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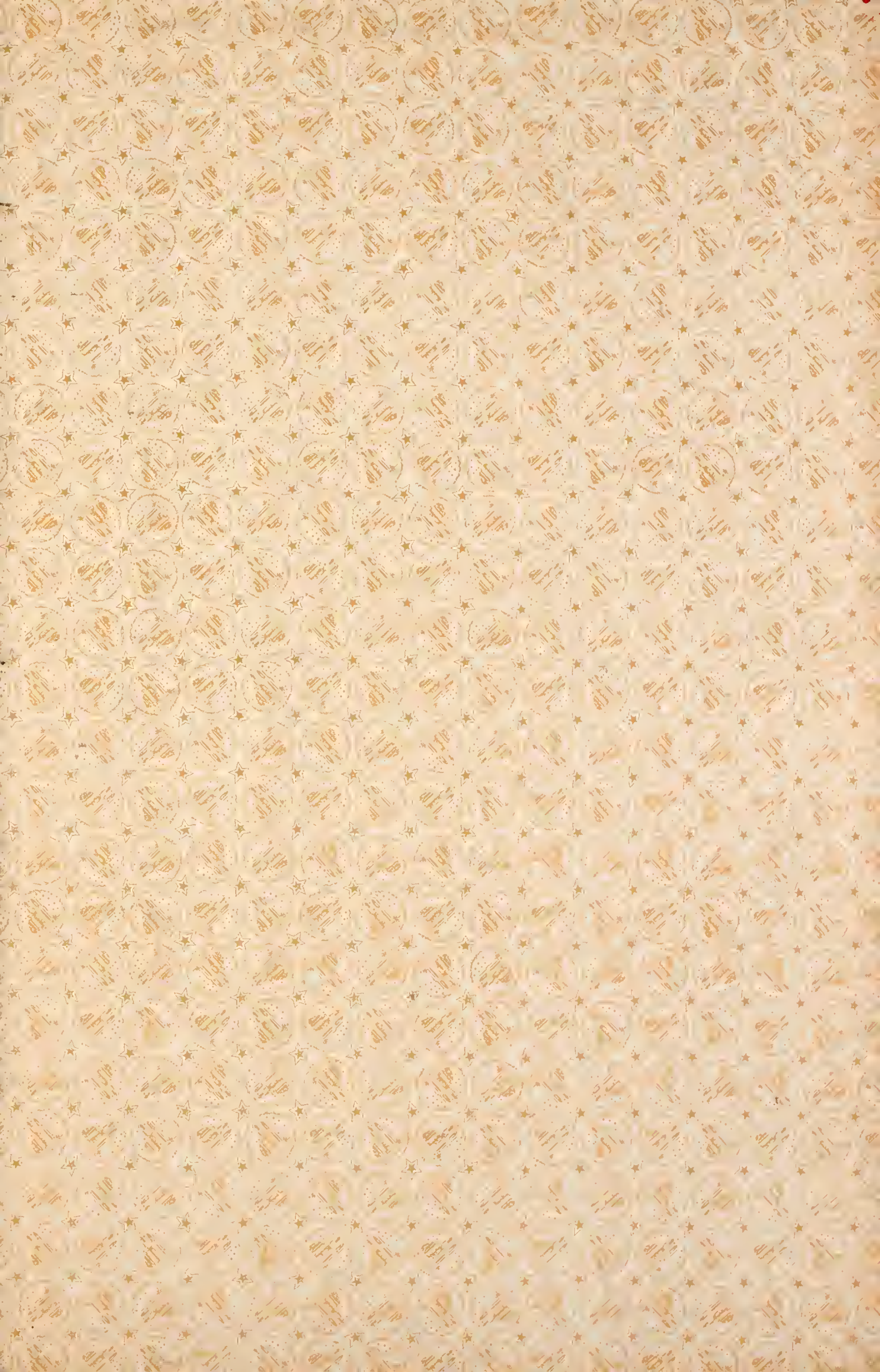

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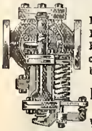

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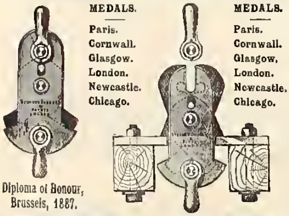

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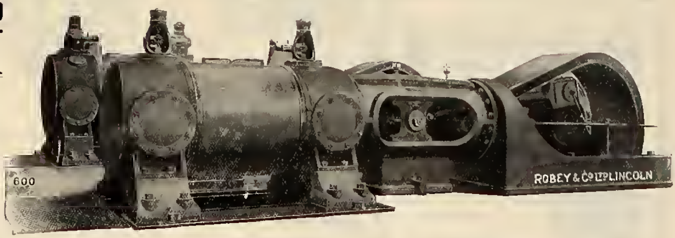

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The Patentee hereby WARNS the trade and the public generally against making, selling, buying, dealing in or using Conveyors made in infringement of the said patent, which it is his intention to support and vindicate by all necessary means including legal proceedings. And further CAUTIONS infringers that they render themselves liable to an injunction or interdict with costs or expenses as well as to damages and delivery up of all infringing apparatus.

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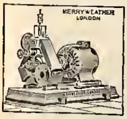

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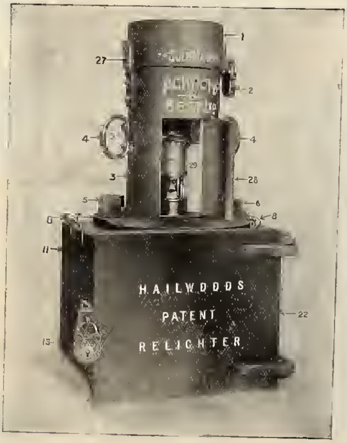

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CARDIFF—Royal Chambers, Park Place.

Agents for Scotland and Cumberland:—
Barnes and Bell, 79, St. George's Place, Glasgow.

THE CONTENTS OF THE

Shipping World Year Book

have been described as "Infinite riches in a little room"; and although the "little room" has been enlarged year by year until it now comprises 1,800 pages, the description still applies. And amongst its "riches" may be found Interesting and Reliable Information bearing on the various Questions raised by

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CLING SURFACE

May be run SLACK WITHOUT SLIPPING and give INCREASED POWER.

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CLING-SURFACE
THE DAYS OF TIGHT BELTS ARE OVER
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Speciality—
TANK LOCOMOTIVES

Locos. of various sizes specially designed for
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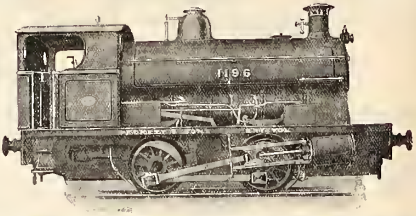

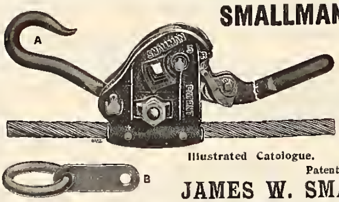

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New Model: Nine Sizes.
Patented 1902, 1906 and 1910.
Automatic Detachment.

The 1911 lever has large lateral stops and a wedge-shaped head.

Drop-forged shells (two sizes), levers (four sizes), catches and couplings.

Clips can be had without catches.

Illustrated Catalogue.

Patentee and Sole Manufacturer:—
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THE "NEW ERA" FIRE EXTINGUISHER

in time of need is like a trusted friend—DEPENDABLE.
Protect your

Pits, Surface Plant and Engine Rooms

with the "NEW ERA." Don't delay. Do it now. To-morrow it may be too late. It is better to have the "NEW ERA" than to wish you had!

Full Descriptive List and Prices will be sent on application to—

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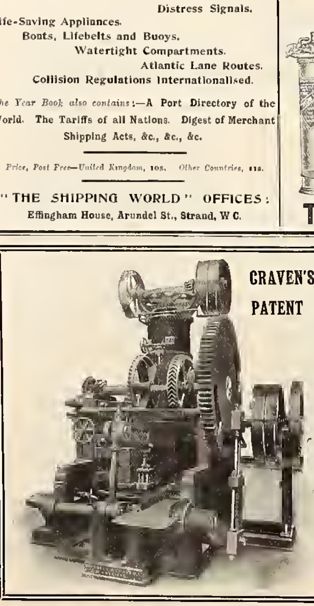

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SPECIALLY DESIGNED FOR PRODUCING LARGE BRIQUETTES FOR MARINE AND INDUSTRIAL USE.

EXERTS HEAVIER PRESSURE and GIVES BETTER RESULTS than any other—either British or Continental.

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Pumps and Pumping MACHINERY

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- HORSE PUMPS.
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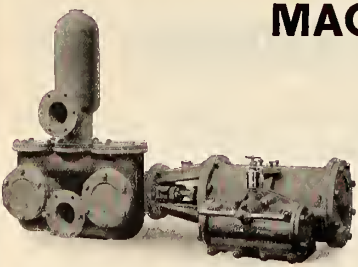

Fig. 600.—"CORNISH" STEAM PUMP for General Purposes.
(300 feet Pattern).

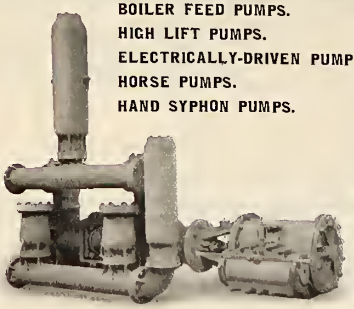

Fig 653.—"CORNISH" DOUBLE-ACTING RAM STEAM PUMP.
(600 feet Pattern).

Telegrams—"Evans, Wolverhampton."
Telephone No. 39 (2 lines).

Write for "Colliery" List.

JOSEPH EVANS & SONS
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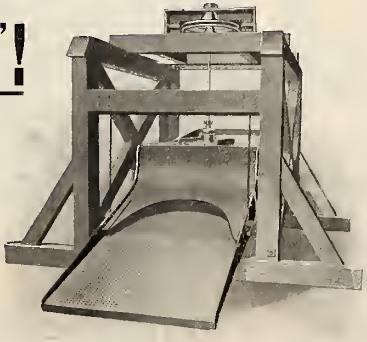
THE RIDDLE!

Which is the Best Screen for Tender Coal?

AND THE ANSWER?

THE "VIBROMOTOR"!

BECAUSE it has the same motion as the hand riddle carried out mechanically.



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THE HARDY PATENT PICK CO. LTD., SHEFFIELD.

THE COAL MINES ACT, 1911.

IMPORTANT TO MINE MANAGERS.

By the provisions of the new Act, which came into force on the 1st July last, it is required that *"a suitable appliance or appliances for the destruction of horses requiring to be destroyed shall be "provided and kept readily available for use."*—(Third Schedule, 6.)

Owing to the objections on humane grounds against the ordinary methods employed for slaughtering horses in mines, either by use of the knife, or by strangulation, and owing also to the use of explosives being practically prohibited in mines, the R.S.P.C.A. is meeting an obvious want by providing a **PAINLESS SLAUGHTERING APPLIANCE FOR WHICH NO EXPLOSIVE IS REQUIRED.** Practical experiments have been carried out most successfully, and orders for the appliance have already been received from Mine Managers and Owners who have recognised its utility.

This new appliance is simple, it is strong, it is cheap, and, requiring no cartridge, entails no current expense.

The Society is prepared to arrange, gratis, for practical demonstrations in the mines under actual prevailing conditions, and further details will be supplied on application to—

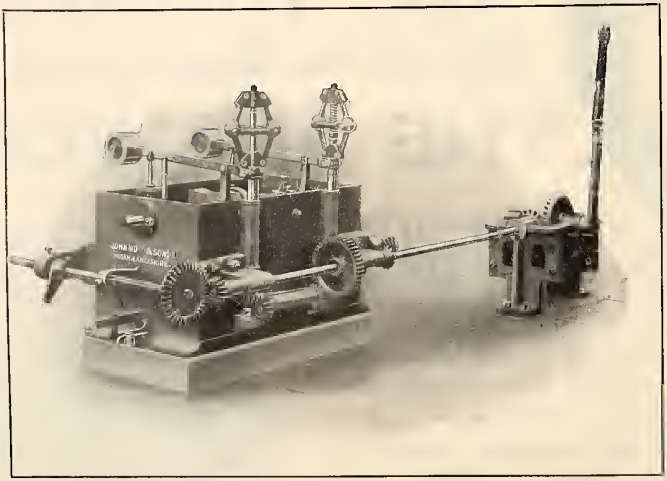
The Secretary, Royal Society for the Prevention of Cruelty to Animals,
105, Jermyn Street, London, S.W.

NO MORE PIT CAGE ACCIDENTS!

Ascending and Descending Cages Safeguarded.

No Interference with Winding.

Starting in the Wrong Direction Prevented.



Safety assured with **'THE VISOR.'**

The most Effective Machine on the Market.

140 at work.

Write for particulars to **JOHN WOOD & SONS Ltd.,**
Telephone: 55 Wigan. **Engineers, WIGAN.** Telegrams: "Haulage, Wigan."

Every British Mine-Owner should adopt the BRITISH (Fleuss-Davis Patent) RESCUE APPARATUS. THE ONLY ALL-BRITISH APPARATUS on the MARKET.

THE "PROTO" SELF-CONTAINED OXYGEN BREATHING APPARATUS.

(Fleuss-Davis Patents).

For Rescue and Recovery Work in Mines.

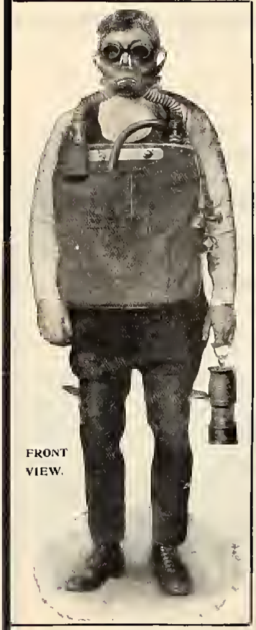
IT HAS SAVED LIVES AND AN IMMENSE AMOUNT OF PROPERTY. IT HAS NEVER COST A LIFE.

Awarded the FIRST GOLD MEDAL (Highest Award), by the Royal Society of Arts, London. 1911.

ITS SIMPLICITY IS REMARKABLE.

ITS EFFICIENCY IS OF THE HIGHEST POSSIBLE STANDARD.

It is the most Comfortable and Flexible, the Lightest and most Compact Apparatus.



FRONT VIEW.

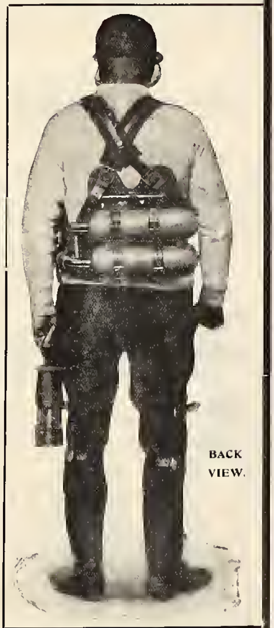
IMPORTANT. We dispense entirely with injectors which, owing to their Microscopic Orifices getting choked, often put the whole apparatus out of action.

Cost of working our apparatus is only half that of any other types.

LESS TRAINING IS NEEDED WITH THIS APPARATUS THAN WITH ANY OTHER TYPE IN EXISTENCE.

Exclusively adopted by the LANCASHIRE AND CHESHIRE COALOWNERS' ASSOCIATION for their RESCUE STATION at HOWE BRIDGE, LANCASHIRE, one of the largest and most important Rescue Stations in the United Kingdom; also by all the principal collieries affiliated thereto. Also by the NORTH STAFFORDSHIRE COALOWNERS' ASSOCIATION for their RESCUE STATION at STOKE-ON-TRENT.

Over 500 Apparatus supplied in this Country alone.



BACK VIEW.

Smoke Helmets, Oxygen Reviving Apparatus, First Aid Boxes, Oxygen Compression Pumps for Charging Purposes, Electric Safety Lamps, &c., &c. Prof. Haldane's New Air Analysis Apparatus for Routine Fire Damp Estimations, and Apparatus for Determination of Oxygen by Flame Test.

Full Particulars and Illustrated Catalogue sent free on Application.

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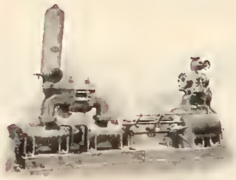
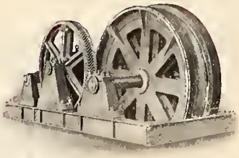
Pumps for all Purposes
(Steam and electrically driven).

Telephones—
1070-1073 Central, Newcastle. 187, City.

Telegrams—
Cyclops, Gateshead.



Direct-acting Mine Pump.
"Woodeson" Patent.



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FOUNDED 1862.

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Machines of our older patterns can be converted at a small cost.

Samples washed and reported on free of cost.

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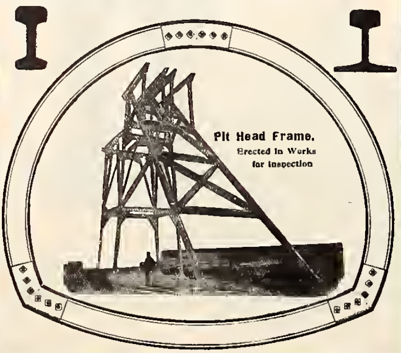
WALTER SCOTT LTD.
Leeds, LEEDS STEEL WORKS. England.

MANUFACTURERS OF
BRITISH STANDARD ROLLED STEEL JOISTS, CHANNELS, TRAMRAILS AND PERMANENT WAY RAILS, &c.



Example of 10in. × 6in. × 42lb. R.S. Joists curved for Framework to Roadway.

ROLLED STEEL JOISTS for PIT PROPS, FRAMEWORK TO ROADWAYS, &c.

STRUCTURAL STEELWORK FOR BUILDINGS, &c.
Mild Steel Blooms, Billets, Slabs, Tinbars, Rounds & Flats.
Rolls cut for Special Sections and to approved quantities.
Books of Sections and other information on application.

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Duisburg, Germany.

Werk BECHEM & KEETMAN, DUISBURG.
Werk BENRATH, BENRATH.
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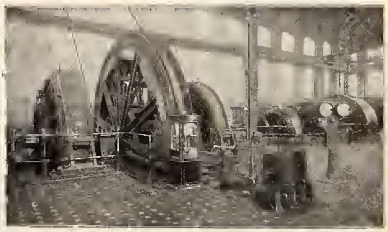

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FOR EFFICIENCY
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Specially
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"SAMSONITE" most used,
"MONOBEL" next.
This is the result of Superior Quality.

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RUST SHORTENS THE LIFE OF IRONWORK
"BITUMASTIC" SOLUTION PROLONGS IT.

And it is to the advantage of every Colliery Company to get the best protective for preserving valuable iron and steel structures from the ravages of rust, at the least possible expense.

"Bitumastic" Solution is inexpensive, supplied ready for use, and can be applied by unskilled labour.

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Also at London, Liverpool, Manchester, Birmingham, Leeds, Hull, &c
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EACH STRAND A RESERVOIR OF LUBRICANT.

That is one of the reasons

PALMETTO
PACKING

lasts so long under steam and compressed air pressures. The graphite grease lubricant given out to the rod by each single strand means lessened friction load on the engine, as well as long life to the packing.

Send for Free Working Samples, and know.

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Queen Anne's Chambers, Tothill Street, Westminster, London.

PLOWRIGHT BROS. LTD.,
Brampton Iron Works, Chesterfield.

Speciality—
COAL SCREENING & CONVEYING.

SECTION OF SCREENING PLANT AT BENTLEY COLLIERY, DONCASTER.

CONSIDERABLY OVER
100 PLANTS NOW AT WORK IN GREAT BRITAIN AND THE COLONIES.

Estimates and Designs on application.
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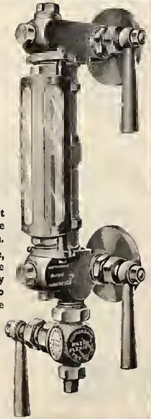
BRUSSELS EXHIBITION: "GRAND PRIX:" ALLAHABAD, 1910.
ROUBAIX EXHIBITION, 1911: "GRAND PRIX."

In accordance with the Factories and Workshops Act, H.M. Inspectors now demand that Water-gauge Glasses shall be suitably protected.

STEAM USERS
regarding their own interests should, therefore, adopt

HOPKINSON'S

Improved
SHIELD OR PROTECTOR
for
Water-gauge Glasses.



Hopkinson's Improved Protectors are not fastened on to the gland nuts, and can therefore be adjusted with the shield in its working position.

The Glasses are of special manufacture, toughened to withstand the blow caused by the bursting of the gauge glass, and are all carefully tested by allowing a wood ball weighing ¾ lb. to drop from a height of 8 ft. on to the centre of the glass, the glass being supported at each end.

Upwards of 500 tons of Standard Steel Castings kept in stock.
We can give immediate delivery of iron and steel Valves.

Write for Catalogue 660 post free on application.

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Makers of Patent Safety Boiler Mountings and Valves
For High Pressure Superheated Steam, High-class Exhaust and Water Sluice Valves for Condensing Plants, &c., Automatic Exhaust Valves, Reducing Valves, Steam Traps, &c., &c.
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No. 199.

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WITH PATENT "DIRECT" RECOVERY OF BY-PRODUCTS
SIMPLE IN DESIGN—MINIMUM STEAM AND POWER REQUIRED
NO NOXIOUS EFFLUENT—PERFECTLY WHITE SALT

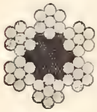
BAUM COAL WASHERS

SIMON-CARVES LD. MANCHESTER

LATCH & BATCHELOR LD.

Wire Drawers, Manufacturers of all classes of Wire Ropes.
Patentees and Manufacturers of
LOCKED COIL AND FLATTENED STRAND WIRE ROPES.
HAY MILLS, near BIRMINGHAM.

Fig. 2. HAULING.



Lang's Lay Ropes.

Fig. 26. WINDING.

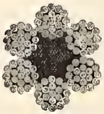
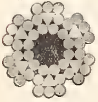


Fig. 1. HAULING.



Patent Flattened Strand Ropes.

Fig. 4. WINDING.

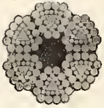
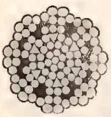


Fig. 13a. SINKING.



Advantages of Patent Flattened Strand Ropes.

1. Greater wearing surface, therefore longer life of rope and less wear upon pulleys.
2. Greater strength, thereby admitting of smaller ropes being used for existing loads, or of increased loads without increase in size of rope.
3. Spliced easily and more effectively.
4. Less tendency to twist and stretch in working.

Fig. 13a for Sinking and Fig. 11b for Cranes, &c., are non-twisting.

Fig 11b CRANE, &c

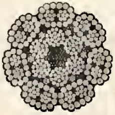
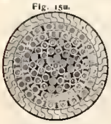


Fig. 15a.



WINDING.

Locked Coil Ropes.

Indispensable for deep shafts.
Stronger than any other rope of same size.
Entirely free from twist.
Smooth surface reduces wear to a minimum.
Duration far ahead of any other construction.

Fig. 20.

GUIDE.

SPENCER & Co. LD.

Engineers,
Melksham,
WILTS.

▼

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A simple, yet scientifically perfect method of killing horses, can be used in confined areas, no experience necessary, adopted by many Collieries, will last a life-time. Complete outfit d/d free 26/6. Descriptive Booklet A. free.

W. W. GREENER, Gunmaker, **BIRMINGHAM.**

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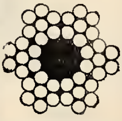
OF ALL KINDS.



Agents for Yorkshire—
YEADON, SON & CO.,
Albion Place, LEEDS.

W. B. BROWN & Co. (BANKHALL) LTD., Globe Works, Liverpool.

THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

Vol. CIV. FRIDAY JULY 5, 1912 No. 2688.

SOUTH STAFFORDSHIRE AND WARWICKSHIRE INSTITUTE OF MINING ENGINEERS.

A meeting of this institute was held at the Council House, Walsall, on June 17.

In the absence of the president (Mr. J. C. Forrest), the Vice-President (Prof. J. Cadman) occupied the chair.

Modern Ventilating Machines.

Mr. Charlton read the following paper on "Modern Ventilating Machines," which was illustrated with lantern slides:—

When the author was asked to contribute a paper on a subject of interest and profit to the members, he found that for some considerable time there had been little or no reference to the subject of mechanical ventilators. Not since the question was so ably treated by the late Mr. M. Walton Brown, in his report on "Mechanical Ventilators,"* has there been any important paper or discussion on the subject. Mr. Brown stated in a very lucid manner the generally accepted theories of Mr. D. Murgue on the action of centrifugal ventilators, and later the subject was lucidly dealt with in a graphic manner by Mr. H. W. G. Halbaum.† The author does not propose traversing that ground again, but, with the aid of information supplied both by makers and colliery companies, to point out briefly some of the chief features of machines now being installed for colliery ventilation.

Changes in Construction of Mechanical Ventilators.

Quite a revolution in construction has been brought about in colliery fans. The directions in which changes have been introduced are chiefly as follow:—

1. There has been a great reduction in the diameter of fans. Many of the old machines were 30 ft. and 40 ft. in diameter, but machines of little more than double that number of inches are now circulating even larger volumes of air than those circulated by the old and larger machines. This reduction in size has reacted in the matter of shafts to carry the fans and in the costs of foundations.

2. The method of driving the fans has undergone striking change. Most of the old machines of the Guibal and Waddle type were driven direct by slow-moving badly-designed horizontal engines. The modern machines are in most cases driven direct, but by vertical high-speed engines designed for the smallest possible steam consumption. Another form of drive is by the direct coupling of electric motors to the fan shaft. Where an alteration has to be made between the revolutions of the motor or engine and the fan shaft, the form of drive found most effective is that by ropes. Whilst travelling recently in the South Wales coalfield, a point with regard to rope drives and the provision of duplicate drives came to the writer's notice. In this case a Sirocco fan had fitted to each end of its shaft a rope pulley. Two motors were provided as alternative drives, and the custom was to run them alternately for a month at a time. Considerable delay and a period of slow running occurred at each turnover from one motor to the other. This was due to the ropes not finding their seatings in their grooves until after a period of running.

Another plant erected by the same engineers had clutches inserted, one on each side between the rope pulley and the fan. When a change is now made, it is not necessary to take the ropes off one pair of pulleys and replace these on the other pair of pulleys, all that is necessary being to take out one clutch and insert the other.

3. The greatest change is seen, however, in the internal construction of modern fans. In the old types the blades extended from the shaft boss to the circumference. In the new types there are no blades in the centre and only very short ones arranged around the circumference. In the old types various shapes of blades were adopted—some straight and inclined backwards, as in the Guibal. In most of the other types the blades were curved backwards so as to be almost tangential with the circumference where they joined it, the general idea in such construction being to provide an easy passage for air through the fan and into the external atmosphere. In modern machines one type of blade—namely, short curved with its concave surface facing the direction of rotation—is adopted, this type of blade forming, so to speak, a scoop.

Messrs. Bumsted and Chandler have slightly compromised between the old and new types. The first part of their blades are scoops, the outer portions being curved backwards, with the avowed object of giving easy delivery, and they claim for this construction a higher mechanical efficiency than is obtained with scoop blades.

Another change is in the number of blades. In the old types eight and ten blades were considered sufficient; in the newer types the number sometimes exceeds 60. The reason given for this change is that in the old types the increasing areas between the blades increase from the centre to the circumference forming dead spaces, giving rise to eddy currents, which considerably hampered the free passage of the air. In the newer types, the large number of short blades cut the air into as many small streams, the passage of which is very short and not subject to the hindrances experienced in the old types.

These points in construction are brought out in a short consideration of three types of modern fans:—In the Sirocco fan, which may be either of the single or the double inlet type, there are 64 blades arranged round the circumference. The end of the shaft of the single-inlet fan carries a cone; in a double inlet there is a central diaphragm dividing the fan into two parts; and on each side of the diaphragm is a cone similar to that on the end of the shaft of the single-inlet fan. The fan delivers into a casing of gradually-increasing capacity, terminating in an *évasée* chimney. The rim of the fan is braced to the centre shaft by a number of tie-rods.

The Chandler fan is in nearly all respects similar in construction to a Sirocco, with the exception that the extremities of the blades, as previously stated, are curved backwards to give easy delivery of the air. The volute chamber into which the air is delivered is larger even than in the case of the Sirocco, terminating again in an *évasée* chimney. In the Barcley fan very similar principles of construction are adopted.

It may be profitable to enquire briefly into the effects of these changes in internal construction on the general efficiency of a ventilating machine. It is generally claimed that a primary effect of the cutting out of blades from the centre of the fan has the effect of reducing internal resistance.

To bring out this point a re-statement of the action of a centrifugal fan may be allowed. A fan acts by bringing about a depression or reduction in pressure at its centre. This depression is expressed by the formula—$H = \frac{U^2}{g}$, in which H = the depression, expressed in feet of air-column; U = the periphery speed of the fan, in feet per second; g = the usual gravitation unit of 32. This depression may be expressed in the more familiar form of inches of water gauge, as follows:—$W G = \frac{12 U^2 d}{G D}$, in which $\frac{d}{D} = \frac{\text{density of air}}{\text{density of water}} = \frac{1{\cdot}2}{1{,}000}$. This statement is for a perfect fan-running under ideal conditions. As no such ideal fan and conditions exist, the formula has to be modified by the introduction of a coefficient K, which may vary in value for each individual fan. $\therefore W G = K \frac{12 U^2 d}{g D}$.

It will, however, be much more convenient to express the effect produced by a fan as H, with the understanding that it may be expressed either in feet of air column or in inches of water-gauge.

The depression initially set up by a fan is used up in overcoming the resistance of the mine, indicated by h, and the internal resistance of the fan itself, the value of which is shown by h_o; therefore $H = h + h_o$. The evident object of fan-makers must be to keep down h_o—that is, the internal resistance of the fan; or, to adopt Mr. Murgue's simile, to enlarge the "orifice of passage of the fan."

The manometric effect of a fan is expressed as $\frac{h}{H}$ and it will be evident that the nearer h approximates to H, the higher will be the manometric effect, and the greater the proportion of the energy of the fan used up usefully in effective ventilation. Any modification in construction that realises this must be welcomed as an improvement.

Again, in the old types of fan the size of the inlet was only a half to a third of the diameter of the fan, whereas in the modern makes the size of the inlet is equal, or nearly so, to the external diameter, the whole effect being to give a free unimpeded entry of air into the centre of the fan.

If the cutting away of external blades and the enlargement of the inlet be advantageous, how unscientific must be that idea incorporated into some recently made Capell fans, where the edges of the interior blades are turned up, with the idea of making the blade into a scoop and increasing the depression, but with the practical result of seriously throttling the inlet to the fan.

A comparison of the shape of blades in old and new types is interesting. In the former, as previously mentioned, two general types of blades are used, namely:—(1) Straight, but inclined backwards as in the Guibal; and (2) blades curving backwards from the direction of rotation.

In the new fans the scoop blade is adopted, with the exception (as before noted) that in the Chandler fan the extremities of the blades are curved backwards from the direction of rotation. The claim of the makers is that this form of blade has a more positive effect in bringing about depression or water-gauge.

An experience of the writer in South Wales somewhat confirms this view. In a certain dusty mine, ventilated by a Sirocco fan, it was found after a short period of running there was a sensible drop in the water-gauge. As the speed of the fan had been maintained, this was difficult to account for, until the fan was stopped and examined. It was then found that the cavities of the fan blades had become filled up with dust, making the blades straight instead of curved. The remedy has been found in the provision of a duplicate fan, and a modification in the casing by which one fan, after a period of running, can be taken out and replaced by the other whilst the blades of the former are cleaned from the adhering dust.

It will be noted that in the three examples of modern fans which have been mentioned, very similar designs of discharge chamber and chimney are adopted. These are not, however, new ideas. The volute discharge chamber was adopted in the old Schiele fan, and the *évasée* chimney was first introduced by Guibal.

Summing up the modifications in construction in modern fans as compared with the old ones, the writer recently in conversation was asked by a fan-maker: "What part of a fan is taken into consideration in calculations as to its effect?" The writer replied: "The velocity of the blade tips." Then said the fan-maker: "Why not make it all tips?" That appears to be an outstanding idea in the construction of modern fans—they are nearly "all tips."

In Mr. M. Walton Brown's report on mechanical ventilators, the manometric efficiency for the Guibal fan was a little over 0·6, for the Schiele fan it ranged between 0·47 and 0·55, and for the Waddle fan it ranged between 0·44 and 0·49.

The figures contained in the accompanying table have been supplied by Messrs. Davidson and Co., the makers of the Sirocco fan. The columns for initial depression and manometric effect have been added by the writer. The five cases given are for double-inlet fans.

Summary of Tests on Sirocco Double-inlet Fans.

No. of test	1	2	3	4	5
Diameter in inches	77	98	140	161	161
Revolutions, per minute	284	184	183	167	203
Volume of air, in cubic feet per minute	120,600	220 000	340,030	493,850	598,000
Calculated initial depression (water-gauge) ...In.	4·56	3·09	5·62	6·88	10 32
Observed water-gauge in fan-drift ...In.	4 03	2·75	6·01	6·16	9 07
Manometric efficiency	0 88	0·86	1 06	0·88	0·88
Horse-power in air	766	—	299	475	840
Brake horse-power on fan-shaft	100·0	—	390·0	553·0	1,000·0
Fan efficiency ... Per cent.	76·0	—	76 6	86 0	84 0

Seeing the remarkably concordant results of tests Nos. 1, 2, 4 and 5, it is suggested that there is some error or circumstance not known to the writer to account for case 3.

If the figures supplied by Messrs. Davidson and Co. are correct, the Sirocco fan gives a manometric effect of 0 6 to 0·9, so that on comparison the modern makes use up a comparatively small amount of their own energy in overcoming internal resistance.

The foregoing figures are submitted with reservation, as the methods adopted in making the observations are not

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* *Trans.* Inst. M. E., 1899, vol. xvii., page 482.

† *Ibid.*, 1900, vol. xx., page 404.

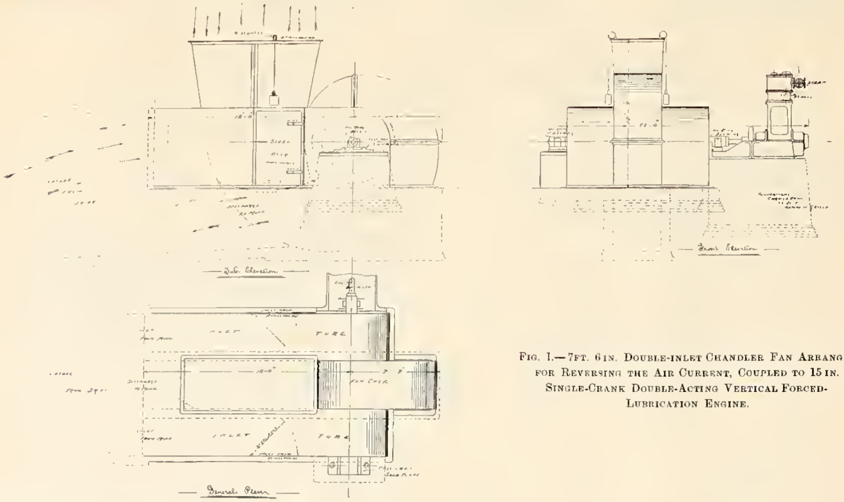


FIG. 1.—7FT. 6 IN. DOUBLE-INLET CHANDLER FAN ARRANGED FOR REVERSING THE AIR CURRENT, COUPLED TO 15 IN. SINGLE-CRANK DOUBLE-ACTING VERTICAL FORCED-LUBRICATION ENGINE.

given. At the same time, the writer suggests that they are sufficiently remarkable to induce those firms who may have installed modern fans of the type described in this paper to have tests made that may confirm or modify the results put forward by Messrs. Davidson and Co.

Reversal of the Air-current.

One of the clauses of the new Coal Mines Act of 1911 requires that where a mechanical contrivance is used for ventilation, provision shall be made to reverse the ventilation. There is no doubt that the recent cases of underground fires in the neighbourhood of downcast-shaft bottoms and in intakes, and the consequent contamination of the whole air-circuit by smoke and foul gases, thus cutting off access to the mine, are responsible for this new departure; and at most mines where the rule applies, plans are being considered for the carrying out of the provision. Several fan-makers have been good enough to submit their proposals to the writer, and a selection has been made by him. The plans generally follow one or other of two broad principles, namely:—

1. The fan to be so arranged that it can either exhaust from or blow into what is normally the upcast shaft.

2. The drifts to be so arranged that the fan may exhaust either from the upcast shaft or from the downcast shaft, and in the latter case the top of the upcast (normal) to be opened to the atmosphere, whilst a covering will be arranged for the downcast (normal) to cut off the connection with the external atmosphere.

A modification of the second plan has been adopted. A stand-by fan is connected to the downcast pit, and in case a reversal is required, all that will be necessary will be to stop the fan exhausting from the upcast shaft, open the fan drift doors, start the stand-by fan, and cover the downcast pit top.

Methods of Reversing.

In one plan proposed by Messrs. Bumsted and Chandler (fig. 1), the *évasée* chimney is placed somewhat different from the usual plan, being erected on the fan drift side of the fan; whereas, usually it is on the opposite side. The lower portion of the chimney case is hinged in such a way that by drawing it up, the outlet is closed and a fresh opening made into the fan drift, through which fresh air is blown into the upcast (normal) pit. This hinged door is counterbalanced by weights hanging outside the fan casing, in order to facilitate its manipulation. At the same time, by opening two iron doors, situated on the outside of each of the fan inlets respectively, the fan centre is put into communication with the external atmosphere.

In the plans suggested by Messrs. Davidson and Co., the proprietors of the Sirocco design (fig. 2), the V partition that divides the fan race into two portions and conducts the air in two streams, one to each inlet of the fan, consists of two doors, which when opened would cut off the access of air from the upcast into the fan inlets, and make a fresh opening from a duct over the top of the fan casing, by which air can be blown into the upcast pit. This duct enters the fan chimney, and when reversal is required, a shutter, which normally closes the mouth of the duct, is raised and simultaneously closes the outlet and opens the duct. The two inlet chambers to the fan centre are

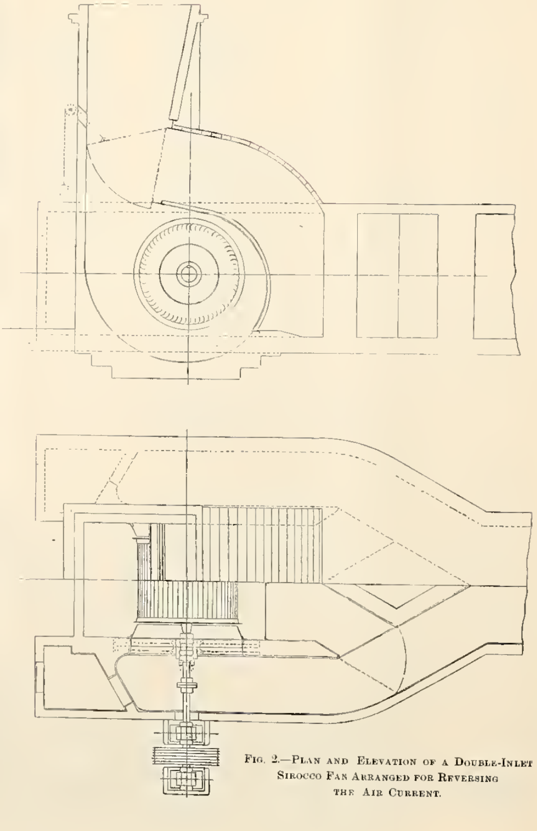


FIG. 2.—PLAN AND ELEVATION OF A DOUBLE-INLET SIROCCO FAN ARRANGED FOR REVERSING THE AIR CURRENT.

extended some little distance on each side of the fan, and each contains two doors. The opening of these put the fan centre into communication with the external atmosphere.

In the arrangement adopted with the Barclay double-inlet fan (fig. 3), as in the Chandler arrangement, a portion of the bottom of the fan chimney is so hinged as to open outwards into the fan drift. A second shutter is required to close the chimney. Again, two doors form the V dividing the fan race. By the manipulation of these, communication from the upcast to the fan inlets can be cut off, and an opening provided for air from the new delivery orifice of the fan to the upcast shaft.

apparatus, it may be sufficient to reverse the direction of the air-current, and so prevent the workings from becoming fouled and inaccessible; for unless special arrangements are made underground to prevent it, the ventilation will be short-circuited to the shortest cut from shaft to shaft.

The point as to whether it is worth while to make provision to prevent this from occurring may be a good subject for debate. In case it is considered desirable, not only to reverse the direction of the air-current between shaft and shaft, but also to establish a fairly considerable ventilation of roads beyond, necessitating a fairly considerable volume of air, then the method of exhausting from the

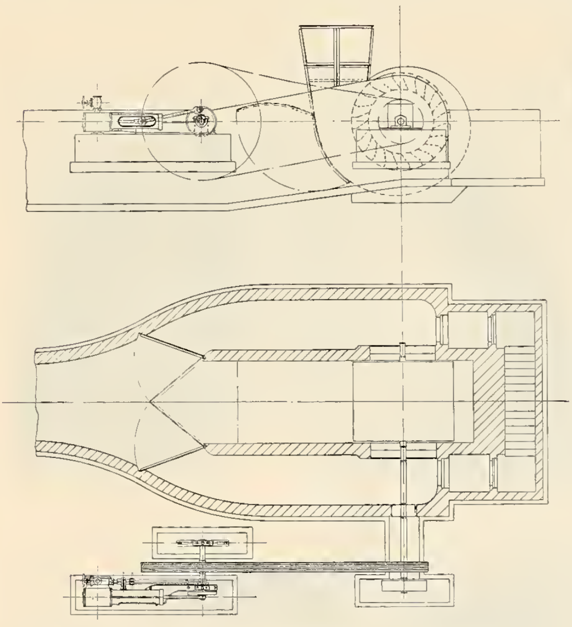


Fig. 3.—Plan and Elevation of Double-Inlet Barclay Fan Arranged for Reversing the Air Current.

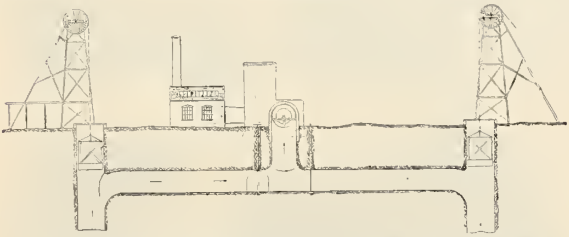


Fig. 4.—Arrangement of Sirocco Double-Inlet Fan for Reversing the Air Current.

[Note.—This drawing does not show the identical arrangement described by the author, but is a typical arrangement designed by Messrs. Davidson and Co. Limited, the makers of the Sirocco fan.]

An arrangement has also been suggested by Messrs. Davidson and Co. in a specific case to enable the fan to exhaust either from the upcast or the downcast shaft. (*See* fig. 4).

Conclusions.

It is not the intention of the writer to canvass the relative merits or demerits of these plans. No doubt with experience they may be modified or improved upon. There may arise, however, some discussion as to which method in principle will be the more efficient—that is, the plan of blowing into the upcast as compared with the plan of exhausting from the downcast shaft. In the writer's opinion, the term "efficiency" in this connection has quite a different significance from that commonly attached to the word when used in association with mine ventilation. In the contingency contemplated by the provision of this downcast shaft seems the one most likely to set up the greater volume of air. The conditions of working of the fan remain as before, the only difference being that it exhausts from one shaft instead of the other, and against natural ventilation. Even in that case the same volume of air could not be expected under reversal conditions as under normal conditions. To the writer, however, it appeals as a debatable point alone, and not as a practical proposition.

Discussion.

The Chairman, in opening the discussion, said the author was indeed a brave man to introduce that subject at that particular time, because people were looking up the question of mine ventilation, and as they were all fairly *au fait* with some of the points raised by Mr Charlton, they ought to have a very interesting discussion on that particular problem, and he hoped there would be a frank expression of opinion.

Mr. H. C. Peake said that he was unable to agree with some of the points that had been raised, but he scarcely felt competent to say much on the subject, because he had not had an opportunity of reading the paper. Personally he was not very great on fans, because he believed that fans were designed by people who wanted to keep their air-currents high in the mine. But many of the difficulties they had heard of recently in the way of coaldust were now passing away. From Mr. Charlton's point of view the paper was an admirable one, and it seemed clear that if they were to have fans they must have them so arranged that the current could be reversed. At the same time, he was not personally altogether a convert to fans. It might be they were necessary in some cases, but he believed that if not altogether death traps, on the whole their mines were very much better without them.

Mr. Noel Chandler said there were some points that he should have liked to have considered rather more fully. There was a statement in the paper that the Chandler fan was "in nearly all respects similar in construction to the Sirocco, with the exception that the extremities of the blades are curved backwards to give easy delivery to the air." He (Mr. Chandler) had carried out a large number of experiments with various shapes of blades, and about 20 years ago he put down a fan at the Coseall Colliery, Derbyshire. He believed that that was long before the Sirocco fan was thought of, and from that fan they got a mechanical efficiency of 82 per cent. With regard to the figures given embodying the summary of tests on the Sirocco double-inlet fans, he thought they must take those figures with a grain of salt. At the same time, he pointed out some errors in the table [which were subsequently explained to be typographical mistakes]. A little later in the paper, Mr. Charlton had dealt with the question of the tips of the blades, in which, referring to some recently-made Capell fans, in which the edges of the interior blades were turned up, he said that was "with the idea of making the blade into a scoop and increasing the depression, but with the practical result of seriously throttling the inlet to the fan." For many years past his firm, Messrs. Bumsted and Chandler Limited, had been making these blades to scoop up the air from the inlet and deliver it to the tip of the blade with the blade slightly reclining backwards from the radial line, and they had carried out a large number of experiments with the view of finding out the best way to secure higher water-gauges without any loss of mechanical efficiency. His firm had always followed the plan of scooping up the air, but had never attempted to draw air in by using extra blades of the propeller type. The slight dip was with the object of delivering the air smoothly into the casing of the fan, and they found that by scooping up the air in the way they had adopted they gained in efficiency, but there was a loss of efficiency if the tip of the blade was advanced. That was why they had for so many years retained their present system. The speaker, replying to a question as to whether, in speaking of higher water-gauge and lower mechanical efficiency, he referred to those conditions at the point of entry or delivery, said he was speaking of the outer tip of the blade on the main outer chamber. They got a higher efficiency by turning them backward, and the mechanical efficiency was higher because they got less difference between the horse power in the air and the brake horse-power of the engine or motor. The author had referred to a certain Sirocco fan in South Wales getting quickly choked up with dust, the effect of which was to make the blade straight or radial instead of curved. That seemed to prove that the air did not easily follow the curve of the blade. It rather wanted to be more of a sweep, like a centrifugal pump blade.

Mr. S. L. Thacker said previous writers had remarked on the analogy between a fan and an electrical machine. Both of them produced an initial difference of pressure, in the one case a difference of air pressure measured in feet of air column and in the other a difference of electrical potential measured in volts. They both produced a volume—one of air, the other of current—and they were both subject to losses, the amount of which increased with the internal resistance and the volume of air or current passed. That very point of internal resistance was the important point upon which the paper concentrated attention. It seemed to him (the speaker) that recent practice in fan design was in the right direction. The difference of pressure or depression produced by a fan depended upon the centrifugal force in the air set up by the circumferential speed of the fan, and the object of the designer was to set in motion an annulus of air at the fan periphery at the required speed. Provided he could do this by a good mechanical device, it mattered little what became of the blades between the annulus and the fan centre. It would seem that the more they covered up the fan inlet with blades, the more they added to the resistance met with by the air in passing through the fan, and on those grounds he thought the success of the fan with short blades was clearly explained, because it seemed that multiplying the number of blades gave the necessary velocity to the narrow annulus of air at the fan circumference, and their short length reduced its internal resistance. Reference had been made to the report of the North of England Institute Fan Ventilation Committee, edited by the late Mr. M. Walton Brown. He (Mr. Thacker) thought that the time was now ripe for a further report on mechanical ventilation. A vast amount of valuable information and data was brought forward by that investigation, but in his judgment it went somewhat on wrong lines, because it was limited to tests of fans of different types on the same mine. He did not think that limitation should have obtained, and further the method adopted involved the calculation of the equivalent orifices of the mines from data obtained by the tests of the fans themselves. It seemed to him that before satisfactory results could be obtained it was necessary to standardise the resistance. Every engineer knew that before it was possible to carry out experiments upon any mechanical appliance, the first necessity was to standardise the methods of measurement and the appliances that were used. He suggested that before further tests of mine fans were carried out, a committee of the Institution of Mining Engineers or of the Institution of Civil Engineers, or of both acting jointly, should standardise artificial equivalent orifices for different sizes of fans, and then carry out comparative tests upon such recognised standards. They would then have reliable data, reliable methods of testing, and truly comparative results. It was clear that satisfactory comparative tests of fan efficiencies could not be obtained with varying volumes of air, varying water-gauges and under varying mine conditions. Referring to the question of the reversal of the air current, it was very debatable as to what was the best method of reversal. In the case of many existing mines the second method mentioned would be impracticable, as it was not always possible to connect the fan by drifts with either shaft. But he thought it was the method which would have the greater practical utility and would be adopted in the case of new mines, because one of the principal dangers which a reversal was designed to meet was the case of a fire at the bottom of the downcast shaft or in the main intake, and he was doubtful whether a fan blowing down the upcast would be as efficacious in preventing the fumes reaching the workings as a fan exhausting from the downcast.

Mr. L. **Holland** said it was all very well to bring forward various theoretical qualifications for a fan, but they were very well aware what the practical qualifications were. In the Sirocco fan they aimed at a very high water-gauge, but the case was different with the Chandler fan. In the latter machine air was easily admitted, but there was a lot of strain on the blade tips. From what he had seen of the Sirocco fan and the Chandler fan, he did not think there was any comparison in the life of the two machines, and that was a very important point for the colliery manager to consider. An important point dealt with by Mr. Charlton was the reversal of the air. The power to reverse the air was a very useful thing to have in a mine, but it was a very difficult position for anyone to be in to have to decide whether or not the air should be reversed, and he sincerely hoped that he would never find himself compelled to decide such a matter. If there were men working down the pit endeavouring to extinguish fires and the air was reversed, there was a very great risk of losing those men's lives, and if they had got a fan furnished with the means of reversal, and in the case of a fire in the pit the air was not reversed and there was a loss of life, then in that case they would be sure to be blamed by the Government. It was, indeed, a very knotty point to decide what they were to do. Another point dealt with was the form of drive, and Mr. Charlton said the most effective form he had found was that of ropes, but he would like to ask whether he did not think direct drive would be better, because in that case they would get no loss at all. With a high-speed engine coupled up to high-speed fans, he thought they got very much better results than with a rope or a belt. If ropes were used they might have too many, and then they got extra friction, and if they had too few some of them were liable to slip, and they would lose efficiency. Ropes might be all very well while they were new, but he had often seen them either sagging or tight, and in neither case was the result satisfactory. He had very much pleasure in supporting the resolution of thanks to Mr. Charlton, who had done a tremendous lot of work, and gone carefully and closely into the figures.

Mr. J. W. **McTrusty** said a rather interesting point arose out of the question under discussion. To express the theoretical depression, Mr. Charlton had used the formula $\frac{U^2}{G}$. It was of interest to note that in Murgue's complete expression denoting the depression produced by the fan, there was a second term involving the cosine of the angle which the blades make with the periphery. In order to get rid of this term, he considered this angle to be 90 degs., making the cosine factor zero and leaving the expression as used by Mr. Charlton. It would be noted that when the blade curved forward the angle was greater than 90 degs., thereby making the cosine negative. Hence the double negative had the effect of making H greater than $\frac{U^2}{G}$. From figures which had been mentioned in connection with the Sirocco fan, it would appear that in this case the theoretical depression should be something like 1·5 to 1·8 times $\frac{U^2}{G}$. Consequently, the table of manometric efficiencies given by Mr. Charlton should throughout be multiplied by about two-thirds. It would appear that the term "manometric efficiency" required a better definition, as one factor (h) used by Mr. Charlton referred to the mine resistance and the other (H) referred to an arbitrary theoretical depression. Hence it was difficult to see how the expression used could have reference to the efficiency *of the fan*. It was clear that to estimate efficiency they must have both quantity and pressure. With regard to the reversal of the air, the only point he wished to refer to was the principle involved by reversal either by blowing or exhaustion. In his opinion, reversal should be done by blowing and not by exhaustion, inasmuch as by the former method pressure was increased throughout the pit, making it certain that bodies of gas could not be moved from one side of the pit to the other on reversal.

Mr. F. B. **Clark** said that with regard to manometric efficiency he tested two fans in the North of England

THE X-RAY EXAMINATION OF COAL.

(*See* page 15.)

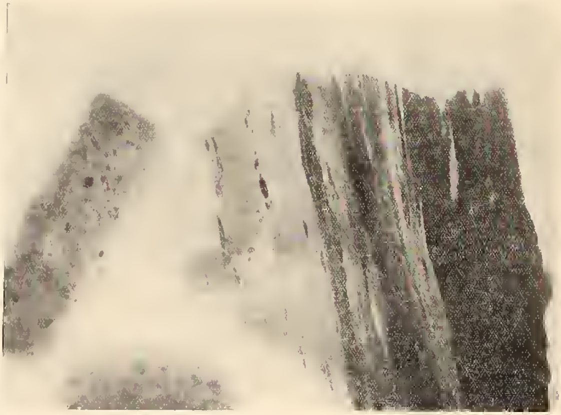


Fig. 10.—Cylindrical Briquette, termed "Charbon de Paris."

Fig. 11.—Ovoid "Boulet" (35 mm. thick.)

Fig. 1.—Bituminous Coal with Rock Intercalations.

Fig. 4.—Hard Coal.

Fig. 2.—Welsh Anthracite.

Fig. 9.—Coal Crushed in Fold.

Fig. 3.—Welsh Anthracite. (30 to 35 mm. thick).

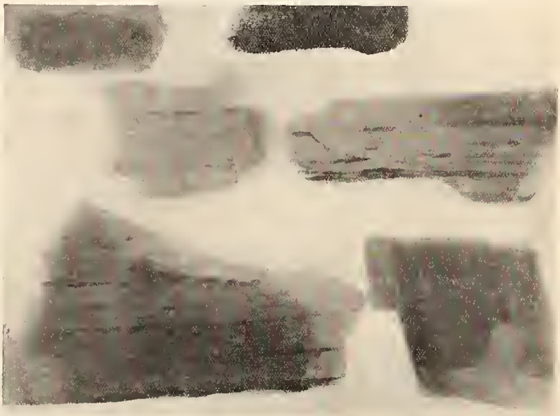


Fig. 6.—Belgian Anthracitic Coal (50 mm. thick).

recently and obtained a manometric efficiency of over 100 in both cases. He thought that rather strange, and when be discussed this to those on the spot they gave the same answer as the gentleman who had just spoken. He thought the point was not quite cleared up even now. With regard to the method of driving the fan, if a modern fan was coupled to the engine the engine must be more or less of the high-speed type and generally vertical. There were many who claimed that the horizontal slow-speed engine was less likely to break down than a high-speed engine, and therefore a slow speed engine drawing the fan by a rope pulley was better than the direct-coupled method. But nowadays high-speed engines were in construction almost, if not quite, as reliable as slow-speed engines, so that having regard to the power lost in rope transmission and the extra space required, there appeared very little to choose as between the two methods. But, if anything, the direct-coupled method seemed the most suitable. The uneven torque obtained from the direct coupling seemed by some people to be more liable to damage the fan, but such an idea seemed more theoretical than practical. With regard to the electric driving, the torque of an electric motor was so even that unless speed reduction was required there was obviously no economy in using rope-pulley drive, since power must be lost in transmission by such practice. A direct-current motor could have its speed economically regulated. In other words, if the fan was only required to do half the work and it was driven by a direct-current motor, then the speed of the direct-current motor could be regulated without using up all the superfluous power in resistance. A D.C. motor in fact took current from the mains in proportion to the work it gave out. But an ordinary A.C. motor used the full supply of current no matter what work was required of the fan, all superfluous power being dissipated in resistances. Bearing this in mind, and having regard to the large number of collieries that only generate A.C. for power purposes, it did not seem economical to put an A.C. motor to drive the fan when a new colliery was being opened out, seeing that it might be three or four years before the full output of the fan would be required. Indeed, if the boiler gallery was situated close to the fan there was no economy in drawing the fan electrically, the only gain being an improvement of the load factor of the electrical plant, the importance of which was often exaggerated by electrical engineers. When the fan was some distance from the boiler gallery then electricity was certainly to be recommended. It might be of interest to members that an arrangement had been recently introduced by Brown, Boveri and Co. Limited which enabled an A.C. motor to obtain economical speed variation. This was done by the introduction of a commutator motor which was connected in cascade with an induction motor and which took in electrical energy from the slip rings of the latter and transformed it into mechanical energy, so that the power required for regulating the speed was retained. But the arrangement was somewhat costly and complicated, and as far as he was aware there was no colliery in England employing the method at present, although there were a few on the Continent.

Mr. V. A. WILKES remarked that, with regard to the reversal of the air current, it would be within Mr. Charlton's recollection that some years ago he (Mr. Wilkes) submitted a scheme for altering that apparatus, and Mr. Charlton thought rather favourably of it. Then he passed the scheme on to their respected friend Mr. Johnstone, who did not give a very good opinion of it. But a somewhat similar arrangement had been adopted in Scotland, and it had been an unqualified success. As regarded the reversal of the air by means of a second draught without any alteration of the fan at all, that was far and away the better. That was an idea he was just adopting at his colliery; but he had provided a second draught by means of a swinging door. By that means the ventilation could be reversed in a few minutes with practically no trouble at all. He thought the second proposal in the paper was considerably in advance of any alteration in the fan or fan mechanism.

The **CHAIRMAN** said he would like to say a word or two in connection with only one point reached in the paper, although there were a number of points which all touched vitally upon fan construction. With regard to the reference made to reversal either by blowing or exhaustion, one often picked up a paper and read something suggesting that there was a vital difference between blowing and exhausting. He ventured to think that if any person would make a small calculation he would see at once that whether a fan be put to blow or exhaust the efficiency need not be in any way affected. Mr. Charlton had put that forward in his conclusions, suggesting that discussion should take place upon the subject. Personally, he was unable to see that any discussion could possibly enlighten them on the subject. Anybody could calculate quite easily so as to show that whether blowing or exhausting the efficiency would be exactly the same. But whether a particular fan could satisfactorily be blowing or exhausting was entirely another question. The reversal of fans, or to speak more correctly, the introduction of fans which permitted of the reversal of air, was a very interesting and important subject at the present moment. He did not think it was quite clear what was actually meant by the section of the Act—whether it meant that it should be possible to reverse the whole of the air current throughout the mine, or whether they had only to reverse the air in the shaft or the air in the main air current, that was rather an open question. The intention, however, was perfectly clear, and that was that they should have an equipment capable of producing a reversal within such limits as might be required.

Mr. CHARLTON, acknowledging the vote, said he was extremely obliged to the meeting for the appreciation shown. Certain points might be answered at once, though he should prefer time and leisure to consider some others. He quite appreciated the remark made by Mr. Thacker—and indeed that idea was present in his own mind throughout the preparation of the paper—that a further enquiry was very much called for. When they considered that the report of the North of England Institute dealing with mechanical ventilation was issued in 1899 and that the tests were made a considerable number of years before, and that the enquiry was very limited in its scope, there seemed abundance of room for a complete enquiry into the subject of mechanical ventilation. A point had been raised by Mr. Holland as to whether it was better to have direct drive rather than rope drive. The point made in his paper was that if a difference or change was made in the form of fan, then some form of gear was necessary. As far as his own observation was concerned, he was bound to say that rope drive seemed to have been most satisfactory. Some other points had been raised by Mr. McTrusty. One of those points was not at all new and occasioned himself some doubt at times. Fans might be constructed showing a higher manometric efficiency than 100, and he had heard of one case in which the figure was 108. He had not the temerity and boldness necessary to venture upon that point, and the question of Murgue's investigations of the construction of blades might very profitably be revived and discussed. With regard to the point raised as to what exactly was meant by reversal in the Mines Act, he had hoped that he had laid a bait which would have drawn some opinions, and he had deliberately dealt with the subject with that object; he somewhat regretted that nobody had come forward before. It was clear the Act required a simple reversal of the air, a reversal of direction between shaft and shaft. The chairman had interpreted that as meaning that reversal should be established as far as would reasonably be required. That appeared to cover the whole case, but at the same time did not carry them much further in the interpretation of the Act.

On the proposition of the **CHAIRMAN**, it was decided to continue the discussion at the next meeting.

THE X-RAY EXAMINATION OF COAL.

In view of the interest created by the paper read recently by F. C. Garrett and R. C. Burton before the North of England Institute of Mining and Mechanical Engineers on "The Use of X-rays in the Examination of Coal" (*Colliery Guardian*, June 14, 1912, p. 1187), attention may be directed to a communication on the subject to the Société de l'Industrie Minérale by M. Henri Couriot, professor of mine working at the Central School of Arts and Manufactures, Paris. A translation of the paper appears in the *Colliery Guardian* of May 26, 1899 (p. 961), to which issue we must refer our readers for the description of the method and apparatus employed. The radiographs, however, which have kindly been supplied to us by M. Couriot, were not reproduced at the time, and the descriptive matter relating to them is repeated.

The author maintained that X-rays "afford fresh means for ascertaining the greater or less degree of purity in mineral fuels." In carrying out his examinations a Rhumkorff coil was employed, with an independent interrupter, the specimens being interposed between the vacuum tube and a fluorescent screen. Fragments were chosen having a nearly constant thickness of 2 cm. ($\frac{4}{5}$ in.), or one just double.

FIG. 7.—PEAT FROM LA SOMME (35 to 45 mm. thick).

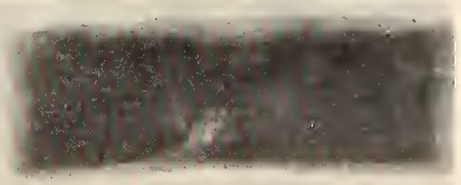


FIG. 8.—BROWN COAL FROM BRÜHL, NEAR COLOGNE (20 to 25 mm. thick).

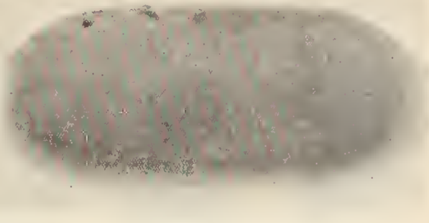


FIG. 15.—BROWN COAL BRIQUETTE FROM BRÜHL, NEAR COLOGNE (30 mm. thick).

Turning to the radiographs, it is observed that the impurities alone influence the shade presented by the specimen under consideration. The graduation of shade is very apparent in the radiograph of a piece of bituminous coal, with rock intercalations (fig. 1). Seen by reflection, the same specimen shows tolerably fine rock intercalations, though at the same time only the thickest are visible; and as to the fragments of schist disseminated through the upper portion of the specimen, which specimen is considerably purer than the lower, they are absolutely invisible on the surface of the fragment. The variations in shade to be observed in one and the same stratum indicate the gradual transition of the pure coal into schist, showing that Nature proceeds in the same manner on a small as on a large scale in the schistification of coalseams.

The above radiograph may be compared with others of the series, notably those showing the structure of pure Welsh anthracite (figs. 2 and 3); Belgian and French hard coals (figs. 4, 5, and 6), sold as anthracite; peat from the department of La Somme (France), (fig. 7); and a fibrous lignite from Brühl, near Cologne (fig. 8). The comparison makes it evident that the content of volatile matter does not influence the shade, but that the latter is only affected by the proportion of mineral matters; the cloudy appearance of the peat radiograph proves that it is largely impregnated with earth.

Fig. 9 is of much interest, as it shows a coal that has been subjected to grinding action in the sharp fold of a seam, the schistose layers having been, as it were, pulverised in the geological movements—a circumstance which has permitted the X-rays to pass through the rocky intercalations and impressionise the sensitive plate.

The radiographs of a perforated briquette and of ovoid *boulets* (figs. 10 to 14) show the impurities irregularly distributed in these two varieties of patent fuel, the black spots corresponding with pieces of shale that have escaped the action of grinding. Thus in fig 14 is to be seen a fragment nearly 1 in. in length. The radiograph of a lignite briquette (fig. 15) shows that this fuel is pure, the spots being very small, and lost in a rather dark and uniform shade, which contrasts with the light shade of natural lignite (fig. 8).

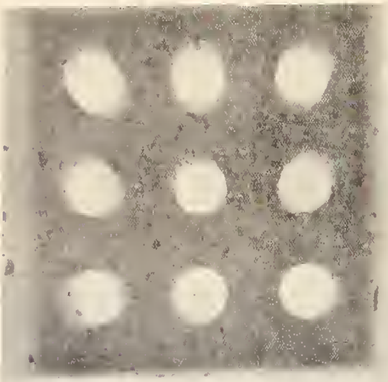
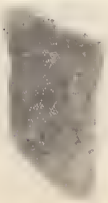


Fig. 12.—Perforated Coal Briquette.

Fig. 13.—Ovoid "Boulet."

Figs. 13 and 14.—Ovoid "Boulets" (30 to 40 mm. thick).

Fig. 17.—Gas Coke from Unwashed Coal.



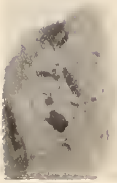


Fig. 18.—Gas Coke from Washed Coal.

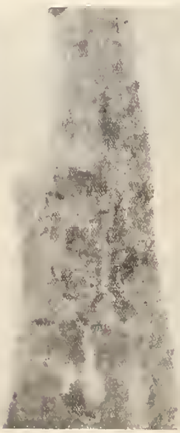


Fig. 16.—Oven Coke (20 to 45 mm. thick).

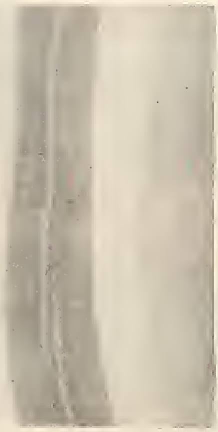


Fig. 19.—Charcoal.

Radiographs were taken also of oven coke (fig. 16), gas coke from unwashed coal (fig. 17), and gas coke from washed coal (fig. 18). In the latter two intense black spots will be noted, due to protosulphide of iron from the reduction of the pyrites by the carbon in excess, pyrites appearing in the same manner in the radioscopy of coal. Evidence is also given of the presence of sulphur which has not been eliminated by washing, but as a whole the radiograph is lighter than that shown in fig. 17, proving that the sample contains less ash. M. Couriot concludes that radiography should be useful in eliminating pieces of coke containing sulphur embedded in their mass, where the same is to be employed in the manufacture of high-grade pig iron.

The radiographs of charcoal (fig. 19) show internal cavities, due to the contraction of the substance, which diminish the density and detract from the good quality of this fuel.

The author points out that, after having chosen, by the aid of radioscopy, one or more fragments that appear to correspond with the mean value of a consignment of mineral fuel, the examiner will be able to appreciate the proportion of impurities by photometric methods, a system of two compensating prisms of aluminium or a Napoli photometer being employed for reproducing the *facies* furnished by the rays passing through prepared dust. The remainder of the paper deals at length with this method of examination (*see Colliery Guardian*, May 26, 1899, p. 962).

COALMINING IN NEW ZEALAND.

Report of Royal Commission.

(Continued from page 1293, *vol. ciii.)*

Ventilation.

Much consideration has been given to the important subject of ventilation. To enable them to obtain a thorough knowledge of the existing conditions the Commission have inspected the underground operations at the majority of the large coal and gold mines in the Dominion, and have made numerous measurements of the quantity and temperature of the mine air, also taking samples of air for analysis, in addition to which the inspectors of mines throughout the Dominion have furnished copious tabulated information giving the air measurements and analyses over an extended period. As the conditions and systems of ventilation at metal mines and collieries are often dissimilar, the report deals with each separately.

In regard to metal mines, the Commission find that the recent introduction of centrifugal fans and blowers in some of the most important metal mines, to replace ventilation by natural means formerly adopted, has proved extremely beneficial, for, in addition to the greater volume of air circulated, the supply is constant and therefore reliable, which natural and consequently intermittent ventilation was not. They are therefore of opinion that to secure satisfactory conditions it is absolutely necessary that the deep metal mines of this Dominion should be ventilated by mechanical ventilators. They consider that a quantity standard alone (*i.e.*, the anemometer measurement of the air), as now in operation, is subject to many practical difficulties, for the amount of air required for adequate ventilation varies according to the nature of the individual mine, and cannot be fixed at a given quantity per person at all mines alike, for the following reasons:—

(*a.*) The variable temperature of different mines. One of the principal objections of ventilation in deep mines is the reduction of the temperature of the exposed rocks. If this were not effected the work would be unbearable.

(*b.*) The quantity of organic carbon dioxide from men and animals is variable.

(*c.*) The velocity of the air-current necessary to sweep away noxious gases and dust and to reduce the temperature of the rocks is dependent on the sectional area of the airways and stopes, and a specified quantity per person adequate for the confined stopes of the Thames goldfield might be insufficient to create any observable current in the wide stopes at Waihi.

(*d.*) An efficient distribution of the air-current and proper air stoppings, also brattice and doors, are necessary, otherwise a large quantity entering the mine may inadequately ventilate the workings.

(*e.*) The variable exudation of noxious gases from minerals and rocks, which varies in the same mine as the area of the exposed rock surfaces.

Considerable attention was given to the question of a maximum percentage of carbon dioxide, and a great number of samples were recently taken for analysis under the various conditions of mining from nearly every metal mine in the Dominion. With the exception of the sample from the Thames 1,000 ft. crosscut, where 3·31 per cent. of ground carbon dioxide was present, the maximum percentage of CO_2 obtained in any sample taken was 0·97, and the maximum percentage of CO was 0·008. The highest percentage of carbon monoxide gas detected in the smoke when shovelling commenced at Waihi mines was 0·0025, and from Reefton mines 0·008; and it may reasonably be concluded that this gas is not produced in the metal mines under normal conditions in hurtful quantities, and is never produced unless accompanied by carbon dioxide.

As a result of the above investigations, giving the percentages of noxious gases found in the mines under unfavourable conditions, the Commission are of opinion that for New Zealand mines a carbon dioxide standard slightly stricter than the British standard should be fixed—viz., a maximum of 1 per cent., the British standard being 1½ per cent.

In deep metal-mining operations it is sometimes necessary to circulate a larger volume of air than is required to produce, from a quality standpoint alone, adequate ventilation. For the purpose of reducing the temperature of the rock surfaces a greater volume of air is necessary, for if this were not effected hard work would be either intermittent or unbearable in the heated atmosphere of many deep and hot mines, in which class those of the Hauraki goldfield in this Dominion must be included. Observations made with the object of determining the rate of increment of temperature with depth in several countries where deep mining is conducted have shown considerable divergence in different places, as will be seen from the following comparisons of the results of temperature observations:

Locality.	Depth required for an increase of 1 deg. Fahr. Ft.
Comstock, U.S.A.	33
Witwatersrand, Transvaal	208
British collieries (mean)	64
Bendigo, Victoria	77
Ballarat, Victoria	80
Thames, New Zealand	43 5
Waihi, New Zealand (approximate)	32 8

The relative rock temperatures at the 1,000 ft. level at Thames and at Comstock are 83 degs. Fahr., and at Waihi approximately 85 degs. Fahr., but it was found that, owing to various causes, the temperature throughout the Waihi goldfield at any particular horizon was by no means constant.

During the investigations it was found that the air in the working places at Waihi and Thames was highly saturated, generally to the extent of 90 per cent. or more, and that the wet-bulb temperature of the air in working places ranged between the following limits at the deepest levels:—

	Underground (wet bulb). Degs.	Outside in shade (dry bulb). Degs.
Thames goldfield (1,000 ft. level)	70·0 to 83·5	55
Waihi mine (1,000 ft. level)	61·0 to 82·5	56·5
Waihi Grand Junction mine (944 ft. level)	64·5 to 63	55
Waihi extended mine (960 ft. level)	79·5 to 89	50

On the Reefton goldfield the rock temperatures are not nearly so great, the highest temperature recorded—viz., 78 degs. Fahr., wet bulb—being obtained at the 1,266 ft. level in the Progress mine.

The extent to which underground temperature may be reduced by increased ventilation is somewhat limited, as investigations have proved. During the inspection of the Thames mines it was ascertained by actual measurement that atmospheric air which entered a Roots blower at the surface, and was forced at a velocity of 10 ft. per second through a thin galvanised iron 22 in. air pipe down a vertical shaft 1,000 ft. in depth, and along a cross-cut 670 ft. in length, increased in temperature in the space of 2 minutes 47 seconds from 55 degs. to 76 degs. Fahr., being at the rate of 7·64 degs. Fahr. per minute. The temperature of the air surrounding the pipe did not exceed 81 degs. Fahr. At the Waihi Grand Junction mine it was found that the temperature of the air, while passing from the top to the bottom of a vertical downcast shaft 955 ft. in depth, increased at the time of measurement from 51 degs. to 56 degs. Fahr., the velocity of the air being at the rate of 16 ft. per second. In this case the temperature of the air in the shaft increased at the rate of 5 degs. Fahr. per minute. The return air in the fan passage at the surface of this mine was 69 degs. Fahr. (completely saturated). From the foregoing examples it will be noted that in the North Island of New Zealand, where the outside temperature is equable (the mean surface temperature at Waihi being 55·7 degs. Fahr.), the temperature of the air descending into the mine will have attained that of the rock surfaces within seven minutes of entering the shaft.

As a result of their investigations and deductions the Commission are of opinion that, to secure a continuous distribution of the air in metal mines adequate to reduce the temperature in hot working places within reasonable limits, a standard or fixed temperature of 80 degs. Fahr., wet bulb, should not be exceeded, unless it is not reasonably practicable to maintain the air at such standard, in which case a reduction of the hours of employment should be provided for.

In three of the Australian States fixed standards of temperature are now provided for by law, as follows:—

West Australia: Temperature not to exceed 80 degs. Fahr. wet bulb, or 87 degs. Fahr. dry bulb, without permission of inspector in case of impracticability.

Victoria: Temperature not to exceed 83 degs. Fahr., wet bulb, without permission of inspector in case of impracticability.

Queensland: A reasonable limit of humidity shall be maintained—viz., at a temperature of 85 degs. Fahr. by the dry bulb the wet bulk should be at least 5 degs. less, and in case of a higher temperature from 7 degs. to 8 dege. less.

The Commission proceed to make certain recommendations in regard to metal mines. It is proposed, *inter alia*, that a place shall not be deemed to be in a fit state for working or passing therein if the air contains more than 1 per cent. of carbon dioxide or less than 19 per cent. of oxygen, with power, however, to exempt certain mines. The maximum temperature of the air in any working place, measured by a wet-bulb thermometer, shall not exceed 80 degs. Fahr., unless firing of explosives has occurred in such place not more than 20 minutes previous to the observation of the thermometer; but the inspector may, in writing, allow a higher limit of temperature. Regulations under the Mining Act shall provide for the classification of mines according to the amount of noxious gases in the working places and to the temperature of the surrounding rocks, and the amount of air passing into a mine shall be such amount proportionate to the number of men and animals employed underground in the mine as may be prescribed by the regulations respecting mines of the class to which the mine belongs. These regulations to classify mines as follows:—

Class A: All mining operations on Thames and Waihi goldfields below the 800 ft. level, 200 cubic feet per man per minute minimum, 500 cubic feet per minute for each horse.

Class B: Other metal-mining operations, 150 cubic feet per man per minute minimum, 500 cubic feet per minute for each horse.

Special attention has been devoted to the ventilation of coalmines, and it was found that the majority of the collieries of the Dominion were well ventilated. To a certain extent this opinion is substantiated by the fact that during the past 15 years only one life has been lost as the result of an explosion of firedamp. The principal defect noticed was inadequate distribution of the air by splitting, the insufficient use of air-stoppings and brattice, and the installation of fans of insufficient power in case of extension of the workings or during emergency.

The Commission propose that, as in the case of metal mines, a place shall not be deemed to be in a fit state for working or passing therein if the air contains either less than 19 per cent. of oxygen or more than 1 per cent. of carbon dioxide.

Special rules shall also provide for the classification of mines according to the amount of inflammable and noxious gases in the main return airway, and the amount of air passing into the mine shall be such amount, proportionate to the number of men and animals employed underground in the mine, as may be prescribed by the special rules with regard to mines of the class to which the mine belongs, but in no case shall less than 150 cubic feet of air per minute be provided for every person, and 600 cubic feet of air per minute for every horse while employed underground. The total number of men employed ordinarily in any ventilation section is not to exceed 50 at one time.

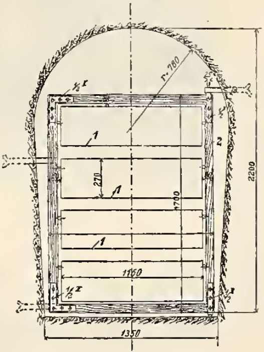
Further recommendations provide for the keeping of ventilation charts, the prohibition of mechanical ventilators below the surface, the use of reversing fans, and the prohibition of furnace ventilation in new mines.

(*To be continued.*)

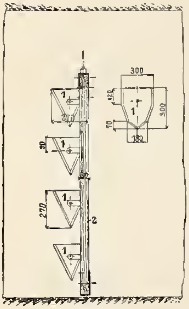
AUSTRIAN COALDUST EXPERIMENTS.*

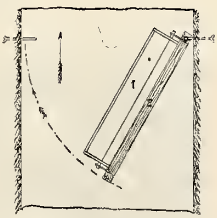
Experiments with Concentrated Wet Zones.—Owing to the defects attaching to the wet zones and water curtains used in the earlier experiments (*see Colliery Guardian*, September 24, October 1, 1909, and December 30, 1910), and the failure of the trials with hygroscopic materials for laying coaldust (*ibid.*, May 10, 1912), attempts were made to use devices for concentrating the wet zone or water curtains in a portion of the gallery, so that their effective quenching action could be brought into play at the moment of the explosion. The idea of the concentration was to provide sufficient of the means of extinction in one spot to put out the flame of the explosion, the means themselves being set in operation by the force of the explosion pressure which precedes the flame, so that they should be discharged into the dust cloud and fill the sectional area of the gallery for a certain distance. The means employed were the known media: water and stonedust, and a liquid introduced by Kruskopf.

Front Elevation.



Side Elevation.





Plan.

For preparing the concentrated zones, various devices were suggested, and a trial was made of the Kruskopf device for extinguishing fires (*see* fig.). This consists of a very strong wooden frame carrying four swing troughs, these being as light as possible in order that they might be shattered by the force of the explosion without injuring the gallery timbers. The frame itself is set up so as to project a little way into the gallery, but not enough to interfere with the ventilation or haulage. The advancing explosion pressure swings the frame on its axis, smashes the troughs, and disperses their contents over some distance. The four troughs contain from 140 to 210 litres (30·45 gallons) of the extinguishing medium; and several frames can be set up in close proximity.

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* Dr. Czaplinski and Werksdirektor Jicinsky. *Oesterreichische Zeitschrift für Berg- und Hüttenwesen.*

The first experiments were made with Kruskopf's liquid, in such a manner that either one apparatus, charged with 140 or 210 litres, could be employed at a distance of 91 m. from the explosion chamber, or else two sets, containing together 280 litres, at 91 and 93 metres respectively from the chamber. The sectional area of the gallery being 3 square metres, the amount of liquid distributed per square metre was 47, 70, and 93 litres respectively.

The explosions were produced in the same way as in the earlier experiments, and the results proved highly satisfactory. The contents of the troughs are completely sprayed by the shattering of the troughs, so that by the time the flame reaches the spot the air there is completely saturated with the atomised liquid, the walls being also wetted therewith. In the dust explosions produced by the aid of acetylene, the broken parts of the apparatus were flung a distance of 60 m., and the liquid formed a perfect wet zone 70 m. in length. With the smallest proportion of liquid, the flame was shortened considerably, whilst with the larger amounts it was checked completely. In all cases there was no ignition of the coaldust zone situated 30 m. in rear of the concentrated wet zone. The experiments also showed water to be a more efficient quenching agent than the Kruskopf solution, by reason of the greater fineness of division of the spray and more rapid evaporation than in the case of the more viscous liquid.

These concentrated wet zones being free from the defects of the ordinary wet zones and water curtains, and are easily produced, it is intended to continue the experiments with different methods of suspending the receptacles on the gallery walls, and with stonedust in place of water.

Stability of Barrier Doors in Coaldust Explosions.—The Austrian mining regulations prescribe that the return air-current must be shut off from the intake current by means of explosion-proof barriers, or else by doors of iron (or slabs strengthened with iron) set in masonry frames in all cases where there are more than 80 men in a shift, or the mine air contains either more than 1½ per cent. of firedump or less than that percentage when associated with fine dust. Since the needs of traffic almost entirely preclude the erection of permanent barriers, the prescribed doors are generally used in the Rossitz district, these being built of 2¼ in. slabs, 6 ft. high and 4 ft. wide, set in a masonry frame measuring 2 ft. by 3¼ ft., and fitting against at least three sides of this frame. No previous tests having been applied to ascertain the stability of these doors under the influence of coaldust explosions, a number of trials were carried out in the experimental gallery, with coaldust containing 22 per cent. of volatile matters, 12 per cent. of ash, and 1 per cent. of moisture, and leaving 3 per cent. of residue on a sieve with 1,160 meshes per square centimetre, 7 per cent. on the 1,850-mesh sieve, and 17 per cent. on the 3,480-mesh sieve. Acetylene gas was admitted into the explosion chamber just before firing the dynamite charge.

Nobel's ammonium gelatine was used as the explosive, the cartridges being suspended freely in the chamber and ignited by means of a 1-gramme detonator. The charges ranged from 250 to 500 grammes, and in some of the experiments charges were fired in both explosion chambers simultaneously, in order to obtain a maximum explosion flame.

The length selected for the coaldust zones was in general 90 m., the weight of coaldust used 34 kilogs., and the proportion of acetylene gas admitted into the explosion chamber, 10 per cent. With the by-pass closed the flame passed straight along the main gallery; with the gallery closed it traversed the by-pass and attained a length of up to 246 m.

Results of the Experiments.—During the tests of the two doors set up in the by-pass, these were closed, those in the straight gallery being left open; whilst the converse arrangement was adopted for testing the doors in the gallery itself. In the latter case the first door in the gallery was either smashed or dislodged and projected for some distance, the second door, however, remaining intact, though forced open by the shock of the explosion. As a rule the closed doors in the by-pass were uninjured so long as the doors in the main gallery remained open; but when the latter were closed by the explosion, the first door in the by-pass suffered damage. The iron barrier door, of the Witkowitz pattern, built to stand a pressure of 10 atmospheres, was not injured by either purely coaldust or by coaldust-acetylene explosions.

The results of the indicator diagrams taken show that the pressure produced by a dynamite explosion does not exceed 1·8 atmospheres, measured in the straight gallery, and that of a coaldust explosion not over 1·4 atmospheres. The duration of pressure was not more than 2·2 seconds, and the length of the flame did not exceed 246 m. Direct observation of the flame, in conjunction with the recoil after each explosion, showed that the pressure phenomena set up in the gallery by coaldust explosions continue even after the flame is extinguished. This gives a velocity of propagation of the flame exceeding 112 m. per second (246 ÷ 2·2).

Grimsby Coal Exports.—The following is the official return of the quantities of coal exported from Grimsby during the week ended June 28, 1912:—To foreign destinations (tons): Trondhjem, 2,187; Stockholm, 2,015; Riga, 1,904; Rotterdam, 749; Dieppe, 480; Tregnier, 186; Esbjerg, 694; Malmo, 2,666; Klagshamn, 1,634; Hamburg, 789; Cronstadt, 2,639; Antwerp, 300; Copenhagen, 2,074; Laguna, 199; Pernau, 2,272; Aarhus, 1,977; Ystad, 1,954; and Helsingborg, 1,503; total, 26,222 tons. To coastwise destinations (tons): Whitstable, 280; Pentewan, 290; and Lerwick, 1,710 tons; total, 2,280 tons. The export for the corresponding week of last year was: Foreign, 34,079; and coastwise, 2,465 tons. The export of coal from Immingham during the past week was 20,775 tons, 6,644 going to Oxelosund, 2,800 to Stockholm, 2,663 to Riga, 2,603 to Rotterdam, 2,258 to Gothenborg, 2,065 to Gefle, and 1,662 to Hamburg. This export was only about 6,000 tons less than the export from Grimsby.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

New Mines Act: Serious Financial Effect—Questionable Safety—One Railway Company's Losses by Strikes—Two Collieries Stoppsd for One Man—Grave Disorder: Police Stoned—Important Developments at Port Talbot—Extraordinary Claim by Collier Plaintiff—The King at a Colliery and Rescue Station—Royal Visit to Dowlais Works—Proposed Wages Board for Swansea.

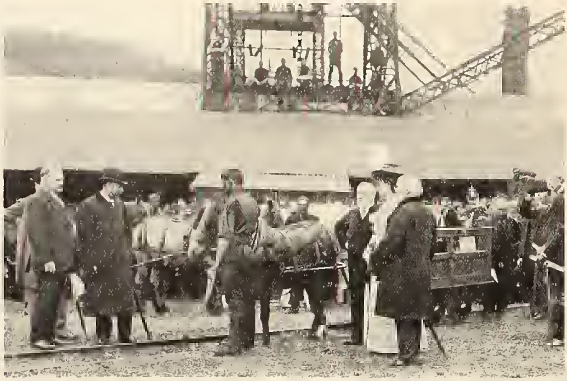
The new Mines Act is provoking keen discussion, though it is much too soon to arrive at any trustworthy conclusion. Inevitably opinions differ widely, and there is the added uncertainty which arises from the fact that the whole of its provisions have not yet come into operation, nor will do so till the year after next. But even the provisions already operative are viewed in colliery management circles with grave misgiving, and the financial effect of the whole must prove really serious. Upon the ground of safety alone, the effect of certain clauses is directly challenged—that, for instance, which requires the use of guides in the sinking of new shafts. Widely varying estimates of the cost that will be entailed are put forth; tens of thousands of pounds in initial outlay, and an annual cost of 2d. to 4d. per ton, being among the forecasts given—one estimate ran as high as 6d. per ton.

THE ROYAL VISIT TO SOUTH WALES.

THE KING AND QUEEN AT THE LEWIS-MERTHYR COLLIERY.

[Photo by "Topical."

The Queen Emerging from a Specially-Constructed Roadway Designed to Show the Method of Timbering.



[Photo by "Topical."

Their Majesties Inspect the Pit Ponies. Lord Merthyr is to be Seen in the Foreground.

Among those who have taken early advantage of the opportunities afforded by the Glamorgan Council for meeting the requirements of the new Mines Act are many officials of the United National Collieries, and on Monday, when distributing the certificates gained, Mr. Hugh Watts stated that he would have much pleasure in returning the whole of the examination fees which they had paid. This is typical of the action of many colliery proprietors in this district.—Mr. Henry Davies, the director of mining instruction for Glamorgan, informed those present at the meeting that the Council had already examined 550 firemen under the new Act, that 1,000 more were at present under instruction, and that arrangements were in progress for bringing 2,000 others under tuition.

As evidence of the loss sustained by local railway companies through the colliers' strike, it may be noted that the Barry Company's earnings fell off by no less than £80,000. By reason of the extra pressure, both immediately before and since the strike, that loss has been in large measure made good, but the final estimate shows a reduction of not less than £30,000 in the gross income for the past six months as compared with the corresponding period of last year—£315,000 against £345,000.

An outbreak of disorder at the Lancaster Steam Coal Collieries, Cwmtillery, Monmouthshire, on Monday, was of a very serious character, especially in view of its sudden and originally trivial occasion. About nine o'clock in the evening a number of youths attempted to rush the works in order to induce men at work to cease operations. There was stone-throwing, and windows in the washery were broken; and afterwards the residence of the manager of the washery was stoned, and his windows broken, a crowd of 2,000 persons assembling. Only a few police are permanently stationed in the place, but reinforcements were quickly telephoned for. For two hours the situation was serious, and a motor car bringing police was stoned, and the chaffeur was hurt. It was after midnight before the full force of police arrived, and they were received with volleys of stones as each detachment came upon the scene. At least a hundred constables had to be brought in, and during the baton charges which were necessary to disperse the crowds many persons were injured.

The origin of the trouble was the posting of a "show cards" notice, and also a notice relating to a meeting of the Navvies' Union. The man who posted them up is said to have been ordered to take them down because he had put them up during his working time; but, however this be, they were pulled down, and friction arose which led to the removal of the man from the washery to the screen, at the same rate of wages. Then followed a meeting of the men, and cessation of work both at Cwmtillery and at Rose Heyworth. The Federation is giving support to the strikers, on the ground that they had general permission to post "show card" notices at the pits, and that it had been understood that the permission extended to all the employees of the company.

One of the incidents of local business is the revival of the statement that the Italian Government are endeavouring to ensure for Italian steamship companies the contracts for transporting South Wales coal to Italy. It is stated also that the Government is trying to restrict the conveyance of supplies for the army in Tripoli to Italian steamship owners. The owners of cargo shipping usually engaged in the South Wales trade, whilst, of course, recognising that any such national restriction would operate against them, are not as yet fully acquainted with the actual facts of the new departure, but if it be true that a ten-years term for this restriction is to be instituted, local shipping business must be to a great extent interfered with.

Developments at Port Talbot proceed apace and are significant of the opening up of the coalfield in the immediate district. A heavy dredging contract for extension of deep water in the dock has been let, and an additional wharf is to be constructed at the end of the float nearest the steelworks. The wharf will be equipped with loading discharging plant of the best description, several railway sidings, of course, being erected in conjunction with this. The breakwater is to be extended so as to afford still further protection to vessels entering and leaving the dock, and the cost of this extension alone will be £80,000. Among the improvements is to be the construction of a coal belt elevator for loading. This is said to be the first case of adoption in South Wales of a system which is already in operation in the North of England. The general manager, Mr. E. Lowther, had early experience of shipping work at Sunderland and Newcastle, being mineral agent under the North Eastern Railway Company, before he became traffic manager of the Port Talbot Railway and Docks 12 years ago, shortly afterwards obtaining the position of general manager. Extensions of the steelworks are already contemplated, and in this direction also the outlook at Port Talbot is very gratifying.

The struggle between the hobblers and trimmers at Port Talbot has widened into an endeavour to promote farther striking. On Monday the police had to interfere with a march of trade unionists, so that these should not influence men against working. Between 30 and 40 of the hobblers appear to have been penalised in respect of their engagements, and that quarrel is one between the regular trimmers and those hobblers who are more casual employees in that kind of work. Statements have been made on behalf of the hobblers against regular trimmers, and these allege that 32 of the former are now refused work. They are being backed up by other trade unionists, and hence the present difficulty. Men at the discharging wharves, to the number of 150, subsequently struck.

A singular case has come before the Pontypool County Court, when a collier claimed payment of a difference in price according to the price list because the roadway in which he worked had been converted into an aircourse. It appears that on account of a fall the aircourse had been diverted so that plaintiff's road had become an airway, and he put in a claim to the manager for payment. Several witnesses deposed to the existence of the custom to pay airway prices for stall roads which were converted into airways, but the manager denied that it was a custom to pay airway prices for stall roads thus temporarily converted. The judge, who described plaintiff's contention as remarkable, held that there was no ground for payment of airway prices in a case where, through a fall, the ventilation had been temporarily diverted, and he therefore gave judgment for the company.

His Majesty the King, with the Queen, during their four days in South Wales, visited Lewis-Merthyr Collieries (in the Rhondda Valley), the rescue station at Dinas, and the great ironworks of Guest-Keen at Dowlais. A special feature of the day's tour was the luncheon at the Dowlais works, which they entered under a triumphal arch built of great blocks of coal. Mr. Arthur Keen, director, received the Royal party, and among those presented to their Majesties were Mr. F. W. Keen, Mr. G. Nettlefold, Mr. Edward Steer, and Mr. J. W. Evans, with Mr. W. Evans, manager of the works.

The King and Queen witnessed the tapping of a blast furnace, and Lord Merthyr presented Mr. Reece, manager of the Cardiff-Dowlais works, to whom the King recalled a previous visit he had paid, and his witnessing the operations at Cardiff. The engine house was inspected, and of Mr. Gilroy Williams the King asked a number of questions as to the power of the engines, the duration of the plant, &c. The Bessemer furnaces were inspected, and Mr. John Evans with Mr. D. T. Jenkins were presented.

The whole of the processes in dealing with great ingots by the electric cranes, the rolling mill, and the actual making of rails were gone through, and the party left the works under a steel arch composed of different forms of product. Particularly interesting were the labour-saving appliances and the ease with which huge masses of glowing metal were dealt with.

It is claimed for the Dinas rescue station, which the King also visited, that it is one of the finest in the country. Standing between Porth and Dinas in the Rhondda Valley, it is equipped with all the latest appliances for life-saving in mines, and in the two galleries are constructions whereby students learn to deal with falls of roof, with timbering, air bridges, etc. The station is in telephonic communication with every colliery in the Rhondda, and a motor car is to be kept on the premises in constant readiness to take the instructor (Mr. J. H. Thorne) and his equipment to the scene of an accident, and at such a time all the trained workmen will be summoned to the place of need.

A proposal has been made that Swansea should establish a wages board, in order that, by its negotiating and conciliatory operations, a method should be framed whereby the port will be saved from the serious effects of stoppages, such as that recently witnessed. The experience of the tinplaters through their system of annual agreements is cited; and impulse is given to the new movement by the fact that owing to the diversion of vessels because of the strike, there is now a great lack of tonnage, thousands of tons of coal being on order for which shipment at an early date cannot be ensured. The idea is that the Chamber of Commerce should take the lead in bringing about establishment of the wages board.

The Swansea proposal gives point to the statements made on Tuesday before the commission of enquiry into labour unrest, by Mr. Clement, secretary of the Tinplate Employers' Association of South Wales. He furnished abundant proof of the useful work of the Conciliation Board. His association, he said, represented 80 per cent. of the mills, and they dealt with six trade unions. Matters which the Conciliation Board could not agree to were referred to a joint committee, and if this failed to agree, the matter would go to an independent umpire. During four and a-half years in which he had been secretary, they had had on only three occasions to resort to the umpire. They had an annual agreement which had undoubtedly been of incalculable benefit to the development of the trade, and in some cases agreement had been made for two years instead of one. They had no fewer than 300 different rates and a multiplicity of grades of men, but this had been no barrier to the making of universal agreement and the maintenance of peace. In every case, they had found men keep the agreement honourably.

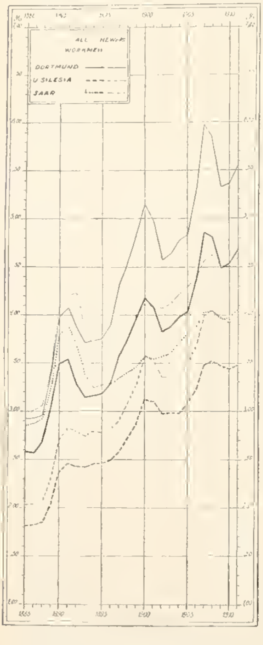
The association endeavoured to prevent "cutting," and they asked the assistance of the men to keep up prices, because that helped to maintain rate of wages. In the same way, employers were applied to by the unions to help them in the case of men who did not pay their trade union contributions. In answer to a question whether union men were best and most desirable employees, witness said "Yes, decidedly, but we do not say that all union men are angels." He thought it most desirable that both the men's unions and the masters' organisations should be kept to the highest state of efficiency, because each was able to help the other for the making and keeping of agreements. He regarded their system as ideal. The spirit of conciliation on both sides was very marked.

Witness favoured somebody, such as the Industrial Council, having power to compel employers to come into line with the conciliation system, but in the case of the South Wales tin-plate trade they had never experienced any difficulty with the 20 per cent. of employers who were not attached. Workmen as well as employers should be penalised for breaking agreements. It was certainly desirable to have some compulsory power for the interpretation of the awards in case of dispute.—Mr. T. Griffiths, representative for South Wales of the Steel Smelters Union, agreed with Mr. Clement as to the good terms existing between employers and workpeople.

A very interesting report was presented at the annual meeting of the South Yorkshire Coalfields Church Extension Committee, held at the Mansion House, Doncaster, on the 13th ult. This stated that during the year there were further mining developments within the sphere of the work of the committee, the Barnsley seam being reached at Maltby, Yorkshire Main, and Bullcroft, whilst sinking was commenced at Hatfield, and preparations made at Rossington. About 14,000 persons were now employed at the collieries, and the number increased every day. Four clergymen had been appointed by the Archbishop of York during the year to work in the new coalfield. A new church had been dedicated at Maltby, and a temporary mission church had been opened at Edlington Large numbers of houses had been built during the year, especially at Maltby, Bentley, Owston, and between Bentley and Doncaster, but the building had hardly kept pace with the immigration of miners and other workers, with the result that there had been regrettable overcrowding in some instances. Those immediately concerned in mining developments continued to give generous support. Mr. Chas. Thellusson had increased his donation to £6,859 for the church at the model village of the Woodlands; Lord Scarborough had increased his to £600, and Mr. Streatfeild his to £1,500. The Brodsworth Main Colliery Company and the Edlington Land and Development Company were among those who had given sites for mission churches. The meeting, over which the Bishop of Sheffield presided, adopted the report, and re-elected Lord Scarborough as treasurer, and the vicar of Doncaster (Canon Sandford) and Mr. W. H. Pickering (H.M. inspector) as honorary secretaries. The financial statement showed that the income for the year was £7,394, and there is a balance in hand of £4,635, but most of the money subscribed is for capital expenditure, and a large annual income will shortly be required for stipends of clergy.

MINERS' WAGES IN PRUSSIA, 1911.

The total number of workers engaged in mining in Upper Silesia, excluding salaried officials and overseers, amounted in 1911 to 117,403 (116,262 in 1910), and the average number of shifts worked to 282 (280). Their aggregate earnings were 115,069,182 marks (112,061,267 marks), being 3·48 marks (3·44 marks) per shift, or 980 marks (960 marks) per head. In Lower Silesia the workers totalled 255,243 (249,950), average number of shifts 307 (302), aggregate earnings 27,926,408 marks (27,264,560 marks), being 4·74 marks (4·59 marks) per shift or 1,453 marks (1,385 marks) per head. The workers in the Dortmund district numbered 341,716 (334,619), and the average number of shifts 307 (204), aggregate earnings 493,952,005 marks (462,285,579 marks), being 4·69 marks (4·54 marks) per shift, or 1,446 marks (1,382 marks) per head. The Saar miners numbered 1,736 (52,397), working an average of 288 (283) shifts, and earning in the aggregate 60,415,203 marks (58,788,092 marks), being 4·06 marks (3·97 marks) per shift, or 1,168 marks (1,122 marks) per head. In the Aachen district 23,302 (22,224) workers averaged 304 (306) shifts and earned a total wage of 32,501,023 marks (30,551,203 marks), being 4·59 marks (4·49 marks) per shift, or 1,395 marks (1,375 marks) per head.

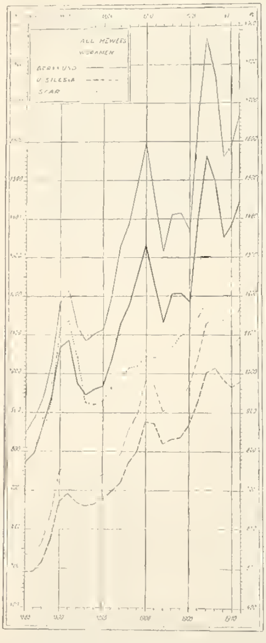


With regard to the earnings of the various classes of miners per shift, hewers in Upper Silesia (49·8 per cent. of the total working staff) averaged 3·98 marks (3·91 marks) per shift, other underground workers (17 per cent.) 3·82 marks (3·79 marks), adult workers at bank (23·7 per cent.) 3·13 marks (3·10 marks), young persons under 16 (4·5 per cent.) 1·18 marks (1·17 marks), female workers (5 per cent.) 1·25 marks (1·25 marks). In Lower Silesia, hewers (50·1 per cent.) earned 3·54 marks (3·46 marks), other underground workers (20·7 per cent.) 3·41 marks (3·36 marks), adult workers at bank (27·3 per cent.) 3·08 marks (3·03 marks), young persons (2·8 per cent.) 1·23 marks (1·21 marks), female workers (1·4 per cent.) 1·60 marks (1·60 marks). In the Dortmund district the hewers (50·3 per cent.) earned 5·55 marks (5·37 marks), other underground workers (27 per cent.) 4·09 marks (3·98 marks), adult workers at bank (19·7 per cent.) 3·91 marks (3·88 marks), young persons (3·5 per cent.) 1·34 marks (1·31 marks). The hewers in the Saar district (49·4 per cent.) earned 4·60 marks (4·50 marks), other underground workers (33·5 per cent.) 3·72 marks (3·67 marks), adult workers at bank (13·7 per cent.) 3·61 marks (3·60 marks), young persons (3·4 per cent.) 1·43 marks (1·41 marks). Aachen district: hewers (59·3 per cent.) 5·19 marks (5·09 marks), other underground workers (14·6 per cent.) 4·30 marks (5·20 marks), adult workers at bank (22·2 per cent.) 3·82 marks (3·72 marks), young persons (3·9 per cent.) 1·47 marks (1·45 marks).

The rise in net earnings per head per shift and per annum since 1886 is shown by the curves in figs. 1 and 2 respectively. These earnings are computed, after deduction of the contributions to the insurance and pension funds, which amounted, in the Ruhr district alone, to an aggregate of 28,645,321 marks for 1911, having increased from 21,984,881 marks in 1907. During the same period the employers' contributions to the same funds in that district increased from 28,901,328 marks to 44,197,812 marks, or from 0·63 mark to 0·80 mark per ton of coal raised.

IMPORTANT COLLIERY RATING APPEAL.

An important colliery rating case was decided by Lord Hatherton and other justices at Staffordshire Quarter Sessions last week, when the Florence Coal and Iron Company Limited, of Longton, appealed against the poor rates made on May 31 and November 21, 1911, by the Stoke-upon-Trent Assessment Committee.



Mr. Disturnal, for the appellants, said the two appeals involved precisely the same matters. The gross estimated rental concerned was £14,705 and the ratable value £3,565. There would be no question as to the deductions from the gross to make up the ratable. The question would be whether the net was a true sum. The hereditaments were in Longton, and consisted of a colliery. The undertaking extended into several parishes, but the surface works, as well as certain underground workings, were in the parish of Longton. The total underground area of the colliery was something like 1,600 acres. These pits were originally sunk in 1878 by the then Duke of Sutherland, and they were worked by a private partnership, which was really the Duke himself, until 1890. Then a lease was granted to a company for 40 years upon certain terms, and it had been worked by that company down to the year of rating with varying success, or latterly, rather with an absence of success. During that period rearrangements had been made with the landlord, the Duke of Sutherland, new areas had been granted, the term extended and the royalties adjusted. In the year of rating there was a dead rent of £2,000 per annum reserved on the lease. There was a royalty on coal of £75 per acre yard thick, which worked out at approximately 4½d. per ton; there was a royalty of 9d. a ton on ironstone and of 3d. a ton on clay, marl and so forth. As a matter of fact, the ironstone had never been worked except for a short period in the early eighties, when it was not successful and was abandoned. The total gross estimated rental of the whole undertaking was £16,874, and the total ratable value was £5,309. Although the Florence Colliery Company, the present appellants, was a limited company, the whole of the share capital, except shares for nominal amounts which were necessary to be held for purposes of complying with the Companies Act, belonged to the Duke of Sutherland and his family, and practically the whole of the debenture capital also belonged to the Duke and his family. In 1910 the condition of things at the colliery became such that the Duke was advised to close it, and notices were actually given to the men for that purpose. The trading of the undertaking not only represented an enormous capital loss, but loss of interest, and the rents and royalties, although reserved in the lease, were not paid. He believed that in the year 1910 there was actually a sum representing a rental of £13,835, which the company had not been able to pay. Therefore in this case the royalties upon the tonnage got from the pit gave no sort of idea as to the true rent a hypothetical tenant would give for this undertaking upon an annual tenancy. Shortly after the notices were served, it was conceived there might be some hope of the place, not as a colliery but for the purpose of getting the ironstone, and therefore an arrangement was come to with another company called the coking company, by which the coking company worked the colliery for and on behalf of the present appellants. They were really contractors working this place for that year. The coking company thought there was some prospect in this matter, and they had put down a considerable sum in the way of capital, and had sunk further shafts for the purpose of working this ironstone. This, however, was all in the air at the moment. It was entirely undeveloped. The shafts were not completed, and in the year of rating there was no working of ironstone. The respondents had asked for the production of various documents relating to the arrangement with the coking company. His lordship would know that business difficulties arose in these matters, and his clients had up to the present declined to produce these documents, because they were not the coking company, and the coking company had, he was told, great ramifications in North Staffordshire. The documents did not in any way, the appellants contended, affect the nature of the appeal. The question was: What rent would a hypothetical tenant give in the year of rating for the undertaking as it then stood, with its hopes and prospects? It was not what a man would give on a lease, paying a rent which would be spread over the whole lease in the hope of getting a benefit in the future. He submitted that, having regard to the state of things existing, no tenant could have been found who would have paid anything for the place, with all the risks attaching to it. In the year 1910 there was raised from the parish of Longton 139,356 tons of coal, and from the parish of Trentham 134,792 tons, making a total of 274,148, to which should be added 26,031 tons, representing consumption of coal at the colliery. It was a significant fact that in the parish of Trentham the ratable value represented 2·85d. per ton and in the Longton parish at 6·14d. per ton. Of course it should be pointed out that the shafts, &c., were in the Longton parish. Except in the years 1902 and 1908 the average selling price of the coal from this undertaking never reached 8s. per ton. In 1902 it was 8s. 2d., and in 1908, which was known as the boom year, it went just over 9s. The loss on the profit and loss account of the company in the year 1910 was £11,328. That, of course, was charging the company with royalties, rents, and debenture interest. The loss in 1909 was £12,022. But in the profit and loss account no debenture interest was charged for the year 1909, and, taking it on the same basis as the year 1910, there was really a loss of £16,000 for 1909. As regards 1908, which was exceptional as regards the selling price of coal, there was a profit of £4,236, but again when debenture interest was deducted it left practically no profit at all. There were serious faults across this coal area which made it exceedingly difficult to work. The crush was exceptional, and the roof was continually falling in. The cost of timbering alone in the year 1910 represented a sum equal to 6d. per ton. This was, of course, apart from labour. The character of the coal was such that 47 per cent. had to be washed, and of the whole quantity got, over 12 per cent. went on to the dirt heap. Under the circumstances counsel urged that the rate was grossly excessive, and practically the whole amount ought to be wiped out, and either nothing or a nominal sum inserted.

Mr. George Humphries-Davies, rating surveyor, of London, supported counsel's opening statement. He contended there was no ratable value at the present time. The witness put in an estimate based on the accounts for the year ending September 1910, pointing out that if proper provision had been made for depreciation and insurance against strikes, explosion, fire, flooding, &c., there would have been a deficit—before providing for tenants' profit and interest, rent payable to the landlord and royalties—of £1,058. A hypothetical tenant would, he added, have to provide £10,000 capital, and in respect of such a hazardous undertaking as a colliery interest should be put down at not less than 25 per cent., which was equal to £10,000 a year.

Mr. George Arthur Green, secretary to the company, the next witness, was questioned by Mr. Ryde as to the profits made by the company before 1908. Witness said that in 1907 the balance of profit and loss account was £4,900 Deducting debenture interest, it left a balance of £715. In 1906 there was a net profit of £5,161, in 1905 £3,719, and in 1901 £14,808.

Mr. Ryde, for the respondents, submitted he was entitled to see the agreement under which the coking company—the real appellants—held the premises, and ultimately the lease was produced.

Mr. George Arthur Mitcheson, mineral agent to the Duke of Sutherland, and formerly general manager of the Florence Colliery, also gave evidence.

Mr. William Frederick Clarke, M.Inst C.E., F.G.S. managing director of the Aldridge Collieries, gave evidence as to the abnormal difficulties encountered by the Florence Company, because of the great amount of cover and the shaly nature of the earth.

Col. R. S. Williamson, managing director of the Cannock and Rugeley Colliery, said he was chairman of the coking company referred to, and he was a director of Florence Colliery. Witness did not consider the property had any letting value as a colliery. The coking company would not have entered into the arrangement with the Florence Company in 1911 had it not been for the ironstone. The rents and royalties reserved in the sub-lease were the same as those reserved in the original lease with the Duke of Sutherland. The coking company also had the use of the Florence Company's plant without any further consideration. Provision was also made for the coking company determining the lease in the event of no profit being made either on the coal or ironstone. The Florence company was, in the first place, to receive the profits up to £2,500; after that the coking company received 10 per cent. interest upon their capital expended. At the same time the coking company entered into an agreement with another company to take all the calcined ironstone gotten at a sum which left a profit of 2s. per ton for the coking company. The total amount paid in 1911 by the coking company under the terms of the lease was £4,600.

Mr. Ryde, in addressing the Court for the respondents, said he wished to protest against the way the assessment committee had been treated. They had been led to believe all along that the appellants were the Florence Colliery, but apparently the real appellants and the only persons aggrieved were the coking company. The coking company had taken a new lease within a few weeks of the rate under appeal being made, and the rent paid under that lease was, of course, very important evidence in considering what rent a tenant might reasonably be expected to pay in May 1911 The coking company did agree to pay the previous month royalties which worked out at £4,600, and under certain conditions a great deal more He submitted this answered the statutory problem.

Mr. Edgar Howard Collins (Messrs. Howard Collins and Co., Westminster) gave evidence of a valuation he made on the instructions of the Assessment Committee. He made the ratable value for the year, based on output, £6,669

Mr. William Arthur Mason (Messrs. Hadley, Mason and Hadley, Birmingham) also described the method of his valuation, which brought the total ratable value to £3,737, whilst Mr. Alexander Smith, mining engineer, of Birmingham, who had also made a valuation, brought the ratable value out at £4,608.

Mr. Ryde urged that the problem of rating would be unworkable if, every time a colliery company or railway company had a good or bad year, it became necessary to put the rating up and down. The words of the statute were "the rent which might reasonably be expected to be paid." He submitted this question was answered by the terms of the sub-lease to the coking company.

After half an-hour's consultation the Bench dismissed the appeal with costs.

At Newcastle County Court on the 19th ult., Alexander Sinclair, auctioneer and coal merchant, Wick, brought an action for damages against Matthew Worth, shipbroker, for alleged breach of contract to deliver a quantity of coal—damages to the amount of £63 being claimed Defendant's traveller received an order from plaintiff for 170 tons of Tunstall coal at 14s. per ton free on board, and later 10 tons of smithies. The coal had not been delivered up to November, and in the course of correspondence defendant stated that Ryhope Colliery could not supply the coal owing to the railway strike. Plaintiff had purchased coal elsewhere, but not being of the same reputation as Tunstall it did not meet with the same demand in Wick. Of the amount claimed, £40 was for general damages. Defendant's case was that the vessel was waiting for her cargo when the railway strike stopped her, following which bad weather prevented her reaching port. Then after September 26 he kept the boat trading in the district waiting for the coal company to fix a loading date. Judge Greenwell gave judgment for the plaintiff for £9 15s. He regretted that plaintiff under the Sale of Goods Act could not recover more.

CONTINENTAL MINING NOTES.

Austria.

Government Enquiry on the Coal Industry.—At the enquiry held at the instance of the Ministry of Commerce on the Austrian coal industry and the existence of agreements among producers and distributors, it was stated that the coalowners in the Ostrau-Karwin district had formed a convention for the purpose of meeting the competition of imported coals from Upper Silesia, and to prevent undercutting. On behalf of the Convention it was claimed that the agreement merely fixed the minimum selling price to meet such competition without unduly restricting the output. For 1907 the average price per ton of coal at the pit mouth was 11 70 kronen; between 1908 and 1911 it averaged 12 74 kr., and in 1911 12 90 kr. During the same period the average net earnings of the miners per shift increased from 3 42 kr. to 3·72 kr., and in the present year to 3 92 kr. In addition the cost of production has increased; but this, it is claimed, has had to be borne by the coalowners. In connection with the question of price to the consumer, evidence was brought forward to show that the prices charged to retailers by wholesale merchants were only 20 heller per ton (0 20 kr.) over the cost price, in the case of truck loads, or 44 heller if supplied from the shutes, the advance to private customers being 50 heller. A member of the Vienna Coal Merchants' Association stated that wholesalers never made more than 4 to 5 kr. profit on a truck load, whilst some of the smaller firms worked at a loss. The enquiry revealed a comparatively unsatisfactory state of affairs, so far as the retailers are concerned. Though the prices charged are 80 heller per ton in Vienna and 50 to 60 heller in Graz, more than the wholesale prices, profits are very small or non-existent, owing to the small volume of business done—the average trade being 40 to 50 truckloads a year, and the net profit about 1,000 to 1,400 kr. per annum. The Convention opposed the fixing of prices by the State, and also the acquisition of collieries by the State; whereas the consumers' representatives urged the extension of State ownership for the purpose of controlling prices. A lively discussion took place on the question of the existence of a cartel agreement among the wholesale merchants, it being stated that a dealer who supplied coal at a low figure to the Association of Austrian Housewives had been threatened with underselling on the part of the wholesalers' association unless he increased his prices and subscribed to a cartel agreement, which he had been compelled to do. On the other hand, the association declared that there was no regulation of prices, each dealer fixing rates according to circumstances; and that the only agreement which existed related to freights and labour. The possibility of increasing the consumption of lignite in the capital was also investigated, and the action of the Ministry of Public Works in this connection was approved, more particularly from one point of view, in that this enlarged market for Bohemian lignite would tend to restrict competition from Upper Silesia, and thus benefit the Austrian pit coal industry as well. The conclusion formulated by the chairman of the enquiry was to the effect that no cartel agreement covering the whole of Austria is in existence.

Germany.

Miners' Housing Accommodation in the Ruhr District.—From a desire to secure continuous service, in view of the complicated local conditions prevailing in the collieries in the Ruhr district, the mineowners for some years past have devoted special attention to the provision of housing accommodation for the miners, at rents varying from 25 to 50 per cent. cheaper than privately owned property. Around Dortmund, for example, where the total number of miners is about 26,000, there are 5,410 such houses letting, with outbuildings and land, at 5 to 26 marks per month, and loans are granted at some collieries, at low rates of interest, to miners wishing to build houses for themselves. In the Ost-Recklinghausen district (24,800 men) there are 7,138 miners' dwellings and 841 houses rented by the mineowners, whilst 1,096 houses are owned by miners and officials. In West Recklingbausen (30,800 men) 1,763 houses are owned by the collieries, and 422 are now building. The State collieries have recently built 939 dwellings, the Graf Bismarck pit 189, and the Brassert and Baldin pits 433. At Nord Bochum (18,300 men) the pits own 2,716 houses, letting at 6 to 23 marks per month. At Herne (20,000 men) the number of miners' dwellings has recently increased from 1,049 to 3,984, chiefly at the Victor and Ickern collieries. In Gelsenkirchen (17,700 men) there are 3,596 houses, mostly with four rooms, and letting at 8 to 18 marks per month. In the Ost Essen district (17,000 men) five collieries own 3,457 houses accommodating 4,459 miners, 13,883 dependants and 744 boarders; rents, 2 50 to 5 marks per room per month. Each house has a patch of garden ground either included in the rent or at 30·40 pf a month extra; and allotments are granted at about 25 pf. per square rood. In West Essen (20,200 men) the number of houses is 6,691, an increase of 721, and others are being put up. In Sud Essen (15,500 men) seven collieries own 3,189 houses, all let below current prices; and premiums are given for tidiness, about one-half the monthly rent being remitted. In Werden (18,800 men) four collieries own 2,700 houses, and 132 are building. The Oberhausen Colliery grants building loans up to 1,000 marks, repayable at the rate of 20 marks per month free of interest. In Duisburg (23,100 men) three collieries own 9,049 dwellings, and 66 more are building. In the Hamm district (10,100 men) five collieries have 3,864 dwellings.

Exports and Imports of Fuel.—The following shows the exports and imports of coal, coke, &c., from and to Germany during May and the four months ended therewith:—

	May.		January-May.	
	1911. Tons.	1912. Tons.	1911. Tons.	1912. Tons.
Exports—				
Coal	2,325,346	2,480,522	10,712,366	13,022,847
Lignite	4,405	4,172	23,897	23,121
Coke	348,611	512,026	1,779,147	2,208,802
Coal briquettes	131,548	193,907	672,515	869,067
Lignite ditto	31,880	37,081	196,437	227,713
Imports—				
Coal	995,392	882,846	4,142,121	2,997,757
Lignite	666,723	503,825	3,026,004	2,934,312
Coke	51,506	48,767	248,802	220,702
Coal briquettes	11,576	3,372	50,336	22,147
Lignite ditto	8,168	7,399	45,853	53,234

The quantity of coal imported from Great Britain in May amounted to 794,773 tons, as against 877,254 tons in May 1911; in the five months 2,448,948 tons were imported, as against 3,547,349 tons in the corresponding period of last year. The following shows the quantities of coal and coke exported from Germany to some of her more important markets in May:—

To	Coal.		Coke.	
	May 1911. Tons.	May 1912. Tons.	May 1911. Tons.	May 1912. Tons.
Belgium	485,043	522,532	36,977	105,992
Denmark	6,322	19,418	545	1,658
France	307,307	255,671	141,726	167,435
Great Britain	—	8,081	168	150
Italy	64,419	51,151	9,545	15,389
Netherlands	504,321	487,523	14,666	16,966
Norway	465	3,589	2,483	3,803
Austria-Hungary	692,091	800,786	62,684	73,514
European Russia	74,810	104,039	27,136	47,470
Sweden	2,950	14,917	8,309	16,894
Switzerland	123,357	123,400	21,444	19,984
Spain	6,207	19,886	—	6,356
Egypt	13,203	5,220	—	—
Mexico	—	—	6,728	2,352
United States	—	—	820	2,683

Output of Fuel.—The following shows the production of coal, coke, &c., in Germany in May and the five months ended therewith:—

	May.		January-May.	
	1911. Tons.	1912. Tons.	1911. Tons.	1912. Tons.
Coal	13,872,914	14,731,098	66,334,976	70,817,532
Lignite	5,866,190	6 442,672	30,002,235	33,212,644
Coke	2,106,526	2,378,226	10,558,503	11,439,556
Coal briquettes	431,793	438,477	2,016,110	2,067,742
Lignite ditto	1,336,966	1,389,169	6,706,212	7,615,616

Coal Market in Upper Silesia.—The volume of traffic is large, though not so great as during the first four months of the year, during which period the English strike greatly increased the demand. Stocks are very small, and practically non-existent so far as industrial coals are concerned; and even in house coal there is an improved tendency, whilst gas coal and coking coal are well enquired after. The increased imports of English coal are having hardly any effect on the situation, the consignments from this district to Hanover, Mecklenburg, &c., being still satisfactory in volume. Russia and Austria-Hungary are large buyers, and the increased railway rates do not seem to have greatly affected the trade. The river is in good condition, and railway wagons are fairly plentiful. The coke market is quite as active as heretofore, blast-furnace and foundry coke, in particular, going off well.

Coal Market in South Germany.—Considerable shipments of fuel have been coming forward, the large supplies available in the Ruhr harbours having enabled the abundant supply of craft to be fully utilised. Frankfurt has been able to accommodate large stocks in the new eastern harbour; and extensive consignments have been forwarded as far as Basle. English coal is again coming freely into the district, but mostly to fulfil existing contracts, very little being offered for sale. Current business is small, and dealers are confining their purchases, for prompt delivery, to kinds which are due to advance in price on August 1. The demand for anthracite and large smithy nuts is accordingly good, whereas large bituminous nuts continue to be neglected.

Ruhr Coal Market.—The fact that English coal is once more appearing on the market in large quantities has not affected the Ruhr trade in the slightest degree. The main condition for active inland business—namely, a favourable state of the iron industry—actually exists, and seems likely to continue. The export trade is also very active, large consignments being sent to northern Germany, so that it would appear as though the Syndicate were able to retain a large share of the business wrested from importers of English coals. The demand for house coal is naturally low, and stocks are growing; and the peculiar condition of the coke market has led to coking coal being neglected. The main interest attaches to industrial coals; and large quantities of gas coals are being exported. The shipments to South Germany are also extensive, where a steady, active demand prevails. On the other hand, the coke market, though not actually in a bad way, is in such a peculiar state that the restoration of healthy conditions will be a matter of some difficulty. The arrangements with the outsiders and the State collieries have thrown large outputs on to the hands of the Syndicate, whilst the participation of the members has had to be increased owing to the new cokeries started; and, on the other hand, the demand has become smaller through the increase of the ironworks pits, which supply their own coke without contributing to the revenue of the Syndicate.

Coal Syndicate Report for May.—The total coal raised amounted to 7,990,369 tons (7,520,187 tons in April), or 319,615 tons (313,341 tons) per working day. The calculated distribution was 6,478,817 tons (6,196,470 tons), being 259,153 tons (258,186 tons) per working day, or 98·66 per (98·29 per cent.) of the participation. Total distribution from Syndicated pits 7,973,910 tons (7,643,361 tons), or 318,956 tons (318,473 tons) per working day. Deliveries, including local contracts, miners' house coal, and supplies to pits' own ironworks:—Coal, 5,274,614 tons (4,892,043 tons), or 210,985 tons (203,835 tons) per working day; coke, 1,561,774 tons (1,595,375 tons), or 50,380 tons (53,179 tons) per working day; briquettes, 346,289 tons (325,915 tons), or 13,852 tons (13,580 tons) per working day.

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The Second Chamber of the Dutch States General have this week discussed the proposed appropriation of 1,900,000 florins for the purpose of enlarging the State Mines exploitation area by 18,150 acres, including the land known as the Meuse field. M. Janssen (Catholic) and M. Bos (Liberal Democrat) raised objections to the scheme, whilst M. Van Karnebeek pointed out the danger of the German Coal Syndicate occupying these lands in the event of the latter being left open to private development. M. Vliegen (Socialist) supported the measure. M. Talma, Minister of Agriculture, pointed out how important it was for Dutch industry that foreign commerce and finance should not have Dutch coalfields in their hands. "The German Coal Syndicate," he said, "is no less useful to Germany than dangerous for us." We require a national mining industry. This, explained the Minister, was the principal reason why he did not wish to grant private concessions for this coal area. He was, however, negotiating with certain private firms for the exploitation of the De Peel coal basin with the aid of a subsidy by the State. The appropriation was agreed to by 52 votes to 11.

Russia.

During the first five months of the present year the Donetz collieries have delivered 438,000,000 poods of coal, as against 371,000,000 poods in the corresponding period of last year.

The Donetz coal trade has not been so active for many months as it is at the present time. Exports *viâ* Mariupol show a remarkable development, the Produgol Syndicate having sold considerable quantities of fuel in Roumania and Bulgaria, where British coal is exceptionally scarce. Trials of anthracite on the Midi railways have been made with satisfactory results.

The Edward Medal.—His Majesty King George held an investiture at Buckingham Palace on Monday, when several miners were decorated with the Edward Medal for gallantry. The Edward Medal of the First Class was bestowed upon Mr. Henry Merritt. On December 14, 1911, an underground fire broke out in the intake airway of the No. 9 Cannock Chase Colliery, which made it necessary to withdraw all the men. Most of the men reached the shaft safely, but it was found that five were still in the pit. Merritt, a fireman at the colliery, accompanied by a miner named Stokes, went to their rescue and succeeded in reaching them in a distant part of the workings in spite of the smoke, which was rapidly increasing in density. One of the men got out by holding on to Merritt, but the other four were suffocated. Merritt did not at first discover that the other men had not followed him, and when he became aware of this he made two further attempts to reach them, but was finally driven back by the smoke and reached the surface much exhausted. Stokes, who took part in this gallant attempt at rescue, unhappily also lost his life, and his Majesty has been pleased to award an Edward Medal of the First Class to his widow. A similar award was made to Mr. John Mitchell. On December 23, 1911, water broke into the Bamfurlong Colliery, near Wigan, in large quantities, and a party of 13 was cut off from safety by a heavy fall. Mitchell explored the roads in order to find a way of reaching these men, though the water was continually rising. After two hours' work, during which he was in constant danger of his life from falling roof and sides, he finally succeeded in making a passage through the fall, thereby rescuing all the men who had been cut off. The Edward Medal of the Second Class was awarded to Mr. George Edwards. On July 22, 1911, while driving a road to release an accumulation of gas at Bryncethin Colliery, near Bridgend, the manager and three men were overcome by a sudden outburst of gas. Mr. Edwards, the night overman, who was at home, was summoned, and with a rope tied round his legs he tried to reach the bodies of the three men who had not been rescued, but, being overpowered by the gas, had to be dragged out. On recovering, he made further attempts and succeeded in attaching a rope to the bodies of two of the men, who were drawn out, but unfortunately too late to save their lives.

OBITUARY.

It is with sincere regret that we have to announce the death, at the age of 60, of Mr. Enoch Edwards, M.P., president of the Miners' Federation of Great Britain. Mr. Edwards had been ill for some time, and there is no doubt that the great strain of the strike in the spring induced a nervous breakdown, which brought about his premature death. A Staffordshire man by birth, Mr. Edwards first saw the light at Talk-o'-th'-Hill in 1852. At the age of nine he began work in the Hollinwood Colliery, passing through all the stages from pit boy to checkweighman. At the age of 17 he went to the Talk-o'-th'-Hill pit, and was below ground at the time of the memorable explosion in 1873, but was, fortunately, uninjured. He was offered an official position at the colliery, but preferred to preserve his status of an ordinary collier. In 1874 he went to the Harecastle Colliery, where he again refused a responsible employment. Early in life Mr. Edwards joined the North Staffordshire Miners' Association, of a lodge of which he subsequently became treasurer. In 1875 he was appointed treasurer of the association, and in 1878 he was appointed secretary. In that capacity he played a prominent part in organising the Midland Miners' Federation. In 1888, when the Miners' Federation of Great Britain was formed, Mr Edwards was chosen for the responsible post of treasurer of the new organisation. Sixteen years of service in that capacity was rewarded in 1904 on the death of Mr. Ben Pickard, M.P., by election to the presidency of the Federation—a position he occupied up to his death. Simultaneously he occupied the post of vice-chairman of the Conciliation Board for the Coal Trade of the Federated Districts of England and North Wales, in which position his earnestness and tactfulness earned him the respect and esteem of the employers. To him was due, in no small measure, the improved status enjoyed by miners in the Midlands; at the same time, he was an avowed advocate of conciliatory measures, and was actively hostile to the more militant methods employed by some of his collaborators. He acted as a member of the Royal Commission on Mines. In 1884 Mr. Edwards removed to Burslem, and immediately began to take an active part in the local government of this and the other pottery towns. Two years later he began his electioneering career by securing a seat on the Burslem School Board, and in 1887 he was elected to the Town Council, subsequently being re-elected six times without opposition. In 1889 he became mayor of the borough, and in 1900 he was made a magistrate, and subsequently an alderman. His name first became connected with a political career in 1892, when he was adopted as miners' candidate for Newcastle-under-Lyme, the division at present represented by his late friend, Mr. Josiah C. Wedgwood; but he declined to go to the poll. In 1900 he consented to contest Hanley, but was beaten by 600; in 1906, however, he had his revenge by defeating Captain Heath by more than two to one, his majority being 4,896. Before the fusion with the Labour party Mr. Edwards served as chairman of the Trade Union group in Parliament. Mr. Edwards leaves three sons behind him.

[Photo by Elliott and Fry.

The Late Mr. Enoch Edwards, M.P.
President of the Miners' Federation of Great Britain.

On Saturday the death occurred of Mr. David Richard Lewis, Wind-street, in his eightieth year, who for the last 10 years was coal and wagon inspector under the Powell Duffryn Company, Aberaman. He took an active part in the formation of the Miners' Provident Fund. Some three years ago he was the recipient of a testimonial from his fellow townsmen, and members of various friendly societies and others, Lord Merthyr heading the list with 50 guineas.

The death occurred from heart failure on Saturday, at Great Comp, Borough Green, of Mr. Walter Stowe Bright McLaren, Liberal member for the Crewe Division of Cheshire, aged 59. He had been ill for some time, and visited India for the benefit of his health. Mr. McLaren was a director of the Dinnington Main Coal Company Limited, the Sheepbridge Coal and Iron Company Limited, the Tredegar Iron and Coal Company Limited, the Maltby Main Colliery Company Limited, the Oakdale Navigation Collieries Limited, the Dunderland Iron Ore Company Limited, the Brecon and Merthyr Tydfil Junction Railway Company, the Cleveland Salt Company Limited, Bolckow, Vaughan and Co. Limited, the Soria Mining Company Limited, the Electric Construction Company Limited, James Dunlop and Co. Limited, the Madras Electric Railways (1904) Limited, the North American Land and Timber Company Limited, and the National General Insurance Company Limited, and he was also connected with other concerns. He was a member of the South Wales Coal Conciliation Board, and during the recent strike his efforts to bring about a settlement were unremitting. Mr. McLaren was the fourth son—by his third wife, Priscilla, daughter of the late Jacob Bright and sister of John Bright—of the late Mr. Duncan McLaren, of Edinburgh, who was Lord Provost, and for many years member for the city of Edinburgh. He was a half-brother of the late Lord McLaren, and brother of Lord Aberconway. Mr. McLaren's first attempt to enter Parliament was in 1885, when he unsuccessfully contested Inverness Burghs. The following year he was elected for Crewe, which he represented until 1895. In 1910 he was again elected for the same constituency. Mr. McLaren married, in April 1883, Eva, the youngest daughter of Mr. William Müller, of Hillside, Herts, and Valparaiso, Chile. There are no children of the marriage.

The death has occurred of Major Harvey Scott, D.S.O. (well known on Newcastle Quayside), in New South Wales. The deceased gentleman, who was 44 years of age, was a son of the late Alderman John Oliver Scott. Major Harvey Scott was a partner with his brother in the firm of Messrs. John O. Scott and Co., shipowners and colliery owners, of Newcastle, and about three years ago he retired from business and went to Australia to reside, subsequently purchasing a farm at Richmond, about 60 miles north of Sydney. He went to South Africa in command of the Elswick battery in 1900, and was mentioned in despatches during the Boer War. He received the Queen's medal and four clasps, and was decorated with the D.S.O. for distinguished service. On the return home of the Elswick battery he was the recipient of the honorary freedom of Newcastle, in recognition of his patriotic services to his country.

At Colwyn Bay, on Tuesday, the death took place of Mr. William Henry Bleckly, J.P., Thelwall Lea, near Warrington, deputy-chairman and managing director of the Pearson and Knowles Coal and Iron Company Limited, Warrington and Wigan. He was vice-president and hon. treasurer of the Iron and Steel Institute, and trustee of the Bessemer Medal Fund. Mr. Bleckly was the eldest son of Henry Bleckly, former chairman of Liverpool Quarter Sessions. He joined his father at Dallam Forge, Warrington, in 1856, when the Lancashire iron trade was in its infancy, and in spite of the strong competition of the Staffordshire trade, flourished, and Bewsey Forge was set up to accompany Dallam Forge. Later these concerns were amalgamated, and the collieries of Messrs. Pearson and Knowles were acquired. The iron and steel department of the firm, managed by Mr. Bleckly and his brother, Mr. J. J. Bleckly, now employs upwards of 2,000 hands. The late Mr. Bleckly was a director of the Partington Steel Works, now being erected on the banks of the Ship Canal. He was born at Northallerton. He married the youngest daughter of Mr. John Johnson, of Easingwold, York, and leaves a widow and three sons and one daughter. His age was 72.

The death is announced of Mr. William Grove, who for many years resided at Loxdale House, Bilston, and had recently resided at Tettenhall. Mr. Grove was well known in the Bilston district, and for many years he acted as the mining engineer and general agent of the Loxdale and Warren estate, a position which was previously held by his father. Mr. Grove, besides being extensively connected with the mining industries of South Staffordshire, was well known in the Shropshire coalfields, having acted as mining adviser to many large landowners in that county. He was much interested in the establishment of the South Staffordshire Mines Drainage Commission, and the benefit of his experience was frequently placed at the service of the Commissioners. He was in a fair state of health until a few weeks ago, but was then seized with the illness which resulted in his death at the age of 74 years. Mr. Grove was a widower, but leaves one son and four daughters.

The Swedish steamship "Drotning Sophia" last week shipped at Immingham Dock what is believed to be the largest coal cargo ever taken from the Humber. It comprised 7,500 tons.

[Photo by Lafayette, Manchester.
His Honour Judge
James Kinder Bradbury, K.C.,
Lancashire and Cheshire: North Staffordshire.

[Photo by Elliott & Fry.
Honour Judge
R Barry Lindley, K.C.,
ept South Derbyshire).

[Photo by Elliott & Fry.
His Honour Judge Arthur O'Connor, K.C.,
Leicestershire.

[Photo by A. Lewis & Son.
Ald. G. Pearson,
Bristol

[Photo by Elliott & Fry.
Honour Judge
KE Stanger, K.C.,
inghamshire.

Mr. Russell J. Kerr,
Forest of Dean.

[Photo by S. Ward.
Mr. John Burnett,
Scotland.

[Photo by Langton.
George Peel,
Somerset.

[Photo by Lafayette, Glasgow
Sir Thomas Mason,
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Sir Walter Roper Lawrence, Bart.,
G.C.I.E.,
South Staffordshire (except Cannock Chase) and
Worcestershire: Warwickshire.

[Photo by Lafayette.
Hudson, K.C.,
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The Edward Medal.—His Majesty King George held an investiture at Buckingham Palace on Monday, when several miners were decorated with the Edward Medal for gallantry. The Edward Medal of the First Class was bestowed upon Mr. Henry Merritt. On December 14, 1911, an underground fire broke out in the intake airway of the No. 9 Cannock Chase Colliery, which made it necessary to withdraw all the men. Most of the men reached the shaft safely, but it was found that five were still in the pit. Merritt, a fireman at the colliery, accompanied by a miner named Stokes, went to their rescue and succeeded in reaching them in a distant part of the workings in spite of the smoke, which was rapidly increasing in density. One of the men got out by holding on to Merritt, but the other four were suffocated. Merritt did not at first discover that the other men had not followed him, and when he became aware of this he made two further attempts to reach them, but was finally driven back by the smoke and reached the surface much exhausted. Stokes, who took part in this gallant attempt at rescue, unhappily also lost his life, and his Majesty has been pleased to award an Edward Medal of the First Class to his widow. A similar award was made to Mr. John Mitchell. On December 23, 1911, water broke into the Bamfurlong Colliery, near Wigan, in large quantities, and a party of 13 was cut off from safety by a heavy fall. Mitchell explored the roads in order to find a way of reaching these men, though the water was continually rising. After two hours' work, during which he was in constant danger of his life from falling roof and sides, he finally succeeded in making a passage through the fall, thereby rescuing all the men who had been cut off. The Edward Medal of the Second Class was awarded to Mr. George Edwards. On July 22, 1911, while driving a road to release an accumulation of gas at Bryncethin Colliery, near Bridgend, the manager and three men were overcome by a sudden outburst of gas. Mr. Edwards, the night overman, who was at home, was summoned, and with a rope tied round his legs he tried to reach the bodies of the three men who had not been rescued, but, being overpowered by the gas, had to be dragged out. On recovering, he made further attempts and succeeded in attaching a rope to the bodies of two of the men, who were drawn out, but unfortunately too late to save their lives.

OBITUARY.

It is with sincere regret that we have to announce the death, at the age of 60, of Mr. Enoch Edwards, M.P., president of the Miners' Federation of Great Britain. Mr. Edwards had been ill for some time, and there is no doubt that the great strain of the strike in the spring induced a nervous breakdown, which brought about his premature death. A Staffordshire man by birth, Mr. Edwards first saw the light at Talk-o'-th'-Hill in 1852. At the age of nine he began work in the Hollinwood Colliery, passing through all the stages from pit boy to checkweighman. At the age of 17 he went to the Talk-o'-th'-Hill pit, and was below ground at the time of the memorable explosion in 1873, but was, fortunately, uninjured. He was offered an official position at the colliery, but preferred to preserve his status of an ordinary collier. In 1874 he went to the Harecastle Colliery, where he again refused a responsible employment. Early in life Mr. Edwards joined the North Staffordshire Miners' Association, of a lodge of which he subsequently became treasurer. In 1875 he was appointed treasurer of the association, and in 1878 he was appointed secretary. In that capacity he played a prominent part in organising the Midland Miners' Federation. In 1888, when the Miners' Federation of Great Britain was formed, Mr. Edwards was chosen for the responsible post of treasurer of the new organisation. Sixteen years of service in that capacity was rewarded in 1904 on the death of Mr. Ben Pickard, M.P., by election to the presidency of the Federation—a position he occupied up to his death. Simultaneously he occupied the post of vice-chairman of the Conciliation Board for the Coal Trade of the Federated Districts of England and North Wales, in which position his earnestness and tactfulness earned him the respect and esteem of the employers. To him was due, in no small measure, the improved status enjoyed by miners in the Midlands; at the same time, he was an avowed advocate of conciliatory measures, and was actively hostile to the more militant methods employed by some of his collaborators. He acted as a member of the Royal Commission on Mines. In 1884 Mr. Edwards removed to Burslem, and immediately began to take an active part in the local government of this and the other pottery towns. Two years later he began his electioneering career by securing a seat on the Burslem School Board, and in 1887 he was elected to the Town Council, subsequently being re-elected six times without opposition. In 1889 he became mayor of the borough, and in 1900 he was made a magistrate, and subsequently an alderman. His name first became connected with a political career in 1892, when he was adopted as miners' candidate for Newcastle-under-Lyme, the division at present represented by his late friend, Mr. Josiah C. Wedgwood; but he declined to go to the poll. In 1900 he consented to contest Hanley, but was beaten by 600; in 1906, however, he had his revenge by defeating Captain Heath by more than two to one, his majority being 4,896. Before the fusion with the Labour party Mr. Edwards served as chairman of the Trade Union group in Parliament. Mr. Edwards leaves three sons behind him.

[*Photo by Elliott and Fry.*

THE LATE MR. ENOCH EDWARDS, M.P.
President of the Miners' Federation of Great Britain.

On Saturday the death occurred of Mr. David Richard Lewis, Wind-street, in his eightieth year, who for the last 10 years was coal and wagon inspector under the Powell Duffryn Company, Aberaman. He took an active part in the formation of the Miners' Provident Fund. Some three years ago he was the recipient of a testimonial from his fellow townsmen, and members of various friendly societies and others, Lord Merthyr heading the list with 50 guineas.

The death occurred from heart failure on Saturday, at Great Comp, Borough Green, of Mr. Walter Stowe Bright McLaren, Liberal member for the Crewe Division of Cheshire, aged 59. He had been ill for some time, and visited India for the benefit of his health. Mr McLaren was a director of the Dinnington Main Coal Company Limited, the Sheepbridge Coal and Iron Company Limited, the Tredegar Iron and Coal Company Limited, the Maltby Main Colliery Company Limited, the Oakdale Navigation Collieries Limited, the Dunderland Iron Ore Company Limited, the Brecon and Merthyr Tydfil Junction Railway Company, the Cleveland Salt Company Limited, Bolckow, Vaughan and Co. Limited, the Soria Mining Company Limited, the Electric Construction Company Limited, James Dunlop and Co. Limited, the Madras Electric Railways (1904) Limited, the North American Land and Timber Company Limited, and the National General Insurance Company Limited, and he was also connected with other concerns. He was a member of the South Wales Coal Conciliation Board, and during the recent strike his efforts to bring about a settlement were unremitting. Mr. McLaren was the fourth son—by his third wife, Priscilla, daughter of the late Jacob Bright and sister of John Bright—of the late Mr. Duncan McLaren, of Edinburgh, who was Lord Provost, and for many years member for the city of Edinburgh. He was a half-brother of the late Lord McLaren, and brother of Lord Aberconway. Mr. McLaren's first attempt to enter Parliament was in 1885, when he unsuccessfully contested Inverness Burghs. The following year he was elected for Crewe, which he represented until 1895. In 1910 he was again elected for the same constituency Mr. McLaren married, in April 1883, Eva, the youngest daughter of Mr. William Müller, of Hillside, Herts, and Valparaiso, Chile. There are no children of the marriage.

The death has occurred of Major Harvey Scott, D.S.O. (well known on Newcastle Quayside), in New South Wales. The deceased gentleman, who was 44 years of age, was a son of the late Alderman John Oliver Scott. Major Harvey Scott was a partner with his brother in the firm of Messrs. John O. Scott and Co., shipowners and colliery owners, of Newcastle, and about three years ago he retired from business and went to Australia to reside, subsequently purchasing a farm at Richmond, about 60 miles north of Sydney. He went to South Africa in command of the Elswick battery in 1900, and was mentioned in despatches during the Boer War. He received the Queen's medal and four clasps, and was decorated with the D.S.O. for distinguished service. On the return home of the Elswick battery he was the recipient of the honorary freedom of Newcastle, in recognition of his patriotic services to his country.

At Colwyn Bay, on Tuesday, the death took place of Mr. William Henry Bleckly, J.P., Thelwall Lea, near Warrington, deputy-chairman and managing director of the Pearson and Knowles Coal and Iron Company Limited, Warrington and Wigan. He was vice-president and hon. treasurer of the Iron and Steel Institute, and trustee of the Bessemer Medal Fund. Mr. Bleckly was the eldest son of Henry Bleckly, former chairman of Liverpool Quarter Sessions. He joined his father at Dallam Forge, Warrington, in 1856, when the Lancashire iron trade was in its infancy, and in spite of the strong competition of the Staffordshire trade, flourished, and Bewsey Forge was set up to accompany Dallam Forge. Later these concerns were amalgamated, and the collieries of Messrs. Pearson and Knowles were acquired. The iron and steel department of the firm, managed by Mr. Bleckly and his brother, Mr. J. J. Bleckly, now employs upwards of 2,000 hands. The late Mr. Bleckly was a director of the Partington Steel Works, now being erected on the banks of the Ship Canal. He was born at Northallerton. He married the youngest daughter of Mr. John Johnson, of Easingwold, York, and leaves a widow and three sons and one daughter. His age was 72.

The death is announced of Mr. William Grove, who for many years resided at Loxdale House, Bilston, and had recently resided at Tettenhall. Mr. Grove was well known in the Bilston district, and for many years he acted as the mining engineer and general agent of the Loxdale and Warren estate, a position which was previously held by his father. Mr. Grove, besides being extensively connected with the mining industries of South Staffordshire, was well known in the Shropshire coalfields, having acted as mining adviser to many large landowners in that county. He was much interested in the establishment of the South Staffordshire Mines Drainage Commission, and the benefit of his experience was frequently placed at the service of the Commissioners. He was in a fair state of health until a few weeks ago, but was then seized with the illness which resulted in his death at the age of 74 years. Mr. Grove was a widower, but leaves one son and four daughters.

The Swedish steamship "Drotning Sophia" last week shipped at Immingham Dock what is believed to be the largest coal cargo ever taken from the Humber. It comprised 7,500 tons.

Supplement to the "Colliery Guardian," July 5, 1912.

The Coal Mines (Minimum Wage) Act, 1912.

CHAIRMEN OF THE JOINT DISTRICT BOARDS.

[Photo by Lafayette, Manchester.
His Honour Judge
James Kinder Bradbury, K.C.,
Lancashire and Cheshire: North Staffordshire.

[Photo by Elliott & Fry.
Sir W. J. Collins,
Cumberland.

[Photo by Elliott & Fry.
His Honour Judge
The Hon. Walter Barry Lindley, K.C.,
Derbyshire (except South Derbyshire).

[Photo by Elliott & Fry.
His Honour Judge Arthur O'Connor, K.C.,
Leicestershire.

[Photo by A. Lewis & Son.
Ald. G. Pearson,
Bristol

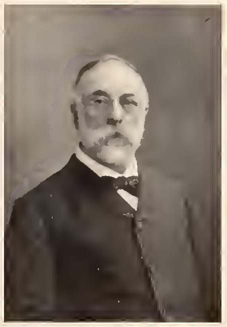
[Photo by J. W. Bernard.
Sir Clarendon Hyde,
Cannock Chase.

[Photo by Elliott & Fry.
The Right Hon. Sir Edward Clarke, K.C.,
South Yorkshire.

[Photo by Elliott & Fry.
The Right Hon. Viscount St. Aldwyn,
South Wales and Monmouthshire.

[Photo by Elliott & Fry.
His Honour Judge
Henry Yorke Stanger, K.C.,
Nottinghamshire.

Mr. Russell J. Kerr,
Forest of Dean.


[Photo by S. Ward.
Mr. John Burnett,
Scotland.

Ald. T. Smith,
Somerset.

[Photo by Elliott & Fry.
The Right Hon. Sir Robert Romer, G.C.B.,
Durham: Cleveland.

[Photo by Elliott & Fry.
The Right Hon. Lord Mersey,
Northumberland.

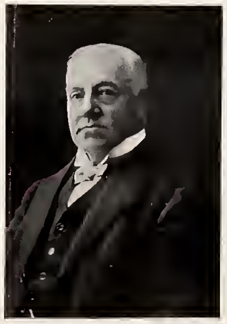
[Photo by Langton.
The Hon. George Peel,
Somerset.

[Photo by Lafayette, Glasgow
Sir Thomas Mason,
Scotland.

[Photo by Elliott & Fry.
Sir Walter Roper Lawrence, Bart.,
G.C.I.E.,
South Staffordshire (except Cannock Chase) and
Worcestershire: Warwickshire.

[Photo by Lafayette.
His Honour Sheriff
A. O. M. Mackenzie, K.C.,
Scotland.

[Photo by F. Bennett & Sons.
His Honour Judge
Richard Holmden Amphlett, K.C.,
West Yorkshire.


[Photo by Romney Studios.
Mr. B. Francis-Williams, K.C.,
North Wales: Shropshire.

[Photo by Lafayette.
Mr. A. J. Hudson, K.C.,
South Derbyshire.

[Photo by Rudduck Ltd.
His Honour Judge
James Valentine Austin,
Somerset.

THE COAL AND IRON TRADES.

THURSDAY, JULY 4.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week, 136,359 tons of coal and 2,703 tons of coke were despatched from Tyne Dock, a decrease of 3,211 tons of coal and an increase of 313 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 73,117 tons of coal and 339 tons of coke, an increase of 6,560 tons of coal and a decrease of 8,350 tons of coke. The Blyth shipments totalled 94,818 tons of coal and coke, a decrease of 1,356 tons. Latest information with reference to the Brussels Gasworks annual requirements goes to show that only 116,000 tons of coal—of the half-million tons required—have yet been ordered. The allotment is as follows:—24,000 tons of Durhams, 12,000 tons Yorkshires, and 60,000 tons Westphalians. The Durham coal is stated to have been arranged for at about current prices. The contract to supply the Christiania Gasworks with 35,000 tons of Durham gas coal has been secured by local merchants as follows:—Holmside coals, 12s. 9½d. per ton f.o.b.; Benwell, 12s. 6d.; Londonderry, 13s.; and Auckland, 12s. These prices show an advance of about 3s. per ton as compared with those paid last year. The following steam coal sales are reported:—Several parcels of Tyne primes, for delivery over the remainder of the Baltic season at 12s. per ton f.o.b. and upwards; considerable quantities of best Blyths, for forward shipment at 13s. and upwards; 20,000 tons Broomhills, for delivery over the next six months at 12s. for large and 6s. 6d. for smalls; a quantity of Hastings-Hartleys, for July shipment at 11s. 3d., and another lot for August delivery at 11s. 6d. The Wismar Railways are stated to have postponed allotment of their contract for the present, on account of the prevalent high prices. The Sunderland Gasworks are stated to have allotted contracts for 200,000 tons of gas coal, for delivery over 12 months, at about 12s. 6d. for bests and somewhat lower figures for seconds. From 10,000 to 20,000 tons of superior Durham bunkers have been sold, for delivery over 12 months, at 12s. 6d. f.o.b. Tees. The South Shields Gasworks are stated to be in close treaty for their annual supplies, and the allotment is expected to be announced this week. Although tonnage shortage is still a serious obstacle to business, there is a strong enquiry for coal, and collieries report improving turns. Quotations for prompt shipment are generally well maintained this week, and prices for forward loading are upheld without much difficulty. Buyers are holding off as best they can, but collieries, on the other hand, maintain a firm attitude, and are not disposed to make much concession. Quotations for prompt shipment are as follow:—Best steams, Blyths (D.C.B.), 12s. 9d. to 13s. per ton f.o.b., unchanged on the week; Tynes (Bowers, &c.), 12s. 3d., 3d. increased; seconds, Blyths, 11s., from 3d. to 6d. dearer; Tynes (Hastings or West Hartleys), 11s. 3d. to 11s. 6d., from 3d. to 6d. higher; unscreened, 10s. to 10s. 3d., similarly increased; smalls, Blyths, 8s. 3d., from 6d. to 9d. decreased; Tynes, 7s. 6d., from 3d. to 6d. lower; specials, 9s. to 9s. 6d., similarly fallen; smithies, 11s. to 11s. 3d., 3d. down; gas bests (New Pelton or Holmside), 13s., 1½d. lower; seconds (Pelaw Main or similar), 10s. 9d. to 11s., unaltered; specials, 13s. 6d., firm; unscreened bunkers, Durhams, 10s. 6d. to 11s., in sellers' favour; Northumbrians, 9s. 9d. to 10s. 3d., 3d. advanced; coking coal, 10s. 3d. to 10s. 9d., well maintained; smalls, 10s., no change; households, 14s. 6d., steady; coke, foundry, 21s. 6d. to 22s., stronger; blastfurnace, 16s. 6d. to 19s., from 6d. to 1s. higher; and gas coke, 17s. 9d., unaltered.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 99,960 tons of coal and 215 tons of coke, as compared with 97,280 tons of coal and 1,010 tons of coke for the corresponding period of 1911, being an increase of 2,700 tons of coal and a decrease of 795 tons of coke. There is a fair demand for coals, and the supply is fuller than it was last week. There is still, however, a scarcity of prompt tonnage, hence not much business is doing. A good demand continues for forward positions, and values are generally steady. In bunker coals there is a fair enquiry, and recent prices still prevail. In the gas coal trade there is a fair demand for this season, bests being firm at 13s. per ton free on board; second qualities are plentiful at 10s. 6d. to 11s. per ton. The Sunderland Gas Company is said to have paid about 12s. 6d. on contract for best gas coal, and part of the Christiania Gas Company's contract has been placed with Londonderry at 13s. per ton, f.o.b. Seaham Harbour. The demand for coke for local consumption is still heavy, and prices are strongly held. There is also a good export enquiry. Quotations are:—Special Wear gas 14s., coking unscreened 10s. 3d. to 10s. 9d., smalls 10s., smithies 13s. to 14s., household ordinaries 14s., bests 15s., peas and nuts 13s. to 14s., foundry coke 22s. 6d. to 23s. 6d., gas house coke 18s. to 18s. 6d., blast furnace coke 20s. at the Teesside furnaces. Bunker quotations are:—Morrison's Marley Hill, 11s. 3d., Priestman's, Burnhope, Consett 11s., Pease's, South Derwent, Framwell-gate, 10s. 6d., Lambton, South Hetton, 10s. 6d., Ryhope 11s. 6d., all f.o.b. South Dock. It is reported that 10,000 to 20,000 tons of superior bunkers have been sold for delivery over 12 months at 12s. 6d. per ton, f.o.b. in the Tees. In the freight market there is a good enquiry, and as tonnage is only sparingly offered rates are firmer all round. In the coasting trade London is 3s. 6d. to 3s. 9d., with Antwerp 4s. 10½d., and Havre 6s. 6d. There is growing demand for Baltic boats, and 6s. 6d. is now the rate for Cronstadt, with 6s. 3d. for Swinemunde, and rates are expected to go higher. The Bay is steady; 8s. has been paid for Bilbao. Mediterranean is very firm; 12s. is now obtainable for suitable tonnage for Genoa, and Alexandria will pay the same rate.

Middlesbrough-on-Tees.

COAL.

There is a somewhat quieter feeling in the fuel trade. Supply of coal is full, and for prompt delivery prices are easy. Deliveries of gas coal are good for this season of the year, and best Durhams run from 13s. to 13s. 6d. f.o.b. It is understood that of the contracts for coal for Brussels gas supply some 24,000 tons have been allotted to Durham, and 15,000 tons to Yorkshire pits. There is an ample supply of bunker coal to meet the large demand. Unscreened Durhams of the usual classes range from 10s. 3d. to 10s. 6d. f.o.b., and special kinds are quoted 11s. 6d. to 12s. Household coal is abundant, and prices are weak. Coking coal is rather easy. There is a better supply of coke, and the heavy local requirements are now being fairly well met. With more coke on the market, prices are not quite so strong as they have been. Average blast-furnace kinds are 19s. 6d. delivered at Teesside works. Foundry coke for shipment is quoted 22s. 6d. f.o.b. and upward.

IRON.

Shipments of iron and steel for the month of June were quite up to expectations. Those of pig iron amounted to 111,626 tons, 104,136 tons of which went from Middlesbrough, and 7,690 tons from Skinningrove. For the previous month the clearances of pig reached 112,723 tons, and the despatches for June last year were returned at 109,219 tons. All the pig shipped at Skinningrove last month went to Scotland. Of the pig loaded at Middlesbrough last month, 69,002 tons went to foreign ports and 35,134 tons coastwise. Scotland was again the largest customer, receiving 22,880 tons; whilst Germany took 16,665 tons, Russia 11,200 tons, Japan 5,625 tons, Belgium 5,652 tons, France 5,420 tons, Wales 4,630 tons, Canada 3,675 tons, Holland 3,660 tons, and Sweden 3,620 tons. Of the 11,336 tons of manufactured iron shipped from the Tees last month, 9,170 tons went abroad and 2,166 tons coastwise; and of the 29,655 tons of steel cleared, 24,524 tons went foreign and 5,331 tons were despatched to coastwise destinations. The market is rather unsteady, so far as Cleveland pig iron is concerned, due to erratic movements of warrants caused by the operations of speculators. This week, up to 57s. 7½d. has been realised for early f.o.b. delivery of No. 3 g.m.b. Cleveland pig iron, but there are now sellers at 57s. No. 1 is 62s., No. 4 foundry and No. 4 forge each 56s. 10½d., and mottled and white iron each 56s. 6d. Fairly good enquiries for east coast hæmatite pig are reported, and mixed numbers have been raised to 73s. 6d. for both early and forward business—that figure has been paid for delivery to the end of the year. Foreign ore shows an upward tendency. Prices are based on 21s. 6d. to 22s. ex-ship Tees for best rubio. Producers of all descriptions of manufactured iron and steel are very busily employed, many firms having so much in hand that they cannot enter into further contracts for anything like early delivery. Quotations all round are stationary.

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South-West Lancashire.

COAL.

The demand for inland house coal is only on a summer basis. Prices are unchanged, and rule about 15s. 6d. for the best grades, 14s. for good medium sorts, with kitchen coals about 11s. 6d.—all into wagons at the pit. Full supplies of screened coal continue to be demanded by forges and manufactories, and prices range from 11s. to 12s. per ton at the pit. Steam coal on bunker account is in fair demand, the quantities for coastwise excursion traffic daily increasing as the season advances. There is, however, nothing fresh with regard to prices of Lancashire steam coals, these ranging from 11s. 6d. f.o.b. tips for ordinary qualities and upwards. There is a very brisk enquiry for all qualities of slack, and supply seems to be falling short of consumption, causing prices for this fuel to further harden. For the time of the year the coastwise and cross-channel household trade is good. Best coal rules at 14s. 6d. to 15s., with good seconds 13s. 6d. to 13s. 9d., both f.o.b. and net. Slacks are very firm in tone, both for open supply and contract, and scarce in quantity. List prices are from 9s. 9d. to 10s. for the best rough qualities, 9s. to 9s. 3d. good medium grades, and 8s. 6d. or near that for the smaller and commoner varieties—all per ton and at the pit.

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South Lancashire and Cheshire.

COAL.

The demand for house coal remains at a somewhat low level, but prices are steady at late rates; 16s. to 16s. 9d. for best coal, 14s. 6d. to 15s. 6d. for medium, and 11s. 9d. to 12s. 9d. for kitchen qualities, all at pit. Furnace coal still meets with a steady enquiry, prices being unchanged at about 12s. 6d. per ton at the pit. Shipping coal is in improving demand, and prices are steady at 12s. to 14s. f.o.b. Partington. Slack is very brisk, and prices are firm at about 9s. to 9s. 9d. for the better qualities, with second grades at 8s. to 8s. 6d., all at pit. There is no information as to gas fuel contracts.

IRON.

Pig iron remains firm, and prices are well maintained. Forges are very busy on Crown bars at £8, second quality £7 10s., hoops £8 2s. 6d. Steelworks are full of work, with bars at £7 15s. and up, less 2½ per cent., and billets £5 17s. 6d. net. Founders and engineers are only moderately employed. Wagon works are very busy.

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Yorkshire and Derbyshire.

Leeds.

COAL.

The feature of Tuesday's market, which was well attended, was the all-round firmness of prices. In spite of short time work at some of the house coal pits and the fairly big stocks in colliery sidings, merchants were unable to secure concessions in prices, and forward business was particularly firm. The unseasonable weather and the turn of the month have caused a better demand for house coal, and the output of the week has been cleared without increasing stocks. London merchants have taken fair supplies of the standard qualities at about the following pit prices:—Haigh Moor selected, 14s.; Wallsend and London best, 13s.; Silkstone best, 13s.; Silkstone house, 12s. to 12s. 6d.; house nuts, 10s. 6d. to 11s. 6d. A few contracts with London merchants have been booked, those on the sliding scale averaging 1s. 6d. advance on last year's basis, while fixed-price contracts have realised 2s. to 2s. 6d. per ton advance. It is reported that one large colliery in Derbyshire has sold over 400,000 tons of house coal, in forward contracts alone, at 2s. 6d. per ton advance, and that these sales have nearly all been booked within the past 10 days. The coastwise trade is fairly brisk, although very little is going into the Thames. Current f.o.b. Hull prices: Haigh Moor house coal, 15s. 6d. to 16s. 6d.; Silkstone best, 14s. 9d. to 15s. 6d.; Silkstone house, 13s. 9d. to 14s. 6d.; house nuts, 12s. 6d. to 13s. In Leeds, Bradford, Halifax, Huddersfield and other West Riding centres merchants report a better demand from the public, more particularly for the cheaper grades such as cobbles, seconds and house nuts. Pit prices: Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. to 16s.; ordinary house, 14s. to 15s.; secondary sorts, 12s. to 13s. 6d. Manufacturing sorts have a hardening tendency, and no difficulty is found in realising the following pit prices:—Large double-screened engine nuts, 10s. to 11s.; small engine nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slacks, 8s. to 9s.; small slacks, 7s. to 7s. 6d.; coking smalls, 6s. 3d. to 6s. 9d. Makers of washed furnace coke are quoting 15s. 6d. per ton at the ovens for open market sales, and up to 16s. for contract to the end of the year. Supplies are quite inadequate to meet the demand, and there are no stocks anywhere. The gas coal position is, if anything, stronger on the week. Quite a number of gas coal buyers have refused to buy on the tenders submitted to them, and are seeking supplies on the open market; but current prices are about equal to contract rates, and they are having to risk the market without any corresponding advantage. A well-known gas engineer has recently stated that the higher price of gas coke and residuals generally over the next twelve months will more than compensate them, even if they have to pay the half-crown advance. Current pit prices:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal, 9s. to 10s. Exports of gas coal are increasing, and the following f.o.b. Hull figures are firmly quoted:—Screened gas coal, 12s. 6d. to 13s. 3d.; gas nuts, 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d. to 12s. 6d.

Barnsley.

COAL.

Though there has been no material alteration on the week so far as the demand is concerned, which is generally of a vigorous character, the tone for forward business is decidedly stronger. Coalowners in many respects are so strongly placed as almost to ignore the need for entering upon any further obligations, except at such rates as buyers consider are impossible, and prefer to risk the operations in the open market. So far as the management of collieries is concerned, the trouble arising out of the Minimum Wage Act, which is pleasing nobody, is becoming very real, and so onerous are the financial obligations that the greatest care is requisite to protect the interests of colliery proprietors. The Miners' Association are complaining of the large number of men thrown upon their funds by having left work, and the inevitable process of weeding out the incompetent or unwilling worker is but a natural sequence. However, so far as the trade generally is concerned, the possible outcome will be a reduced output owing to a shortage of men who are competent, so that at the present, in spite of the full working, there is a considerable shortage in the production, which will have serious results. This is being felt especially in regard to the smaller kinds of steam fuel, with the consequence that the present higher prices may probably be further advanced until a bigger tonnage is available. Though the export trade continues to be below the expected volume, considering the arrears of shipment it is of a substantial character, but the weakness has not in any way affected values, which are fully maintained on the week. The greater bulk of the production of the best hards are going to home markets with prices from 10s. 9d. to 11s. per ton. More is being done with secondary sorts for the foreign markets, and in this respect values are strong at 10s. to 10s. 3d. per ton, but only for current delivery. The big volume of business for steam nuts is in no way diminished, and for the best washed sorts from 10s. to 10s. 6d. per ton has to be paid, the secondary grades making from 9s. 6d. to 10s. per ton. Pea nuts and slacks are also in particularly good request. The former class of coal is making from 8s. 6d. to 9s. per ton, whilst best slacks are about 8s. per ton, and rougher qualities from 7s. to 7s. 6d. per ton. In respect to the latter classes of fuel buyers show keenness to fix up contracts for supplies, and fully 2s. 6d. per ton over last year's rates are being paid, particularly by engineering firms in the towns near to the coalfield. With respect to gas coal, though the volume of fuel contracted for over next year is not extensive, coalowners are taking a very optimistic view of the position. The better grade of coal is especially strong, and it seems certain 2s. per ton if not 2s. 6d. per ton will have to be paid, though there are indications that a smaller rate of advance is being accepted by sellers of what is regarded as secondary quality fuel. The house coal trade has again profited considerably on the week by the variable weather, though it is more likely the extra buying for London and the eastern counties has been for stocking purposes. The position has so materially assisted collieries that renewals of contracts are being obtained, it is said, at from 2s. to 2s. 6d. per ton, but in the Midland towns not much in this direction has been done. Stocks at collieries are low, and the absence of spot clearances has given much strength to current prices, which are:—Silkstone, 13s. 6d. per ton; best Barnsley softs, 12s. 6d. per ton; seconds, 11s. to 11s. 6d. per ton; nuts, 9s. 6d. to 10s. per ton. In regard to coke, the position is unaltered, and is likely to be with the scarcity of coking fuel and the high prices. Values are therefore of a firm character, being about 14s. per ton at the ovens for ordinary brands.

Chesterfield.

COAL.

There is a fair demand for house coal, prices of which remain firm at the recently advanced figures. New contracts to operate during the ensuing twelve months are being concluded at prices that mark a rise of 2s. 6d. per ton upon those accepted a year ago. Some merchants are holding off, hoping that better terms will be obtainable later on; in this, however, they are likely to be disappointed, as everything points to an appreciation of values as the year advances. The market for small fuel is exceptionally strong, and some difficulty is experienced in obtaining a sufficient supply of slack for steam-raising purposes. The demand for this class of fuel for the Lancashire cotton mills is very great, and an advance of 2s. per ton for a renewal of contracts is readily obtained. Steam coal for locomotive use continues to move freely, the demand being active and indicating an increasing consumption. The export trade is improving, and shipments are proceeding on a larger scale. Exporters are enquiring for further quantities of steam coal for shipment over the season, and prices show a hardening tendency. Ships are still in restricted supply, and rates of freight are very high. This condition of things prevents that expansion of trade which will assuredly take place as soon as shipping tonnage is available. There is a good demand for nuts and cobbles for near Continental ports, and prices are firmer on the week. Washed fuel is in increasing demand, and both nuts and slack are 3d. to 6d. dearer than they were two or three weeks ago. Supplies of these classes of coal are by no means plentiful. There is still a strong demand for all qualities of coke, the supply of which does not keep pace with the requirements of the market. Prices are very firm, and are likely to advance further. Coking fuel is scarce and dear. Quoted prices are as follow:—Best 13s. 6d., seconds 12s., cobbles 11s., nuts 10s., slack 8s.

IRON.

The iron trade of the district is in a very satisfactory condition, and, provided there be no recurrence of serious labour troubles, it would appear as though the trade had entered upon a period of prosperity. All the works of the district report such a state of activity as they have not experienced for many years. The demand for pig iron, as well as for manufactured iron, is very heavy, and prices are inclined to advance further.

Nottingham.

COAL.

For the time of the year the condition of the coal trade in Nottinghamshire is one of activity. Business in the house fuel section has been unusually busy during the last week, some merchants having quite as many orders as they could comfortably carry out. The public appear to have been "scared" by the announcement that prices would go up this month, and they made a rush for coal so as to get their cellars filled. On some qualities which merchants had been purchasing below list prices—in some cases the remainder of unfulfilled contracts at cheaper rates than at present—there has been a big demand, as the prices to their customers have been proportionately lower. The position now is more favourable to owners obtaining prices according to the new list. A fair business is being done at the local landsale depots. Prices at the pits are from 12s. 6d. to 13s. 6d. per ton for best hand-picked brights, 11s. 6d. to 12s. 6d. for good house coal, 10s. to 11s. for seconds, and 7s. to 8s. 6d. for cheap kitchens. The activity in the steam coal section is being well maintained, both in regard to shipments and the home market, and industrials are in strong request. Best steams are quoted at from 10s. 9d. to 11s. 3d. per ton, and seconds from 8s. 6d. to 9s. 3d. Slacks are selling freely at slightly increased prices compared with a week ago, bests making 7s. 6d. to 8s. per ton, and seconds 6s. 9d. to 7s. 3d.

Leicestershire.

COAL.

Business is proceeding in this district much on the same lines as noted last week. The influx of orders continues much of the same amount as for some little time past. There is no great urgency in the demand, but it appears that there is a very healthy condition prevailing in business. The collieries are making a satisfactory output, and the bulk of it is being sent out. The demand touches almost all descriptions of coal, and if there is some lessening of the enquiry for some kinds it may be said that there is a good general business being done. The enquiry for household coals continues active, and the business doing in steam coals of all sorts is good. Local merchants are experiencing a continuance of their improved business, and are generally fairly well supplied with orders. In the conditions present, as may be expected, the market holds very firm with a tendency upwards. The prices obtained are generally well in advance of those of last year, and the indications all point to a maintenance of present rates.

South Staffordshire, North Worcestershire and Warwickshire.

Wolverhampton.

COAL.

The continued excessively wet weather is one of the causes contributing to a quite unusual demand at the collieries at date. The trade can scarcely remember a July before when the pits have been so well employed as now. To some extent the activity in buying is unquestionably due to nervousness about labour, no one being able to prophesy with any degree of certainty what is ahead in this respect for the collieries. So excellent is the demand that certain of the best favoured pits on Cannock Chase are making full time. Prices, too, for steam and forge coal are abnormal. Quotations are up 2s. to 2s. 6d. per ton compared with this time last year, and most probably will go higher. Under these circumstances it cannot be said that the present policy of laying in stocks is ill-advised. Consumption and prices of large fuel and of cobbles, kibbles and slacks is likely enough to be abnormal for the rest of the year. In this immediate district present prices of house coal, delivered on consumers' premises, are 20s. 6d., 19s. 6d., and 18s. 6d. per ton, according to quality, and there is little grumbling by buyers at having to pay these rates.

IRON

An unusual state of affairs exists just now, for instead of manufacturers having little or nothing on hand, as is usually the case when a quarter has just finished, they have still a large amount of work unexecuted. The arrears which accumulated some little time back, combined with the orders which have since been added, have not been yet got through, and with the quarterly meeting a week hence, when further requirements will find expression by customers, there seems every possibility of quite a plethora of employment being experienced. Stock-taking is in progress at some works, but it is not being allowed to interfere with current operations more than possible. The rises in finished material extend also to manufactured goods. Discounts on screwed and socketed black and galvanised tubes and fittings have been reduced by 2½ per cent. gross. In the pig iron trade the output is going into immediate use, and some of the producers are in arrears with deliveries. The costs of production also continue high, especially with regard to coke. Under these circumstances pig iron prices show no tendency towards receding. South Staffordshire common forge pig iron is quoted 58s., and part-mine 62s. to 63s. There is a good demand for best all-mine forge at 90s., for foundry at 95s., and for cold blast at 120s. Considerable quantities are being produced of Northamptonshire sorts at about 60s. to 61s., and also of Derbyshire descriptions at 62s. 6d. to 63s. 6d. North Staffordshire makers are busy and quote 63s. to 64s. for forge, with 68s. to 69s. for best. It is understood here that the hands of Scotch pig iron makers have been considerably strengthened by the recent sharp advance in the pig iron warrant market. The various brands have been officially raised 6d. to 1s. 6d. per ton, and a fair amount of business is being done at the higher figures. The Staffordshire pig iron output may be said to have been absorbed for some months ahead, either by actual commitment or by visible requirements; but emergency supplies are being constantly required. These, however, are of small account. Makers have previously sold forward, and it will take two or three months to complete the existing bargains. Delivery of all kinds of pig iron is now much more regular and abundant than it was, but a larger output could probably easily find a market. In the manufactured iron trade the black-sheet makers are fairly well engaged, considerable quantities being used by the galvanisers and also for working-up purposes. Makers quote singles £7 17s. 6d., doubles £8 2s. 6d. to £8 5s., and trebles £8 12s. 6d. Galvanised corrugated sheets are in good request upon Indian, Australian, and South African account, and quotations are sustained at £12 5s. to £12 10s. for 24-wire gauge f.o.b. Liverpool. With regard to the bar iron trade, large outputs are being made, and sellers find no difficulty in securing very favourable prices. It is quite within the bounds of possibility that marked bars may be further advanced at, or just before, the quarterly meeting. At present they are still quoted £9, with Earl Dudley's "L.W.R.O." brand at £9 12s. 6d. The second-grade bars of the "list" houses are quoted £8 7s. 9d. There is a brisk demand for good merchant bars, which are quoted £8 2s. 6d. to £8 5s., and customers who had previously been holding off in the hope of somewhat easier rates, have since then been purchasing. Common bars, suitable for nut and bolt manufacture, are in steady demand, and makers are able to command from £7 17s. 6d. to £8, with rather less competition than usual in evidence from Continental houses. North Staffordshire "crown" bars are nominally £8, with makers requiring a substantial premium. Some of the Staffordshire sheet and bar makers have nearly three months' work in hand. There is a good enquiry for hoop iron for Australia and India at about £8. Slit nail rods are in fair demand at £9. Gas-strip makers are busy, and quote £8 to £8 2s. 6d. With regard to the steel trade, there is still full employment, and the difficulty is to satisfy customers with prompt deliveries. Steel angles are quoted £7 10s. to £7 12s. 6d., joists £7, Bessemer sheet bars £6, and Siemens ditto £6 2s. 6d. There is still a shortage of steel bars which has to be met by the importation of foreign bars, and recent shipments have brought nearly 8,000 tons into the Bristol Channel. The dealings with abroad, however, rather than with home firms, continue to be largely due to the low prices at which the imported material can be obtained. The supply of steel wire rods is less than the demand. There is a brisk demand for various kinds of steel both upon railway and shipbuilding account. The activity on the Continent and in America is reacting favourably upon British trade.

Hednesford.

COAL.

The coal trade generally throughout the Cannock Chase district continues in a satisfactory condition, and so far there is no indication of any falling off. Orders are fairly plentiful for most qualities of fuel, and prices show very little change. The collieries are working much more regularly than is usual at this time of the year. The house coal trade is keeping up remarkably well, to some extent, in consequence of the cold, wet weather experienced. The demand for all sorts of manufacturing fuel is well maintained.

Birmingham.

COAL.

Trade continues remarkably good for midsummer, and there is no giving way in prices. The call for household fuel is quite good, and has been stimulated by the wet and cold weather. There is no slackening in the demand for all kinds of works coal, and despite the large output slacks are scarce and very dear. High prices, of course, tend to economy, and many people are using slacks who would under more normal circumstances buy superior qualities of fuel.

IRON.

We are within a week of quarter-day, and business on Thursday was less concerned with immediate requirements than with those of the next three months. All the negotiations point to a very firm market. In most cases they were of a tentative character, inasmuch as no announcement has yet been made as to whether marked bars are to be advanced another 10s. Within the last few days merchant qualities have stiffened, and the ruling prices are £8 2s. 6d. to £8 5s. delivered by boat, and 2s. 6d. extra delivered by team. The disparity between the two classes of bars is now not more than £1 a ton, and the probabilities, therefore, are all in favour of another advance in marked qualities. Practically every bar maker has three months' work on his books. Puddled iron has jumped up in proportion to the finished article. Less than two years ago it could be had at £4 5s. a ton. Now it is sold at £5 15s. to £5 17s. 6d. a ton. The galvanised sheet industry presents quite an anomaly. Although makers are full up with orders it is with difficulty that values are upheld. In some cases as low as £12 a ton is reported to have been taken, and the market level varies from £12 2s. 6d. to £12 7s. 6d. One producer attributed the cause to the international situation, but no very definite reason seems to be assigned. Gas strip makers report the placing of some orders at the increased prices of £8 to £8 2s. 6d., but the bulk of their work was booked at the former rates, which were 5s. less. Steel strip is in good request at £7 15s., ranging up to £8 5s. for stronger gauges, and £8 7s. 6d. for best tube strip. Pig iron quotations are firmly withheld, and although these are regarded as high they are not considered out of proportion to the prices of finished iron. There are practically no stocks of pigs in the district, and although supplies are regular they are not equal to the demand. Steelmakers are working under great pressure, and prices are firm. A few Continental bars are being sold at £5 15s., compared with the English price of £6 to £8 2s. 6d.

Forest of Dean.

Lydney.

COAL.

A considerable amount of irregularity is still being experienced in the house coal trade of this neighbourhood. The better qualities suitable for domestic purposes are in very slow request; merchants are buying very sparingly, and it is as much as collieries can manage to keep going three days in the week. The inland business is much neglected; cargo orders are not plentiful, and at best the shipping trade can only be described as dull. Prices remain at:—Block 15s. 6d., rubbles 14s. 9d., Forest 14s. 6d., nuts 13s., and rough slack 7s. 6d. at pit. There is no change to report in connection with the steam coal trade, and all the pits continue in full work.

THE SCOTCH COAL AND IRON TRADES.

Thursday, July 4.

Glasgow and Lanarkshire.

COAL.

The volume of business in the shipping department of the Scotch coal trade has not been quite so large as in the preceding week, but it is still above the average, and the figures undoubtedly indicate the prevalence of a healthy state of trade. The aggregate shipments from Scottish ports amounted to 354,491 tons, being 25,935 less than in the preceding week, but at the same time showing an increase of 27,097 tons compared with the quantity despatched in the corresponding week of last year. The Glasgow shipments embraced 41,174 tons foreign and 40,670 tons coastwise, the total of 81,844 tons comparing with 84,495 in the preceding week and 91,412 in the corresponding week of last year. There has been a good demand for the better qualities of house coal for export. Treble and double nuts have also been in request, and single nuts, being restricted in supply, are comparatively dearer. There has been a fair outlet for splint coal for shipment, and as the home consumption of this quality is now on an extensive scale, prices are well maintained. The Glasgow Corporation Gas Committee has provisionally fixed up between 500,000 and 600,000 tons of coal, by far the larger proportion of which is splint, and the contract prices for the coming twelve months are reported to be from 2s. to 2s. 6d. per ton higher than in the preceding year. The current f.o b. prices of coal at Glasgow are for steam 11s. to 11s. 6d., ell 11s. 3d., to 11s. 6d., splint 11s. 3d. to 11s. 9d., treble and double nuts 11s. 3d. to 11s. 6d., and single nuts 11s. to 11s. 3d. per ton. As the annual holidays are now near at hand the men are working very steadily, and large outputs are coming from collieries. The inland demand for household coal is easier, owing to warmer weather, and retail prices have given way to a small extent. The demand for coal for manufacturing purposes is very large.

IRON.

The Glasgow iron market has been in a strong and excited position since last report, and there has been a further substantial upward movement in prices, with a large business doing. The movement in the market is not unattended with speculation, but at the same time this appears to be justified by the condition of trade at home as well as abroad. Notwithstanding the increased production of pig iron in all districts, stocks are being drawn upon in order to meet the current demand; and this is a feature of the business which more than anything else goes to encourage the strong buying that has been taking place. Every new upward movement is followed by reaction, but the general tendency hitherto has always been higher. Since last report business has been done in Cleveland warrants from 56s. 10d. to 57s. 11d. cash, 57s. 1½d. to 57s. 11½d. one month, and 57s. 11d. to 59s. three months. Transactions have also taken place at 57s. 4d. for August 2, and 57s. 7d. for September 18 and 20. There has been a fair business in Scotch pig iron, prices of which are again substantially higher. Scotch hæmatite has been raised 1s., merchants now quoting 77s. per ton for west of Scotland delivery. Ordinary and special brands of Scotch makers' iron are all substantially advanced. Govan and Monkland Nos. 1 are quoted f.a.s at Glasgow, 66s. 6d., Nos. 3, 65s.; Carnbroe, No. 1, 70s., No. 3, 66s.; Summerlee, No. 1, 73s. 6d., No. 3, 69s.; Calder, No. 1, 73s. 6d., No. 3, 68s. 6d.; Clyde, No. 1, 74s., No. 3, 69s.; Langloan, No. 1, 74s., No. 3, 69s 6d.; Gartsherrie, No. 1, 74s. 6d., Nos. 3, 69s. 6d.; Coltness, No. 1, 89s., No. 3, 69s.; Eglinton at Ardrossan or Troon, No. 1, 66s., No. 3, 65s.; Glengarnock, at Ardrossan, No. 1, 74s., No. 3, 69s.; Dalmellington, at Ayr, No. 1, 67s., No. 3, 65s.; Shotts, at Leith, No. 1, 74s., No. 3, 69s. 6d.; Carron, at Grangemouth, No. 1, 74s. 6d., No. 3, 69s. 6d. per ton. There are 85 furnaces in blast in Scotland, compared with 84 last week, and 79 at this time last year. The shipments of pig iron from Scottish ports have been small, amounting to 2,086 tons foreign, and 1,538 coastwise, the total of 3,624 comparing with 3,608 in the corresponding week. The arrivals of pig iron at Grangemouth from Middlesbrough and district reached 8,212 tons, being 4 130 tons more than in the corresponding week of 1911. The finished iron and steel trades are extremely busy, with prices tending higher. The Scottish Iron and Steel Company, a combination of thirteen iron and steel making firms in the west of Scotland, has just been formed and its prospectus issued, with a share capital of £750,000. The output last year of the amalgamated makers amounted to 225,000 tons, chiefly malleable iron. The large makers of Siemens and Bessemer-basic steel are not included in this combination, but are connected with the British Association of Steel Makers for the purpose of regulating prices.

Renfrew, Ayr and Dumbarton.

COAL.

A very good business is being done in the coal trade of this district. Shipments in the past week are so large that they probably constitute a record. Both the exports and the coastwise shipments are larger than usual. The clearances have been at Bowling 188 tons, Irvine 2,780, Greenock 4,275, Ardrossan 9,045, Troon 10,900, Ayr 21,041—total 48,229 tons, compared with 36,833 in the preceding week, and 30,778 in the corresponding week of last year. The household demand for home use is quiet, but there is a very active trade in coal for manufacturing purposes. Outputs are generally large and steady from the district mines, but a considerable proportion of the coal shipped is drafted from Lanarkshire. Prices are without material change.

Stirling, the Lothians and Fife.

COAL.

Business is comparatively good in the coal trade of the Lothians, but from various causes the shipments are about 30,000 tons less than they were in the previous week, which was, however, a particularly busy one at the ports. At Granton 8,910 tons were shipped, Bo'ness 21,433, Leith 37,957, Grangemouth 42,427—total 110,727 tons, against 144,164 in the preceding week, and 81,624 in the corresponding week of last year. The shipments from this district were in the proportion of 77,666 tons foreign, and 22,863 coastwise. Best screened steam coal is quoted f.o.b. at Leith 11s. 6d. to 12s., secondary qualities 10s. 9d. to 11s. 3d., single nuts 11s. 9d. to 12s. 3d., doubles 11s. to 11s. 6d., and trebles 11s. 6d. to 12s. per ton. The shipments of coal at Fife ports have been from Methil 57,255 tons, Burntisland 50,910, Alloa 1,790, Dysart 1,520, Wemyss 1,245, Tayport 632, Charleston 267—total 113,619 tons, compared with 114,842 in the preceding week, and 123,308 in the corresponding week of last year. Prices f o b. at Methil and Burntisland are for first-class screened navigation coal 15s. to 16s., unscreened 13s., steam coal 10s. 6d. to 12s. 6d., single and double nuts 11s. to 11s. 6d., and treble nuts 12s. to 12s. 6d. per ton. The tone of the market is steady, with a good enquiry.

THE LONDON COAL TRADE.

Thursday, July 4.

The London coal trade for the past week has been exceedingly slow. The long-expected fight between the colliery owners and the merchants as to the advance of 2s. 6d. per ton in the pit prices has begun in real earnest, and since the beginning of the month orders and wagons have been held back to an alarming extent. The extra tonnage brought forward during June and the consequent plethora of all kinds of house coal at the various wharves and depots has made the bulk of the London merchants very independent of further supplies during the current month, and the comparatively warm weather, curtailing, as it does, all actual consumption of household fuel, has aided the merchants considerably in their efforts to stave off all future purchases until the summer and autumn more distinctly advances. The heavy stocks at the chief metropolitan centres would, in any case, prevent any large buying during July, and possibly well into August, and coupled with the fact that pit prices are ruling much higher than last year, it is hardly to be wondered at that both factors and merchants are refraining from buying until the actual demand is setting in. The whole question, however, resolves itself into one of supply and demand. The general public are not prepared to allow themselves to be caught without any preparation for the winter supply, as many of them were during the preceding summer, and consequently far more orders are forthcoming than is usual during the summer months, simply in anticipation of the winter stock, and on the other hand merchants well know it would be the greatest folly not to keep a good reserve in hand; so in accordance with the continuance of the public orders the volume of trade must expand or decline. Early in the week the market was seriously debating the probable question of an early advance in the public prices to compete with the enhanced pit prices coming into effect from July 1, but during the week the slow, meagre flow of orders and the stoppage of so many empties has had a telling effect in the rapid accumulation of stock in the hands of the factors and also of loaded wagons at the pit's mouth. More attention has been devoted to the shipping trade, and orders for foreign trade have been more pronounced. Gas coals have also been coming forward with increasing regularity and the branches of the trade which have been neglected during the troublesome periods of the last few months have been sought out and fresh fields opened out rather than take the lower prices offering on the London market. Manufacturing coals still continue in good demand, but the singular feature of the trade is that small nuts and slacks have considerably toned down; this may possibly be accounted for by the extra time worked during June and the consequent increase in the tonnage available for the summer months, but prices for small nuts and peas have fallen. On Monday the report that Poplar Docks were at work was received with a good deal of satisfaction on the market, especially as a large number of barges had been held up for weeks waiting for the coal to be tipped, but on Tuesday the disappointing news came through that the men at work had been intimidated and that work had ceased. The seaborne market is still considerably handicapped over the trouble with the lightermen on the river, but some of the steamers loaded with coal which have been waiting for weeks past are now being unloaded into barges, and although the work is proceeding slowly the barges are being towed to the up-river depots and wharves. One steamship is reported to have been held up for 33 days. The Exchange still keeps up a good attendance and the business doing, although much smaller this week, is very animated. The old contracts terminated on June 30 and the new contract prices came into force on July 1, but at present merchants are resisting this very strongly. The official quotation for seaborne coal continues at 20s. best and 19s. for seconds; 16 cargoes were reported on Monday and 5 on Wednesday as having arrived in the Thames. Yorkshire is unquoted. The advance of 1s. per ton on June 24 is fully maintained. A early advance in the public advertised prices has been fully discussed, but no settlement has been arrived at yet. Contract renewals for inland house coal are proceeding very slowly, the collieries remain firm in their intention to secure 2s. 6d. advance on last year's fixed prices (or 1s. advance on the sliding scale rates), and merchants are slow to fix up at these enhanced quotations.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, June 28.—There were no seaborne house coals on offer at to-day's market; enquiry, however, good. Best (Durham), 20s.; seconds, 19s. Cargoes 14

Monday, July 1.—The enquiry for seaborne house coal continued good to-day, but no cargoes of either Durham or Yorkshire forthcoming. Best (Durham), 20s.; seconds, 19s. Cargoes 16.

Wednesday, July 3.—There was no alteration in the seaborne house coal market to-day, no cargoes being on offer. Best (Durham), 20s.; seconds, 19s. Cargoes 5.

Preparations are being made for a considerable extension of building development at Wheatley, Doncaster, on the estate which Earl Fitzwilliam purchased from the late Major Browne. The population of Wheatley has increased by close upon 2,000 during the last 10 years, and the developments now projected will add something like another 1,000 within the next few years. The extension is necessitated by the big population which colliery enterprise is bringing to Doncaster.

LAW INTELLIGENCE.

HIGH COURT OF JUSTICE.

KING'S BENCH DIVISION.—July 2.

Before Mr. Justice Neville.

The Legality of Trade Unions.

Luby v. Warwickshire Miners' Association.—The plaintiff was a checkweighman employed at the Kingsbury Colliery in Warwickshire. The defendant association was a trade union registered under the Trade Union Acts, 1871 and 1876, and by its rules membership of the association was open to all persons employed in and about the mines in Warwickshire and in kindred industries. The association was established for the usual objects of a trade union, and the plaintiff claimed (1) a declaration that he was and had at all times since October 1, 1910, been a member of the defendant association; (2) a declaration that a resolution of the defendant association or of its executive committee made in November 1910, which purported to expel the plaintiff from the association, was *ultra vires* and void, and unauthorised by the constitution of the association or by any of its rules or by any of the provisions of the Trade Union Acts; and (3) an injunction restraining the association, its officers and servants from acting upon or enforcing the said resolution and from excluding the plaintiff from such membership. The plaintiff alleged that no provision was made by the rules for the expulsion of members of the association, but if a power to expel existed it could only be exercised in accordance with Rule 63, which required a majority of the votes of the members present to be taken by ballot, and that expulsion from the association would deprive him of his status of a trade unionist, and would render it wholly impossible for him to remain a checkweighman, or to earn a living in any other capacity.

In their defence the defendant association relied on Rule 58, which empowered the council to make by-laws, and provided that any dispute which might arise between members of the association not provided for in the rules, should be dealt with by the council, and their decision should be final and binding in all cases. The defendants alleged that the plaintiff had not acted straight to the defendant association in that he had obtained possession of certain books and papers belonging to the association, and had wrongfully detained and refused to deliver up the same; and that he made use of extremely discourteous and improper language in regard to the officials of the association, and by his conduct embarrassed the work of the association. The association further pleaded that the plaintiff was not entitled to maintain the action because the association was an unlawful combination and confederacy within the meaning of the Acts 39 Geo. III., c. 79, and 57 Geo. III., c. 19, by reason of the fact that the association was divided into a number of district lodges, and the same constituted different divisions or branches or parts of which the association was composed, and such different divisions, branches, or parts acted separately from each other, and had a separate president and other officers to act for such parts, and appointed delegates to meet and confer with delegates of other associations.

Mr. Justice Neville, in delivering judgment, after holding that the defendant association had no power under its rules to expel a member, and that the attempted expulsion was illegal, said the only other question to be decided was whether the trade union was a criminal association. Having regard to the titles and preambles of the Acts cited, it was, he thought, plain that they were not intended to interfere with what were at that time considered by the law to be innocuous and useful associations (it was doubtful if trade unions would be included in that category), but undoubtedly they purported to prohibit certain acts connected with associations and meetings in general terms, and he found it difficult to put a reasonable interpretation upon either Act which would not have brought within its prohibition, at the time of the passing of the Act, the branches and the delegates of the modern trade union. It was true that trade unions had in their own interests not been invested with a legal status, but when it was asserted, as it sometimes was, that trade unions were illegal associations, it was true only in the sense stated. It had never until the present case been suggested that the membership of trade unions involved a criminal act. If, however, the Acts of George III., above referred to, applied, the existence of the trade union branches would make every member of the union a participator in a criminal act, and their recognition by the Legislature, not for the purpose of imposing penalties, but for the regulation of their affairs, would be wholly inexplicable. There was no express provision in the Acts dealing with trade unions that the statutes of George III. should not apply, but inasmuch as the manner in which Parliament had dealt with them was quite inconsistent with their criminality, his lordship was of opinion that such a provision must of necessity be implied. The plaintiff therefore was entitled to a declaration that he was a member of the defendant association, and to the injunction for which he asked, with the costs of the action.

Large branches of the Scottish Firemen and Shot-firers' Association are being formed throughout Lanarkshire. The necessity for a progressive organisation amongst the firemen is regarded as imperative, in view of the provisions of the new Mines Act.

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SUBSCRIPTIONS.

The *Colliery Guardian* is published at 2.30 p.m. on Friday, and includes the latest intelligence. The Annual Subscription is 24s.; but if paid in advance, 21s. In both cases the charge includes delivery free by post in the United Kingdom. Post free and prepaid to Foreign Countries, £1 7s. 6d.

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(A Classified List appears on page 42.)

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The Tramways and Electricity Committee of the Belfast Corporation are prepared to receive **TENDERS**, to their amended specification, for a supply of about 31,000 tons of COAL (excluding lighterage) for the Generating Station, East Bridge-street, Belfast, from the 12th August, 1912, to the 30th June, 1913.

Form of tender and terms of contract may be obtained from Mr. T. W. Bloxam, City Electrical Engineer, East Bridge street, Belfast.

Duplicate 2 cwt. samples of the coal offered to be delivered, properly labelled, at the Electricity Works, Belfast, not later than July 18th.

Sealed tenders endorsed "Tender for Coal, Electricity Department," must be lodged in my office not later than 11 a.m. on Thursday, the 18th of July, 1912.

The lowest or any tender not necessarily accepted.

A tender, if sent by post, must be registered. If delivered, an official receipt must be obtained for it, otherwise the undersigned will not be responsible.

R. MEYER,
Town Clerk.

COUNTY BOROUGH OF SOUTHAMPTON
TO COAL MERCHANTS.

The Corporation invite alternative **TENDERS** for the supply and delivery at Otterbourne Siding, near Eastleigh, of Welsh **STEAM COAL, BESTWOOD COBBLES,** and **GAS COKE** for six or twelve months.

Forms of tender and all particulars may be obtained at the Waterworks Engineer's Office, French street, Southampton.

Sealed tenders upon the printed form and endorsed "Tender for Coal, Waterworks," must be delivered at the Town Clerk's office on or before the 16th proximo.

No pledge is given to accept the lowest or any tender.

Town Clerk's Office,
Municipal Offices, Southampton,
28th June, 1912.
R. R. LINTHORNE,
Town Clerk.

The Directors of the Powell Duffryn Steam Coal Co. Ltd. invite **TENDERS** for the supply of the undermentioned **STORES** from the 1st October, 1912.

No. 16. Oils and Grease.

Forms of tender and all particulars can be obtained upon application to the Stores Manager, Aberaman Offices, Aberdare. Tenders to be addressed to the Directors of the Powell Duffryn Steam Coal Co. Ltd., 101, Leadenhall-street, London, E.C., and posted so as to be received not later than 10 a.m. on Monday, the 5th August, 1912.

The Directors do not bind themselves to accept the lowest tender, and they reserve to themselves the right to accept any part of a tender.

101, Leadenhall-street,
London, E.C.
By order,
H. R. CLARKE,
Secretary.

COUNTY BOROUGH OF OLDHAM.

The Gas Works Committee invite Tenders for the supply of **GAS COALS** during a period of ten months, commencing 1st September, 1912.

Conditions and forms of tender may be obtained on application to Mr. A. Andrew, Gas Offices, Oldham, to whom tenders are to be delivered not later than Tuesday, August 6th, 1912.

2nd July, 1912.
By order,
J. H. HALLSWORTH,
Town Clerk.

COUNTY BOROUGH OF CROYDON.
COAL SUPPLY TO ELECTRICITY WORKS.

Notice is hereby given that the Council are prepared to receive **TENDERS** for the supply of **COAL**, if and to the extent ordered by them, for use at their Electricity Works, Factory-lane, Croydon, for six months or one year from August 1st, 1912.

Form of tender, particulars, and specification, may be obtained on application at the Electricity Works, Factory-lane, Croydon.

Tenders will only be received subject to the particulars, specification, and draft contract which have been deposited at my office, and may be inspected during office hours.

Tenders are to be sent to me by eleven o'clock in the forenoon of Monday, July 15th, 1912, endorsed "Tender for Coal, Electricity Works."

The Council will not be bound to accept the lowest or any tender, and reserve to themselves the right to accept the whole or any part of any tender.

Town Hall, Croydon,
July 2nd, 1912.
F. C. LLOYD,
Town Clerk.

CITY OF MANCHESTER.
MUNICIPAL SCHOOL OF TECHNOLOGY, SACKVILLE STREET, MANCHESTER.
COAL MINES REGULATION ACT, 1911.

Section 15 of the Coal Mines Act, 1911, requires that after January 1st, 1913, "A person acting as a fireman, examiner, or deputy in a mine in which that Act applies, must have obtained a certificate from a Mining School, Institution, or Authority approved by the Secretary of State."

The Secretary of State has approved the School of Technology under this Section. An Examination will be held at the School of Technology on the evening of July 18, 1912, and following evenings.

The following Fees will be charged:—

For the full examination (*i.e.*, gas tests, air measurements and hearing) ... 7/6
Note.—This will only apply in the case of new firemen appointed after the passing of the Act.
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— **See Page 50.** —

This List of New Prescribed Forms, &c., appears weekly in the "Colliery Guardian."

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⁂ *For other Miscellaneous Advertisements see Last White Page.*

Forthcoming Annual Meetings.

Institution of Mining Engineers—Provincial Meeting (Birmingham)	September 11, 12 & 13, 1912
North of England Institute of Mining and Mechanical Engineers	August 3, 1912
Midland Counties Institution of Engineers	Sept. 1912
Manchester Geological and Mining Society,	Oct. 8, 1912
North Staffordshire Institute of Mining and Mechanical Engineers	October 14, 1912
South Staffordshire and Warwickshire Institute of Mining Engineers ...	October 1912 (2nd week)
Iron and Steel Institute—Autumn Meeting	September 1912
Association of Mining Electrical Engineers—	October 4 & 5, 1912 (Provis.)

The Colliery Guardian.

LONDON, FRIDAY, JULY 5, 1912.

With this issue we present our readers with a supplementary plate, on which appear photographs of the independent chairmen of the Joint District Boards under the Coal Mines (Minimum Wage) Act, 1912.

We are advised by the Controller of H.M. Stationery Office that he is informed by the Home Office that Special Rules will soon be replaced by Regulations, and attention is drawn to section 88 (1) (*b*) of the Coal Mines Act, 1911, which requires the supply by the owner, agent, or manager of a mine to persons employed in or about a mine of "a book containing *so much of* the abstract and *so much of* the regulations as the Secretary of State may prescribe as being the parts of the abstract and regulations for the time being in force affecting persons of the class to which the person belongs." It is important to bear in mind that the *prescribed forms and books* under the new Coal Mines Act, 1911, are *not to be reprinted without the consent of the Controller of H.M. Stationery Office. See* Copyright Act, 1911, sec. 18 (Provisions as to Government publications.)

The King held an investiture at Buckingham Palace on Monday, when Edward Medals of the First Class were bestowed on John Mitchell for gallantry at a flooded colliery at Bamfurlong, near Wigan, and upon Henry Merritt for gallant conduct at Cannock Chase Colliery. Mr. George Edwards received a medal of the Second Class for life-saving at a Bridgend Colliery.

It is officially announced that the second census of production under the Census of Production Act, 1906, will be taken in 1913 in respect of production carried on in the present year. The instructions have been simplified and the majority of the schedules have been reduced from eight pages to four pages of somewhat larger size. At the present time the schedules are being issued in draft to chambers of commerce and trade associations in order to afford them an opportunity for the consideration of the details of the information required before these are finally settled. The schedules on which manufacturers will be required to make their returns will not be sent out until the beginning of next year.

In the Chancery Division, Mr. Justice Neville has delivered his reserved judgment in the action brought by Mr. Patrick Luby, of Broomfield House, Fazeley, Warwickshire, miner and checkweighman at the Kingsbury Collieries, for a declaration that he was still a member of the Warwickshire Miners' Association. The trade union claimed that the action was not maintainable, on the ground that under certain Acts of George III. they were an "illegal, seditious, and revolutionary body." Mr. Justice Neville held that these Acts were not intended to interfere with innocuous and useful societies, such as trade unions, and granted Mr. Luby the relief he asked for, with costs.

To-morrow (Saturday) the honorary degree of Doctor of Laws of the University of Birmingham will be conferred upon Mr. W. E. Garforth, the president of the Institution of Mining Engineers, for the services rendered by him to mining engineering in this country, and in recognition of the forthcoming visit of the institution to Birmingham in September. It had been originally intended to confer the degree nearer the date of the meeting, but it was thought by the council of the University that it would be a sign of greater honour to invest Mr. Garforth at the ordinary degree function to be held to-morrow.

We regret to announce the death of Mr. W. S. B. McLaren, M.P., brother of Lord Aberconway. He was prominently connected with the coal and iron trades in South Wales and other parts of the country.

While blasting operations were being carried on between seams in the Osterfeld pit at the Gutchoffnungs Colliery, near Oberhausen, on the 3rd inst., an explosion of gas took place, with the result that 16 miners were killed and others injured.

It is with sincere regret that we have to announce the death of Mr. Enoch Edwards, M.P., president of the Miners' Federation of Great Britain, and vice-chairman of the Conciliation Board for the Federated Districts of England and North Wales.

The meeting of the Coal Conciliation Board for the Federated Districts of England and North Wales, which was to have been held on Wednesday to consider the miners' application for a 5 per cent. increase in wages, has been postponed until Wednesday, July 17. The postponement has been arranged at the request of the miners as a result of Mr. Edwards' death.

The chairman of the District Joint Board for North Wales, Mr. B. Francis-Williams, K.C., has been asked to explain some points in his award. In reply, Mr. Francis-Williams wrote that, in his view, he had no authority to construe the rules which had been settled, and were he to put an interpretation upon any matter about which there is a difference of opinion between the owners and the workmen, it might lead to very inconvenient results.

The Royal Itinerary.

By the end of the present month their Majesties the King and Queen should be able to form some conception of the ordinary routine of the coal trade. In their tour last week through the Rhondda—the first ever made by a ruling sovereign—they were able to see at close quarters the conditions of life and society in perhaps the most typical and famous coalmining district in this country. Next week their Majesties will see something of the new communities that are springing into existence in the neighbourhood of Doncaster, and the contrast will be sure to impress them. The magnificent opportunity that exists in this new area for the satisfaction of the highest ideals in the direction of industrial town-planning and local government cannot fail to receive an impetus if the King and Queen give a helping hand by their kindly interest and consideration. In Yorkshire also the King will venture underground, at Earl Fitzwilliam's Elsecar Colliery, and we are sure that what he sees there will leave a lasting impression, as our Sovereign is not only gifted with eyes but has the valuable faculty of being able to use them.

Later in the month King George will open the huge dock undertaking of the Great Central Railway Company at Immingham, and here again he will be able to see some of the vast consequences of the coalmining industry. It is certain that our King can devise no better means of securing the devotion of his toiling people than by coming among them in this way and learning something of their daily round of labour and its fruits.

The Minimum Wage and the Small Colliery.

Since the Minimum Wage Act became the law of the land several cases have been recorded in which the owners of small or ancient collieries have definitely decided to discontinue working, owing to the additional burden that it imposes upon them. It is obvious that the small measure of elasticity provided by the Act is proving to be inadequate—a matter that should not have been surprising, since the disparity in conditions to be encountered in the industry militates in the strongest possible sense against any arbitrary classification of a geographical denomination.

In going back to the beginnings of the minimum wage agitation it will be found that the miners' representatives offered persistent opposition to any differentiation in rates; their original intention was that one large conciliation board should act for the whole of the coalfields—secure in the belief, perhaps, that the complacency of the large corporations would override the opposition of the smaller concerns, and that the closing of the poorer collieries and the consequent residue of unemployment would be compensated for by the greater opportunity afforded to obtain a high rate under desirable conditions in the collieries remaining open. Such a policy, it is scarcely necessary to say, is opposed to all interests of national economy and would be equivalent to a general practice of working out thick and valuable seams at the expense of those of a less remunerative character. Therefore the Minimum Wage Act was drafted so as to make provision not only for a greater number of separate awards than was to the liking of the men's leaders, but section 2 (4) also provides that the Joint District Board of any district may settle a special rate for any group or class of mines, where circumstances demand it, and also (section 2 (5)) subdivide the district into two parts or, with the agreement of the members of the Board, into more than two parts.

It will be seen from the awards that some use has been made of these facilities, by the independent chairmen rather than by the parties. In Northumberland Lord Mersey awarded a special rate for small collieries employing not more than 30 persons underground; in Cumberland the rates applicable to certain classes of workpeople at five collieries were held in abeyance with a view to consideration; in Lancashire and Cheshire special rates have been fixed for the miners in the Darwen district and at three other collieries, and in South Yorkshire for the collieries in the ganister or Don and Loxley valleys district; Judge Amphlett, in West Yorkshire, and Judge Lindley, in Derbyshire, have each adopted the plan of dividing the district into two geographical subdivisions; whilst Sir Walter Lawrence has taken a similar step in the Black Country, differentiating between the Dudley and Wolverhampton areas, whilst there are different rates again for working in thick and thin coal. The Somerset district is divided into the Radstock and Newbury areas in the Shropshire award there is a special schedule for the collieries in Hanwood district;

in Scotland there is one exception, the isolated Canonbie Colliery in Dumfriesshire, where the question remains in abeyance; in Nottinghamshire, certain collieries have been transferred to Derbyshire in exchange for others handed over to the eastern shire; similarly, the Manton and Shireoaks mines in the Notts district are to be treated as though they were in South Yorkshire; otherwise special rates on a higher scale have been applied to the Top Hard mines—with the exception of Gedling—thus adopting the proposals of the owners; in Derbyshire, there are special rates for certain classes of labour at a number of collieries: in the case of South Wales, where no award has yet been issued, it is fairly certain that the western collieries will be treated on a different basis from those in the Rhymney Valley, for example.

Thus it will be seen that some latitude has been allowed, but it would be incorrect to say that no anomalies remain. Furthermore, as observed at the outset, even had the greatest consideration been shown to the small collieries, there would still have been anomalies or the Act would have been rendered completely nugatory. As cases in point, there is little or no comparison between the thin-seam pits in the Mirfield district and those working the thick Haigh Moor and Silkstone seams, between the Mountain mines in Cheshire and those in the Wigan coalfield. Up to the present, the most cogent protest has been that of the Flintshire owners. They point out that their seams are irregular and are cut up by numerous faults, washouts and dykes; that unwatering of the mines is a large and constant expense: that two-thirds of the output has been raised during the last three or four years at a heavy loss; and over £500,000 has been sunk in several Flintshire collieries without a penny return.

In the cases mentioned above we have geographical and geological distinctions, but it is frequently the case that small landsale pits exist cheek by jowl with the largest undertakings, and we may well ask whether the arrangement in Northumberland, by which the number employed is made the index, does not act as a deterrent to the legitimate extension of small undertakings. Again, when we talk of the small and old collieries, the intention is to include many enterprises which, although large and modern, are unable from exceptional causes to be worked on so cheap a scale as some of their more fortunate neighbours. Some indication of the variations of fortune and its unequal distribution is afforded by the figures published by the Belgian Government in regard to the profits from coalmining in that country. In the ten years 1901-10 certain collieries have made profits in the aggregate varying from 24 to 55 million francs per annum, but other collieries have at the same time sustained losses ranging from 3 to 12 million francs per annum. In 1910 an aggregate profit of 25 million francs was made by some collieries, whilst others showed a loss of 12 million francs. Local geological disturbances, washouts, water and fire are sometimes most eccentric in their incidence. Thus, it is no secret that some of the new collieries in the Doncaster district have failed to a large extent to realise expectations, whilst others have greatly exceeded them; at Manton, in Nottinghamshire, Hamstead, in South Staffordshire, to take two cases only, excessive difficulties have had to be faced, which other large collieries not far distant from them have been fortunate to escape, whilst the important rating appeal heard at Hanley last week attests another case of a large and well-equipped colliery that has been churlishly treated by Nature. It may be urged with some reason that no case has been made out for the payment of lower wages under such conditions, but an adequate safeguard exists in the free competition for labour; and it is no part of the duty of the State, where such competition is an admitted force, to remove the opportunity for mutual arrangement between a colliery proprietor and his workmen, when the latter are willing to bear some portion of his burden in a time of trouble.

We cannot but think that the miners' leaders are ill-advised in standing out against the sub-division of districts, as their policy is in some ways decidedly prejudicial to the interests of the workmen. It has already been pointed out that one of the ultimate effects of a statutory minimum wage is a tendency for the minimum to become the actual wage, for higher rates to approximate to the lower. It is certain that any fair-minded chairman, in settling a minimum wage rate for a district in which a great disparity of working conditions prevails, must, unless he adopts some system of classification, make an award that gives recognition to the circumstances of the poorer collieries. The consequence is that a minimum wage is fixed that, in the case of a large proportion of the collieries, may be little more than a convention, but may, at the same time, throw further weight into the scales already adjusted greatly to the advantage of the large concerns in competition with their poorer neighbours. It cannot be too strongly reiterated that the continued existence of the small colliery as a class is a national necessity.

Trade Summary.

The London coal trade during the past week has been exceedingly slow, particularly in the house coal department. Manufacturing qualities are firm, but small nuts and slacks are weaker. Contract renewals on the increased basis are proceeding very slowly, and since July 1 merchants are distinctly refraining from purchasing. Public orders are fairly plentiful. Seaborne qualities are increasing, but the work on the River Thames is still severely handicapped. Public prices remain unaltered, but the recent advance in pit prices is maintained with difficulty.

Although tonnage shortage is still a serious obstacle to business, there is a strong enquiry for coal at Newcastle and turns are improving. Quotations for both prompt shipment and forward loading are well maintained. Coke is stronger and house coal is steady.

The Durham coal trade is fairly active, but the scarcity of prompt tonnage continues to impede business. Forward values are generally steady. Bunker coals are steady, as are gas sorts. The consumption of coke is heavy.

The Lancashire house coal trade is somewhat dull. Forges and manufacturers generally are taking good supplies of screened coal, and there is a fair demand for bunkers. Slacks are very firm.

In West Yorkshire prices are very firm all round. Buyers are unable to secure concessions on house coal contracts, although the output is below par. Manufacturing sorts have a hardening tendency. Coke supplies are inadequate.

In South Yorkshire there is a distinct accession of strength in regard to forward business. This is especially the case in respect of the smaller varieties of steam fuel. The export branch falls rather short of expectations, but it is compensated for by the vigour of home demand. The house coal trade is steady and stocks are inconsiderable. Coke is scarce.

There is a fair demand for Derbyshire house coal, and prices remain firm, with a rising tendency as regards future business. Slacks are extremely scarce, and the export demand for hard coal is improving. Washed fuel is in increasing request.

The demand for fuel of all descriptions is strong in South Staffs.

The Royal visit somewhat disorganised business at Cardiff last week, but the lack of tonnage continues the dominating feature of the market. The prices of best steam in consequence are weak. Small coal is extremely strong. Monmouthshire coals continue weak. Patent fuel shipments have been heavy.

The Scottish coal trade continues active, although shipments have fallen away to some extent. House coal is firm and manufacturing fuel is active.

The members and friends of the Mining Institute of Scotland held a most successful outing on Saturday, the venue being Campheltown. The trippers, who journeyed from all parts of Scotland, joined the turbine steamer "Queen Alexandra" at Wemyss Bay and Fairlie.

LABOUR AND WAGES.

North of England.

The Cumberland colliery enginemen have been awarded the following advance of wages:—Winding engineers' wages, from 5s. 7½d. to 6s. a day; other enginemen and boiler firemen, an advance of 2½ per cent.; enginemen working 12-hour shifts, an extra shift for the long week-end turn. The demand for an advance of 4d. a day in surfacemen's wages is to receive further consideration next week.

A meeting of the Northumberland coalowners and the County Wages Board was held in Newcastle on the 3rd inst., to consider the question of weekly pays. A vote has been taken at the collieries on the proposal that fortnightly pays be discontinued, and, with the exception of one of the Cramlington pits, the whole of the collieries favour weekly pays. The meeting was adjourned pending the issue of regulations by the Home Office.

Mr. William Straker has issued a letter to the branch officials of the Northumberland Miners' Association, under date June 28, on the use and storage of explosives. In this he says:—"Owing to the new Explosives Order having just been issued, and to certain of its provisions being of a very objectionable character, and quite unnecessary in mines where inflammable gas is not known, colliery owners have requested us to jointly approach the Home Office in the matter, and in the meantime to continue the old system of purchasing and using explosives until the reply by the Home Office is received, and the owners have had time to prepare for the carrying out of the Order under the 1911 Mines Act. Our Wages Committee, before whom the owners raised the question, agreed to the owners' request, providing that not more than three months are taken to make the necessary provision, subject to the approval of the Home Office. Lodges should therefore act accordingly."

Under the Minimum Wage Act, Mr. Charles Alderson, umpire for the owners and men at the Seaton Delaval group of collieries, Northumberland, has given an award affecting the class of workmen known as "wastemen." The point at issue was whether the employers were entitled to refuse the minimum wage to men who had voluntarily sought the lighter employment of wastemen, on the ground that they were inefficient. The umpire decided in favour of the men.

The executive committee of the Northumberland Miners' Association have decided that there ought to be a cleaner at every coal-getter, in addition to the machine driver, the opinion being that it is not safe for any man to be alone when attending these coal-getters.

Federated Area.

A further meeting of the Notts Joint District Board under the Coal Mines (Minimum Wage) Act—the first meeting held since the award was received—took place on Wednesday at the Victoria Station Hotel, Nottingham. The meeting was convened for the purpose of dealing with a number of matters arising out of the business considered at various meetings of the Board when sitting under the chairmanship of his Honour Judge H. Y. Stanger. The chief business was the constitution of a panel of gentlemen to act as independent chairmen of the local tribunals from time to time as occasion arises. Several names were submitted by either side—the owners and the men's representatives—and after due consideration the panel was agreed upon. A number of other questions were discussed, as the result of which further meetings will be held after both sides of the Board have placed the matters before the parties they represent.

Mr. Robert Smillie, the vice-president of the Miners' Federation of Great Britain, who, owing to the death of Mr. Enoch Edwards, M.P., is temporarily filling the post of president, is likely to be chosen as Mr. Edwards' successor. Mr. Smillie is still one of the most advanced trades union leaders in the country. He was a member of the Royal Commission on Mines and has fought seven unsuccessful contests for Parliament.

At a mass meeting of miners at Chesterfield this week, Mr. Frank Hall, treasurer to the association, in opposing the fixing of two rates of wages for thick and thin seams, contended that this unfair principle made him a strong advocate of nationalisation of the mines. He declared that some 48 per cent. of the colliery owners in Derbyshire were paying less than the minimum wage laid down in Judge Lindley's award, and raised the question as to who was responsible for the wages shortage since the award became operative. His answer was that it would not be the contractor, but the colliery owners. Judge Lindley fixed the holers' minimum wage at 5s. 8d. per day, but many men were working for as little as 3s. 4d. per day.

The meeting of the Coal Conciliation Board for the

Federated Districts of Great Britain, which was to have taken place this week, has been postponed for a fortnight in consequence of the death of the vice-chairman, Mr. Enoch Edwards, M.P.

The council of the Yorkshire Miners' Association concluded a two days sitting at Barnsley on Tuesday. In regard to the dispute at the Newmarket Silkstone Colliery, the officials were asked to make a further application for an interview with the management with a view to effecting a settlement. The branches are to decide whether the men at the Manton, Hazlehead, and Sharlston collieries are to be allowed to ballot on the question of giving notice. The trouble in each case arises from the alleged employment of non-unionists, and in regard to the Sharlston Colliery, it is also alleged that men who worked at the pit before the strike have not been restarted. The council decided by a large majority not to become an approved society under the Insurance Act. Arising out of the operation of the Minimum Wage Act, Mr. H. Smith (president) said certain colliery owners had sent out certain forms, and had not complied with the awards of the independent chairman. Many men and boys had not yet received any payment in regard to the minimum rates due. The council were advised by the officials to refrain from any action until a meeting could be arranged with the coalowners of both South and West Yorkshire, to see if the matter could not be settled with regard to the payments and the definition of certain points. At one colliery, the council were informed, the management were adopting the method of bringing a man, or set of men, out of a working place and putting another set of men to test the place, and in this way throwing men on the funds of the association. The council decided to resist this. At many collieries in South Yorkshire, and at a larger number in West Yorkshire, no minimum rates had been paid. The association were determined that, bad as the awards were, the men should be paid what was given to them. A large number of men had been thrown on the funds of the association by the action of various managers, and rules were drafted at the request of the owners to safeguard their position. These rules were being ignored, however, and men were being dismissed in large numbers. That action would not be tolerated by the association.

The dissatisfaction among the coalminers in North Wales in regard to the different interpretations by masters and men as to the meaning of many parts of the awards of the independent chairman of the District Joint Board under the Minimum Wage Act has led the miners' agent for North Wales (Alderman Edward Hughes, J.P.) to write to Mr. B. Francis-Williams, K.C., the Recorder for Cardiff (the North Wales independent chairman), asking him to explain some of the points. In reply, Mr. Francis-Williams wrote that in his view he had no authority to construe the rules which had been settled, and were he to put an interpretation upon any matter about which there was a difference of opinion between the owners and the workmen, it might lead to very inconvenient results. He was sorry, therefore, that he could not accede to Mr. Hughes's request. The result is that the unrest in the coalfield is increasing and the men are already striking at various collieries.

Disputes at the Westminster and Bersham Collieries, near Wrexham, were settled on Monday, when the miners resumed work at the minimum wage awarded by the chairman of the Conciliation Board. The colliery owners, on their part, have agreed to pay the men the arrears of wages due. The strike affected about 2,000 men.

The half-yearly meeting of the Midland Miners' Federation was held at Birmingham on Tuesday. In view of the death of the president, Mr. Enoch Edwards, M.P., it was decided not to fill his position for the present—Mr. S. Finney, of the North Staffordshire Miners' Federation, being appointed to hold the office for the next six months. A resolution was considered from the North Staffordshire district, asking that a resolution should be placed on the agenda of the annual conference of the Federation of Great Britain to consider the advisability of seeking a 25 per cent. advance in wages to all workmen employed in and about mines; also that the Federation should endeavour to procure a price list for each pit in the Federation, so that the men might know the exact price to be paid for the work they had to do.

Mr. J. G. Hancock, M.P., the agent, gave a report at the monthly meeting of the council of the Notts Miners' Association on Saturday afternoon relative to the business transacted at the meetings of the local District Board formed under the Coal Mines (Minimum Wage) Act, and the award given by Judge Stanger was discussed. A complaint was received from Stapleford Colliery workmen who alleged that the management there were not carrying out the agreement entered into between the association and the Erewash Valley Coalowners' Association regarding bankworkers' wages, and it was decided that steps should be taken to remedy the grievance.

About 350 miners employed by the Grassmoor Collieries Company Limited, near Chesterfield, have just received notice to terminate their engagement. It is stated that the reason the company have taken these steps is that they intend closing down the pit in which the men are employed.

Scotland.

A stoppage is threatened at Earnock Colliery, Hamilton, belonging to John Watson Limited. A dispute has been in progress at the colliery for some considerable time over the refusal of the firm to pay the usual extra tonnage rates in double-shifted places. At first only one section of the pit was involved, but latterly an application was made to the Lanarkshire Miners' Union to authorise a stoppage of all double-shifted places in the colliery until the dispute was settled. Within the last week or two a strong agitation has resulted in extending the dispute to the whole colliery, which employs between 700 and 800 men. Arrangements have been made for the taking of a ballot vote at the colliery.

The executive of the Scottish Miners' Federation met in Glasgow on Saturday, when arrangements were made for a meeting with the employers under the Conciliation Board for the consideration of the question of weekly pays, and of matters arising out of the Insurance Act. Steps were taken with a view to a meeting of the Joint Wages Board for the appointment of a panel of chairmen from whom selections may be made by local committees.

The Iron, Steel, and Engineering Trades.

The quarterly ascertainment under the sliding scale in force in Cumberland, shows that the average selling price of hæmatite iron warrants was 69s. 8d. per ton, compared with 64s. 1d. in the previous quarter, and with 62s. 4d. in the corresponding period last year. Blastfurnacemen's wages, which are now 37 per cent. above standard, advance by 7 per cent., and are 9¼ per cent. higher than they were at this time last year.

According to the quarterly returns received from the general secretaries of the Northern Conciliation Board, the wages to be paid to the steel mill men at Consett works in the next three months will, under the agreement, be the same as prevailed during the quarter just ended.

THE WELSH COAL AND IRON TRADES.

Thursday, July 4.

North Wales.

Ruabon.

COAL.

The coal trade generally has not been particularly brisk, and prices remain at about the same figures as last reported, there being a good demand for steam and gas coals for general manufacture, and to make up arrears. Gas coal contracts are continuing to be settled quickly, and so far the advance of 2s. to 2s. 6d. is well maintained.

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Monmouthshire, South Wales, &c.

Newport.

COAL.

At the beginning of this week the local coal market prospects showed promise of an improvement, which has not materialised generally, although some collieries are certainly better off than last week. The position now is rather irregular, and buyers are showing much care in their negotiations. Collieries most favourably placed are asking, if anything, prices which are a shade higher, while others whose output is restricted by heavy stocks are willing to make concessions to get wagons released. Taken all round, however, there is very little movement, values remaining substantially as a week ago. Smalls continue in good request at firm rates, with patent fuel firm at unaltered figures. Pitwood quotations remain as last week, but the near approach of the harvesting season affects prices for forward delivery considerably. The Egyptian State Railways contract for 75,000 tons to be delivered before end of August have been placed with Messrs. T. Beynon and Co., Messrs. H. C. Vivian and Co., and Messrs. Pyman, Watson and Co., the latter having secured over half the quantity. It is generally understood that the price approximated 14s. 9d. per ton f.o.b. The shipment of this large quantity at Newport Docks should not be without effect upon the trade here. In the freight market, an active enquiry for suitable tonnage for the Mediterranean has been met with, rates showing an improving tendency all round. Latest ruling quotations are as follow, coal prices being f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Best Newport Black Vein large, 15s. to 15s. 6d.; western-valleys, ordinaries, 14s. 3d. to 14s. 9d.; eastern-valleys, best, 14s. to 14s. 3d.; other sorts, 13s. to 13s. 3d.; colliery smalls, best, 9s. 6d. to 9s. 9d.; seconds, 9s. to 9s. 3d.; inferiors, 8s. 6d. to 8s. 9d.; screenings, 9s. 6d. to 10s.; through coals, 10s. 3d. to 10s. 9d.; nuts, best washed, 11s. to 11s. 3d.; house coals, best, 18s. to 18s. 6d.; seconds, 17s. to 17s. 6d.; patent fuel, 19s. to 19s. 6d. Coke: Furnace, 21s. to 23s.; foundry 25s. to 27s. Pitwood: Best French fir, 20s. to 21s. ex-ship.

IRON.

Whilst there is little fresh to report in the conditions of the local iron and steel trades, the markets generally remain firm, and any alterations in values that have taken place have been upward. The tin-plate and sheet bar mills are very busy with current orders, and whilst official quotations are on the basis of £5 12s. 6d. to £5 15s. Bessemer and £5 15s. to £5 17s. 6d. Siemens, most makers are demanding more, and, if able to make prompt delivery, are obtaining it. Good enquiries are coming to hand at the rail mills, and works are busier than they have been for some time past. Prices here are firm at £6 5s. to £6 10s. for heavy sections, with the usual extra for lights. There is continued activity at the local blastfurnaces, and makers of Welsh hæmatite are demanding 78s. 6d. delivered in the district, and with the present trend of things this is likely to be increased within the next few days. The enquiry for tin-plates has been small, and very little fresh business has been transacted during the past week. Works, however, are well booked for some time ahead, and will not reduce official quotations of 14s. 9d. to 14s. 10½d. Bessemer and 14s. 10½d. to 15s. Siemens for 20 × 14's, and 29s. 9d. Bessemer and 29s. 9d. to 30s. Siemens for 28 × 20's.

Cardiff.

COAL.

Business was considerably disorganised last week by the Royal visit, but not so much as was expected, it having been very generally anticipated that the Rhondda valley collieries would have stopped for at least one day. As a matter of fact, however, the suspensions were of a partial character only; but no work whatever was done in the Merthyr district on the day that the King and Queen made their tour through the valleys, at which the colliery sales agents were greatly relieved, inasmuch as there is still considerable difficulty in providing full work for the whole of the men. With regard to the condition of the market, the same old story has to be repeated. There is still a lack of tonnage, with consequent high rates of freight, vessels to Genoa being unobtainable under 12s., whilst Algiers has been done at 13¼ fr., Naples at 12s., and Bari at 13s. Chartering last week was of a very disappointing character, the number of vessels taken up representing a tonnage of only 205,760, as against 328,170 tons in the previous six days, being the lowest total recorded, with one exception, since the early part of April. Arrivals over the week-end were rather more satisfactory, the number of vessels in port on Monday being over 200, which is the largest total since the beginning of March. Shipments during the week, on account of the holidays incident to the Royal visit, fell off considerably, only amounting to about 320,000 tons, being a decrease of over 36,000 tons as compared with the corresponding week of last year. The Italian Government seem to have experienced some difficulty in obtaining the requisite number of vessels for the transport of coal for the use of the Naval and States railway departments. It will be remembered that last year a Bill was passed under which these departments were authorised to make contracts with Italian steamship owners for the transport of 700,000 tons of coal annually from the South Wales collieries. This Act, which practically meant the boycott of British and other foreign vessels, was to be operative for a period of 10 years, and should have come into operation on July 1. But difficulties have arisen which make it doubtful if the Act will come into operation for some considerable time. One of the reasons for the delay is the impossibility of getting the required number of Italian steamers, as so many are at present employed in the transport of war munitions to Tripoli and elsewhere, and in the conveyance of merchandise to the new colonies in North Africa. There does not seem, however, to be any intention of abandoning the measure, but it is probable that where Italian steamers can be engaged it will be on terms equivalent to a subsidy. According to private advices received from Italy, the belief is gaining ground that the war with Turkey will not be of much longer duration, and, of course, whenever there is a cessation of hostilities a vast amount of tonnage belonging to all nations will be released. At present the scarcity of tonnage is very marked. A large number of free berths are always available at Genoa, and the same remark applies to other Mediterranean ports; and whilst this state of things continues there is not much prospect of any improvement in the Welsh coal market. Amongst colliery sales agents, however, the feeling is still optimistic with regard to the future. As they point out, no one can take up any trade organ without being impressed with the fact that not only is trade good, but that it is actually booming, especially in the iron and steel industries, the makers in which are quite unable to cope with the demand for raw material. It has always been found that activity in these spheres of labour is soon reflected in the coal trade. There is one disquieting feature, and that is in connection with the shipbuilding yards. At present these have so many passenger steamers and oil-tank steamers on the stocks that makers find it impossible to turn out tramp steamers at anything like the rate required. The general opinion, however, is that in a comparatively short space of time a more plentiful supply of tonnage will be forthcoming from ports in other parts of the world, when it would be next to impossible to maintain the high freights at present ruling, and as previously pointed out in these columns, a decrease in tonnage rates is invariably followed by an advance in the price of coal. This is sadly needed, for best steam large now does not command more than 17s. 3d. to 17s. 6d. for fairly prompt shipment, whilst second Admiralties are offering at 16s. to 16s. 3d. and ordinary descriptions at 15s. to 15s. 6d. per ton. Although Viscount St. Aldwyn, up to the time of writing, had not given his decision with respect to the minimum wages to be paid at the collieries, the coalowners are viewing with considerable alarm the inevitable increase in the cost of production, which will undoubtedly be a great factor in future contracts. Some of the largest steamship and railway contractors appear to be anxious to cover their future requirements before the increase which is looming becomes an accomplished fact. Amongst others the Cunard Steamship Company are in the market for 120 000 tons of best steams for delivery over the six months commencing in November next. The directors of the Bombay, Baroda, and Central India Railway Company have also asked for tenders for 23,000 tons of best steams or any coals on the Admiralty list, to be delivered in four equal instalments in September and December of this year and in February and May of next year. The Paris and Orleans railways are also seeking tenders for 20,000 tons of second quality steams, whilst the Egyptian States Railways, which have taken a considerable quantity of American coal since the strike, have been in the market for supplementary supplies. According to the reports current on 'Change on Tuesday, the orders for these have been divided between Messrs. Pyman, Watson and Co. Limited, Messrs. H. C. Vivian and Co. and Messrs. T. Beynon and Co. The total requirements were 75,000 metric tons, of which 50,000 tons have been placed with the first named firm and the remainder between the other two firms. The coal is to be of Monmouthshire or equal quality and to be delivered over July and August. The price is reported to be about 14s. 3d. net per metric ton, equal to a current market price (less discount) of about 14s. 10d. per ton f.o.b. The movements of the British Admiralty are just now exciting much interest. For some days their agents have been busily engaged in securing tonnage to follow the fleet with coal during the forthcoming naval manœuvres. Several steamers have been taken up on time charter at 12s. 6d. per ton per month on the gross registered tonnage. This represents an advance of about 4s. 6d. on the figure paid for last year's manœuvres. The quantity of tonnage required has not been disclosed, but it is understood that close upon 100,000 tons of coal will have to be provided for, and high as the rate already paid is, there are shipowners who prophesy that the Admiralty will have to pay even more than 12s. 6d. ere they complete their arrangements, as the absorption of so much tonnage on their account will be sure to cause anxiety amongst other shippers, who will probably bid higher prices for whatever tonnage is available. The coal which the Admiralty are taking is, of course, that which they contracted for towards the end of last year, but as they have all along been taking pretty nearly their full quantities, it is not at all improbable they may have to come into the market for further supplies earlier than usual. The strongest feature of the market just now is that relating to small coal. This is exceptionally scarce, and bunkerings easily realise 11s., best ordinaries 10s. 6d. to 10s. 9d., and cargo qualities 9s. 6d. to 10s. per ton. Washed nuts are about 14s. 6d., and washed peas 13s. per ton. Monmouthshire coals continue very weak, Black Veins selling at 15s. 6d., western-valley at 15s., and best eastern-valley at 14s. 6d., and second qualities at 14s. to 14s. 3d., in each case f.o.b. Cardiff. Bituminous coals are quoted:—No. 3 Rhondda large 17s. 6d., through-and-through 15s., and small 12s. to 12s. 6d.; No. 2 large 12s., through-and-through 10s. 3d., and small 8s. 6d. to 9s. per ton. Shipments of patent fuel have been unusually heavy, amounting in the aggregate to over 31,000 tons. The Crown Fuel Company shipped 10,143 tons, other local firms 534, whilst Swansea shipped 18,515 and Newport 2,250 tons. As much as 19s. is demanded for prompt shipment, and as this is about 2s. above the price of best steam coal, buyers are purchasing very small quantities. Special foundry coke is 27s., ordinary qualities 24s. to 25s., and furnace about 20s. per ton. Pitwood is 20s. 6d.

IRON.

There was almost a record shipment of tin-plates last week, the total being 191,864 boxes, or 49,545 boxes more than were received from works. Stocks, however, are still very heavy, amounting to 460,311 boxes. The American makers are striving to capture the Far Eastern trade, and recently a steamer left New York with 1,800 tons of tin-plates for China and Japan. In other markets, however, the Welsh manufacturers hold their own, and some good orders have recently reached their hands. Bessemer standard cokes are selling at 14s. 7½d. to 14s. 9d., and oil sizes at 14s. 10½d. to 15s. per box. Notwithstanding the importation of foreign steel bars, the whole of the steel-smelting plants are briskly occupied. They, in fact, can scarcely meet the demands of the tin-plate and sheet mills, and it has been decided to re-start the Pyle and Blaina blast furnaces. Prices of steel bars are unchanged, from £5 15s. to £5 17s. 6d. being demanded for Siemens bars, and 2s. 6d. less for Bessemer. There is no improvement in the galvanised sheet trade, and the general quotation for 24-gauge corrugateds is £11 17s. 6d. to £12. A slightly better demand has set in from the East, and thin-gauge sheets are firmer. Rails are exceptionally strong on the basis of £6 5s. to £6 10s. for heavy sections, with the usual 5s. extra for light sections. Welsh hæmatite is rather harder, from 75s. to 76s. being quoted for mixed numbers free on trucks. Best rubio iron ore is 21s.

Swansea.

COAL

During the past week, the trade of the port displayed great activity, the coal and patent fuel trades were both above the average, and the shipments totalled 116,036 tons. There was a good attendance on 'Change this morning, and the undertone of the anthracite coal market continued steady. Swansea Valley large was in good request, and prices were fully up to last week's level. Red Vein large, however, continued weak, with very little demand. Machine-made nuts and cobbles were easier, but beans and peas continued firm. Rubbly culm was a little easier, but duff continued very strong. There was very little, if any, movement in the steam coal market, both large and through being quoted at reduced figures. Smalls, however, were in excellent request. The following were approximately the closing quotations:—Anthracite: Best large for malting (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 16s. to 18s. less 2½ per cent.; Red Vein large, 12s. to 13s. 6d. less 2½ per cent.; machine-made cobbles, 22s. to 24s.; Paris, French, and German nuts, 23s. to 25s.; beans, 22s. to 23s.; machine-made large peas, 14s. to 15s.; ditto fine peas, 13s. to 14s., all net; rubbly culm, 7s. 9d. to 8s. 3d., less 2½ per cent.; duff, 4s. to 4s. 6d., net. Steam: Best large, 18s. to 19s. 6d.; seconds, 14s. to 15s.; bunkers, 10s. 6d. to 12s.; small, 9s. 6d. to 11s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 18s. to 19s. 6d.; through-and-through, 15s. to 16s. 6d.; small, 10s. 6d. to 11s. 6d., all less 2½ per cent. Patent fuel, 17s. 6d. to 16s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

The trade in this district was, on the whole, highly satisfactory during last week. Notwithstanding the importation of foreign steel bars recently, the whole of the steel-smelting plants were briskly occupied. The largest firms have steelworks adjoining their tin-plate mills, and therefore are quite independent of the foreign manufactured article. The tin-plate mills were also actively engaged, and all departments of the Mannesmann Tube Works were kept fully employed. The shipments of tin-plates last week were 191,864 boxes, receipts from works 142,319 boxes, and stocks in the dock warehouses and vans 460,311 boxes.

Llanelly.

COAL.

A fairly satisfactory state of things exists in this market, but the scarcity of tonnage is a drawback. If sufficient boats could be got the market would become very firm, and prices would again advance for several sorts. Collieries are being seriously handicapped by shortage of empties, and often have to close down a day or two. It is expected that tonnage will shortly improve, when shipments to the Continental market especially will be very heavy, as stocks there are getting low. Most of the anthracite kinds have a firm demand. There is an easing off just now for cobbles and nuts, and sellers are prepared to accept lower figures to release wagons, but beans, peas, culm and duff are all going strong. Steam and bituminous kinds are not going at all well, and the market appears to be flooded with coals. Prices this week are:—Best malting large, 21s. to 23s.; second malting large, 20s. to 22s.; Big Vein large, 16s. to 18s.; Red Vein large, 13s. to 14s.; machine-made large cobbles, 21s. to 23s.; Paris nuts, 22s. to 23s.; French nuts, 22s. to 23s.; German nuts, 22s. to 23s.; machine-made large beans, 22s. to 23s.; ditto, second quality, 20s. to 22s.; machine-made large peas, 14s. to 15s.; rubbly culm, 9s. to 9s. 3d.; duff, 5s. to 6s.; large steam, 13s. to 15s.; through-and-through, 10s. 6d. to 11s.; bituminous small, 10s. 6d. to 11s.; small steam, 8s. 6d. to 9s. 6d.—all f.o.b.

THE IRISH COAL TRADE.

Thursday, July 4.

Dublin.

The local trade is very quiet this week upon the whole, and house coal sales are now about at the usual summer level. There is no change in prices either of steam or household coals. Quotations in the city are as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 21s.; best Orrell slack, 21s.; "bell" coal, 1s. 5d. per sack; best coke, 28s. per ton. The coaling vessels arriving during the week totalled 61, as compared with 65 the week previously, [illegible] from Point of Aire, Preston, Troon, Garston, Ayr, Partington, Manchester, Liverpool, Irvine, Maryport, Swansea, Cardiff, Newport, Burryport, Glasgow and Workington. The contract for the supply of coals and coke to the South Dublin Union for twelve months is open, representing some 7,000 tons. The Queen's County Council at their quarterly meeting this week, unanimously passed a resolution approving of the construction of a line of light railway from Athy to the collieries at Oracefield and Moduheagh, Queen's County, for the further development of the coalmines. It is estimated that when the railway is in full working order the output will average 1,000 tons per day, and that employment can be given to about 1,000 men.

Belfast.

There is no change in prices, either of household or steam coals, this week, but an advance is expected shortly in Scotch coals at this side, as prices are already higher at the Scottish ports. The demand for manufacturing steam and works fuel continues to be active, but business in the household branch has fallen off considerably. House coals in the city stand as follow:—Best Arley coal, 25s. per ton; best Wigan, 24s.; Orrell nuts, 24s.; Scotch, 21s.; Orrell slack, 21s. Quotations ex quay are about:—21s 4d. per ton for Arley house coal; Scotch household, 18s.; Scotch steam coal, 14s. 6d. to 15s. 6d.; navigation steam, 15s. 6d. to 16s. 6d.; Welsh steam coal, 16s. 6d. to 17s. 6d. per ton. The freight market is keeping firm, and supplies are plentiful. Cargoes arriving during the week were chiefly from Irvine, Girvan, Ayr, Preston, Maryport, Neath Abbey, Whitehaven, Point of Aire, Lydney, Partington, Manchester, Workington, Sharpness, Glasgow, Garston, Swansea, Troon, Campbeltown and Ardrossan.

THE BY-PRODUCTS TRADE.

Tar products:—The market is steady, though business is quiet. Pitch and benzols keep firm. Carbolics hold to the recent rise. Toluol and naphthas are advancing. Closing values are:—

Benzols, 90's, 11½d.; ditto 50's, 10d.; toluol, 10½d.; carbolic acid, crude (60 per cent.), 2s. 5d. to 2s. 6d.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 11½d., as in quality and package; crude ditto, 4½d. in bulk; creosote, 2½d. for ordinary qualities; pitch, 52s. 6d. to 54s. 6d. f.o.b. east coast; ditto, 52s. 6d. to 53s. 6d. f.a.s. west coast; ditto, 55s. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—The feeling of lassitude continues to prevail and prompt prices are easier. There is a fairly good forward enquiry and the general situation is satisfactory, notwithstanding the export situation. Nearest prompt quotations are:—

London (ordinary makes), £13 12s. 6d.; Beckton, £14 2s. 6d.; Liverpool, £14 12s. 6d.; Hull, £14 10s.; Scotch ports, £14 10s.; nitrate of soda (ordinary), 11s. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

An unusual case was heard at Doncaster West Riding Police Court last Saturday, when Thomas Haynes, an electric motor man, employed at Maltby Main Colliery, was summoned for a breach of colliery rules in being asleep in charge of his engine. Defendant, it appeared, was in charge of a 200-horse power electrical motor which supplies power for haulage and other purposes at the colliery. His defence was that some one had stolen one of his lamps, and that he was simulating sleep, thinking that the thief would return, and he would so catch him. In consideration of his previous excellent character defendant was ordered to pay the costs, and was bound over in the sum of 40s.

THE TIN-PLATE TRADE.

Liverpool.

The market is steady, and if anything prices are a shade firmer. Works are all very busy, and are standing well to their quotations, and a fair amount of buying is reported for delivery ahead over the rest of the year. Several large buyers, however, are disposed to hold off all they can. Current quotations run:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 14s. 9d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 1½d. to 15s. 3d. per box; I C 28 × 20 (112 sh. 216 lb.), 29s. 3d. to 29s. 6d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. per box; I C 14 × 19¼ (120 sh. 110 lb.), 15s. per box; I C squares and odd sizes, 15s. basis. Ternes are steady at 26s. for I C 28 × 20, and charcoal tins stand firm at 16s. 6d. basis and upwards. Coke wasters are in fair demand, and rates are firm as follow:—C W 14 × 20, 13s. 9d. per box; C W 28 × 20, 28s. 3d. per box; C W 14 × 18¾, 13s. 9d. per box; C W 14 × 19¼, 14s. per box; C W 20 × 10, 19s. 6d. per box—all f.o.b. Wales, less 4 per cent.

Mine Managers Examination.—The following is a list, communicated by the Home Office, of the successful candidates at the examination held in the South Wales district on May 21, 22, 23 and 24, 1912, to whom certificates of competency as managers or under-managers of mines have been granted under the Coal Mines Regulation Act, 1887:—First-class (managers): F. C. Baker, J. Barrie, E. J. Bennett, H. L. Blosse, J. A. Bosher, W. Bowen, W. M. B. Burnyeat, G. C. Carter, J. Christopher, F. B. Clark, D. Daniel, D. J. Daniel, A. J. Davies, D. Davies, D. Davies (Cymmer), D. Davies (Cwmaman), E. Davies, E. Davies, J. Davies, J. Davies, J. H. Davies, T. L. Davies, W. Davies, W. J. Davies, G. G. Deer, T. R. Dowdeswell, E. D. Dyer, E. Embrey, D. Evans, H. Evans, J. Evans, J. L. Evans, W. C. Evans, A. B. Frowen, E. J. Gay, O. L. Gibbon, D. A. Hann, W. J. Harris, C. W. Hayes, W. Herbert, J. Hopkins, J. O. Howells, C. E. Hughes, D. Hughes, J. J. Hughes, N. Hutchinson, C. D. James, E. D. James, O. H. B. James, H. J. James, W. James, D. Jeffreys, H. H. Johnson, B. Jones (Blaina), B. Jones (Cwmaman), W. J. Jones, I. W. Lamonby, A. Lewis, L. Lewis, M. Lewis, W. M. Llewellyn, R. N. Lundie, A. Lyon, H. G. Madley, W. Manley, J. K. Martin, W. F. Mewton, T. E. Moody, E. Morgan, W. Morgan, W. A. Morgan, T. Morris, W. J. Oliver, J. Parkinson, R. L. Partridge, C. Philpott, J. Powell, D. J. Price, J. Pugh, S. Radford, D. Reece, W. Rees, D. P. Robathon, S. Rosser, H. S. S. Scott, A. T. Seymour, G. H. Simpson, W. U. Staveley, D. Thomas, E. Thomas, J. Thomas, W. Thomas, G. J. Venn, I. Warfield, G. Watkins, A. Williams, J. Williams, M. T. Williams, R. J. Williams, T. M. Williams. Second-class (under-managers): A. Adams, T. Adams, O. A. Ames, A. T. Andrews, T. Austin, T. M. Bevan, G. Black, T. J. Blake, A. Bound, J. T. Bowen, W. Bowen, W. F. Bradley, jun., T. J. Broome, J. H. Carter, W. Charles, W. E. Clay, J. Connell, T. Cordey, W. Crooks, J. Curtis, L. E. Cutts, A. Davies, A. Davies, D. D. Davies, D. H. Davies, D. L. Davies, D. W. Davies, E. Davies, J. Davies, J. P. Davies, J. Davies, R. S. Davies, R. D. Davies, T. Davies, T. G. Davies, T. I. Davies, U. Davies, T. Edwards, W. Edwards, W. A. Ellis, T. J. English, A. S. Evans, D. T. Evans, D. J. Evans, D. M. Evans, E. Evans, J. L. Evans, J. T. Evans, R. T. Evans, T. Evans, T. E. Evans, W. Evans (Llangennech), W. Evans (Trimsaran), W. T. Evans, J. Foster, J. J. George, D. D. Gething, F. Godwin, S. Goodwin, D. Griffiths (Ystradgynlais), D. Griffiths (Pontyberem) J. Griffiths (Ynismeudw), J. Griffiths (Cwmgore), J. Griffiths (Blaenavon), J. Griffiths (Blaina), T. Griffiths, T. Griffiths, T. I. Griffiths, J. Gwyn, W. Hammonds, I. E. J. Hares, A. Harris, J. Hart, B. Haynes, A. Henry, T. W. Hicks, A. Hinton, T. Hoare, E. Hopkins, J. Hopkins, T. A. Hopkins, J. W. Howells, J. Howells, D. Hughes, D. J. Hughes, R. Hughes, W. J. Hughes, W. H. Hunt, E. James, J. James, W. James, H. Jeffreys, D. Jenkins, G. E. Jenkins, L. J. Jenkins, O. Jenkins, P. Jenkins, W. Jenkins, R. H. John, A. I. Jones, D. Jones, D. Jones, E. J. Jones, E. P. Jones, E. Jones, F. O. Jones, G. J. Jones, I. J. Jones, J. Jones, J. Jones (Abercrave), J. Jones (Tredegar), J. M. Jones, N. D. Jones, O. Jones, R. Jones, W. R. Jones, W. Jones (Ystradgynlais), W. Jones (Gilfach Goch), W. Jones (Five Roads), W. B. Jones, W. K. Jones, W. M. Jones, J. Legg, D. W. Lewis (Rhymney), D. W. Lewis (Ammanford), G. R. G. Lewis, G. Lewis, L. Lewis, L. J. Lewis, M. R. Lewis, R. Lewis, T. Lewis, W. W. Lewis, W. E. Lewis, W. D. Llewellyn, F. J. Lowe, W. McCale, T. Matthews, R. G. Maurice, D. Meredith, F. Mitchard, W. Mitchell, A. Morgan, D. Morgan, I. Morgan, L. Morgan, T. L. Morgan, W. Morgan, M. E. Morris, R. Morris, W. D. Morris, W. J. Morris, J. Mosley, J. Munn, F. C. Mutlow, W. E. Oakey, E. Oates, D. Owen, J. Pearce, J. M. Philipps, T. Phillips, F. L. Pocock, A. J. Powell, T. Powell, S. Price, T. H. Price, V. Pritchard, R. Prosser, D. Pugh, A. W. Rake, D. Ramsay, D. Rees, G. Rees, J. Rees, J. Rees, O. Rees, T. Rees, T. J. Rees, D. Richards, T. Roberts, J. L. Robins, W. Rolfe, W. J. Rollings, W. Rosser, J. V. Sage, H. St Clair, J. Saunders, G. H. Savage, D. Sime, G. E. Smith, J. F. Smith, J. H. Smith, A. W. Steeds, J. Stephens, E. Swain, A. Terrell, D. Thomas (Nantymoel), D. Thomas (Cross Hands), D. J. Thomas, E. Thomas, H. Thomas, J. Thomas, O. Thomas, W. H. Thomas, W. Treharne, J. Truscott, G. Turner, T. Vaughan, L. Walker, W. Walters, W. O. Ward, M. Watkins, T. Watkins, O. Watson, W. R. G. Wattley, A. Webster, D. Williams, E. D. Williams, H. Williams, H. R. Williams, J. Williams, jun., J. Williams, T. J. Williams, W. Williams, T. J. Willmott and T. Wright.

SPITZBERGEN COAL.

By W. Hamilton Patterson, M.Sc.

It is generally known that coal, in apparently extensive deposits, occurs both in Arctic and Antarctic regions.

Attention having been called to the good steaming properties of Spitzbergen coal in particular, it was considered to be of interest to subject it to a thorough chemical examination. The result is interesting.

The finely-powdered coal showed, by reflected light, very distinct brown colour similar to German brown coals, but it differed from these, on further examination, in that it contained relatively little moisture, and possessed also a high calorific value. The latter is mainly due to its high hydrogen content; corresponding to the hydrogen, it contains a large percentage of volatile matter.

The following gives the results of elementary analysis:—

	Per cent.
Moisture (total)	1·99
Ash	2·52
Carbon	79·79
Hydrogen	5·45
Sulphur	0·76
Nitrogen	1·08
Oxygen	8·41
	100·00

On making a coking experiment, the coal gave 65·20 per cent. of coke. This was firm and blown out, and the gas evolved burnt with a large but not very smoky flame.

	Per cent.
The volatile matter was...	32·81
The fixed carbon	62·68

and from the analysis above, the combustible matter was 95·49 per cent.

From the above analysis the calorific value, calculated by the formula, which is that adopted in Germany:—

$$H = 81C + 290 (H - \frac{O + N}{8} + 25S - 6W$$

gives 7,705 calories (or heat units), or equivalent to 13,869 British thermal units, which is the heat evolved when the coal burns to *carbon dioxide and steam.*

The experimental calorific value determined by burning a sample of the coal in the bomb calorimeter under a large pressure of oxygen, gave the gross calorific value, 8,034 calories (or heat units), which is the heat evolved when the coal burns to *carbon dioxide and liquid water at ordinary temperature.*

	Calories.
Correction for water condensed from oxidation of hydrogen and from moisture contained (hydroscopic moisture)	306
Correction for formation of sulphuric acid	17
Correction for formation of nitric acid	8
Total correction	331

which gives 7,703 calories (heat units) or 13,865 B.T.U., the net value, corresponding to the value obtained by calculation above.

The coal, therefore, gives actual and calculated calorific values which are practically identical. With an ordinary brown coal one would expect a divergence between the true calorific value actually determined by the bomb calorimeter and that calculated from the above formula of more than 1 per cent. and probably up to 3 per cent. Otherwise, the results of analysis present more or less normal figures.

BOOK NOTICES.

MacSwinney on Mines, Quarries, and Minerals. By Robert Forster MacSwinney. Fourth edition by the author, assisted by Philip Lloyd-Greame. London: Sweet and Maxwell. Price 42s.

The current edition has been kept within compass by dispensing with the chapters in the third edition relating to local courts, rights, and customs. In this way room has been found for comments on the recent decisions on the meaning of the word "minerals," and the meaning of the words "mines of minerals" in the Railways and Waterworks Clauses Acts; on the recent decisions on the law of support, the provisions of the Finance Act as to duties on mines, and the Coal Mines Act, 1911.

It may be here mentioned that the chapter dealing with the Coal Mines Act has been published separately, a fact already noted in these columns. The authors have evidently found it difficult to keep pace with the unending train of legislation, for there are addenda directing attention to the Coal Mines (Minimum Wage) Act, 1912, the Conveyancing Act, 1911, and some recent orders and legal decisions. The text of the new Acts is given in full. As in former editions, the value of this admirable work is greatly enhanced by a comprehensive index and table of cases, which is in addition to the copious notes in the text.

NATIONAL HEALTH INSURANCE.

Persons Working for Contractors.

Provisional regulations have been made by the Joint Committee established under the National Insurance Act, 1911, and the Insurance Commissioners established under the said Act, acting jointly, as to employed contributors working under the general control and management of some person other than their immediate employer, dated June 27, 1912.

The regulations, which are published in Paper 184, are of special importance to colliery proprietors, who are compelled by the Coal Mines Act to exercise authority and management over many persons not in their immediate employment, such as pit sinkers, datallers, employed by a contractor, &c. These regulations may be cited as the National Health Insurance (Intermediate Employers) Regulations (England), 1912, and provide that, where a contributor engaged in any of the employments specified in a schedule to the regulations works under the general control and management of the person specified in the corresponding entry in the second column of the schedule, that person (in these regulations called the principal employer) shall, notwithstanding that he is not the immediate employer of the contributor, be deemed to be the employer for the purposes of the provisions of Part I. of the Act relating to the payment of contributions and for the purposes of the provisions of the Third Schedule to the Act, and those provisions and the National Health Insurance (Collection of Contributions) Regulations, 1912, shall be construed and have effect as if that person were the immediate employer of the contributor.

The principal employer shall be entitled to deduct the amount of any contribution paid by him on behalf of any contributor whose employer he is deemed to be by virtue of these regulations from any sums payable by him to the immediate employer in respect of the period or any part of the period for which the contribution has been paid, and upon any such contribution being so paid by the principal employer the immediate employer shall be entitled to recover from the employed contributor the like sum and in the like manner as if he had paid the contribution.

Schedule.

Employment.	*Principal Employer.*
1. Employment in a coal mine within the meaning of the Coal Mines Act, 1911.	1. The owner of the mine within the meaning of the said Act.
2. Employment in a metalliferous mine within the meaning of the Metalliferous Mines Regulation Acts, 1872 and 1875.	2. The owner of the mine within the meaning of the said Acts.
3. Employment in a quarry under the Quarries Act, 1894.	3. The owner of the quarry for the purposes of the said Act.
4. Employment in a factory or workshop within the meaning of the Factory and Workshop Act, 1901 (not being a tenement factory or workshop, or factory or workshop within which an insured trade within the meaning of Part II. of the Act is carried on, or a quarry under the Quarries Act, 1894.)	4. The occupier of the factory or workshop.
5. Employment in an insured trade within the meaning of Part II. of the Act (other than the trade of building or of the construction of works) where the immediate employer of the contributor himself works wholly or mainly by way of manual labour in or for the business of the principal employer.	5. The person in whose business or for the purposes of whose business the contributor is employed.
6. Employment in the trade of building or of the construction of works (within the meaning of the Sixth Schedule to the Act) where the immediate employer of the contributor himself works wholly or mainly by way of manual labour in or for the business of the principal employer and where the principal employer has a right to the exclusive services of the immediate employer of the contributor.	6. The person in whose business or for the purposes of whose business the contributor is employed.
7. Employment in a tenement factory or workshop within the meaning of the Factory and Workshop Act, 1901, where the owner of the factory or workshop has a right to the exclusive services of the immediate employer of the contributor.	7. The owner of the factory or workshop.

After several months' work, new and up-to-date screening plant has been successfully installed at the Whitwick Colliery. It will replace the plant which previously dealt with the coal from Nos. 2 and 5 pits. The company have commenced to work the Deep Main seam from the No. 5 shaft. This seam has been worked from the Speedwell and New pits for some years.

Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

BORING AT OXNEY, KENT.

Sir,—When I was visiting the Midlands and North of England the week before last, I was repeatedly told by mining engineers that the company I represent—the Trefor Boring and Mining Company Limited—had had to abandon, and could not finish, the bore that we are finishing for the Vivian Boring Company, of Barrow-in-Furness, on the Kent Coal Concessions Company's ground at Oxney.

As this is absolutely untrue, I would esteem it a great favour if you will mention this in your valuable paper. Instead of our being beaten by this bore, we are managing to put it down even quicker than we did the one at West Langdon on the same concession. This bore reached a depth of 3,700 ft. in about 11 months, and we are presently doing better than that, and getting, if not the full amount of cores that is possible, considerably over 98 per cent. of them. The last extracted core measured 11 ft. 6 in. James Jno. McNaughton.

"Trefor" Société Anonyme,
British Agency, 66, Victoria-street,
Westminster, S.W.
July 1, 1912.

TO CORRESPONDENTS.

Daily Personal Supervision.

A. B.—The phrase "daily personal supervision" contained in section 3 (1) of the Coal Mines Act, 1911, is also to be found in section 21 of the Coal Mines Regulation Act, 1887. Under the Coal Mines Regulation Act such supervision had to be exercised *either* by the manager *or* by the under-manager; under the Coal Mines Act, it must be exercised by the manager *and* the under-manager. Subsection 2 of the same section, however, provides for the appointment of substitutes in cases where, "on account of the absence of the manager or under-manager on leave or from sickness or any other temporary cause," such daily personal supervision cannot be exercised. There is also a provision for cases in which mines are grouped as provided in section 4 (2). It is apprehended that the duty of the manager is to supervise the officials of the mine and satisfy himself that they perform their duties properly, as well as to be satisfied, by similar personal supervision, of the safety and general good order of the whole mine. It has been held that it is the duty of the certificated manager to be in the mine day by day to supervise it; if he is away then some other certificated manager should take his place (Evans *v* Small (1885) 2 T.L.R. 139). It has also been held that owners can dismiss a manager who absents himself without leave, even during holidays (Plant *v.* Cheadle Valley Coal and Iron Company (1882) Q.B.D. In connection with the latter case it may here called that the previous Act of 1872 required that the mine should be under the "control and daily supervision" of the manager; and "it was clear from the true construction of that Act (said Lord Justice Coleridge) that it was the duty of the manager to be in the mine day by day to supervise it; and when he undertook this most onerous duty, if he desired at any time to be away, then the Act required that he should provide some other certificated colliery manager to fill his place during the period of his absence." When the Coal Mines Act was before the House of Commons on the Report stage, Mr. Harmood-Banner proposed that the word "at" should be substituted for the word "in," pointing out that the latter word might imply that the manager was to be daily underground—an impossibility if he was to exercise proper supervision over the surface works. Mr. Masterman, replying on behalf of the Government, stated that there was not the slightest doubt that "in the mine" referred to surface works of the mine as well as underground workings. On the assurance that the word "in" did not force the manager to go down the mine every day, the amendment was withdrawn.—Ed., *C.G.*

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, June 25, 1912, is as follows:—Amsterdam, 827 tons; Antwerp, 103; Algiers, 502; Buenos Ayres, 4,465; Bombay, 1,007; Bremen, 1,200; Bergen, 191; Copenhagen, 649; Cronstadt, 10,454; Ghent, 786; Gothenborg, 1,156; Harlingen, 1,469; Hamburg, 8,054; Harburg, 2,537; Kiel, 4,278; Libau, 397; Landscrona, 1,386; Naples, 495; Oxelosnod, 2,150; Reval, 1,833; Ronneby Redd, 1,820; Rouen, 2,008; Rotterdam, 6,223; Riga, 5,800, St. Petersburg, 4,590; Stettin, 4,159; Stege, 1,070; St. Malo, 448; Venice, 399; Westervik, 438; Wasa, 106; total, 71,000 tons; corresponding period June 1911, total 48,527 tons.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.—July 2.

Housing of Miners.

Sir Arthur Markham asked the Chancellor of the Exchequer whether he would say what loans for the housing of miners had been made during the past six years ending December 31, 1911, under Clause 67 of the Housing of the Working Classes Act, 1890, in the counties of Nottinghamshire, Derbyshire and Yorkshire respectively, and the total amount of loans made in the same period and for the like purpose in England, Scotland and Wales respectively.

Mr. Masterman (who replied) said the total amount granted by the Public Works Loan Commissioners for the housing of the working classes under section 67 of the Housing of the Working Classes Act, 1890, during the last six financial years ending March 31, 1912, was £1,118,726. The amount required for the housing of miners specially had not been kept distinct in any way.

Sir Arthur Markham also asked the Chancellor of the Exchequer if he would say, in view of the statement he made at Cardiff on December 29, 1911, that the housing conditions in certain districts in South Wales were a disgrace to civilisation, whether he was aware that the Public Loans Commissioners had recently refused to sanction loans for the housing of miners in Yorkshire to a Welsh firm of builders on the ground that such a scheme was not of public benefit; whether he was aware that this refusal had resulted in the builders erecting cheap houses without baths and the other conveniences which are compulsory under the Housing Act; and, if so, what action he proposed to take.

Mr. Masterman said he was informed that the application to which the hon. member referred was probably one which was made by a firm who appeared to the Public Works Loan Commissioners to be speculative builders whose scheme was on ordinary commercial lines, who declined to enter into covenants usually required by the Commissioners restricting the rents, or otherwise limiting the profits to be derived from the buildings, and the loan was refused on the ground that the work was not of such a benefit to the public as would justify a loan out of public money.

COASTWISE SHIPMENTS IN MAY.

According to the monthly coal tables there was a recovery in coastwise shipments in May, as will be seen from the following table :—

From	Total cargo.		Total bunker.	
	1911.	1912.	1911.	1912.
	Tons.	Tons.	Tons.	Tons
Bristol Channel ports	396,230	549,041	20,608	21,644
North-western ports	288,643	295,361	59 201	65,198
North-eastern ports	682,009	741,362	25 999	30,862
Humber ports	180,830	212 745	8 971	10,532
Other ports on east coast	15,914	11,990	8,848	7,119
Other English ports	3 057	2,444	4,833	3,397
Total from England and Wales	1,566,683	1,812,943	128,460	138,752
Ports on east coast of Scotland	130,112	152,818	20,197	17,810
Ports on west coast of Scotland	160,664	197,860	41 298	37 586
Total from Scotland	290,776	350,678	61,495	55,396
Irish ports	35	—	7,279	3,487
Total from United Kingdom	1,857,494	2,163,621	197,234	197,635

The destination of cargo shipments was as follows :—

To ports in	May 1911. Tons.	May 1912. Tons.
England and Wales	1,281,576	1,490,452
Scotland	151,682	183,458
Ireland	424,236	489,711

Shipments to London amounted to 797,938 tons.

The application of the Balby-with-Hexthorpe Urban District Council for power to borrow £1,373 for works of sewerage and surface water drainage was the subject of a Local Government Board enquiry at Doncaster last week. It was shown that the extension of the Council's sewerage works had become necessary through the overflow of the Doncaster population into the Balby area, and the increase in the local population arising from the sinking of the Yorkshire Main Colliery at Edlington. The surveyor stated the matter was one of urgency, as many new houses were completed, and the owners wanted to let them. They would eventually draw into the Balby area and the new area a total of 12,168 houses. Hexthorpe is mainly drained through the Doncaster Corporation system. Dr. Wilson, of the West Riding Rivers Board, expressed the opinion that within the next 10 years Doncaster and district would increase more rapidly than any other part of the West Riding.

INDIAN AND COLONIAL NOTES.

Australia.

Big Coal Contracts.—In view of the approaching termination of the existing contracts for the supply of coal to the South Australian railways and other Government departments, the State Supply and Tender Board invited tenders for approximately 200,000 tons per annum, or an aggregate of 400,000 tons for the two years contract. The successful joint tenderers were Messrs. Huddart, Parker Limited, Messrs. McIlwraith, McEacharn and Co. Limited, the Adelaide Steamship Company Limited, and Messrs. Howard Smith and Co. Limited, the prices per ton at Adelaide being first-class coal 18s. 6d., second-class 17s. to 17s. 7d.; Port Pirie and Port Augusta, first-class 18s., second-class 17s. 7d. to 18s.; outports 18s. 6d. to 25s. for first-class, and 17s. to 24s. for second-class. The aggregate value of the contract on the estimated quantity, writes our Sydney correspondent, is about £375,000. There is an all-round increase in the prices, but the contractors will have to pay, in the shape of wharfage rates, at least 1s. per ton of the increase. In New South Wales the State Railway Commissioners have accepted a number of contracts for 1912-13 for the supply of large and small coal. Included in the number are the Metropolitan Colliery, Helensburgh, 175,000 tons of large and 44,000 tons of small; Southern Coalowners' Agency, 83,000 tons of large and 17,500 tons of small; South Clifton Company, 50,000 tons of large and 11,500 tons of small; North Bulli, 10,000 tons of small.

Weighing Coal.—The New South Wales Minister for Mines states that he intends to provide in an amending Mining Bill that where the coal got by the miners is not paid for at a consolidated rate—that is, a rate covering both large and small coal—the coal must be weighed within 20 ft. of the pit mouth. The prevailing system is said to consist in screening the coal and paying the miners on the result. If weighed before screening, the miners would get the benefit of the full weight raised. If the Act is thus amended, a frequent source of dispute for many years past will become removed.

Canada.

In the first half of the year the coal production of Cape Breton was approximately 300,000 tons greater than in the corresponding period of 1911, and much exceeds any previous year to June 30. The output of the Dominion Coal Company's Glace Bay collieries for the six months was 2,120,000 tons, comparing with 1,891,000 tons to June 30, 1911. The Nova Scotia Steel and Coal Company's output to June 30 was 280,000 tons, comparing with 222,000 tons in 1911. The Springhill Mines of the Dominion Coal Company produced in the six months 212,000 tons against 71,400 in the previous year. The combined increase over 1911 of the Glace Bay and Springhill Mines of the Dominion Coal Company to June 30 was 369,000 tons. The output of the Glace Bay mines of the Dominion Coal Company reached over 17,000 tons per day on several occasions during June, and on one occasion over 18,000 tons was obtained.

A peculiarity of Nova Scotian outputs compared with English conditions, says our Cape Breton correspondent, is that Nova Scotian mines are usually single-shifted. Coal is hoisted from 7 a.m. to 5 p.m. All the shaft mines have separate winding shafts for men. In most cases tumbler cages are used for winding coal, and the coal is dumped from the pit-tub into a tank, the pit-tub never leaving the shaft. In the slope mines a separate travelling way is provided for the men, who are not allowed on the haulage ways, so that with it both shaft and slope mines coal is hoisted without any interference through the passage of the workmen to and from their shift. If the mines were double-shifted much greater outputs could be obtained with the same plant, but multiple shifts are not popular in Nova Scotia, principally because of the marked disparity between summer and winter shipments. It would not be possible to keep the mines on double shift in the winter, and the change from double shift to single shift would cause more or less unemployment.

ALLEGED CONTRAVENTIONS OF TRUCK ACT.

Important Prosecutions in Hamilton

Sheriff Hay Shennan, in the Hamilton Sheriff Court, has just disposed of two test prosecutions under the Truck Act which were taken at the instance of the Crown against the Summerlee Iron Company and John Watson Limited. The Summerlee Iron Company, who were represented by their general manager, Mr. D. M. Mowat, Coatbridge, were charged with having, on or about February 15, at their No. 3 Pit, Orbiston Colliery, Bellshill, contracted with three of their workmen that, in the event of their leaving the company's employment, the latter would be entitled to retain for rent and other obligations whatever moneys were then due to the workmen until they severally removed from the houses occupied by them and belonging to the company, and that on March 1 and 2 the respondents deducted £1 from the wages of three workmen.

The charge against John Watson Limited, who were represented by their general manager, Mr. John B. Thomson, Hamilton, was of a similar character.

Amongst coalowners throughout Scotland intense interest was manifested in the prosecutions, which were really sequels to the recent coal strike.

On Friday of last week, Sheriff Shennan issued a written judgment in the cases. He points out that the complaint against the Summerlee Iron Company embraces three charges. The first charge was that on February 16, 1912, the respondents contracted with three miners in their employment that in the event of their severally leaving the employment, the respondents should be entitled to retain whatever moneys were then in their hands until the miners severally removed from the houses respectively occupied by them, and belonging to the respondents, and that for rent of and obligations connected with and arising out of their occupation of said houses for the period subsequent to their leaving the respondents' employment.

"There is no dispute," continues Sheriff Shennan, "that a contract was made at each fortnightly payment of wages between the respondents and each of the men libelled in the complaint. It was contained in the printed receipt forms on the wages slip which was signed by each workman when he received his wages. So far as material the form runs thus:—'Received payment of the above balance, being payment in full of all wages due to me up to this date; and I hereby authorise you to deduct from my future wages the amount of my house rent, and in the event of my leaving your employment I authorise you to retain whatever moneys are in your hands until I remove from your house.' In my opinion, whatever view may be taken, the agreement is a breach of the Truck Act and I must convict of the contravention of February 16, 1912.

"The second charge is that on March 1 and 2 the respondents contracted with each of the three miners in question that they should stop and deduct from the wages due on March 1 £1 each for rent and other obligations connected with and arising out of their occupation, severally, of their houses for the period after their employment ceased. The short and conclusive answer to this charge is that the three miners were not parties to any such agreement. They protested against the deduction of any sum from their wages, but felt they were helpless to enforce full payment.

"The third charge is that the respondents did stop and deduct from wages due on March 1 £1 for rent, &c., in respect of the period subsequent to employment ceasing, and did fail to pay in current coin. It is a charge that, instead of paying in current coin, the respondents appropriated the wages due to payment of rent to become due. While the form of the charge is not what could be desired, I think that this is clearly the substance of the charge, and I am bound to deal with it accordingly. If that be so, here also there was a contravention, because the respondents paid the miners by turning this portion of their wages into a credit fund for their (the respondents) further security. Observe that it was not a bare refusal to pay. The respondents in effect said: 'We admit that we owe you £1 each, but instead of paying it in current coin we shall pay it to ourselves as your bankers, and we shall exercise a lien on it for sums which will from time to time be due to us by you for rent.' I think this was payment otherwise than in current coin of the realm. These sums were all carried to the credit of the men respectively as 'unpaid wages,' and though it may seem paradoxical to hold that payment of these 'unpaid wages' took place, still I think it is the logical and legal effect of the respondents' action whereby they constituted themselves holders of these funds for these three miners, reserving their right to apply the funds in a particular manner.

"Had it been necessary to determine whether or not these miners were in the respondents' employment during the time of the strike, I should have found in the negative without hesitation. It is ridiculous to say that men who refuse to work and who were in receipt of strike pay remained in their employment. They had no rights they could enforce against the employers. The employers were entitled to fill the pit with new workers if they could have obtained them. As one of the witnesses said, 'I could not lose my job when there was no one there.' The circumstances were such that the men were practically certain to be reinstated, but pending the strike there was no relationship of employer and employed between the respondents and those miners."

Sheriff Shennan gave a similar decision in the prosecution against John Watson Limited. He imposed a fine of £3 on the Summerlee Iron Company and 30s. on John Watson Limited. The agents acting for the respondents have asked the Sheriff to state a case for appeal to a higher court.

MINING AND OTHER NOTES.

The Secretary of State has appointed additional inspectors of mines to the Yorkshire and North Midland Division, the staff now being constituted as follows:—Inspector for the division, W. H. Pickering, Lawn House, Doncaster. Senior inspectors: J. R. R. Wilson, The Woodlands, Westwood-lane, Leeds; H. R. Hewitt, 131, Rustling's-road, Sheffield. Junior inspectors: James Mellors, St. John's North, Wakefield; G. Y. Tickle, 56, Thorne-road, Doncaster; H. M. Hudspeth, 11, Beechgrove-terrace, Woodhouse-lane, Leeds; E. H. Frazer, 4, Muster's-road, Nottingham; C. D. Mottram, 613, Ecclesall-road, Sheffield. Sub-inspectors: Joseph Hobson, 25, Inglewood-terrace, Delph-lane, Leeds; H. J. Burden, 72, Dodworth-road, Barnsley; T. Gawthrope, 45, Junction-road, Sheffield.

Mr. John Shaw, late manager of Bankhead pit, has been presented with a salver, a Bible, and a purse of severigns.

A gob fire broke out last week in the Seven-feet mine of the Prescot pit, which is owned by the White Moss Colliery Company, and is situated at Upholland, in the Wigan coalfield. Fortunately, there was no loss of life, the precaution having been taken to withdraw the men from the workings. Rescue brigades from collieries in the district were drafted to the pit quickly, with the object of checking the spread of the subterranean outbreak, and, if possible, subduing the flames.

In succession to Sir John M. N. Alleyne, Bart., deceased, Sir Gilbert Claughton, Bart., chairman of the London and North-Western Railway, and manager of the Earl of Dudley's mineral estate, has been elected a member of the council of the Iron and Steel Institute.

The Electric Lighting Committee of the Derby Corporation have just arranged their contracts for the supply of coal for the next twelve months, and their orders, which amount in the aggregate to something like 22,000 tons, have been distributed among several local firms. Whereas last year the average price was 7s. 10½d. per ton, the new contracts work out at an average of 9s. 3d.

Mr. Robert English has been elected chairman of Messrs. Fraser and Chalmers, in succession to the late Sir Julius Wernher.

The electrical engineering department at Manchester University is in future to be a separate department, similar to the general engineering, the physics, and other departments. The first professor of the new department is Dr. Robert Beattie.

Mr. John Dodd, of The Hollies, Werneth Park, Oldham, chairman of Messrs. Platt Brothers and Co. Limited, mechanical engineers, of Oldham, who died on April 13, aged 74, left estate of the gross value of £228,100, of which the net personalty has been sworn at £222,380.

Sir Gilbert Claughton, chairman of the London and North-Western Railway Company, on Monday opened the new railway to Holywell, Flintshire. The line (about two miles) connects Holywell with the Chester and Holyhead section of the London and North-Western Railway.

In connection with the new lines which the North British Railway Company propose to construct with a view to giving greater facilities for the Midlothian coalfields and other traffic, in accordance with the promise given in the course of the hearing on the Lothian Railways Bill before a Select Committee of the House of Lords, it is understood that it is proposed to apply for the necessary powers next session. The proposed construction includes both the formation of new lines and the doubling of existing single tracks. The South Leith branch will be doubled, and an independent line from the east end of that branch will be carried round by the north of Portobello station and right on to Monktonhall, connecting there with the Ormiston and Macmerry branch, which is to be doubled as far as to Smeaton Junction. At this junction some improvements will be carried out, and a signal cabin will be put in, in connection with the Dalkeith Colliery. The new line at Monktonhall will not only connect with the Ormiston and Macmerry branch, but also with the main line; while at the Portobello end it will, in addition to connecting with the South Leith branch, connect with the main line. From this new line there are spurs, one to serve the Niddrie Collieries, and the other to serve the collieries of the south-west district of the Lothian field, such as the Lothian Coal Company's and the Shotts Iron Company's collieries. In addition to these works, the company may lay down sidings on six acres of ground which they have acquired at South Leith from the Caledonian Railway Company. The North British Railway Company have undertaken to lay in siding accommodation at Craigentinny. They will provide either for 1,000 wagons (in the event of the connecting line from the South Leith branch to the Caledonian line at Seafield being formed) or (in the event of that connecting line not being proceeded with) for 2,000 wagons.

Messrs. Hall, Blyth and Co. have admitted to partnership Mr. Harry Sillitoe, who has been associated with the firm for the past 16 years.

At a meeting of the South Staffordshire Sub-committee last week, the director reported that the resolution passed at their last meeting with regard to examination arrangements under the Coal Mines Act, 1911, was referred back by the Education Committee on June 1. He reported the result of enquiries he had made with the Birmingham University, which authority would be willing to undertake the examination of candidates under the Act. It was resolved that the examination of firemen should, in South Staffordshire, be left to the University and to make no application to the Home Office for recognition as an examining body; the director's report was received that a further course of special instruction for firemen, etc. had been commenced, and the appointment of Mr. D. S. Newey as assistant for the Dudley classes was approved, subject to a charge for his services being made to the Dudley authority. The North Staffordshire Sub-committee made a similar recommendation and the General (Education) Sub-committee recommended that Mr. A. Hassam be appointed to represent the County Education Committee on the advisory committee of the Birmingham University in connection with examinations under the Act.

The exhaustion of the Top Ward coal in the Leen Valley is now only a question of a few years, and most of the collieries have been experimenting with a view to testing other seams. The Sherwood Colliery Company is now driving two stone headings or drifts from the bottom of the present shafts at their Hucknall (No. 2) Colliery to reach the Deep Hard seam; and at the Linby Colliery in the vicinity, developments have been taking place for some time. Recently the High Hazel seam was struck, being about four feet thick and of excellent quality.

The Board of Education has just presented to the King their report for last year on the Nottingham University College. It is stated in the report that the colliery owners of the district have promised a sum of £210 annually to enable the college to appoint a professor of mining, and a sum of £40 towards furnishing and equipping a mining laboratory, to which the County Council of Notts has also given a sum of £100.

Dr. Cox, the medical secretary of the British Medical Association, has made a statement with regard to the termination by doctors of their contracts with friendly societies. He stated that some districts have already sent in their resignations. These districts are acting with the sympathy of the association, but upon their own responsibility, and he was not in a position to say yet whether the association as a whole would call upon all practitioners to take this course. Probably the whole matter would be left for the decision of the representative meeting at Liverpool on July 19.

Rats constitute a vexatious pest at collieries, and their extermination is frequently a matter of some difficulty. For this purpose "Ratin," a bacterial culture containing the germs of a disease to which only rats and mice are susceptible, has proved most effective. The vermin feed ravenously upon this bacterial preparation, from which they contract a fatal disease which is communicated from one to another, with the result that large colonies of rats are destroyed. The vendors of the scientific preparation, The Ratin Laboratory, have issued a small pamphlet entitled "The Scientific Extermination of Rats," which, we are informed, would be sent post free to anyone applying to the Laboratory's offices at 155, Fenchurch-street.

Samuel Deacon and Co., the well-known firm of advertising agents and contractors, established at Snow Hill over a century ago, and who have occupied No. 154, Leadenhall-street, for the last 57 years, have removed to No. 7, Leadenhall-street, nearly opposite. We understand their premises have been acquired by a large insurance company for reconstruction.

Mexboro is setting a good example in the matter of town planning. Its Town Planning Committee has recommended the local governing authority to acquiesce in a joint scheme for the area sketched out by the surveyors of the various authorities concerned, on the conditions that when a scheme is prepared and sanctioned it shall provide that each authority will carry out, in its own township, the details of the scheme which affects that township. They also recommend that Mexboro shall be the applying authority for the preparation of the scheme, the cost of which shall be jointly borne by the various authorities, and that for all purposes of voting at the conference the separate authorities shall be represented on the basis of valuation. Although a great clamour has been made at Doncaster as to the necessity of a town planning scheme, little, if anything, has so far been done.

It has been computed that blastfurnace gas is now being used to the following extent in the various countries:—Germany, 480,428-horse power; America, 337,490-horse power; France, 55,050-horse power; Belgium, 46,714-horse power; Austria-Hungary, 25,500-horse power; Great Britain, 24,986-horse power; other countries, 63,341-horse power. The total of 1,033,509 is horse-power consumed as to 855,819-horse power in metallurgical operations, 68,200-horse power at collieries, 34,950-horse power at electrical works, and 74,540-horse power in other works.

Evidence of Doncaster's growing importance is found in the fact that the National Insurance Commissioners have decided to place in the borough a divisional office for Labour Exchanges and Unemployment Insurance. Doncaster thus becomes the centre for seven large and important counties—viz., Yorkshire, Derbyshire, Nottinghamshire, Lincolnshire, Leicestershire, Northamptonshire, and Rutlandshire. The opening of this office, which comprises 20 rooms, coincides with the closing of the temporary office in Leeds, and the transference of the staff to Doncaster. When in full working order the staff will number 70. It is interesting to note that the divisional officer is Lieut. J. B. Adams, R.N.R., formerly of the Shackleton South Pole expedition.

The Iron Trades Employers' Insurance Association Limited, whose annual report was issued recently, is the largest mutual society in this country undertaking employers' liability insurance. The premiums received in 1911 amounted to £224,888, being a considerable increase as compared with the previous year. Claims were £169,366, and expenses are given at £15,336. The surplus on trading account for the year was £40,186, out of which £21,050 was allotted as a bonus to such members as were entitled to participate.

Col. the Hon. Herbert Alexander Lawrence, of 67, Lombard-street, has been appointed a director of the Midland Railway Company, in the place of Mr. James Samuel Beale, resigned.

A settlement has been arrived at in an action raised in the Edinburgh Court of Session by Robert P. Wilkinson, 15, Fernville-street, Sunderland, as administrator of the estate of the deceased Clifton Pecket, of Garrucha, Spain, against the Sirena Iron Ore Company Limited, 105, West Nile-street, Glasgow, for £10,000. The plaintiff said that the late Mr. Pecket was owner or lessee of a number of mines near Garrucha, and the defendants had been in occupation of the mines as tenants, the sum sued for being in respect of royalties. The defendants pleaded that the plaintiff had no title to sue, and that all parties had not been called. They said that no evidence had been produced by the plaintiff that his title had been legalised in Spain, and that it had been intimated to them by others interested that if any sum was paid to the plaintiff they would at once raise an action in Spain. The action was formally dismissed, without expenses to either party.

Presiding at the annual meeting of the Ebbw Vale Company, Mr. Joseph Brailsford, the chairman, said the total amount they had had to pay in local rates during the last year had been £54,797. If to this they added the large amount thrust upon the cost of coal by the Eight Hours Act, the Minimum Wage Act, the Coal Mines Act of 1911, and the Insurance Act, the annual payment would raise the sum which the company would have to pay by some £7,000. The total wages paid by the company during the year had been £747,457, as compared with the previous year's figure of £839,800, a reduction of close upon £100,000. The directors had quite anticipated at the beginning of the financial year that, with full employment, their wages bill would have touched £1,000,000, as it certainly could do in this current year—subject, of course, to settled conditions. Mr. D. A. Thomas, in seconding the resolution, said he believed that had it not been for the coal strike they would have been paying a dividend of 6 per cent. The company paid £700,000 in wages, and had only distributed something like £22,000 to the shareholders. That was not a fair proportion for capital. In a speculative business like theirs it was going far beyond a fair condition of things that for every 1s. distributed to the shareholders labour should take 35s. Though the coal prospect was encouraging he would not unduly raise their hopes, for there was legislation coming into force during the next month, apart from the Minimum Wage Act, which would entail upon the South Wales coalfield an additional cost of from £800,000 to £1,000,000 per annum, and in addition to that the rate of wages at the end of the year was likely to be increased. He anticipated before the close of the year that the cost of production of coal would be at least 1s. a ton more than it was at the present time.

Southampton Town Council have accepted the tender of Myers, Rose and Co. Limited, for 500 tons of Pinxton coal at 20s. 9d. per ton, and the tender of Dinham, Fawcus and Co. Limited, for 250 tons of Bolsover coal at 20s. 11d. per ton.

A preliminary programme has been issued in connection with the joint meeting of scientific, mining and engineering societies to be held in Cornwall from July 16 to 20 inclusive, to which reference was made in the last issue of the *Colliery Guardian*. On July 16 a visit will be paid to the engineering works of Messrs. Holman Bros. Limited, at Camborne, and to the Dolcoath mine. On July 17, the visitors will inspect the china clay works of Messrs. Parkyn and Peters and Carpella, at Burngullow, followed by excursions to Lanhydrock and Redmoor. On July 18, the itinery will be St. Michael's Mount, Tranwith, St. Ives Consols and Giew mines, and on July 19, South Crofty and King Edward mines and the rock drill works of Messrs. R. Stephens and Son, Carn Brea. On the concluding day a visit will be paid to the Cathedral and Museum of the Royal Institution of Cornwall, at Truro, and the Hall of the Royal Cornwall Polytechnic Society, at Falmouth.

CONTRACTS OPEN FOR COAL AND COKE

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Abstracts of Contracts Open.

Altrincham, July 8.—For best screened gas coal and cannel, for the directors of the Altrincham Gas Company.

Antrim (Ireland), July 8.—For best screened house and steam coal, for the Antrim District Lunatic Asylum.

Belfast, July 10.—For coal, for the Harbour Commissioners.

Belfast, July 10.—For 1,500 tons, more or less, of best Welsh steam coal, delivered at the Hospital, Grosvenor-road, and 120 tons best English house coal, delivered at the Throne Hospital. Further particulars from the superintendent at the Hospital, Grosvenor-road.

Billinghay (Lincs.), July 8.—For 100 to 200 tons of Portland hard best steam coal, for the Trustees of the Billinghay South District Drainage.

Bishop Auckland, July 24.—For best household and steam coal, for the Auckland, Shildon, and Willington Joint Hospital Board.

Brecon, July 11.—For coal, including anthracite (French nuts) (free from stone and without small), also with firewood (split) at per cwt., for the County Council.

Bridlington, July 22.—For 500 tons of best South Yorkshire screened hard steam coal, for the Waterworks Committee of the Corporation.

Chelmsford, July 8.—For Portland hand-picked steam coal, 300 tons; Portland screened cobbles, 150 tons; Rockingham best selected, from Newton, Chambers and Co.'s colliery, 50 tons; for the Guardians.

Christiania (Norway), July 13-August 2.—Tenders are invited by the Norwegian State Railway Authorities for the supply of (1) 39,650 tons of best quality locomotive coal (Shireoaks, Langwith, Kiveton Park, Hetton, Sherwood, &c.), and, for supply in Bergen, 1,200 tons of smokeless double-screened Cardiff coal; (2) 672,700 kilogs. of petroleum. Conditions of tender for both (1) and (2) can be seen by British firms at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Cleator Moor, July 19.—For 2,000 tons of round gas coal or nuts, for the Urban District Council.

Clitheroe, July 13.—For screened and unscreened gas coal and nuts, for the Corporation.

Connah's Quay, July 9.—For about 1,200 tons of gas coal, screened or unscreened, nuts or slack, for the directors of Connah's Quay Gas and Water Company Limited.

Cork, July 16.—For best double-screened steam coal, for the Harbour Commissioners.

Dalton-in-Furness, July 10.—For about 1,800 tons of best screened gas coal, for the Gas Committee.

Darlington, July 8.—For gas coal, for the Coporation.

Darwen, July 24.—For rough gas slack and nuts, for the Corporation.

Droitwich, July 8.—For 2,400 tons of best screened gas coal, for the Corporation.

Dublin, July 10.—For coal, for the South Dublin Guardians. Estimated quantity required. House coals, 5,000 tons; Scotch coals, 2,000 tons. Scotch coal to be quoted from Geo. Taylor and Co.'s Hard Ayr, Bargany, Ayrshire, Auchencreevie, and Wallsend collieries; and from the English collieries of Ellenborough, St. Helens, Workington, Broughton, Plas-pow coal, hard Derbyshire, Staffordshire, Yorkshire, Lancashire, and Point of Ayr coal. Also quotations from Irish collieries. Also for best Irish coke.

Dublin, July 10.—For 50,000 or 100,000 tons of locomotive coal, for the directors of the Great Northern Railway Company (Ireland).

Eastbourne, July 13.—For coal and coke, for the Education Committee of the Corporation.

Eccles, July 15.—For coal and coke, required by the various departments of the Corporation. The requirements include 5,000 tons of slack per annum, for the electricity works.

Erith, July 15.—For coal and coke, for the Erith Education Committee.

Glossop, July 13.—For about 6,000 tons good gas coal, for the directors of the Glossop Gas Company.

Halifax, July 9.—For 14,000 tons of coal, for the Corporation.

Hamilton (Lanark), July 8.—For 350-400 tons washed singles, for Lanark County Council District of the Middle Ward.

Hanwell, July 8.—For coal and coke, for the Middlesex Education Committee.

Hastings, July 24.—For fuel, for the Education Committee; about 330 tons machine-broken coke (from local tradesmen), about 230 tons (from local tradesmen), about 44,000 bavins.

Heywood, July 13.—For 11,000 tons of coal, for the Corporation.

Hinckley, July 13.—For gas coal and lime, for the Urban District Council.

Hove, July 9.—For household coal, coke and small firewood, for the Corporation.

Hull, July 15.—For house, steam, and gas coal, for the Hull City Asylum, Willerby, near Hull.

Kendal, July 22.—For 8,500 tons of screened or unscreened gas coals and nuts, for the Corporation.

Kettering, July 8.—For coal and coke, for the Urban District Education Committee.

Killough (Ireland), July 8.—For about 120 tons best Whitehaven coal to the Charles Sheils' Institution, Killough, for the Local Board of Governors.

King's Lynn, July 15.—For 500 tons (more or less) of coal (hand-picked hards), for the Corporation.

Leek, July 10.—For 10,500 tons of washed or unwashed nuts or beans, for the Urban District Council.

Lincoln, July 13.—For 30 000 tons of screened or unscreened gas coals and nuts, for the Corporation.

London, July 9.—For 400 tons of house coal, for the Poplar and Stepney Sick Asylum District Managers.

London, July 22.—For coal and coke, for the Metropolitan Water Board.

Macclesfield, July 13.—For the whole (or part) of 18,000 tons of the best screened gas coal and 1,000 tons of cannel, for the Corporation.

Mirfield, July 23.—For 11,000 tons of best screened gas coal, for the directors of the Gas Company.

Newport (Mon.), July 10.—For about 30,000 tons of best gas coals, for the directors of the Newport (Mon.) Gas Company.

Odiham (Hants), July 12.—For coal and coke, for the Hartley Wintney Guardians. Estimated quantities required, 250 tons coal and 70 tons coke.

Oldbury, July 13.—For 12,000 tons of best screened gas coal, for the Urban District Council.

Port Louis (Mauritius), July 15.—The Crown Agents for the Colonies, acting for the Government of Mauritius, invite tenders for the supply of 12,500 tons of South Wales steam coal, delivered into lighters at Port Louis, Mauritius. Forms of tender and conditions of contract can be obtained at the Crown Agent's Office.

Rotherham, July 8.—For smudge or pea nuts, for the Electric Light Committee of the Corporation.

Saffron Walden, July 8.—For about 200 tons of best hand-picked hard steam coal and 100 tons of coke, for the Guardians.

Sheffield, July 13.—For coal and coke, for the Education Committee.

Shrewsbury, July 9.—For good cobbles (free from slack), for the Corporation.

South Tottenham, July 8.—For best Wollaton hards, best Derby brights, and best gas coke (properly broken), for the Tottenham Education Committee.

Stafford, July 10.—For coal, coke and slack, for the Staffordshire Education Committee.

Stoke-on-Trent, July 10.—For washed gas fuel, for the Town Council.

Stourbridge, July 16.—For about 18,000 tons of good screened gas coal, for the Urban District Council.

Strokestown (Ireland), July 12.—For 50 tons of best English, Irish or Scotch coal, free from slack, for the Guardians.

Tipperary, July 15.—For best coal (all round and free from slack), for the Managing Committee of the County Tipperary Infirmary.

Torquay, July 22.—For 3,000 tons of approved gas coal, for the Corporation.

Wallasey (Ches.), July 9.—For best steam coal, double screened North Wales, Lancashire, or other steam coal, for the Corporation (Ferries Department).

Walthamstow, July 12.—For coal and coke, for the Urban District Council.

Wanstead, July 15.—For 30 tons of Creswell large nuts, Derby brights, or bright house coal of equal quality, and 50 tons of coke, more or less, for the Essex Education Committee (Wanstead District Sub-committee).

Ware, July 8.—For 60 tons of Old Roundwood best Silkstone house coal, and 40 tons of Annesley best hard steam coal, for the Hertford and Ware Joint Hospital Board.

Wolverhampton, July 8.—For coal, coke and slack, for the Corporation.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Bourne (Lincs.), July 15.—*Cast Iron Pipes, &c.*—For about 1,900 lineal yards of 3 in. and 600 lineal yards of 2 in. cast iron pipes and valves, for the Rural District Council.

Bridgend (Glam.), July 9.—*Steam Engine, &c.*—For a 325 kw. steam engine, alternator, and accessories, for the Urban District Council.

Bromley, July 8.—*Boiler, &c.*—For a new sectional boiler, for the Education Committee.

Cairo (Egypt), July 27.—*Wrought Iron Fencing.*—Tenders are invited by the Egyptian State Railways and Telegraphs Administration for the supply and delivery of 30,000 m. of wrought iron or steel pale fencing. Forms can be seen by British manufacturers at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Chichester.—*Cables.*—The directors of the Chichester Electric Light and Power Company are prepared to receive tenders for cables.

Christchurch (New Zealand), August 16.—*Electric Motor, &c.*—Tenders are invited by the Christchurch City Council for an electric motor and induced fan.

Congleton, August 6.—*Lancashire Boilers.*—For two 24 ft. by 7 ft. Lancashire boilers, for the Water Committee of the Corporation.

Dublin, July 18.—*Transformers.*—For transformers, for the Corporation.

London, July 9.—*Hydraulic Riveting Plant.*—For hydraulic riveting plant, for H.M. Government (the Secretary of State for India in Council). Conditions of contract obtainable from Mr. W. G. Butler, the Director-General of Stores, India Office, Whitehall, S.W.

Milford Haven, July 11.—*Cast Iron Pipes, &c.*—For 2,420 yards of 3 in. by 9 ft. cast iron S and F gas and water mains, and about 40 3 in. cast iron S and F special pipes, for the Urban District Council.

Partick (Scotland), July 9.—*Cable.*—For 1,210 yards 1 square inch single L.S. and yarned cable, and 550 yards 5 square inch single L.S. and yarned cable, or, alternatively, 1,210 yards 1 square inch single bitumen, taped and braided cable, and 550 yards 5 square inch single bitumen, taped and braided cable, for the Corporation (Electricity Department).

Sofia (Bulgaria), July 22.—*Road Rollers.*—Tenders are invited by the Bulgarian Ministry of Public Works for the supply of 16 road rollers. Specification (in Bulgarian) can be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Sutton (Surrey), July 8.—*Cast Iron Pipes, &c.*—For 3,360 yards of 10 in. and 750 yards of 8 in. socket and spigot pipe, coated with Dr. Angus Smith's composition, for the directors of the Sutton Gas Company.

Wednesfield, July 12.—*Tractor.*—For a 5-ton mechanical appliance, for the Urban District Council.

Whitehaven, July 10.—*Boilers, Radiators, &c.*—For two Cornish boilers, calorifiers, pumps, and radiators, with the pipes for heating and domestic hot-water service; new baths, lavatories, and sinks, &c., for the Guardians.

PUBLICATIONS RECEIVED.

United States Bureau of Mines: Technical Paper 11 "The Use of Mice and Birds for Detecting Carbon Monoxide after Mine Fires and Explosions." By George A. Burrell. Washington. Government Printing Office.

United States Bureau of Mines: Technical Paper 10, "Liquefied Products from Natural Gas, their Properties and Uses." By Irving C. Allen and George A. Burrell. Washington: Government Printing Office.

United States Bureau of Mines: Technical Paper 8, "Methods of Analysing Coal and Coke." By Frederic M. Stanton and Arno C Fieldner. Washington: Government Printing Office.

United States Bureau of Mines: Bulletin No. 10, "The Use of Permissible Explosives." By J. J. Rutledge and Clarence Hall. Washington: Government Printing Office.

United States Bureau of Mines: Bulletin No. 36, "Alaskan Coal Problems" By Walter L. Fisher, Washington: Government Printing Office.

United States Bureau of Mines: Bulletin No. 23, "Steaming Tests of Coals and Related Investigations September 1, 1904, to December 31, 1908." By L. P. Breckenridge, Henry Kreisinger, and Walter T. Ray, Washington: Government Printing Office.

"Bulletin Mensuel de la Société Industrielle du Nord de la France" (No. 180), Mai; "The Journal of the South African Institution of Engineers" (Vol. 10, No. 10), May; "The Journal of the Franklin Institute" (Vol. 173, No. 6), June, price 50 cents; University of Illinois (Bulletin No. 57), "Superheated Steam in Locomotive Service," by W. F. M. Goss; (Bulletin No. 59), "The Effects of Cold Weather upon Train Resistance and Tonnage Rating," by E. C. Schmidt and F. W. Marquis; "Transactions of the Mining and Geological Institute of India" (Vol. 7, Part 1), April, price 4s.; "The Engineering Magazine" (Vol. 43, No. 3), price 1s.

The Measurement of Employment.—At a recent meeting of the Royal Statistical Society Mr. A. L. Bowley read a paper entitled "The Measurement of Employment: An Experiment." The author pointed out that the only general measurement of unemployment in the United Kingdom was that supplied by the Labour Department's returns of the number of trade unionists reported as out of work at the end of each month. For many reasons this did not produce a safe or universal measurement. After discussing the nature of index numbers in general, and demonstrating that the Labour Department index-number was based on an arbitrary and hazardous system of weighting, and was not strictly representative of any defined group of industries, though, in many ways, a good and useful number, it was shown how it would be possible to utilise for the purpose of an index-number the *Labour Gazette* verbal summary of the state of employment. For each principal industry and for industry as a whole they had such statements as "Employment continued good; there was a slight decline compared with a month ago, but employment was much better than a year ago." The adjectives ranged from very good through good, fair or moderate, slack or bad, to very bad. An experiment had been made to see whether numerical results could be obtained from this verbal material. On the whole the diagrams worked out with remarkable consistency. By a simple graphic method the average of the positions assigned for the 12 months of each year was marked. It was then assumed that the four changes from very good to good, good to fair, fair to bad, and bad to very bad had each the same numerical significance. An arbitrary (but reasonable) scale was then assigned—viz., that very bad corresponded to an increase of 10 per cent. unemployed over very good. A more refined measurement could have been made if this had been varied from trade to trade, but this was not attempted. These averages were then read year by year on the scale of the diagrams and were entered in a table. The general impression of the state of employment, as stated month by month, was treated in the same graphic way. In conclusion, the author made it clear that the investigation should give support to the opinion that the Labour Department's number was a very good index of employment, though perhaps it might suggest that it was an index rather than a measure. It was to be hoped that it would find it possible to include some information as time went on, without introducing any difficulties of comparison with its earlier records.

THE FREIGHT MARKET.

The volume of outward chartering done on the north-east coast is restricted by the lack of ready tonnage. Rates to near ports are somewhat easier, but those Mediterraneanwise and to the Baltic are firmly held. At South Wales chartering is fairly active, and there is a good enquiry for tonnage for most directions. The Admiralty has taken up a large number of vessels for the forthcoming naval manœuvres. At the Clyde, business is quiet at well-maintained figures. Fixtures from the Humber are being made at advancing rates. Homewards, the volume of business done is less than normal. Australia is dull. The rice ports are very quiet. The East Indies are steady. The Black Sea is dull for prompt loading, but there is a good demand for forward shipment, for which vessels are offering very sparingly. America is quiet, but firmly held. The River Plate is inactive. The Mediterranean and ore trades are lethargic. There is a good enquiry and some scarcity of tonnage at the Baltic.

Tyne to Antwerp, 1,800, 4s. 10½d.; Alexandria, 4,000, 12s.; 5,300, 11s. 9d.; 6,500, 11s.; Algiers, 3,800, 10s. 3d.; 3,000, 10s. 3d., 600; Aalborg, 2,300, 6s.; Boulogne, 2,100, 4s. 10½d.; Bilbao, 3,000, 8s.; Cette, 2,100, 13s. 3d., 375; Cronstadt, 2,700, 6s. 6d.; 2,200, 6s. 6d., spot; 5,500, 6s.; Catania, 1,750, 12s. 3d., 350; Constantinople, 3,500, 12s. 6d., 400; Fécamp, 600, 6s.; Genoa, 8,000, 10s. 6d. if 500, 10s. 3d. if 800; 8,500, 10s. 6d.; 4,800, 11s. 6d.; Havre, 700, 5s. 6d., from Elswick; Helsingfors, 1,800, 7s. 6d.; Königsberg, 2,000, 6s.; London, 1,800, 3s. 7½d.; 2,400, 3s. 6d.; Marseilles, 5,500, 11s., from Dunston; Norrkoping, 1,150, 7s.; Port Said, 11s., ppt.; 4,400, 11s., from Dunston; Piræus, 5,000, 11s. 6d.; 3,600, 12s.; 4,500, 12s., 600; Palermo, 600, 14s., cargo; Rouen, 6s., from Elswick; Rotterdam, 3,500, 3s. 1½d.; Venice, 4,500, 13s.

Cardiff to Antwerp, 2,400, 5s. 6d.; Algiers, 6,000, 13¼ fr., ppt.; 6,300, 13¾ fr., ppt.; Alexandria, 4,000, 12s., 500, ppt.; 5,000, 11s. 4½d., 700; 5,000, 13s., 400, spot; Brest, 1,300, 5s.; Bari, 3,000, 13s., 500, spot; Colombo, 12s. 6d., July; Cronstadt, 5,000, 7s., ppt.; 3,000, 7s. 3d.; Copenhagen, 1,300, 6s. 3d., July 6; Genoa, 3,200, 12s.; 5,300, 12s., ppt.; 3,300, 11s. 7½d., ppt.; 6,200, 11s. 6d., July 4; 5,300, 11s. 6d., July 10; 5,600, 11s. 6d.; 5,800, 11s. 3d., July 8; 6,300, 11s. 6d.; 5,000, 11s. 6d.; Granton, 800, 5s. 6d., spot; Halifax, 2,000, 12s. 3d., July 15, Admiralty; Havre Canal, 1,100, 5s. 9d.; Havre, 1,250, 6s.; Las Palmas, 3,200, 11s., ppt.; 6,000, 11s., ppt.; 3,000, 11s. 3d., ppt.; Marseilles, 5,300, 13¾ fr., ppt.; 6,800, 13¼ fr.; 6,400, 13¼ fr., July 16; 6,200, 13¼ fr., July 19; Malta, 4,200, 10s. 9d.; 4,200, 10s. 10d., ppt.; Newhaven, 350, 5s. 3d.; Naples, 4,400, 11s. 6d., 800, ppt.; 3,800, 11s. 6d., 800, mid-July; 3,900, 12s., 600, ppt.; direct nitrate port, sail, 1,702 net, 16s. 6d.; Oporto, 6,500, 9s. 6d.; Palermo, 2,500, 13s. 6d., ppt.; Plymouth, 4,800, 4s. 6d.; River Plate, 19s. 9d., ppt.; 21s., early July; 20s., end July; Rosyth, several steamers, 4s. 9d.; Rochefort, 2,200, 7¾ fr.; Rouen, 600, 6s. 6d.; 1,900, 6s. 3d., spot; Savona, 5,800, 11s. 3d., July 8; Spezzia, 5,800, 11s. 3d., July 8; St. Nazaire, 1,450, 7¾ fr.; 3,200, 7¾ fr.; Stockholm, 2,200, 8s., ppt.; Teneriffe, 3,000, 11s. 3d., ppt.; 3,300, 11s., July 5; Torre Annunziata, 4,400, 11s. 6d., 600, ppt.; 3,000, 12s. 9d.; Tripoli, 5,300, 11s. 6d.; time charters, naval manœuvres, several vessels, 12s. 6d. per ton on gross register, 15 days guaranteed; Venice, 5,000, 12s. 3d., 500, ppt.

Glasgow to Santos, 23s., 300, ppt.; Monte Video, 19s., 250, July 25-31; sail, 16s. 3d., ppt.; 16s.; Venice, 13s., ppt.; Genoa, 4,000, 11s. 10½d.; Savona, 4,000, 11s. 10½d.; Leghorn, 4,000, 11s. 10½d.; Alexandria, 11s. 6½d., coal and general cargo, 11s. 7½d.

Wales to River Plate, sail, 16s.; Iquique, sail, 17s., coal, September; Campana or Villa Constitucion, 4,000, 20s. 6d., option Rosario, 21s., July; nitrate port, sail, 16s. 6d., July; West Coast South America and home to United Kingdom-Continent, sail, 1,697 net, 40s. in and out, less 1s. insurance.

Newport to Caen, 750, 5s. 9d.; Seville, 2,600, 10s. 7½d., ppt.; Corcubion, 2,200, 8s.; Naples, 5,000, 11s. 6d.; Newross, 280, 5s.; Alexandria, 5,000, 11s. 4½d.

Swansea to Rouen, 1,600, 6s. 6d.; 2,250, 6s. 3d.; 1,900, 6s. 6d.; 1,100, 6s. 6d.; 700, 6s. 9d.; 1,550, 6s. 9d.; 1,600, 6s. 9d., ppt.; Honfleur, 600, 6s.; 750, 5s. 10½d.; Boulogne, 700, 6s. 3d.; Bordeaux, 1,650, 9 fr.; Valencia, 1,400, 12s. 3d.; La Rochelle, 1,200, 8 fr.; Marseilles, 1,900, 14½ fr., ppt.; 1,500, 14¼ fr.; Stettin, 2,200, 7s.; Shoreham, 500, 5s.; St. Malo, 950, 6s.; Palma, 1,300, 13s. 3d., ppt.; Alexandria, 4,000, 12s. 3d., ppt.; 4,700, 12s. 3d.; Dieppe, 5s. 9d.; Barcelona, 3,200, 12s.; Nantes, 6 fr.; Carthagena, 1,400, 13s.; Genoa, 1,700, 12s., spot; Savona, 1,700, 12s., spot; Naples, 4,000, 12s. 3d. coal, 13s. fuel; Algiers, 2,800, 14½ fr.; Cherbourg, 7,500, 6s. 3d.

Hartlepool to Genoa, 4,100, 11s. 6d.; Kallundborg, 1,250, 6s. 9d.; Naples, 5,400, 11s.; 11s. 3d., 800.

Wear to Stettin, 3,000, 6s.; Swinemunde, 1,800, 6s. 3d.

Hull to Cronstadt, 2,700, 6s. 4½d.; 3,300, 6s. 4d.; 2,800, 6s. 1½d., ppt.; 2,800, 6s. 1d.; Reval, 2,100, 6s. 6d.; Riga, 2,300, 6s. 3d., early July; Queenborough, 1,150, 4s. 7½d., ppt.; Genoa, 5,600, 11s. 9d., spot; Bandholm, 1,300, 6s. 6d.; Hamburg, 2,300, 4s.; Kiel, 1,600, 6s. 6d.

Goole to Boulogne, 750, 5s. 3d., ppt.

Grimsby to Stege, 900, 6s. 7½d.; Hayle, 700, 6s., ppt.; Rendsburg, 1,400, 6s. 3d.

Forth to East Norway, 6s. 6d.; Rouen, 1,800, 6s. 3d.; Norrkoping, 1,150, 7s.

Blyth to Helsingfors, 1,150, 7s. 3d.; Havre, 1,100, 4s. 9d.; Aalborg, 600, 6s. 9d.; Lubeck, 3,500, 6s. 6d.

Rotterdam to Chantenay, 1,600, 6s. 7½d. steam coals, 8s. 7½d. coke, ppt.; Bordeaux, 3,400, 6s. 9d. steam coals, 7s. 6d. fuel, ppt.; 2,950, 6s. 10½d. steam coal, 7s. 7½d. fuel, July 5-6; Alexandria, 5,000, 12s. steam coal, 13s. fuel, 14s. coke, ppt.; St. Nazaire, 3,500, 6s. 9d., Trignac terms, ppt.

Hamburg to Sydney and N.S.W., sail, about 12s.

Seaham Harbour to Malmo, 1,800, 6s. 9d.

Immingham to Cronstadt, 2,700, 6s. 3d.

Homeward charters:—Theodosia, 3,900 max., Rotterdam, 10s. 6d., ppt.; Bombay, 19s. 6d. Liverpool, 19s. 9d. Manchester, net, July-August; 2,294 net, United Kingdom-Continent, 26s., two p.p., on d.w., Dunkirk 6d. extra, July; 2,390 net, Mostyn Deeps, 24s. 9d., ore, July; Kurrachee, 5,000-6,000, United Kingdom-Continent, p.p., 19s., less 2 per cent., August; 2,370 net, Manchester, 19s., option other ports 19s. 6d., August-September; Taganrog, 2,600, 12s. 6d., n.c., ppt.; San Lorenzo, 4,800, 10 per cent., United Kingdom-Continent, 19s. o.c., less 6d., ppt.; 4,000, 10 per cent., 17s. 6d. o.c., less 6d., ppt.; 5,700, 10 per cent., 18s. o.c., less 6d., option Buenos Ayres or La Plata 17s., July-August; Arzew, 3,900, Middlesbrough, 7s. 3d., July; Carthagena, 7,200, Rotterdam, ppt.; Huelva, 3,700, Rotterdam, 8s. 3d., July; Benisaf, 2,900, Middlesbrough, 8s. 9d., f.t., ppt.; Bilbao, 1,800, Rotterdam, 6s. 4½d., ppt.; 1,800, Stockton, 6s. 6d., July; Sydney, C.B., 35s., Port Mann, Puget Sound, rails, ppt.; Gulf timber port, 1,200 stds., 10 per cent., United Kingdom-Continent, p.p., 100s., August; 1,000 stds., River Plate, 157s. 6d., August; 2,371 net, 155s., July-August; sail, 14¼ dols., Rio de Janeiro; Buenos Ayres, 4,000, 10 per cent., Bristol, 16s. 6d., spot; Bay of Fundy, 1,400 stds., West Britain or East Ireland, 50s.; Portland, Or., sail, 37s. 6d., United Kingdom-Continent, wheat or flour, November-December; 37s. 6d., September-October; 40s., September; Campbeltown, Bathurst, 2,000 stds., West Britain or East Ireland, 51s. 9d. two ports to one port, 53s. two ports to two; sail, 75s., Melbourne; Miramichi, 54s., Belfast, August; Hankow, 2,357 net, Glasgow and Cardiff, lump sum £8,800; Moji, 3,130 net, Bombay or Kurrachee, 11s., July; Sydney, Melbourne and Adelaide, 2,626 net, four ports South Africa, 31s. 3d., d.w., ppt.; Sulina, 4,300, Rotterdam, 9s. 6d., option Danube 1s. extra, early July; Danube, 3,500, Marseilles, Genoa, Venice, Trieste or Fiume, 13¼ fr., ppt.; Trapani, 3,300, Gloucester (Mass.), 11s., salt, July; Port Arthur, 29 c., four ports South Africa, July; Newcastle (N.S.W.), sail, 40s., West Coast South America and home to United Kingdom-Continent; time charter, Canadian trade, 5s. 6½d., three months; Azof, 5,300, Rotterdam, 10s. 6d., ppt.; 7,500, Rotterdam, 13s. 6d., Antwerp or Weser 13s. 6d., Hamburg 13s. 9d., on d.w., August 5-21; Java, 2,492 net, Vancouver, about 25s., July-August; Calcutta, 2,926 net, Bombay, Rs. 8·6, July-August; Bahia Blanca, 6,300 max., United Kingdom-Continent, 17s. 6d. o.c., less 6d., spot; Kovda and Archangel, 1,150 stds., Manchester, 62s. 6d. d.b.h., 65s. strips, July; Columbia River, sail, 51s. 3d., Newcastle (N.S.W.); time charter, Calcutta coal trade, 5s. 3d., six months, delivery Calcutta, August; time charter, Baltic and White Sea trade, 3,200, £1,000 net, ppt.; South Japan, 3 dols., Singapore, two loading places; time charter, States and West Indies, 5s. 6d., one round trip, July; Matane and Dalhousie, 55s., Glasgow, July; Nystadt, 350 stds., Ostend, 46 fr., d.b. and b., ppt.; Jacobstadt, two places, 450 stds., Elbe, 39 m., d.b. and b., early August; Iquique, sail, 23s. 9d., United Kingdom-Continent, March-May, 1913; 1,686 net, 23s. 6d., March 15-May 15, 1913.

COAL, IRON AND ENGINEERING COMPANIES.

Avery (W. and T.) Limited.—The directors report for the year to March 31 last that after allowing £6,959 for depreciation, and including amount brought forward from last year, the balance of revenue account is £33,712. From this amount has to be deducted: For interest on debentures, £4,000; for interim dividend for half-year to September 30, 1911 (paid October 2, 1911), on the 5 per cent. preference shares, less income-tax, £2,939; and for interim dividend for half-year to September 30, 1911 (paid January 1, 1912), at the rate of 5 per cent. per annum on the ordinary shares, free of income-tax, £2,665, leaving a disposable surplus of £24,108. The directors recommend that this sum should be applied as follows:—To dividend on the 5 per cent. preference shares for the half-year ended March 30, 1912, already paid, £2,939; to pay on the ordinary shares a dividend for the half-year ended March 30, 1912, at the rate of 15 per cent. per annum (free of income-tax), making with the interim dividend 10 per cent. for the year, £7,997; to place to reserve (which will then stand at £18,500) £5,000; and to carry forward to the next account £8,172.

Canadian-British Engineering Company Limited.—This company has been registered, with a capital of £205,000 (200,000 7 per cent. preferred ordinary shares of £1 each and 100,000 deferred shares of 1s. each), to carry on in Canada or elsewhere the business of consulting, civil, naval, mining, railway, electric, gas, mechanical, and general engineers, manufacturers of all kinds of metal goods, contractors for the erection of engineering works, and to adopt an agreement with Key Engineering Company Limited. First directors, C. L. Agnew, W. H. Patchell, M.I.C.E., L. Andrews, M.I.C.E., and W. A. Martin (managing director in Canada). Applications have been invited for an issue of 100,000 7 per cent. preferred ordinary £1 shares. Contracts have been entered into by the vendors, the Key Engineering Company Limited, with certain British manufacturers, including Sir W. G. Armstrong Whitworth and Co. Limited, Cammell, Laird and Co. Limited, Dorman Long and Co. Limited, the Power Gas Corporation Limited, Ransomes, Sims and Jefferies Limited, the Sandycroft Foundry Company Limited, and Willans and Robinson Limited.

Chinese Engineering and Mining Company Limited.—This company has been registered, with a capital of £1,000,000 in £1 shares, to purchase, take on lease, or otherwise acquire in China or elsewhere any mines, mining rights and undertakings, concessions, metalliferous land, &c., and to adopt an agreement with the Chinese Engineering and Mining Company Limited (registered in 1900), and the liquidator thereof. First directors: W. F. Turner, Sir Hubert E. H. Jerningham, K.C.M.G., Col. A. Thys (president du Chemin de Fer du Congo, C.M.), Chevalier de Wouters (director Banque Josse Belge), E. Davis, Major H. A. Micklem, R.E., G. T. Symons, E. Francqui (managing director Bank d'Outremer), and F. Cattier. The chairman, Mr. William Barry, of No. 22, Austrian Friars, London, E.C., has been appointed liquidator of the old company.

Commercial and Marine Engine Company Limited.—This private company has been registered, with a capital of £30,000 (2,000 preference shares of £5, 15,000 ordinary shares of £1, and 20,000 deferred shares of 5s. each), to carry on the business of mechanical and general engineers, machinists and founders, oil and gas engine makers, &c. Registered office, Devereux-chambers, Temple, E.C.

Cowle Harbour Coal Company Limited.—The accounts for 1911, after providing for administration expenses, debenture and other interest, and writing off £692 for depreciation, show a loss of £5,682, increasing the debit balance of £10,766 brought forward to £16,448. The directors state that all the available cash funds have now been exhausted, and some reconstruction scheme has become necessary to carry on the colliery.

Harvey (Peter) Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to take over the business of a general engineer, carried on by P. Harvey at Stockton-on-Tees. First directors, N. S. Beatty and Dr. W. J. Beatty.

Metropolitan Coal Company of Sydney.—The report for the year ended March 31 last states that the output of coal from the mine for the twelve months was 274,441 tons (211,902 large and 62,539 small), as against 296,357 tons for the previous twelve months. The result of the year's working, after payment of debenture interest and other charges, and deducting £3,000 for depreciation of buildings and plant, shows a profit of £11,673. Adding to this the sum of £15,952 at credit of last year's revenue account, there remains a balance of £27,826. The directors propose to pay a dividend of 8 per cent. on the 8 per cent. cumulative first preference shares, which will absorb £2,288, and a dividend of 7½ per cent. on the 10 per cent. cumulative preference shares, which will absorb £7,429, and to carry forward the balance of £18,106. The directors have secured a renewal of the contract for the supply of coal to the New South Wales Government Railways Department for another two years.

Nottingham Coal Company Limited.—This company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of coal merchants, &c. Minimum cash subscription, £500. First directors, H. Everett, W. Parker and F. H. Grocock. Secretary, H. Brookhouse. Registered office, Newcastle Chambers, Angel-row, Nottingham.

Scottish Iron and Steel Company Limited.—An issue has been made of £300,000 5 per cent. first mortgage debenture and 150,000 6 per cent. cumulative participating preference £1 shares. The complete list of participants in this interesting fusion is as follows:—Messrs. Archibald Baird and Son, Downs and Jardine, Thomas Ellis, Hugh Martin and Sons, John Spencer, William Tudhope and Son, Wylie and Co., the Victoria Iron and Steel Company, the Waverley Iron and Steel Company, and the Woodside Steel and Iron Company—all of Coatbridge; besides Messrs. C. F. MacLaren and Co., of Wishaw, and Messrs. A. and T. Miller and the Glencairn Iron and Steel Company—both of Motherwell. Last year's output of malleable iron and steel of these firms amounted to about 225,000 tons. The capital is £750,000 divided into 300,000 6 per cent. cumulative and participating shares of £1 each, and 450,000 ordinary shares of £1 each.

Thomas (Oliver H.) Limited.—This private company has been registered, with a capital of £20,000 in £1 shares, to take over the business of colliery proprietors, coal and coke shippers, &c., carried on by O. H. Thomas at Neath as Oliver H. Thomas, Son and Co. First directors, O. H. Thomas, W. H. Thomas, and R. H. Snook.

United National Collieries Limited.—The directors announce an interim dividend of 2½ per cent. (5s. per share), free of income-tax.

Wilkinson (T.) (Arnside) Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to take over the business of an electrical engineer, carried on by T. Wilkinson at Arnside, Westmoreland. First directors, O. W. Porritt, W. F. Crowther, and T. Wilkinson. Qualification, £100.

Wragg and Biggin Limited.—This private company has been registered, with a capital of £5,000 in £1 shares, to carry on the business of engineers, machine and engineering tool makers, founders, millwrights, ironmongers, &c., and to acquire the business carried on by Wragg and Biggin at 83, Sussex-street, Sheffield. First directors, C. Wragg, B. Biggin, W. H. Wragg and C. H. Wragg. Qualification, one share. Registered office, 63, Sussex-street, Sheffield.

Mortgages and Charges.—The following have been registered in pursuance of the Companies Acts, 1907:—British Wagon Company Limited (issue on April 1 of £9,200, on April 20 of £7,300, on April 29 of £1,550, and on May 1, 1912, of £15,570 debentures, part of a series); Easington Coal Company Limited (mortgage dated May 18, 1912, to secure £50,000 at 5 per cent. interest); Ebbsfleet Coal Syndicate Limited (sub-mortgage dated May 22, 1912, to secure £1,500, and further sums, not exceeding therewith a total of £6,000); Glascoed Colliery Company Limited (issue on June 5, 1912, of £800 debentures, part of a series); Holly Bank Coal Company Limited (particulars of £100,000 debentures created May 2, 1912, and secured by trust deeds dated September 28, 1910, and May 3, 1912, present issue £79,800—satisfaction to the extent of £39,900 on May 3, 1912, of trust deed dated September 26, 1910, securing £100,000 debentures, by the cancellation of debentures for that amount upon the creation of a new issue); Lincoln Wagon and Engine Company Limited (issue on May 29, 1912, of £15,025 debentures, part of a series); New Restormel Iron Mine Limited (issue on May 17, 1912, of £175 debentures, part of a series).

The honorary degree of Doctor of Science has been conferred by the Governors of Manchester University upon Dr. Dukinfield Henry Scott and Mr. Dugald Clerk. In collaboration with the late Prof. Williamson, Dr. Scott brought to completion an elaborate series of memoirs that were published in the *Philosophical Transactions* "On the Organisation of the Fossil Plants of the Coal Measures." After the death of his colleague he published an important series of papers on the structure and affinities of fossil plants from the palæozoic rocks, and was the joint discoverer with Prof. Oliver of the existence in carboniferous times of seed-bearing ferns—now called the pteridospermeæ—which formed a connecting link between the two great groups of the flowerless and the flowering plants. As professor in the Royal College of Science, and afterwards as honorary keeper of the Jodrell Laboratory at Kew, Dr. Scott has encouraged and stimulated a large number of his students to do good work in the field of palæobotany. Mr. Dugald Clerk is not only a leading authority on the subject of combustion engines and the author of the standard work on the subject, but one who, by his own inventions, has placed his name in the front rank of the scientific pioneers of our time.

No. 15.

THE COLLIERY GUARDIAN

MONTHLY LIST OF RECENT COAL LITERATURE

The following is a list of abbreviations used below :—

Am. Gas Jl. = American Gas Journal.
Am. Jl. Science = American Journal of Science.
Arbeitgeber-Ztg. Bergew. = Arbeitgeber-Zeitung für das Baugewerbe.
Assoc. Water Eng. = Association of Water Engineers.
Austral. Min. Stand. = Australian Mining Standard.
Bd. Trade Lab. Gaz. = Board of Trade Labour Gazette.
Ber. Handel u. Ind. = Berichte über Handel und Industrie.
Bodenreform = Bodenreform Deutsche Volkstimme.
Chem. Engin. = Chemical Engineer.
Chemiker-Ztg. =Chemiker Zeitung.
Chem. World = Chemical World.
Coal Merch. = Coal Merchant and Shipper.
Colliery Guard. = Colliery Guardian.
Color. School Min. Mag. = Colorado School of Mines Magazine.
Comp. Air Mag. = Compressed Air Magazine.
Compt. Rendus Acad. Sciences = Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences.
Contemp. Rev. = Contemporary Review.
El. Engin. = Electrical Engineer.
Engin. Rec. = Engineering and Building Record.
Foerdertechnik = Die Foerdertechnik.
Inst. Min. Metall. Bull. = Institution of Mining and Metallurgy Bulletin.
Jl. Gas Light. = Journal of Gas Lighting.
Mech. World = Mechanical World.
Min. Engin. = Mining Engineering.
Min. Eng. World = Mining and Engineering World.
Mines Minerals = Mines and Minerals.
Min. Scient. Press = Mining and Scientific Press.
Nineteenth Cent. = Nineteenth Century and After.
N. Zeit = Die Neue Zeit.
Preuss. JB. = Preussische Jahrbücher.
Proc. Am. Inst. El. Eng. = Proceedings of the American Institute of Electrical Engineers.
Quart. Rev. = Quarterly Review.
Railw. Engin. Rev. = Railway and Engineering Review.
Rev. El. = Revue Electrique.
S. Afric. Engin. = South African Engineer.
S. Afric. Inst. Engin. = South African Institute of Engineers.
School Mines Quart. = School of Mines Quarterly.
Soz. Prax. = Soziale Praxis.
Sprengst. Waffen = Sprengstoffe Waffen und Munition.
Tekn. Tidskr. = Teknisk Tidskrift.
Tekn. Ugeblad = Teknisk Ugeblad.
Trans. Inst. Min. Eng = Transactions of the Institution of Mining Engineers.
Trans. Min. Inst. Scot. = Transactions of the Mining Institute of Scotland.
Trans. N. Engl. Inst. Min. Mech. Eng. = Transactions of the North of England Institute of Mining and Mechanical Engineers.
Tuermer = Der Tuermer.
Z. Oberschles. Berg- Hütten- Ver. = Zeitschrift der Oberschlesischen Berg- und Huttenmannischen Vereins.
Z. Schiesswes. = Zeitschrift für das Gesamte Schies- und Sprengstoffwesen.
Z. Ver. D. Ing. = Zeitschrift der Vereins Deutscher Ingenieure.

*** We shall be glad to obtain for readers, where possible, copies of the papers referred to at the prices named, which are inclusive of postage.

I.—General.

Profits and Wages in the British Coal Trade, 1898 to 1910. Thomas Richardson and J. A. Walbauk. 16mo., 96 p. London, Simpkin, 1912. 1s. 6d.

Coal Situation in the Philippines. M. Woolley. "Coal Age," vol. 1, 32, p. 1054. 1s. 3d.

Spitzbergen as a Coal Country. (Spitzbergen als Kohlenland.) F. Hjorth. "Nordland," 1912, 5. 2s. 6d.

The Coal Strike. A. Markham. "Quart. Rev.," 1912, 2, p. 554-73. 8s.

The Lanchow Mines in China. K. P. Swenson. "Coal Age," vol. 1, 34, p. 1098-1101; 5 fig. 1s. 3d.

Coal and Other Minerals in Bulgaria. "Trans. N. Engl. Inst. Min. Mech. Eng.," vol. 62, 4, p. 4-6. 8s.

Anti-Trust Laws and the Coal Industry. G. W. Troer. "Mines Minerals," vol. 32, 11, p. 644-6. (Treats of the Sherman Act and the Illinois Act; creating combination in restraint of trade a misdemeanour; to prevent the excessive investment of capital in a given industry.) 2s. 2d.

Mines and Mining in Japan. "Japan Year-Book," 1912, p. 318-32.

Mines and Mining of China. "China Year-Book," 1912, p. 50-54.

The Work of the U.S. Bureau of Mines. J. A. Holmes. "Am. Lab. Legis. Rev.," vol. 2, 1. p. 125-30.

The Government and the Coal Syndicate. (Kohlenfiskus und Kohlensyndikat.) A. Pohlmann. "Bodenreform," 1912, 4, p. 94-101. 2s.

Development and Present State of Coalmining and Coal Trade in Japan. (Entwicklung u. gegenwaertiger Stand des Kohlenbergbaues u. Kohlenhandels in Japan.) "Ber. Handel u. Ind.," 1912, 2, p. 66-92. 2s. 3d.

The English Coalminers' Strike. (Der Streik der englischen Kohlenarbeiter.) Hans Delbrueck. "Preuss. JB.," 1912, 5, p. 368-75.

Miners' Minimum Wages. (Der Minimallohn im Bergbau.) Fillunger. "Arbeitgeber-Ztg. Bergew.," 1912, 10, ill. 6d.

The Coal Strike and After. G. B. Walker. "Nineteenth Cent.," 1912, 4, p. 623-31. 3s. 6d.

The Coal Trade Dispute. "Bd. Trade Lab. Gaz.," 1912, 3, p. 82-6. 6d.

The Third Extensive Coalminers' Strike in the Ruhr District. (Der dritte grosse Bergarbeiter-streik im Ruhrbecken.) O. Niebuhr. "N. Zeit," 1912, vol. 30, 26, p. 934-44. 1s. 9d.

The Mining Industry of Britain. W. Brace. "Contemp. Rev.," 1912, 4, p. 457-65. 3s. 9d.

The Miners' Fight (Germany, England and other Countries). (Der Kampf der Bergarbeiter (Deutschland, Grossbritannien, uebriges Ausland.)) "Soz. Prax.," 1912, vol. 21, 24, p. 754-61; 25, p. 784-93.

Social Position of Coal Miners and Coal as a National Production. (Soziale Lage der Bergarbeiter u. d. Kohle als nationales Erzeugnis). W. Beumer. "Woche," 1912, 12, p. 469-72. 1s. 6d.

Mine Slaves. Social Position of Miners. (Bergsklaven. Soziale Lage der Bergarbeiter.) "Tuermer.," 1912, vol. 14, 7, p. 66-8.

The Application of Business Principles to Mining. G. W. Schneider. "Color. School Min. Mag.," vol. 2, 6, p. 119-23. 2s.

The Extension of the Yorkshire Coalfield. "Colliery Guard.," vol. 103, 2685, p. 1203. (New colliery at Rossington.) 6d.

II.—Education.

Technical Education on the Rand. "Engineer," vol. 113, 2942, p. 509-10; 3 fig., 1 plate. (An account of the South African School of Mines and Technology). 9d.

Technical Education. E. Hooper. "Inst. Min. Metall. Bull.," 92, p. 1-14; 7 plates. 2s.

North Staffordshire Mining and Pottery School. "Colliery Guard.," vol. 103, 2686, p. 1239. 6d.

Firemen's Certificates. "Colliery Guard.," vol. 103, 2685, p. 1202. (List of approved institutions and authorities.) 5d.

III.—Geology.

The Coal and Iron Industries of Derbyshire and Notts. G. S. Bragge. "Assoc. Water Eng.," No. 2, May 30, 1912, p. 1-6. (The geological features of the two countries are described; the unworked coal in the proved coalfields at less than 4,000 ft. depth is estimated at 7,300 million tons available, and in unproved coalfields at 23 million tons concealed resources. The methods of working are described and particulars of coal and iron works given.) 1s. 6d.

The Tectonics of the District South of Rennes. (Sur la Tectonique de la Région du Sud de Rennes.) F. Kerforne. "Compt. Rendus Acad. Sciences," vol. 154, 7, p. 457-8.

Look-out Mountain Coal Measures. A. W. Evans. "Mines Minerals," vol. 32, 11, p. 654-6; 3 fig.; 1 tab., 1 map. 2s. 2d.

The Coalfields of Western Canada. E. Jacobs. "Coal Age," vol. 1, 30, p. 968-9. 1s. 3d.

The Occurrence of Coal in Spitzbergen. (Om Spitsbergens kulforekomster.) "Tekn. Ugeblad," 1912, 10, p. 135-7; 3 ill.; 1 fig. 2s.

A Suggestion for Mineral Nomenclature. H. S. Washington. "Am. Jl. Science," vol. 33, 194, p. 137-51. 3s. 6d.

IV.—Mine Surveying.

The Work of the Geological Survey. "Colliery Guard.," vol. 103, 2684, p. 1137. 6d.

VI.—Working of Minerals.

A Mammoth Seam in Colorado. "Coal Age," vol. 1, 30, p. 966-7; 3 fig. (The preliminary development is described; the coal which is to be sized and loaded into railroad cars is dumped at the railroad track level, and then elevated to the top of the screens by means of an inclined conveyor, the customary tipple being dispensed with.) 1s. 3d.

The Progress in Scottish Mining Methods in 60 Years. J. Hamilton. "Trans. Inst. Min. Eng," vol. 43-2, p. 219-28; 3 tab., 1 fold. tab. (The presidential address is mainly occupied with a consideration of accidents in mines, of which statistical tables are given). 8s.

Mining the No. 8 Seam in Ohio. W. Hibbs. "Coal Age," vol. 1, 32, p. 1036-7; 4 fig. (A heavy overlying stratum of fireclay occurs and is difficult to handle; the poor top has caused enormous losses of coal; some notes on the best method of controlling same.) 1s. 3d.

Mining Coal on the Virginian Railroad. F. W. Parsons. "Coal Age," vol. 1, 32, p. 1039-43; 6 fig.; 1 map. (A description of a new field containing more than 20 billion tons of high-grade minable coal, which has been opened, and low mining costs are probable.) 1s. 3d.

Working of Thick Coal Seams of Upper Silesia. B. C. Gullachsen. "Trans. N. Engl. Inst. Min. Mech. Eng.," vol. 62, 2, p. 53-62; 1 fold. plate. 8s.

Why Leave Shaft Pillars? W. H. and B. H. Pickering. "Colliery Guard.," vol. 103, 2684, p. 1132; 1 fig. (Paper read before Inst. Min. Engin.) 6d.

A Rope-driven Coal-cutter. W. L. Spence. "Colliery Guard." vol. 103, 2684, p. 1134; 10 fig. (From a paper read before Inst. Min. Engin.) 6d.

VII.—Boring, Shaft Sinking, and Tunnelling.

Shaft Deepening. W. Hodgson, Jr. "Min. Engin.," vol. 16, 215, p. 51-2; 3 fig. 9d.

Diamond Drilling at Porcupine, Ontario. A. E. Hall. "School Mines Quart." vol. 33, 3, p. 229-32; 5 tab. 3s. 3d.

Record Sinking at State Mines, Witwatersrand. A. Cooper-Key. "Min. Eng. World," vol. 36, 22, p. 1145-6. (An account is given of the equipment, ventilation, and timbering, other technical data are supplied and notes of record sinkings are given. The south-east shaft of the Government Goldmining Areas Consolidated (Modderfontein) was sunk 283 ft. during March.) 1s. 3d.

Reinforced Concrete as Applied to Mine Shafting. E. R. Jones. "Min. Eng. World," vol. 36-21, p. 1093-4. 1s. 3d.

Boring for Coal. J. O. B. Jaquet. "Austral. Min. Stand.," vol. 47, 1223, p. 359. (It is impossible to bore through lose conglomerate with a bit set with diamonds, except at a ruinous cost; a method and apparatus are described for using the steel cutter shot system of boring; 90 per cent. of the boring is done with the steel cutter, and only on hard bands of rock are the shot used.) 1s. 3d.

Shaft and Slope Construction, 201 Mine, Clinchfield, Virginia. R. G. Johnson. "Coal Age," vol. 1, 30, p. 970-2; 4 fig. (The construction data of a concrete-lined shaft are given; all concrete was placed by gravity chutes or by special shute cars.) 1s. 3d.

Reports on the Sinking of New Shafts in Skane, and the Method of Working. (Nagra meddelanden angaende nyare schaktsänkningar i Skane, samt om därvid använda Arbetsmetoder.) J. Svedberg. "Tekn. Tidskr.," 1912, 19, p. 29-30; 29, p. 42-4. 2s.

VIII.—Explosives, Blasting.

Blasting by Electricity in Mines: Utah System. J. J. Rutledge and C. Hall. "Min. Eng. World," vol. 36, 22, p. 1143-4; 5 fig., 1 map. (Lay out of wires on the surface and in the workings; with the shot-firing wires arrangement in the mineroom, the operation of the system is detailed.) 1s. 3d.

Recent Developments in Explosives. A. E. Anderson. "Color. School Min. Mag.," vol. 2, 8, p. 171-8. (High and low explosives, detonation of high explosives, and systematic handling in mining.) 2s.

Explosives in Coalmines. "Colliery Guard.," vol. 103, 2685, p. 1200. (Text of new Order.) 6d.

Accidents from Explosives in 1911. "Colliery Guard.," vol. 103, 2687, p. 1293. (From 36th annual report Inspectors of Explosives). 6d.

IX.—Timbering, Packing, &c.

Systematic Timbering. S. L. Goodall. "Color. School Min. Mag.," vol. 2, 7, p. 145-52; 5 fig. (The system of mining and timbering in the Connellsville district; more particularly the scheme of rib or pillar drawing developed by the H. C. Frick Coke Company in their coalmines.) 2s.

Methods for the Preservation of Mine Timbers. G. B. McDonald. "Min. Eng. World," vol. 36, 20, p. 1049-50. 1s. 3d.

Hydraulic Filling in European Mines. L. Bucherer. "Mines Minerals," vol. 32, 11, p. 641-3; 6 fig. (An account is presented of the dry filling method formerly used in Silesia; and the hydraulic methods now in use for strengthening the pillars under the inhabited centres.) 2s. 2d.

X.—Surface Arrangements.

Coalbrook Colliery, Heilbron, Orange Free State. "South Afric. Engin.," vol. 17, 5, p. 77-8; 2 fig. (Particulars of the plant, boiler house, motors, headgear and buildings, washing plant, &c., the company owns 17,659 acres coal lands; the present output is about 11,500 tons per month.) 1s. 3d.

The New Buck Mountain Colliery. E. L. Cole. "Coal Age," vol. 1, 33, p. 1067-9; 6 fig. (The details of the belt-loading and car-handling systems are discussed, and the boiler, engine and miscellaneous equipment of the colliery described.) 1s. 3d.

The Acme Company's Plant, Wyoming. J. Simmons. "Coal Age," vol. 1, 31, p. 998-1001; 8 fig. (A detailed description of one of the largest and best equipped coalmining plants in Sheridan, Wyo. A shaking screen with both lateral and longitudinal motion afford unusual refinement in sizing the lignite coal; employees' residences are 22 ft. 8 in. by 27 ft. 6 in., containing four rooms and a bathroom.) 1s. 3d.

Important British Collieries. "Coal Merch.," vol. 24, 610, p. 513-4; 2 fig. (Particulars are presented of the Cortonwood Collieries, Wombwell; the surface arrangements, the machinery and mining methods, also the coke ovens and by-product plant.) 10d.

XI.—Winding and Haulage.

The Ilgner System in Electric-hoisting Operations. G. E. Edwards. "Min. Eng. World," vol. 36, 19, p. 989-92; 7 fig. 1s. 3d.

Wire Ropes as Applied to Mining. D. Baird. "Trans. Min. Inst. Scotland," vol. 34, 3, p. 61-83. (Conclusion of discussion.) 5s.

Overwinding and Controlling Gear for Colliery Winding Engines. J. Black. "Trans. Inst. Min. Eng.," vol. 43, 2, p. 243-7; 2 fold plates. (A description of the Inglis controller, with notes on controllers in general.) 8s.

An Interesting Overwind Preventer. "Coal Age," vol. 1, 32, p. 1037-8; 3 fig. 1s. 3d.

Inaugural Trials of a Steam Winding Engine. (Abnahmeversuch an einer Dampffoerdermaschine). "Glückauf," 1912, 7, 269-71; 1 ill., 2 fig. (Built by Gutehoffnungshuette for the Westerholt pit to raise a net load of 5·4 tons from a maximum depth of 800 m. Steam pressure 11 atmospheres, temperature 250 degs. Cent., maximum winding speed 20 m. per second.) 2s. 9d.

Engine Calculations for Main Winding Shafts. (Die Berechnung der Hauptschacht-Foerdermaschinen.) A. Wallichs. "Foerdertechnik," 1912, 2, p. 25-31; 3 fig. Fg. 2s. 6d.

Electric Winding Installation at the Noel-Sart-Culpart Colliery, Gilly. (Treuil d'Extraction Electrique de la Société Anonyme des Charbonnages de Nöel-Sart-Culpart, à Gilly). "Rev. El.," 8, 1912, vol. 17, 197, p. 221-6; 5 fig. 2s. 6d.

Automatic Banking Appliances at the Brade and Emmanuelsegen Pits, Kattowitz. (Automatische Hängebankfoerderung und Schachtbedienung auf den Fuerstlich Plessischen Steinkohlenbergwerken Brade und Emanuelssegen bei Kattowitz.) Ebeling. O.-S. "Z. Oberschles. Berg. Huetten. Ver.," vol. 1912, February, p. 45-59; 9 fig. 2s. 6d.

The Recent Development of Hauling Machine Drives and of Safety Devices. (Die neuere Entwicklung der Foerdermaschinenantriebe und der Sicherheitsvorrichtungen.) Wallichs. "Z. Ver. D. Ing.," 1912, 15, p. 599-600; 5 fig. (Appendix to the article published in 1911 (p. 2002); description of a few new safety devices.) 2s. 6d.

Electric Mining Locomotives. A. H. Marshall. "El. Engin.," vol. 8, 23; Supp., p. 33-7. 5d.

A Method of Capping Winding Ropes. B. Jackson. "Colliery Guard.," vol. 103, 2626, p. 1236. (From paper read before Min. Inst. Scotland.) 6d.

The "Primus" Car or Tub Controller. T. C. Futers. "Colliery Guard.," vol. 103, 2686, p. 1237; 5 fig. 6d.

A New Detaching Hook. T. C. Futers. "Colliery Guard.," vol. 103, 2634, p. 1131; 5 fig. (Player and Weddell's improved King's hook.) 6d.

XIV.—Ventilation.

Ventilation Necessary in Shaft Sinking. "Comp. Air Mag.," vol. 17, 5, p. 6434-5. 1s.

XV.—Mine Gases, Testing.

Process and Apparatus for Examining the Afterdamp Produced by Explosives. (Verfahren und Apparat zur Untersucheung der Nachschwaden von Explosivstoffen.) Arthur Wilhelmi. "Z. Schiesswes." vol. 7, 1912, 6, p. 112-3; 1 fig. (Collecting the gaseous mixture resulting from the explosion of blasting materials in presence of air). 2s. 2d.

Testing for Firedamp. H. Briggs. "Trans. Min. Inst. Scotland," vol. 34, 3, p. 84-99; 4, p. 118-28. (Introductory paper read and conclusion of discussion.) 5s.

The Firedamp Testing Station of the Westfaelische Berggewerkschaftskasse. (Die Schlagwetterversuchsanlage der Westfälischen Berggewerkschaftskasse.) Wilhelm Pokorny. "Sprengst. Waffen.," vol. 7, 3 (November 15, 1911), p. 29-31. (Description of the old experimental gallery at Gelsenkirchen, now abandoned.) 2s. 2d.

XVI.—Coaldust.

The Coaldust Question. W. E. Garforth. "Colliery Guard.," vol. 103, 2684, p. 1138. (Presidential address Inst. Min. Engin.) 6d.

The Microscopical Investigation of Coaldust. "Colliery Guard.," vol. 103, 2686, p. 1240. (The Lomax laboratories, Bolton.) 6d.

XVII.—Explosions.

The Jed. W. Va. Coalmine Explosion. "Mines Minerals," vol. 32, 10, p. 579-83; 1 fig., 1 map. (Local conditions in the mine, the accident probably a gas explosion, influenced by change of barometer. The report and analysis of the ventilation and general conditions observed at inspections prior to the explosion.) 2s. 2d.

Prevention of Explosions in Mines. J. Harger. "Trans. Inst. Min. Eng.," vol. 43, 2, p. 132-67; 1 fig., 2 tab. 8s.

XIX.—Rescue and Ambulance.

Improved Mine Rescue Apparatus. "Coal Age," vol. 1, 33, p. 1073-4; 7 fig. (A compound of oxygen and sodium hydrate, which liberates oxygen when water is dropped on it, is used in this apparatus, the weight of the oxygen tank being considerably reduced.) 1s. 3d.

Emergency Car of the Colorado Fuel and Iron Company. "Coal Age," vol. 1, 30, p. 982-4; 12 fig. (The features of the emergency car are described; it is intended to supplement the rescue car proper which carries the regular rescue equipment.) 1s. 3d.

Trials with the Pneumatogen. (Versuche mit dem Pneumatogen.) Grahn. "Glueckauf," 1912, 9, p. 346-52; 3 ill., 2 fig. (Description of apparatus model 1910. Experiments carried out at the mining school in Bochum have shown that the apparatus is reliable against firedamp and coaldust.) 2s. 9d.

"Safety First" Underground: The New Bureau of Mines and its Life-saving Campaign in the Coalfields. A. W. Page. "World's Work," vol. 23, 5, p. 549-63; ill.

A Successful Ambulance Team. "Colliery Guard.," vol. 103, 2686, p. 1241; 1 fig. 6d.

XX.—Drainage, Pumping, &c.

Panther Creek Drainage Tunnel. "Mines Minerals," vol. 32, 10, p. 599-601; 1 fig., 8 profiles. (The Lehigh Coal and Navigation Company tunnel from Coal Port to No. 2 shaft, Nesquehoning; this drainage tunnel is 9,700 ft. long, and is to be extended another 1·5 miles to Summit Colliery. The tunnel is 12 ft. wide and 8 ft. high, and, in addition to its use for drainage purposes, can be utilised for haulage.) 2s. 2d.

XXI.—Preparation.

Fireproof Coal Washing, Panama, Ill. J. A. Garcia. "Coal Age," vol. 1, 30, p. 964-0; 7 fig. (The plant is of steel and concrete construction throughout, it washes all material passing through a 3 in. screen at the tipple; and makes five sizes of coal; the daily capacity is 1,200 tons.) 1s. 3d.

The Screening Problem in Illinois. A. Bemont. "Coal Age," vol. 1, 34, p. 1105; 3 fig. (A review of the relative productions of the different sizes in the Illinois fields. The result noted of a change in the method of payment from a lump to a mine-run basis and graphically shown.) 1s. 3d.

The New Buck Mountain Breaker. E. L. Cole. "Coal Age," vol. 1, 32, p. 1032-5; 7 fig. (A modern anthracite plant of 1,800 tons daily capacity is described.) 1s. 3d.

The Buck Mountain Coal-breaker. "Mines Minerals," vol. 32, 11, p. 637-40; 6 fig. 2s. 2d.

XXII.—Briquettes.

Briquette Plant for the Italian Navy. "Colliery Guard.," vol. 103, 2682, p. 1033-4; 5 fig. (A special patent fuel-making plant constructed and installed for Italian Royal Navy; to produce 150 tons of block fuel or 150 tons of "eggette" fuel per day. On a test the plant ran up to 17½ tons per hour.) 6d.

A New Briquetting Press. (Eine neue Brikettpresse.) "Braunkohle," vol. 10, 1912, 45, p. 713-6; 2 ill., 5 fig. (Built by Ehrhardt and Sehmer, Saarbruecken. Compact design, all parts easy of access.) 8d.

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Utilisation of Coke-oven Gas for the Production of Nitric Acid from the Nitrogen of the Atmosphere. (Ausnuetzung der Koksofengase zur Gewinnung von Salpetersauere aus dem Stickstoff der Luft.) Dobbelstein. "Glückauf," 1912, 8, p. 289-300; 10 fig., 4 ill. (Experimental plant in Nuremberg for Hausser's method.) 2s. 9d.

A New Machine for Drawing Coke. "Gas World," vol. 56, 1452, p. 657; 1 fig. 10d.

Report on the Rhenish-Westphalian Coke Market and Statistics Referring to the most Important Coal and Potash Companies. (Bericht ueb. den rheinisch-westfaelischen Kuxenmarkt f. d. J. 1911, u. statistische Mitteilungen ueb. die wichtigsten Kohlen u. Kali-Gewerkschaften.) "Lex.," 8vo., 16 p. Düsseldorf, Schmitz and Olbertz, 1912. 3s.

The Carbonisation of Coal in Bulk. E. H. Scott. "Gas World," vol. 56, 1454, p. 720-1. 10d.

Methods of Cokedust Disposal. C. J. Bacon. "Am. Gas Jl.," vol. 96, 23, p. 376-7 and 380-4; 4 fig., 7 tab. (The paper contains results of investigations and tests for determining the relative economy of several methods of disposing of a yearly production of approximately 50,000 tons of dust, as well as an accumulated stock of 100,000 tons from by-product ovens.) 1s. 6d.

XXIV.—Fuels, Testing, &c.

The Use of Anthracite Coal for Locomotive Fuel. J. S. Lloyd. "Railw. Engin. Rev.," vol. 52, 21, p. 472-3; 1 chart. 1s. 7d.

Han-Yeh-Ping Iron and Coal Company, China. Oho Yang and Cheng-Fu Wang. "School Mines Quart.," vol. 33, 2, p. 165-72; 3 fig., 1 pl., 1 map, 5 tab. (Analyses of the iron ores and coal from the company's mine.) 3s. 3d.

Economies in Coal for Steam Production. S. J. A. Mills. "Mech. World," vol. 51, 1323, p. 219; 1324, p. 232; 2 fig. 5d.

Identification of Coal and Carbonised Residue. (Zur Kenntnis der Kohlen und Verkohlundsrückstaende.) E. Donath and F. Braeunlich. "Chemiker-Ztg.," vol. 36, 41, p. 373-6. (Behaviour of various coals, &c., when fused with caustic alkalis. Action of concentrated nitro-sulphuric acid.) 1s. 3d.

Methods of Analysing Coal and Coke. F. M Stanton and A. C. Fieldner. "Chem. Engin.," vol. 51, 4, p. 150-7; 5 fig. 2s. 3d.

Fuel Calorimetry. F. H. Coste. "Chem. World," vol. 1, 3, p. 75-7; 2 fig. 9d.

A Laboratory Method for Comparing the Coking Properties of Coals. R. Lessing. "Jl. Gas Light.," vol. 118, 2561, p. 855-61; 8 fig., 2 tab. 1s.

Coking Tests of Coal. R. Lessing. "Jl. Gas Light.," vol. 118, 2557, p. 437. (Describes a new apparatus for testing the coking qualities of coals; it takes the form of a fused quartz or silica vessel of reduced size, and the electric furnace mode of heating.) 1s.

The X-Ray Examination of Coal. F. C. Garrett and R. C. Burton. "Colliery Guard.," vol. 103, 2685, p. 1188; 12 fig. (Paper read before N. of Eng. Inst. Min. Eng.) 6d.

A Laboratory Method for the Comparison of the Coking Properties of Coal. R. Lessing. "Colliery Guard.," vol. 103, 2687, p. 1291; 4 figs. (Paper read before the Inst. Gas Engin.) 6d.

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Water Purification for Collieries. "Coal Age," vol. 1, 31, p. 1002-3; 4 fig. (The water-softeners which make use of the waste heat, and combined heaters and softeners are frequently installed; the special apparatus required for the removal of iron salts and the property of aluminium for softening water are discussed. 1s. 3d.

Westinghouse Turbo-blowers and Compressors. "Colliery Guard.," vol. 103, 2687, p. 1289; 8 figs. 6d.

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Compressed Air Plant for Mines. L. J. Wightman. "Comp. Air Mag.," vol. 17, 5, p. 6424-6. 1s.

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Power Plant for Upper Michigan Mines. "Iron Age," vol. 89, 18, p. 1077-80; 10 fig. (A description of the highhead hydro-electric development on the Marquette Range for the Cleveland-Cliffs Iron Company, using three types of pipe line; the average working head is 580 ft.; on the basis of a 100 second-feet average discharge, 5,250-horse power could be generated continuously, developing on a 66 per cent. load factor 26,500,000 kw. hour per annum.) 2s.

The Operation of Electrical Apparatus in Mines by Remote Control. J. Gillespie. "Electricity," vol. 27, 1124, p. 349-50. (The special object of the control is to regulate automatically the supply from electrically driven pumps to hydraulic accumulators or water-tanks.) 5d.

Economy of Central Station Power in the Coalmine. G. Bright. "Proc. Am. Inst. El. Eng.," vol. 31, 5, p. 523-34; 6 tab. (Notes of the elements which affect the economy of central station electric energy in the mine.) 6s.

Electricity in the D.L. and W. Mines. "Mines Minerals," vol. 32, 11, p. 657-8; 2 fig., 1 tab. (How the Delaware, Lackawanna and Western Railroad Company apply electric power in their 20 collieries to hoisting, pumping, haulage and lighting. Their output from the northern anthracite field of Pennsylvania was about 8 million tons in 1910.) 2s. 2d.

Does it Pay the Average Coalmine to Purchase Central Station Power? G. Bright. "Proc. Am. Inst. El. Eng.," vol. 31, 5, p. 523-34; 6 tab. (Method is shown for obtaining the cost of power at an average mine, with its own plant and the corresponding cost for the power from a central station at some definite rate per kilowatt hour.) 6s.

The Lancashire Electric Power Company's System, and its Application to Lancashire Collieries. C. D. Taite. "Trans. Inst. Min. Eng.," vol. 43, 2, p. 168-186; 6 fig., 3 tab., 1 map plate, 1 fold plate. (An account of the power station is given and a list of motors which are installed in the collieries.) 8s.

The "Cascade" Single and Multi-speed Motor. M. I. Williams-Ellis. "S. Afric. Engin.," vol. 17, 5, p. 89-92, 4 fig. (A description of the Cascade induction motor, both of the single and multi-speed type, and its adaptation to mine and general work, read before the S. Afric. Inst. Engin.) 1s. 3d.

Alternating Systems of Underground Distribution. S. B. Clark and Others. "Proc. Am. Inst. El. Eng.," vol. 31, 4, p. 395-414; 8 fig. 6s.

Safety Devices in Connection with Electrical Machinery and Apparatus for Coalmines. D. Bowen and W. E. French. "Colliery Guard.," vol. 103, 2684, p. 1136; 2685, p. 1188; 2686, p. 1235; 25 fig. (Paper read before Inst. Min. Engin.) 1s. 6d.

Electric Power Plants for Mines. H. D. Jackson. "Coal Age," vol. 1, 34, p. 1102-4; 6 fig. 1s. 3d.

XXVIII.—Surface Transport.

An Unusual Coal and Ash Handling Plant. "Iron Age," vol. 89, 18, p. 1090-1; 3 fig. (A man carrying trolley hoist commands both coal yard and boiler hoppers in the steam plant of the Bryant Paper Company, Kalamazoo, Mich.) 2s.

The United States Naval Collier "Neptune." "Engineer," vol. 113, 2941, p. 488-9; 6 fig. (The collier is 542 ft. o.a., beam 65 ft., depth 39 ft. 6 in., draught 27 ft. 6 in., displacement load 19,440 tons; she has a 4,000-horse power turbine, started by a system of pneumatic tele-control, which also stops, reverses and adjusts the speed from the bridge.) 9d.

A 600 Ton Coal Bin and Tower. "Engin. Rec.," vol. 65, 16, p. 428-9; 16 fig. (A storage bin built for the Republic Iron and Steel Co., for the open-hearth gas-producer plant at Haselton, Ohio. The coal is raised and transferred by a conveyor, the I beam and girder system of construction being exceptionally heavy.) 2s. 3d.

Conveyor for Briquette Stockyard. (Anlage zur Beschickung eines Brikettlagerplatzes.) Oskar Maus. "Z. Ver D. Ing.," 1912, 15, p. 608-9; 2 fig., 1 ill. (Stolz jig conveyor to transport 2,250 large or 4,500 small coal briquettes per hour in either direction.) 2s. 6d.

Coal Unloading Terminal at Sewalls Point, Norfolk, Va. F. W. Parsons. "Coal Age, vol. 1, 33, p. 1077-8; 2 fig. (The pier is 1,045 ft. long, built entirely of steel on concrete foundations at a cost of 2,000,000 dols.; its capacity is 15,000 tons per day of 10 hours; eight vessels not exceeding 200 ft. o.a. can be worked at once. A railway car is handled every two minutes.) 1s. 3d.

New Coal-discharging Crane at Malmö. (Ny kollossningskran i Malmö.) E. G. Edlund. "Tekn. Tidskr.," 1912, 24, p. 43-5; 5 fig. 2s.

XXIX.—Sanitation, Diseases.

The Hookworm and the Miner. R. S. Ogilvie and N. P. Brooks. "Coal Age," vol. 1, 34, p. 1106-7. 1s. 3d.

A Change House for Coalminers. A. A. Steel. "Mines Minerals," vol. 32, 11, p. 647-8: 2 fig. 2s. 2d.

Miners' Baths. H. F. Bulman and W. B. Wilson. "Trans. N. Engl. Inst Min. Mech. Eng.," vol. 62, 3, p. 103-21; 14 fig., 2 fold plates. (Introductory paper and the subsequent discussion.) 8s.

Occupational Diseases in the Mining Industry. S. C. Hotchkiss. "Am. Lab. Legis. Rev.," vol. 2, 1, p. 131-9.

Housing of Scottish Miners. "Colliery Guard.," vol. 103, 2685, p. 1190. 6d.

Tests for Glanders. "Colliery Guard.," vol. 103, 2684, p. 1137. (Text of New Order.) 6d.

XXX.—Mining Laws, Royalties.

Birth of the American Mining Act. H. W. MacFarren, "Min. Scient. Press," vol. 104, 15, p. 526-9; 16, p. 564-6; 17, p. 592-6. 1s. 4d.

Coalmining in New Zealand. "Colliery Guard.," vol. 103, 2687, p. 1292. (Report of Royal Commission.) 6d.

Awards under the Minimum Wage Act. "Colliery Guard.," vol. 103, 2685, p. 1203; 2686, p. 1243; 2687, p. 1295. Scotland, Derbyshire, Warwickshire, West Yorkshire, Nottinghamshire and Somersetshire. 1s. 6d.

Matches in the Mine. "Colliery Guard.," vol. 103, 2684, p. 1151. (Text of New Order.) 6d.

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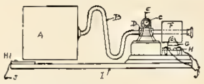
Boiler Explosion Report No. 2141 at Rhymney, 2½d.

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

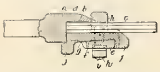
13442 (1911). *An Improved Perchlorate Explosive.* O. Silberrad, Buckhurst Hill, Essex.—The invention consists in an explosive containing 60 to 70 parts of ammonium perchlorate, potassium perchlorate or both, 12 to 14 parts of mono-nitro-benzene, mono-nitro-toluene or both, 6 to 7 parts of dinitro-toluene, 6 to 7 parts of mono-nitro-naphthaline, 4 to 5 parts of wood meal, and 0·5 to 2·5 parts of soluble nitro-cellulose. In carrying the invention into effect according to one form the various nitro and dinitro compounds are incorporated together, the soluble nitro-cellulose added thereto, and the mixture warmed until gelatinisation is complete. The wood meal and oxidising substance are now incorporated into the mass, when the substance may be pressed into cartridges in the usual way. An explosive composed of the ingredients set out above and prepared in the manner described has been found to possess remarkable stability, power, plasticity and efficiency generally. (Four claims.)

13443 (1911). *An Improved Chlorate Explosive.* O. Silberrad, Buckhurst Hill, Essex.—The invention consists in an explosive containing 60 to 70 parts of potassium chlorate, 12 to 13 parts of mono-nitro-benzene, mono-nitro-toluene or both, 6 to 7 parts of dinitro-toluene, 6 to 7 parts of mono-nitro-naphthaline, 5 to 6 parts of wood meal, and 0·5 to 2·5 parts of soluble nitro-cellulose. (Four claims.)

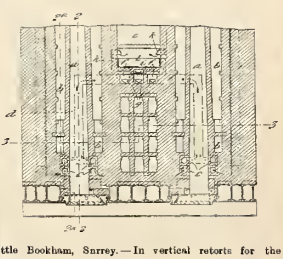
14781 (1911). *An Automatic Mine Alarm.* E. A. Johnson, 12, Princess-road, South Norwood, Surrey.—The nature of this invention is a mechanical arrangement of a hollow brass box and a lead balance weight, connected with a brass tube of a special shape arranged to ride on hardened steel knife edge pivots, and balanced in such a manner that the presence of explosive and other gases, or an unusual rise in temperature acting upon the atmosphere in the mine, causes the hollow brass box to rise or fall; this double action brings about an electrical contact, which rings either bell (which can be situated in any convenient place), notifying the people in charge the presence of light explosive or heavy suffocating gases, also a danger from a sudden rise in temperature. The attached drawing shows the construction. (Two claims.)



20325 (1911). *Improvements in Chucks for Rock-drilling Apparatus.* J. M. Holman and J. L. Holman, both of Camborne, Cornwall.—This invention relates to chucks especially designed for holding the borers or drills of rock-drilling apparatus, and to that class of such chuck provided with a U-shaped bolt or strap, and with a wedge for securing the borer or drill in place. The object is to enable the chuck to be readily adjusted to take tool shanks of different diameters without the use of such a packing piece. According to the invention, the improved chuck comprises a head upon the piston rod, which head is provided with a recess to receive the shank of the tool or borer, the bottom of the said recess having a surface inclined to the axis of the chuck and upon which a wedge-bushing rests. The drill shank is introduced between the plane surface of the wedge-bushing and the underside of a U-shaped bolt or strap, which is secured in the head of the piston rod. The accompanying drawing shows a sectional side view of a chuck or tool-holder constructed according to the invention. (Four claims.)



28852 (1911). *Improvements Relating to Vertical Retorts for the Carbonisation of Coal.* A. M. Duckham, of Walden, Little Bookham, Surrey.—In vertical retorts for the carbonisation of coal where the coke is more or less continually being discharged from the retort, there is a



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considerable waste of heat, due to the temperature at which the coke leaves the retort. This invention relates to the operation of vertical retorts for the carbonisation of coal, which are provided with a regenerator for heating the secondary air, and according to it heat is removed from the coke by passing around the lower part of the retort the primary air alone—that is to say, the air which is to gasify the fuel in the producer; the primary air thus heated is then saturated with water vapour by coming in contact with water on its way to the producer. The accompanying drawing shows a vertical section of the lower part of a setting comprising four vertical retorts. (Three claims.)

23385 (1911). *Improvements in and relating to Rock-drills and the like.* P. Williams, of Church-street, Bedwas, Monmouthshire.—This invention relates to improvements in rock-drills and the like of the kind in which the lubricant is fed to the machine automatically with the pressure fluid through the intermediary of a sliding valve interposed between the pressure cylinder and the oil reservoir and pressure fluid supply. Fig. 1 shows in plan an improved rock-drill constructed according to the invention. Fig. 2 is a side sectional elevation of fig. 1. Carried by the cylinder *a* is a valve box *g* formed rectangular from faced wrought iron or other suitable metal, and provided with a rectangular opening or chamber *h*, within which the valve *i* is adapted to work. The valve is also formed hollow and rectangular to suit the size and shape of the chamber within the valve-box, and may be formed from wrought iron, steel, cast steel, or any other suitable metal, being faced or machined in any suitable manner and provided with ports *k* adapted to register alternately with the ports *b* of the cylinder. The valve-box *g* has secured to it in any suitable manner, or is formed integral with a container *l* of any convenient or desired lubricant, which is fed round, and into the interior of, the valve i, and is thence forced into the cylinder with the working medium. (Two claims.)

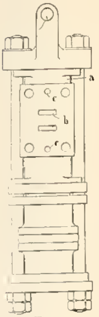

Fig. 1

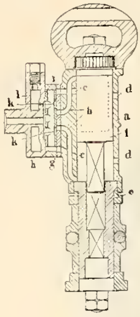

Fig. 2.

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15118. Steam generator. J. E. Clarkson.
15128. Safety devices for use in connection with deep-boring tools. R. Gierszynski and Warstaty Mechaniczne Roman Gierszynski i Ska, Ges.m.b.H.
15151. Steam generators. E. de Normanville, A. H. Adams, and Adams Manufacturing Company Limited.
15163. Steam heating apparatus. T. Barty.
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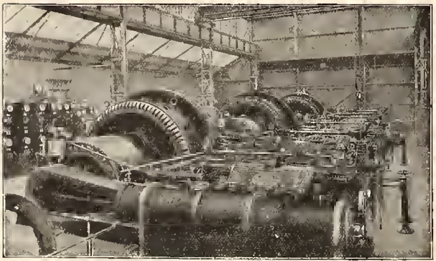

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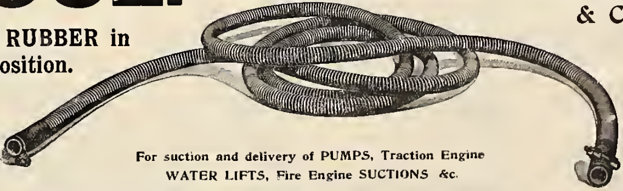

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Wakefield, C. C., and Co., 27, Cannon-street, E.C.
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Pape, Bd., Ld., Belvedere Works, Belvedere, Kent

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Daglish, Robert, and Co. Ld., St. Helens, Lancs.

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Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

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Reavell and Co. Ld., F. Department, Ipswich
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Lewis, William, and Son, Bilston
Mining Engineering Co. Ld., Sheffield
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C., Ld., Dudley

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Mather and Platt Ld., Manchester
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Robey and Co. Ld., Lincoln
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Youngs, Byland-street Works, Birmingham

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Theedam, E. C., Ld., Dudley

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Smallman, J. W., Nuneaton
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Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

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Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Beddaway, F., & Co. Ld., Pendleton, Manchester
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Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

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Tickle Brothers, Vulcan Ironworks, Wigan

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International Channelling Machines Ld., 327, Penistone-road, Sheffield
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Mining Engineering Co. Ld. (The), Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

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Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
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Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Coal Heading Machines
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Mining Engineering Co. Ld., Sheffield
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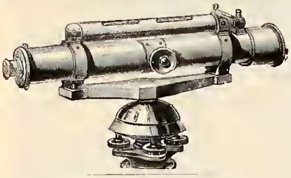

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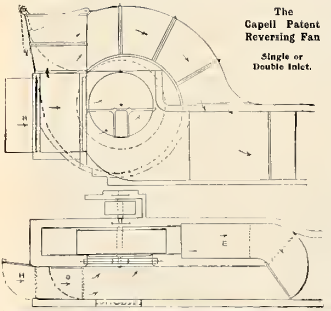
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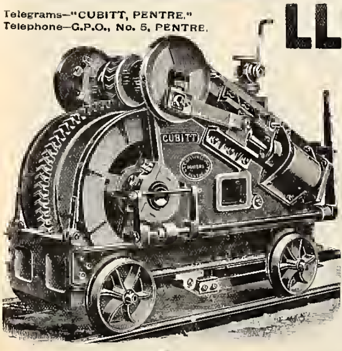

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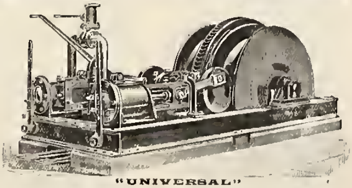
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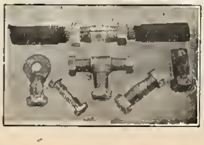

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Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Tickle Brothers Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

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British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Electrical Plant
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British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
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Mather and Platt Ld., Manchester
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Reyrolle, A., and Co. Ld., Hebburn-on-Tyne
Ward, Thos. W., Limited, Albion Works, Sheffield

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Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

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Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C., Ld., Dudley

Emery Wheels
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Wailes, Dove and Co. Ld., Newcastle-on-Tyne

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Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

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Robey and Co. Ld., Lincoln
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Wood, John, and Sons Ld., Wigan

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Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

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Bradley & Craven Ld., Wakefield
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Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Jones, G. H., 74, Blackfriars-road, Salford
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.

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Railway and General Engineering Co. Ld., Nott
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Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, R., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

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British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Jones, G. H., 74, Blackfriars-road, Salford
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

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Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

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Tangyes Ld., Cornwall Works, Birmingham

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Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
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Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, H.S.O., Glam.
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Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
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Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
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British Westinghouse Electric and Manufacturing Co. Ld., Manchester

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Auld, D., and Sons, Whitevale Foundry, Glasgow

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Wood, John, and Sons Ld., Wigan

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Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
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Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Jones, G. H., 74, Blackfriars-road, Salford
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allan, W. G., and Sons (Tipton) Ld., Tipton
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Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Jones, Geo. H., 74, Blackfriars-road, Salford
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, H.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

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Wright, Joseph, and Co., Tipton

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Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
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Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Files
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Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

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Pulsometer Engineering Co., Ld., Reading
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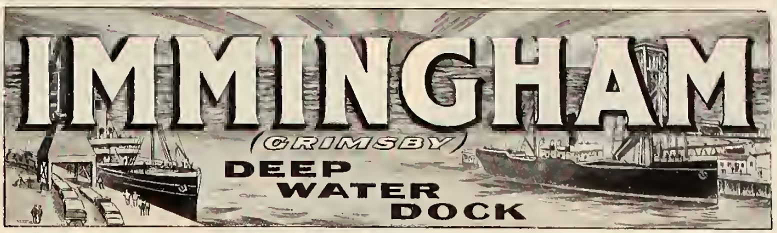
The NEW COAL PORT



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SAM FAY, General Manager.

Purchasers' Guide to Advertisers' Specialities.—(continued).

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Wellington Tube Works Ld., Great Bridge, Tipton

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Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld. Sheffield

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Wright, Joseph, and Co., Tipton

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Yorkshire Boiler Co. Ld., Bradford

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Tangyes Ld., Cornwall Works, Birmingham

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Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
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Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
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Jacobson, Richard, 70, Shoe-lane, London, E.C.
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Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

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Theedam, E. C., Ld., Dudley

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Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

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Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan

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Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Byland-street Works, Birmingham

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Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

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Wright, Joseph, and Co., Tipton

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Mining Engineering Co. Ld., Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
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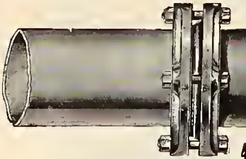
Jones, G. H., 74, Blackfriars-road, Salford
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., B[illegible]ing
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Byland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hydrometers
Davis, John, and Son (Derby) Ld., Derby



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These Tubes are specially suitable for use in Mines, being both light and strong; Joints are easily connected, and a Tube can be removed without disturbing the run.
See page Advertisement May 3 issue.

Purchasers' Guide to Advertisers' Specialities—(continued).

INCLINE ROLLERS
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Steel, Alfred, and Sons Ld., Brightside, Sheffield

INDIARUBBER GOODS
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Beddaway, F., & Co. Ld., Pendleton, Manchester

INDICATORS (STEAM ENGINE)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

INDUCED DRAUGHT FANS
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

INJECTORS AND EJECTORS
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., 22, Southwark-st., S.E.

INSTRUCTION (POSTAL)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

INSTRUMENTS
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

IRON AND BRASS FOUNDERS
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

IRON AND STEEL
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Jones, Geo. H., 74, Blackfriars-road, Salford
Lowmoor Co. Ld., Bradford, Yorks.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

JACKS (HYDRAULIC)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

JIGS
Ormerod, Edward, Atherton, near Manchester

JIM CROWS
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Hyland-street Works, Birmingham

JOINTING CEMENT
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

JOINTING (SHEET)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

JOISTS (ROLLED STEEL)
Heenan and Froude Ld., Worcester
Jones, G. H., 74, Blackfriars-road, Salford
Renton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

KEPS (FOR WINDING CAGES)
Benthams, D., 45, Bank-street, Sheffield
Wood, John, and Sons Ld., Wigan

LAMP CLEANING MACHINES
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP GAUZE BRUSHES
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP GLASSES
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP OIL FILLING MACHINES
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP RE-LIGHTING APPARATUS (UNDERGROUND)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMPS (ARC)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

LAMPS (ELECTRIC)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

LAMPS (ELECTRIC SAFETY)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pope, Hd., Ld., Belvedere Works, Belvedere, Kent
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMPS (MINERS' SAFETY)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMPS (OUTDOOR)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

LATHES
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Jones, G. H., 74, Blackfriars-road, Salford
Tangyes Ld., Cornwall Works, Birmingham

LEATHER APPLIANCES

LESSONS BY POST
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

LIFTING AND HOISTING TACKLE
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Renton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Hyland-street Works, Birmingham

LIGHTNING CONDUCTORS
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Theedam, E. C., Ld., Dudley

LOCKNUT WASHERS
Renton, B. M., and Co., Sheffield

LOOSE COLLARS
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster, S.W.

LUBRICATORS
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

MACHINERY (SECOND-HAND)
Bute Works Supply Co. Ld., Cardiff
Foot, H. G., & Co., 11, Queen Victoria-st., E.C.
Jones, G. H., 74, Blackfriars-road, Salford
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon.
Renton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

MACHINE TOOLS
Foot, H. G., & Co., 11, Queen Victoria-street, E.C.
Jones, G. H., 74, Blackfriars-road, Salford
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

MATHEMATICAL INSTRUMENTS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

MECHANICAL STOKERS
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

METAL PERFORATORS
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

METALLIC PACKING
United States Metallic Packing Co. Ld., Soho Works, Bradford

METEOROLOGICAL INSTRUMENTS
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

MILLS (GRINDING)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

MINING DIALS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

MINING MACHINERY
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Spencer, Matthias, and Sons, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

MINING TOOLS
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Spencer, Matthias, and Sons, Sheffield

MOTORS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

MOTORS—continued.
Jones, G. H., 74, Blackfriars-road, Salford
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

MOTOR STARTERS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne

MOTOR VANS AND WAGONS
Avonside Engine Co. Ld., Bristol
Foot, H. G., & Co., 11, Queen Victoria-street, E.C.

NAILS, SPIKES, &c.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Frost, Albert, and Co., Howard-street, Sheffield
Renton, B. M., and Co., Midland Works, Sheffield

OFFICE FURNITURE AND APPLIANCES
Glover, M., and Co., Holbeck-lane, Leeds
Thornton, A. G., Ld., King-st. West, Manchester

OIL BOTTLES
Baker, John, and Son, Bilston, Staffs
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

OIL CABINETS
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

OIL SWITCHES
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

OILS AND LUBRICANTS
Ackroyd and Best Ld., Morley, nr. Leeds
Asbestos and General Paint Co. Ld., Birmingham
Gaunt and Hickman, Oil Works, Wolverhampton
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

OVERHEAD TRAVELLERS
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Spencer and Co. Ld., Melksham, Wilts
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Byland-street Works, Birmingham

OVERWINDING GEAR
Barclay, Andrew, Sons and Co. Ld., Kilmarnock, Scotland
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

OXYGEN MANUFACTURERS
British Oxygen Co. Ld., Elverton-st., Westminster
Knowles Oxygen Co. Ld., Wolverhampton

PACKING (ENGINE)
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Green and Boulding Ld., London, E.C.
Greene, Tweed and Co., Westminster
Lancaster and Tonge Ld., Pendleton, Manchester
Beddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

PAINT
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Kalbitum Paint Co. Ld., Belvedere, Kent
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

PAINT (FIREPROOF)
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent

PATENT AGENTS
Harris & Mills, 34 & 35, High Holborn, London
Radford, H. H., Son, and Squire, Sheffield

PEDESTALS
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham

PERFORATED PLATES
Barns, W., & Son, Queensland-rd., Holloway, N.
Firth, William, Ld., Leeds
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Norton's (Tividale) Ld., Tipton
Theedam, E. C., Ld., Dudley

PICKS AND SHOVELS
Baker, John, and Son, Bilston, Staffs
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Spencer, Matthias, and Sons, Sheffield
Theedam, E. C., Ld., Dudley

PINIONS
Cort, Arthur & Co., 303½, Camberwell-rd., London

PINIONS (RAW HIDE AND PAPER)
Bridge, David, & Co. Ld., Castleton, Manchester
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan

PIPE JOINT PASTE
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

PIPES (STEAM AND WATER)
British Mannesmann Tube Co. Ld., London Wall
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Isca Foundry Co., Newport, Mon.
Lewis, Edwin, and Sons, Wolverhampton
Pulsometer Engineering Co. Ld., Reading
Russell, John, & Co. Ld., Alma Tube Wks., Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Nile-st., Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

PISTONS
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

PISTON SPRINGS
Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

PIT PROPS (STEEL)
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Bute Works Supply Co. Ld., Bute Docks, Cardiff
Firth, William, Ld., Leeds
Heenan & Froude Ld., Worcester
Henderson and Glass, Liverpool
Lewis, Edwin, and Sons, Wolverhampton
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Spencer, John, Ld., Globe Tube Works, Wednesbury
Tickle Brothers, Vulcan Ironworks, Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton

PIT PROPS (WOOD)
Baird, J. W., and Co., West Hartlepool
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Osbeck and Co., Newcastle-on-Tyne

PIT PROP WITHDRAWERS
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Spencer, Matthias, and Sons, Sheffield

PIT WATER GAUGES.
John Davis & Son (Derby) Ld., Derby

PLANING MACHINERY AND APPLIANCES (WOOD)
Glover, M., and Co., Holbeck-lane, Leeds

PLATES FOR COLLIERY NOTICES
Davis, John, and Son (Derby) Ld., Derby
Railway and General Engineering Co. Ld., Notts
Theedam, E. C., Ld., Dudley

PLATES (IRON AND STEEL)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Jones, G. H., 74, Blackfriars-road, Salford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Stewarts & Lloyds Ld., Birmingham & Glasgow
Stringer, John, and Son, Dept. 11, Blackburn

POINTS AND CROSSINGS
Bagnall, W. G., Ld., Stafford
Firth, William, Ld., Leeds
Heenan & Froude Ld., Worcester
Isca Foundry Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Ld., Albion Works, Sheffield

PORTABLE RAILWAYS
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington

PREPARATION FOR EXAMS.
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Mining School, Porth, Glam.

PRESERVATIVE (FOR PLANT)
Kalbitum Paint Co. Ld., Belvedere Works, Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

PUBLICATIONS
Colliery Guardian Co. Ld., 30 & 31, Furnival-st., Holborn, London, E.C.
Griffin, Charles, and Co. Ld., London, W.C.
Southern, T. A., Universal Mining School, Cardiff

PULLEY BLOCKS
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Byland-street Works, Birmingham

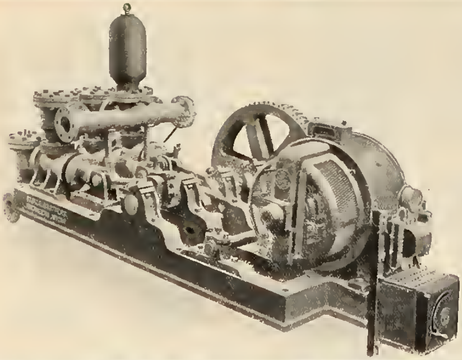
PULLEYS (HAULAGE AND SHAFT)
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Frost, Albert, and Co., Sheffield
Humble, Stephen, 9, Victoria-st., London, S.W.
Jardine, John, Deering-street, Nottingham
Jones, G. H., 74, Blackfriars-road, Salford
Llewellyn and Cubitt Ld., Pentre, R.S.O. Glam.
Spencer and Co. Ld., Melksham, Wilts
Steel, Alfred, and Sons Ld., Brightside, Sheffield
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

PULLEYS (PIT-HEAD)
Bever, Dorling and Co. Ld., Bradford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Head, Wrightson and Co. Ld., Stockton-on-Tees
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Spencer and Co. Ld., Melksham, Wilts
Steel, Alfred, and Sons Ld., Brightside, Sheffield
Thompson and Co., Wigan
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

PUMP BUCKETS AND STRIPS
Cort, Arthur, and Co., Camberwell, London
Daglish, Robert, and Co. Ld., St. Helens, Lancs.

PUMP (PACKING)
Greene, Tweed and Co., Westminster
United States Metallic Packing Co. Ld., Soho Works, Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

PUMPS AND PUMPING MACHINERY
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Cameron, John, Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, John, and Son (Derby) Ld., Derby
Evans, Joseph, & Sons (Wol. Ld.) Wolverhampton



TICKLE BROTHERS,
WIGAN,
MINING ENGINEERS.
THREE-THROW RAM PUMPS
IN STOCK.
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Telegrams: "TICKELL, WIGAN." *Phone: 59.*

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EXPLOSIVES ON THE PERMITTED LIST.

FAVERSHAM POWDER. The Safest of all Permitted Explosives. The remarkable spreading effect in action makes it specially adapted for Coal Blasting.
CONTAINS NO NITRO-GLYCERINE. WILL NOT FREEZE.

REXITE. Specially designed for Hard Coal, Stone, Sinking and Driving purposes; most useful Explosive for all-round work in the Mine. NO THAWING REQUIRED.

NORMANITE. For getting Hard Coal, and general Blasting work in the Mine.

SWALITE. For Ripping, Brushing, Driving and Sinking.

GELIGNITE. GELATINE DYNAMITE.
BLASTING GELATINE.
CORDITE. TONITE. DETONATORS.
ELECTRIC DETONATORS.

EXPLODERS, SHOT-FIRING CABLE, SAFETY FUSE and all Accessories.

Supplies can be obtained from the Company's Agents throughout the United Kingdom

Particulars on application to the Company's Head Office—24, Walbrook, London, E.C.

Purchasers' Guide to Advertisers' Specialities—(continued).

Pumps and Pumping Machinery—*continued.*
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Isca Foundry & Engineering Co., Newport, Mon.
Jones, G. H., 74, Blackfriars-road, Salford
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co. Ld., West Gorton, Manchester
Phillips, C. D., Newport, Mon.
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.
Wood, John, & Sons Ld., Brook Foundry, Wigan

Pumps (Turbine)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Tickle Brothers, Vulcan Ironworks, Wigan

Punching Bears
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street, Birmingham

Rail Benders
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley

Rail Sawing Machines
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Youngs, Ryland-street Works, Birmingham

Rails (Iron and Steel)
Bagnall, W. G., Ld., Stafford
Bute Works Supply Co. Ld., Cardiff
Firth, William, Ld., Leeds
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

Railway Carriages and Wagons
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
Bristol and South Wales Railway Wagon Co. Ld., Bristol
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester
Lancashire and Yorks. Wagon Co. Ld., Heywood
Lincoln Wagon and Engine Co. Ld., Lincoln
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld. Midland Works Birmingham
Moy, Thomas, Ld., Railway Works, Peterboro'
Rigley, Wm., Bulwell, Nottingham
Rolling Stock Co., Darlington
Wigan Wagon Co. Ld., Springs Branch, Wigan

Railway Plant
Avonside Engine Co. Ld., Bristol
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Bute Docks, Cardiff
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Firth, William, Ld., Leeds
Gt. Central Railway, 216, Marylebone rd., London
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester
Isca Foundry and Engineering Co., Newport, Mon.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld. Midland Works Birmingham
Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Ryland-street Works, Birmingham

Railway Plant (Electrical)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester

Railway Wagon Association
Association of Private Owners of Railway Rolling Stock, Clarence Chambers, Gloucester
Chorley Railway Wagon Co. Ld., Chorley, Lancs.

Railway Wagon Financiers
Bristol and South Wales Railway Wagon Co. Ld., Bristol
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lincoln Wagon and Engine Co. Ld., Lincoln

Railway Wagon Repairers
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, near Birmingham
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Heenan & Froude Ld., Worcester
Lancashire and Yorkshire Wagon Co. Ld., Heywood, near Manchester
Lincoln Wagon and Engine Co. Ld., 11, St. Mary-street, Lincoln
Moy, Thomas, Ld., Railway Works, Peterboro'
Rigley, Wm., Forest Wagon Works, Bulwell, Nottingham

Railway Wagons (Tipping)
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester

Rakes (Pit)
Baker, John, and Son, Bilston, Staffs
Hardy Patent Pick Co. Ld., Sheffield

Reducing Gear
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, and Sons (Huddersfield) Ld., Park Gear Works, Lockwood, Huddersfield

Reducing Valves (Full Bore and Standard)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield

Refrigerators
Pulsometer Engineering Co. Ld., Reading

Refuse Destructors
Heenan & Froude Ld., Manchester

Regulating Valves (Full Bore)
Auld, D., and Sons, Whitevale Foundry, Glasgow

Rescue Apparatus
British Oxygen Co. Ld., Elverton-st., Westminster
Davis, E., 2, Aire-street, Leeds
Jacobson, R., 70, Shoe-lane, London, E.C.
Knowles Oxygen Co. Ld., Wolverhampton
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., 187, Westminster bridge-road, S.E.

Respirators
British Oxygen Co. Ld., Elverton-st., Westminster
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., Westminster

Rivets
Baker, John, and Son, Bilston, Staffs
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley
Ward, Thos. W., Limited, Albion Works, Sheffield

Rock Drills
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Spencer, Matthias, and Sons, Sheffield
Stephens, R., and Son, Carn Brea, Cornwall

Rollers and Pulleys (Haulage)
Bagnall, W. G., Ld., Stafford
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Sheffield
Steel, Alfred, and Sons, Ld., Brightside, Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Roofs and Outdoor Buildings
Heenan & Froude Ld., Newton Heath, Manchester
Isca Foundry & Engineering Co., Newport, Mon
Norton's (Tividale) Ld., Tipton
Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton

Ropes (Cotton Driving)
Kenyon, Wm., & Sons Ld., Dukinfield
Wright, J. and E., Ld., Birmingham

Ropes (Driving)
Kenyon, W., & Sons Ld., Dukinfield Manchester

Ropes (Hemp and Manilla
Wright, J. and E., Ld., Birmingham

Rope Preservative
Wright, J. and E., Ld., Birmingham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Ropes (Wire)
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Cooke, William and Co. Ld., Tinsley, Sheffield
Elliot, George, and Co. Ld., 16, Great George-st., Westminster, S.W.
Glover, Wm. Jas., and Co., St. Helens, Lancs.
Haggie Brothers Ld., Gateshead-on-Tyne
Latch and Batchelor Ld., Hay Mills, Birmingham
Thompson and Co., Wigan
Wright, John & Edwin, Ld., Garrison st., B'ham

Ropeways
Bleichert, Adolf, and Co., 99-100, Palmerston House, Bishopsgate-st. Within, E.C.
Tickle Brothers, Vulcan Ironworks, Wigan

Rubber-Covered Rollers
Reddaway, F., & Co. Ld., Pendleton, Manchester

Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster and Tonge Ld., Pendleton, Manchester

Saws and Sawing Appliances
Appleby, E. G., and Co., 10, Victoria-street, Westminster
Glover, M., and Co., Holbeck-lane, Leeds

Scoops for Coal and Coke
Baker, John, and Son, Bilston
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley

Screening
Barns, W., and Son, Globe Works, Holloway, N.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Screening Plant
Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Screwing Machines
Frost, Albert, and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Screws (Stretching)
Youngs, Ryland-street Works, Birmingham

Sewage Treatment Plant
Mather and Platt Ld., Manchester

Shafting
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Hardy Patent Pick Co. Ld., Sheffield
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Phillips, C. D., Newport, Mon.
Spencer and Co. Ld., Melksham, Wilts
Uskside Eng. Co. Ld., Newport Mon.
Wright, Joseph, and Co., Tipton

Shaft Sinkers
Trefor Boring and Mining Co. Ld., 41, rue Royale, Brussels

Sheet Iron
Firth, Wm., Ld., Water-lane, Leeds
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

Sheet Metal Work (for Cylinder Casings
Baker, John, and Son, Bilston
Kenyon, Wm., & Sons, Ld., Dukinfield
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Shipping
Gt. Central Railway, 216, Marylebone road, N.W.

Shot-Firing Batteries and Cables
British Explosives Syndicate Ld., Glasgow
British Insulated and Helsby Cables Ld., Lancs.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Haslam and Schontheil Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

Shovels and Shovel Trees
Baker, John, and Son, Bilston, Staffs
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

Sidings
Bagnall, W. G., Ld., Stafford
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, & Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

Purchasers' Guide to Advertisers' Specialities.—(continued).

Sleepers (Iron and Steel)
Allen, W. G., & Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
Baird, J. W., and Co., West Hartlepool
Bute Works Supply Co. Ld., Cardiff
Firth, Wm., Ld., Water-lane, Leeds
Benton, B. M., and Co., Midland Works, Sheffield

Smiths' Tools
Hardy Patent Pick Co. Ld., Sheffield

Smith Work
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Wright, Joseph, and Co., Tipton

Smoke Helmets
Siebe, Gorman and Co. Ld., Westminster, S.E.

Speed-Reducing Gears
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Spinoter Grip Armoured Hose
Beddaway, F., & Co. Ld., Pendleton, Manchester

Springs
British Wagon Co. Ld., Rotherham
Lancaster and Tonge Ld., Pendleton, Manchester
Skinner, J. P. and Co. Ld., Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Stampings
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Steam Experts
Tickle Brothers, Vulcan Ironworks, Wigan

Steam Fittings
British Mannesmann Tube Co. Ld., London Wall
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Hussell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staffs.

Steam Mains and Pipe Installations
Stewarts and Lloyds Ld., Birmingham & Glasgow
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

Steam-Saving Appliances
Pittatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Burnley
Yorkshire Boiler Co. Ld., Bradford

Steam Traps
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster & Tonge Ld., Pendleton, Manchester
Stewarts & Lloyds Ld., Birmingham and Glasgow
United States Metallic Packing Co. Ld., Soho Works, Bradford
Wright, Joseph, and Co., Tipton

Steam Winches
Bridge, David, & Co. Ld., Castleton, Manchester
Clarke, Chapman & Co. Ld., Gateshead on Tyne
Phillips, C. D., Newport, Mon.
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Steel
Cooke, William, and Co. Ld., Tinsley, Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Latch and Batchelor Ld., Hay Mills, nr. B'ham
Mining Engineering Co. Ld. (The), Sheffield
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Spencer, Matthias, and Sons, Sheffield
Stewarts & Lloyds Ld., Birmingham and Glasgow
Thompson and Co., Wigan
Waterfall, H. & R., & Barber, Bridge-st., Sheffield

Steel Blooms Billets
Benton, B. M., and Co., Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Flats and Rounds
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Tinbars
Scott, Walter, Ld., Leeds Steel Works, Leeds

Stone Breakers
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln

Structural Steel Work
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Wright, Joseph, and Co., Tipton

Sulphate of Ammonia Plant
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Sulphur Recovery Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Superheaters
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
Pulsometer Engineering Co. Ld., Reading
Stringer, John, and Son, Dept. 11, Blackburn

Surgical Appliances
White & Wright, 93, Renshaw Street, Liverpool

Surplus Steam Valves (Full Bore)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Hopkinson, J., and Co. Ld., Huddersfield

Surveying (Books on)
Thomas, Wm., Cambrian Mining School, Porth

Surveying (Instruction)
Thomas, Wm., Cambrian Mining School, Porth

Surveying Instrument Makers
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavement, London
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Switch Boards
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne

Switch Gear
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne

Swivels (Ball-Bearing)
Bridge, David & Co., Ld., Castleton, Manchester
Youngs, Ryland-street Works, Birmingham

Tamping Plugs

Tanks
Bagnall, W. G., Ld., Stafford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Harvey, G. A., and Co. Leampit Vale, Lewisham
Isca Foundry & Engineering Co., Newport, Mon
Jones, G. H., 74, Blackfriars-road, Salford
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Valor Co. Ld., Rocky-lane, Aston Cross, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

Tanks (Ferro-Concrete)

Tar Distilling Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Technical Education
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Telephones
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Timber (Colliery)
Baird, J. W., and Co., West Hartlepool
Osbeck and Co., Newcastle-on-Tyne

Tipplers.
Bagnall, W. G., Ld., Stafford
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Spencer and Co. Ld., Melksham, Wilts
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

Tools
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Tram and Wagon Corner Plates
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Theedam, E. C., Ld., Dudley

Transformers (Electrical)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne

Transport Plant
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Trommels
Barns, W., and Son, Globe Works, Holloway
Heenan & Froude Ld., Worcester and Manchester
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts

Truck Shunting Plants
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Tubbing and Well Cylinders
Head, Wrightson and Co. Ld., Stockton-on-Tees
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Tub Drawbars
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Ormerod, Edward, Atherton, near Manchester
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

Tube Expanders
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

Tube Fittings
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Hussell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Wednesbury
Stewarts & Lloyds Ld., Birmingham and Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tubes (Iron and Steel)
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Lewis, William, and Son, Bilston
Hussell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tub Greasers and Controllers
Theedam, E. C., Ld., Dudley

Tubs (Colliery)
Allen, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Humble, Stephen, 9, Victoria-st., London, S.W.
Longbotham, B. H., and Co. Ld., Wakefield
Theedam, E. C., Ld., Dudley
Wigan Wagon Co. Ld., Springs Branch, Wigan
Wright, Joseph, and Co., Tipton

Tunnel Segments
Railway and General Engineering Co. Ld., Notts
Tickle Brothers, Vulcan Ironworks, Wigan

Turbines
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Jones, G. H., 74, Blackfriars-road, Salford
Mather and Platt Ld., Manchester

Turbines (Exhaust)
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Turbo Compressors
Tickle Brothers, Vulcan Ironworks, Wigan

Turntables
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Isca Foundry & Engineering Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Tuyeres
Baker, John, and Son, Bilston, Staffs
Railway and General Engineering Co. Ld., Notts
Russell, John, and Co. Ld., Walsall
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C. Ld. Dudley

Valuers
Radford, H. H., Son, and Squire, Sheffield
Stringer, John, and Son, Blackburn

Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Green and Boulding Ld., 28, New Bridge-st., E.C.
Haslam and Schontheil Ld., Cardiff
Hopkinson, J., and Co. Ld., Huddersfield
Mather and Platt Ld., Manchester
Hussell, John, & Co. Ld., Alma Tube Works, Walsall

Vices
Frost, Albert, and Co., Sheffield
Glover, M., and Co., Holbeck-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley
Youngs, Hyland-street Works, Birmingham

Vulcanised Fibre
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Washers
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Harvey, G. A., & Co., Leampit Vale, Lewisham, S.E.
Jardine, John, Deering-street, Nottingham

Washers—continued.
Benton, B. M., and Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Water Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Water Filters
Pulsometer Engineering Co. Ld., Reading
Wright, Joseph, and Co., Tipton

Water Softening and Purifying
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Wright, Joseph, and Co., Tipton

Water Tube Boilers
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.

Water Wheels

Welding Apparatus

Well Tubes
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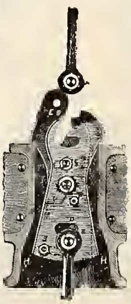

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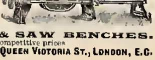

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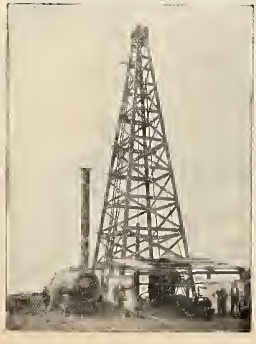

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⁂ *For* later **Advertisements** *and* **Scale of Charges,** *see* **Page 26 (Leader Page).**

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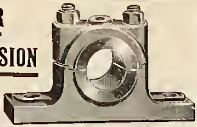

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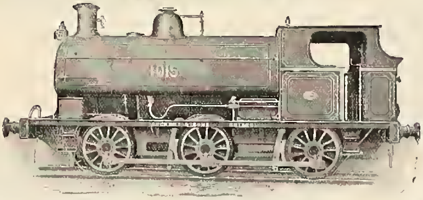

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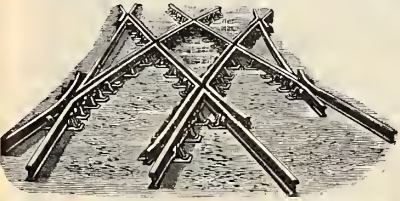

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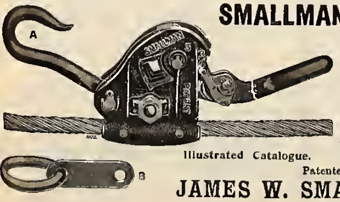

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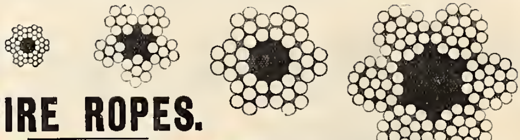

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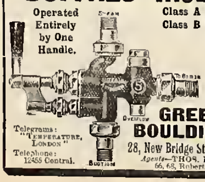

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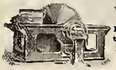

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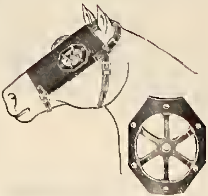

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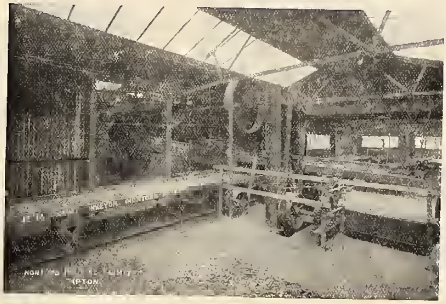

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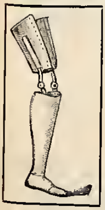

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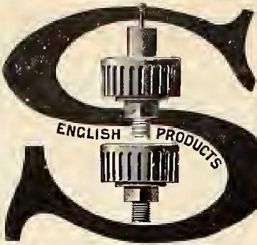

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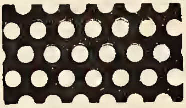

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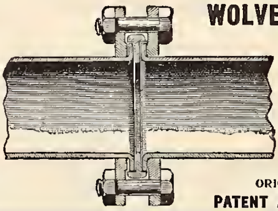

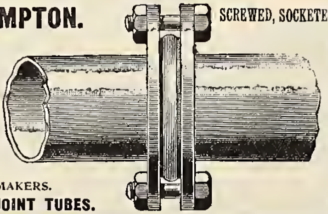

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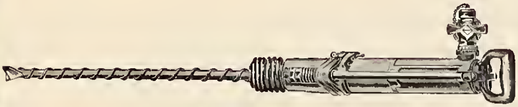

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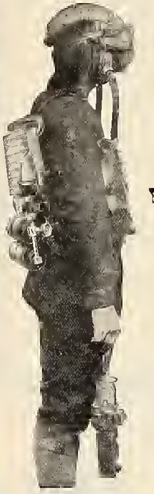

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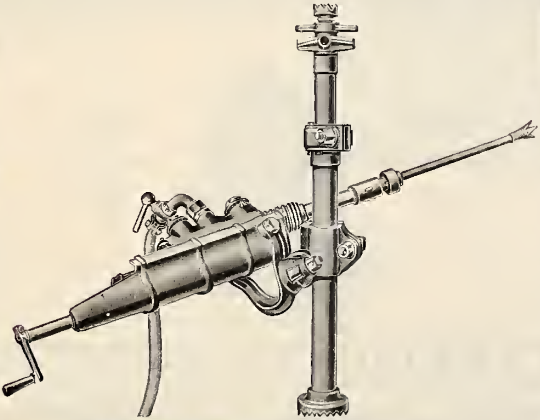

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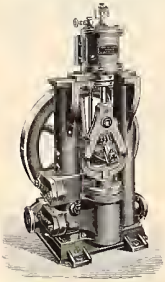
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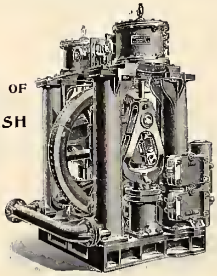
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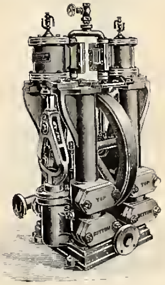
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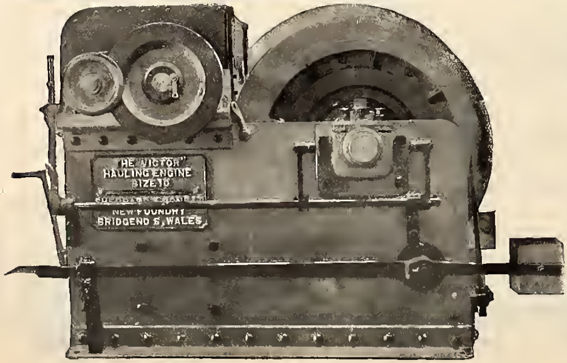

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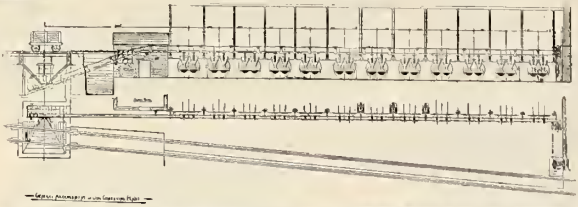

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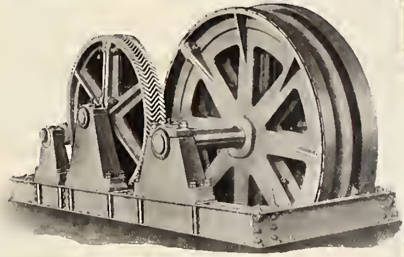

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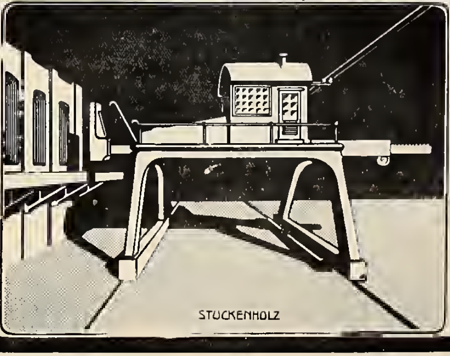

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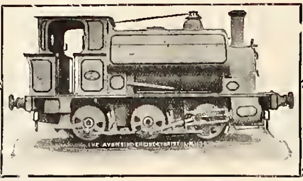

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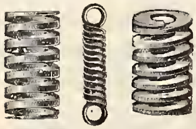

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   (D) Amman Valley. (H) Gwendraeth District.
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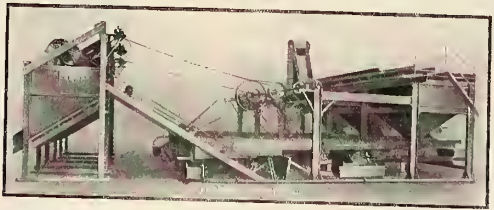

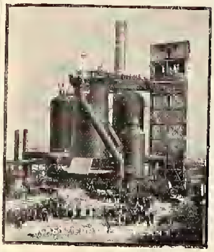

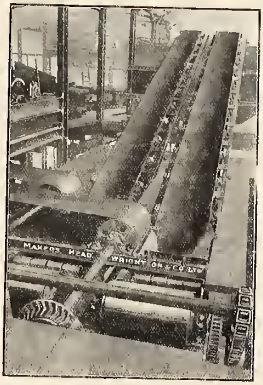

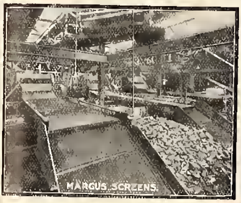

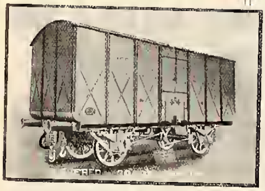

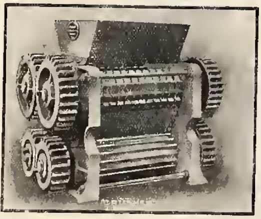

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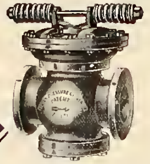

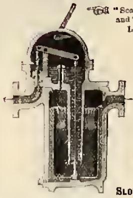

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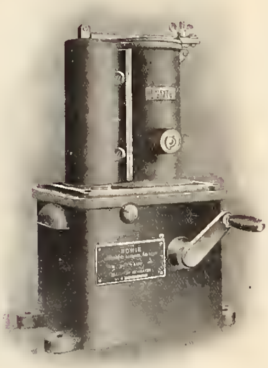

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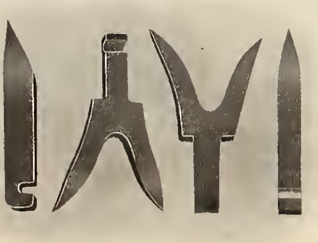

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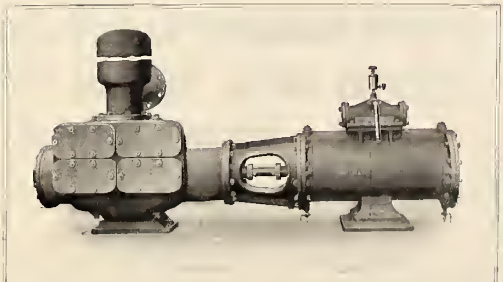

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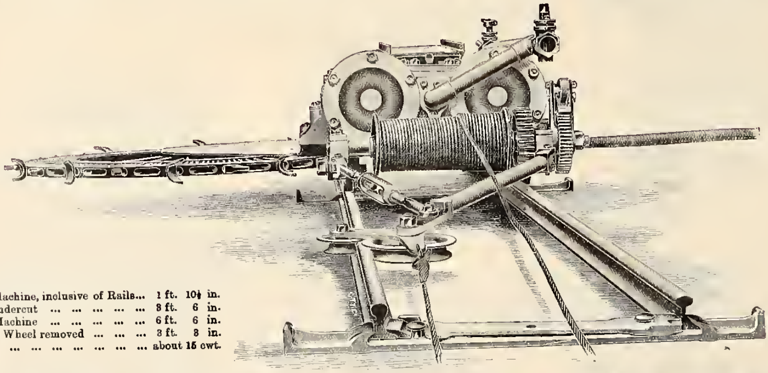

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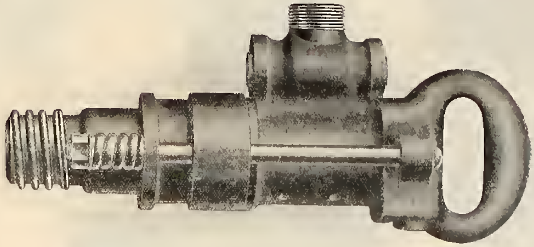

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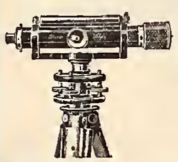

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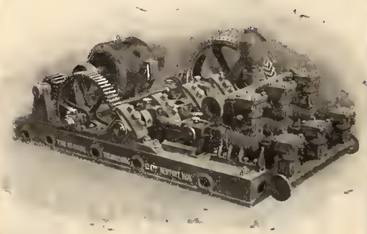

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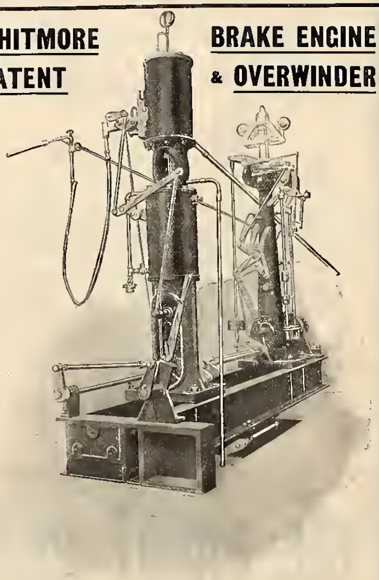

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On account of its high efficiency, the Sirocco Mine Fan can frequently save a considerable percentage of the power required to drive other types of Fans. A Fan has more working hours per annum than most mining machinery, therefore a reduction of power means a big saving at the end of the year. A long list of installations vouches for the great success of the Sirocco Mine Fan.

DAVIDSON & Co. Ltd.,
SIROCCO ENGINEERING WORKS,
BELFAST, IRELAND.

RUST SHORTENS THE LIFE OF IRONWORK
"BITUMASTIC" SOLUTION PROLONGS IT.

And it is to the advantage of every Colliery Company to get the best protective for preserving valuable iron and steel structures from the ravages of rust, at the least possible expense.

"Bitumastic" Solution is inexpensive, supplied ready for use, and can be applied by unskilled labour.

NOT AFFECTED BY EXTREMES OF WEATHER, CHEMICAL FUMES, &c.

Used by the Leading Collieries, Railways, Municipalities, &c.

Prices and full particulars from the Original Patentees and Sole Manufacturers—

WAILES, DOVE & Co. Ld., Newcastle-on-Tyne.
Also at London, Liverpool, Manchester, Birmingham, Leeds, Hull, &c.
EVERY OFFICE ON THE TELEPHONE. Telegrams:—"BITUMASTIC."

Permitted High Explosives.

Official Figures for 1910 show
NOBEL'S
"SAMSONITE" most used,
"MONOBEL" next.
This is the result of Superior Quality.

NOBEL'S EXPLOSIVES COMPANY LTD.,
195, West George Street, GLASGOW.

PLOWRIGHT BROS. LTD.,
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Speciality—
COAL SCREENING & CONVEYING.

SECTION OF SCREENING PLANT AT BENTLEY COLLIERY, DONCASTER.

CONSIDERABLY OVER
100 PLANTS NOW AT WORK IN GREAT BRITAIN AND THE COLONIES.

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BRUSSELS EXHIBITION: "GRAND PRIX." ALLAHABAD, 1910.
ROUBAIX EXHIBITION, 1911: "GRAND PRIX."

HOPKINSON'S
PATENT
"MAC" VALVE.

Suitable for the Highest Steam Pressures.
Fitted with
Hopkinson's "Platnam"
Metal Renewable Valve and Seat.

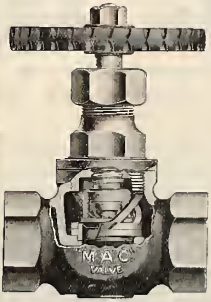

Figure 8200—Inside Screw
Figure 8205—Outside Screw

All parts interchangeable.
All joints made by metallic contact, thereby obviating the necessity of using jointing material.
By removing the cover the seat and valve are withdrawn, enabling new parts to be inserted in about a minute's time, and without the necessity—as with ordinary valves—of removing the valve body from its fixed position.

The Renewable Valve and Seat is made of
Hopkinson's "Platnam" Metal
which is suitable for superheated steam and bad waters.

There are many valves with renewable valve and seat upon the market, but under modern conditions and high pressures do not last any length of time owing to the deterioration which takes place on the valve and seat, and consequently the renewing of the parts is a frequent occurrence. We have tried our "Platnam" Metal under severe conditions, and have every confidence in recommending it to work under high temperatures. The "MAC" valve has been designed to adopt this metal for the renewable valve and seat.

Upwards of 500 tons of Standard Steel Castings kept in stock.
We can give immediate delivery of Iron and Steel Valves.

Write for illustrated specifications and catalogues free.

J. HOPKINSON & Co. Ld. Huddersfield,
Makers of Patent Safety Boiler Mountings and Valves
For High Pressure Superheated Steam, High-class Exhaust and Water Sluice Valves for Condensing Plants, &c., Automatic Exhaust Valves, Reducing Valves, Steam Traps, &c., &c.
Depots and Showrooms—London, Glasgow, Edinburgh, Cardiff.
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GAS MIXING APPARATUS FOR USE WITH SAFETY LAMPS.

(PATENT APPLIED FOR).

SIMPLE.

THE QUICKEST method of obtaining correct and constant Percentages.

CHEAP.

RELIABLE.

Its initial cost is only half that of power driven apparatus.

For its working GAS and WATER are the sole requirements.

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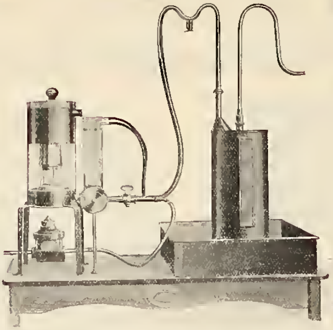

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LEEDS.
Tel. No. 395. Tel. Add.—"Cremer, Leeds."

"Perfect-Combustion" Superheat Furnace

(Pressure System, Stationary or Rocking).

Burns waste or any Fuel without smoke.
Substantial saving on coal bill. (10%—40%).
Exceptional steaming power.
No moving parts to wear out.
The LEADING FURNACE for Collieries.

PILLATT & CO. LTD., Stapleford, Nottingham.
Tel. No. 20 Sandiacre.

AIR COMPRESSORS.

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Illustrated Catalogue C. post free.

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Thomson Bros. (Dunfermline) Ld.
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Prospectors for Minerals, &c., by Diamond Drill and other Systems.

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Market Place Buildings, SHEFFIELD,
Cash Buyer of Scrap Iron & Steel of all descriptions,
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ALSO AT IMPERIAL BUILDINGS, WESTGATE RD., NEWCASTLE-ON-TYNE.

Estab. 1823.

WILLIAM FIRTH LTD
LEEDS.

Iron & Steel Bars,
Angles, Tees, Channels, Zeds, Convex, &c.
PLATES and SHEETS.

RAILS
with Fishplates and all Accessories

STEEL GIRDERS.
Sections—3 × 1½ to 24 × 7½.
FROM STOCK or FROM ROLLS.
SPECIAL COLLIERY SECTIONS.
FIRTH'S STEEL PIT PROPS.
250,000 IN USE.

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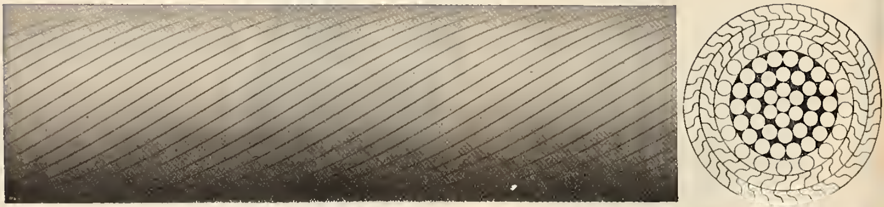
Original and Sole Makers of "Glover's Best" Steel Wire Ropes.

Works—ST. HELENS, LANCS.

SECTION "A."



NON-TWISTING **LOCK COIL** WINDING, SINKING, CAPSTAN **ROPES,** &c.

LANG'S LAY.

Lang's Lay and Lock Coil Ropes of Greatest Length without Joints in Component Wires

REPRESENTATIVES—CARDIFF—A. B. GRANT, 1 & 2, Western Mail Chambers, St. Mary's Street. SHEFFIELD—W. WALTON PITT, 6, Osborne Road, Nether Edge. NEWCASTLE-ON-TYNE, T. W. ANNS, Ward's Buildings, High Bridge.
LONDON—WILKINSON, MADGE & CO., 46, Upper Thames Street, E.C.

THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

Vol. CIV. FRIDAY JULY 12, 1912 No. 2689.

AWARDS UNDER THE MINIMUM WAGE ACT.

(*Continued from page* 1298, *vol.* ciii.)

South Wales and Monmouthshire.

Lord St. Aldwyn's award is in the following terms:—

Coal Mines (Minimum Wage) Act, 1912, South Wales, including Monmouth District.

Whereas at joint meetings held at Cardiff, on April 3, 1912, of the representatives of the colliery owners of South Wales and Monmouthshire, and the representatives of the workmen employed at the collieries, a Joint District Board was constituted for the purpose of the Coal Mines (Minimum Wage) Act, 1912: and I, Viscount St. Aldwyn, was appointed chairman of such Board: and whereas on April 18, 1912, such Board was duly recognised by the Board of Trade as the Joint District Board for the district of South Wales (including Monmouth): and

Whereas the Joint District Board failed to settle the first minimum rates of wages and district rules within three weeks after the time at which it was recognised, and the members of the Board representing the workmen and the members representing the employers agreed to substitute the specified period of ten weeks for three weeks, for the purpose of subsection (2) section 4 of the Coal Mines (Minimum Wage) Act, 1912: and

Whereas rules of procedure for the conduct of the business of the Board, and a classification of the workmen to whom the Act applies, were agreed to by the Board: and

Whereas it was agreed to by the Board that the standard rates of December 1879, or the equivalent as provided by Clause 10 of the Conciliation Board Agreement of December 1910, should be taken as a basis for the general minimum rates of wages, plus the percentage additions from time to time payable under the said agreement, and that special district minimum rates, less than the general district rates, should be applicable to coalmines in Pembrokeshire; and

Whereas it was decided by my casting vote that a standard rate of 3s. should be taken as the basis for the minimum day wage rate of labourers over 18 years of age, and it was subsequently decided by my casting vote that the age for an adult workman of every class except hauliers, trammers, and riders, should be 21 instead of 18, and that on this understanding the minimum day wage rate of labourers should be reconsidered; and

Whereas the Board has failed to settle the first general minimum rates of wages and district rules, and the first special minimum rates of wages for Pembrokeshire, within the aforesaid period of ten weeks,

Now I, as chairman of the Board, in pursuance of the terms of the Coal Mines (Minimum Wage) Act, 1912, having heard the parties, do hereby settle the said rates, rules, and special rates as follows, viz:—

SCHEDULE I.

Part I.—General District Minimum Rates of Wages.

The general rates of wages shall be the standard rate hereinafter fixed for each class of underground workmen, to which is to be added the percentage from time to time payable under the Conciliation Board Agreement of December 1910.

Class 1.—Workmen over 21 Years of Age.

	Standard rate of day wage.		Plus percentage at 51¼.[*]	
	s.	d.	s.	d.
1. Collier in charge of a working place, who is a regular pieceworker, and is prevented from earning piecework wages by a fault in the seam or other cause arising in the colliery and beyond his own control, or by a request from the management to work away from his working place on more than seven days during a period of three months	4	7	6	11·30
(In any other case the minimum day wage rate of such a collier working at day wages away from his working place shall be the minimum day wage rate applicable to the class in which he is working.)				
2. Collier in charge of a working place who is not a worker at piecework (subject to the above rule)	4	8	6	5·25
3. Colliers' helpers	8	4	5	0·50
Timbermen, and repairers or rippers doing timbering work—regular pieceworkers	4	7	6	11·30
Day wage men	4	8	6	5·25
5. Rippers (not doing timbering work)	4	0	0	0·60
6. Assistant timbermen and assistant rippers	3	4	5	0·50
7. Roadmen	3	7	5	5·03
8. Hitchers (leading)	8	10	5	9·57
(ordinary)	3	6	5	3·52
9. Ostlers and labourers	3	2	4	9·47
10. Underground hauling engineers, electric, steam and compressed air main haulage	3	4	5	0·50
Subsidiary haulage	8	2	4	9·47
11. Underground pumpmen, electric, steam and compressed air—main pumps	3	4	5	0·50
Small pumps	3	2	4	9·47
12. Fitters if employed entirely underground	3	4	5	0·50
13. Electricians ditto	3	5	5	2
14. Rope splicers ditto	3	10	5	9·57
15. Masons and pitmen ditto	4	2	6	8·62
16. Cog cutters	3	5	5	2
17. Timber drawers and airway men	3	10	5	9·57
18. Shacklers and spragmen and watermen	3	2	4	9·47
19. Lamplockers, lamplighters, oilers	3	0	4	6·45
20. Coal-cuttermen	4	8	6	5·25

Class 2.

	s.	d.	s.	d.
Boys under 15 years of age	1	0	2	3·22
Boys over 15 and under 16	1	9	2	7·76
Boys over 16 and under 17	2	0	3	0·30
Boys over 17 and under 18	2	3	3	4·83
Boys over 18 and under 19	2	6	8	9·37
Boys over 19 and under 20	2	9	4	1·91
Boys over 20 and under 21	8	0	4	6·45

Class 3.

	s.	d.	s.	d.
Hauliers above 18 years of age—				
(1) Day hauliers	3	11	5	11·08
(2) Night hauliers	3	8	5	6·55
Tonnage hauliers, above 18 years of age, for hauling coal	4	2	6	3·62
Riders above 18 years of age	3	9	5	8·06
Trammers above 18 years of age	3	3	4	10·88

In collieries where night hauliers are now paid day hauling rates that practice shall continue.

Part II.—Special District Minimum Rates of Day Wage for Coalminers in Pembrokeshire

Class 1.—Mines east of the River Claddau.—The rates fixed are standard rates of December 1879, to which is to be added the percentage from time to time payable under the Conciliation Board agreement of December 1910.

	s.	d.	s.	d.
1. Coal hewers	3	0	4	6·45
2. Underground enginemen	2	7	3	10·88
3. Hitchers and banksmen	2	7	3	10·88
4. Roadmen, repairers, hauliers, riders and beam-men	2	6	3	9·37
5. Trammers over 16 years of age	2	2	3	8·32
6. Boys under 15 years (increasing by a standard rate of 2d. with each year of age until placed in one of the above classes)	1	0	1	6·15

Class 2.—Mines west of the River Claddau.—The minimum rates of day wages shall be the following net rates:—

	s.	d.	s.	d.
Cutters and repairers	3	0	4	0·45
Assistant cutters, assistant repairers and hitchers	2	9	4	1·91
Trammers, beam-men and unskilled labourers	2	6	3	9·37
Boys under 16	1	0	1	6·25
Boys from 16 to 18	1	6	2	8·22
Boys from 18 to 20	2	0	3	0·30

After 20, their class rate.

Part III.

The several scales applicable to boys in this schedule shall apply to boys who have started underground work at 14, and have continued to work underground. A boy starting underground work at a later age than 14 to be paid the minimum provided for the age a year below his actual age, until he has had a year's experience of underground work. Afterwards the minimum applicable to his age shall apply.

The minimum wages fixed by this schedule shall be free from any deductions for explosives.

All customs, usages, practices or conditions for the payment of extra or additional wages, or for the supply of fuel, now existing at the respective coal mines to which the minimum wages fixed in this schedule are to apply, shall remain in full force and virtue, notwithstanding anything contained in this schedule, except that the minimum day wage fixed for workmen doing hauliers' work is to include payment for dooring.

Schedule 2.

District Rules for the District of South Wales (including Monmouthshire).

1. The following rules shall apply to the working of all coalmines subject to the Coal Mines (Minimum Wage) Act, 1912, hereinafter called "the Act" within South Wales and Monmouthshire.

2. In these rules the word "workman" means any person to whom the Coal Mines (Minimum Wage) Act, 1912, applies, the word "pay" means the period in respect of which the workmen's wages are for the time being payable, and the word "day" means a colliery working day.

3. A workman who has reached 63 years of age shall be regarded as an aged workman, within the meaning of the Act, and shall be excluded from the right to wages at the minimum rate. A workman who from physical causes is unable to do the work ordinarily done by a man in his position in the mine, or who is partially disabled by illness or accident, shall be regarded as an infirm workman within the meaning of the Act, and shall be excluded from the right to wages at the minimum rate. Where there is no disagreement as to whether a workman has reached the age of 63 years, or is infirm or partially disabled by illness or accident, a certificate signed by the workman affected and the manager of the mine shall be conclusive evidence in reference thereto. Provided that in a case of a workman partially disabled by illness or accident such certificate shall only apply during the period of such partial disablement.

4. A workman shall forfeit his right to wages at the minimum rate on any day on which he delays in going to his working place or work at the proper time, or leaves his working place or work before the proper time, or fails to perform throughout the whole of the shift his work with diligence and efficiency, and in accordance with the reasonable instructions of the official having charge of the district in which such workman shall be engaged.

5. A workman shall regularly present himself for work when the colliery is open for work, and shall forfeit his right to wages at the minimum rate during any pay in which he has not worked at least five-sixths of his possible working days, unless prevented from working by accident or illness. In case of accident or illness the workman shall, if required, submit himself to the examination of a duly qualified medical man to be appointed by the employer; and in case he shall refuse to do so he shall forfeit his right to wages at the minimum rate during that pay.

Every collier and collier's helper shall at all times work, get and send out the largest possible quantity of clean coal contracted to be gotten from his working place and shall perform at least such an amount of work as, at the rates set forth in the price list or other agreed rates applicable, would entitle him to earnings equivalent to the minimum rate. If at any time any workman shall, in consequence of circumstances over which he alleges he has no control be unable to perform such an amount of work as would entitle him under the price list or other agreed rates to a sum equal to the daily minimum rate then and in such case he shall forthwith give notice thereof to the official in charge of the district in which he shall be engaged, and if such official shall not agree that the workman cannot earn at the work upon which he shall be engaged a sum under the price list or other agreed rates equal to the daily minimum rate, then the matter shall be decided in the manner provided by Rule 8. The management shall be at liberty to remove the workman to some other part of the colliery.

If any workman shall act in contravention of this rule he shall forfeit the right to wages at the minimum rate for the pay in which such contravention shall take place.

6. If a case of emergency in or about or connected with the colliery shall render a workman's services for the time being unnecessary, and such workman shall be informed of such emergency when or before he reaches the pit bottom or a station within 300 yards therefrom, then such workman shall forthwith return to the surface (facilities being given), and shall not be entitled to any payment in respect of that shift. If the workman travels to his working place and is there informed or discovers that something has happened to prevent him working in his place, and is offered, but refuses, other work which he may properly be called upon to perform, he shall not be entitled to claim any wages in respect of that shift. In the event of any interruption of work during the shift of any workman, due to any emergency over which the management has no control whereby he

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[*] This column shows the rates plus the existing percentage on the standard of 1879.

[*] This column shows the rates plus the existing percentage on the standard of 1879.

shall be prevented from working continuously until the end of his shift, then he shall be entitled only to such a proportion of the minimum rate for the shift as the time during which he shall have worked shall bear to the total number of hours of such shift. Facilities shall be given to enable him to ascend the mine as soon as practicable.

7. (1) In ascertaining whether the minimum wage has been earned by any workman on piecework the total earnings during two consecutive weeks shall be divided by the number of shifts and parts of shifts he has worked during such two weeks. Upon the average earnings of any workman for two weeks being ascertained in accordance with this rule, the wages of such workman shall be adjusted and the amount found to be due to or from him ascertained and paid or debited to him as the case may be, and in the latter event the amount debited shall be deemed to be a payment on account of wages to become subsequently due to him. (2) In cases where workmen are working as partners on shares and pooling their earnings no member of such partnership shall be entitled to be made up to the minimum rate if the average earnings per day of the set over the whole week shall amount to the minimum rate. (3) In ascertaining the earnings of workmen employed upon piecework for the purposes of the minimum wage there shall not be deducted from the gross earnings for the helper more than the actual wages paid to the helper by the workman. All rates of wages so paid to the helper by the workman shall be registered with the management. No workman on piecework shall without the consent of the management fix the wage paid to his helper at more than a standard rate of 6d. per day, plus percentage, above the minimum standard rate fixed for the class of helper in Schedule 1.

8. Should any question arise as to whether any particular workman employed underground is a workman to whom the minimum rate is to apply, or whether a workman has failed to comply with any of the conditions contained in these rules, or whether by non-compliance with any of these rules such workman has forfeited his right to the minimum rate, such question shall be decided in the following manner:—(*a*) By agreement between the workman concerned and the official in charge of the mine. Failing agreement, by two officials of the colliery representing the employer on the one side and two members of the committee of the local lodge of the workmen's Federation (or not more than two representatives appointed by them) on the other side. Again failing agreement, by the manager of the mine and the district miners' agent. (*b*) Still failing agreement, by an umpire to be selected by them (or if they disagree in the selection, by lot) without delay, from one of the panels constituted as hereinafter provided.

Three panels of persons having a knowledge of mining to be prepared by the two chairmen of the employers' and workmen's representatives on the Joint District Board. One of such panels shall be constituted for questions arising in the Newport district, one for questions arising in the Swansea district (including Pembrokeshire), one for questions arising in the Cardiff district. In case of difference as to the constitution of any panel, such panel shall be settled by the independent chairman of the Joint District Board. The Newport district shall consist of collieries situated to the east ot the Rumney River. The Swansea district shall consist of collieries situated westwards of the Llyndi River, and of a line drawn from the top of that river into the Neath River at Ystradfellte. The Cardiff district shall consist of collieries situated between the Newport and the Swansea districts.

If required by either employer or workman, a panel may be revised at the end of every twelve months from the constitution thereof. For the determination of any question arising under this rule the employers and workmen respectively shall be entitled to call such evidence as they may think proper before the person or persons who may have to determine such question, and such person or persons may make such inspections of workings as he or they may deem necessary for the proper determination of the matter in question.

Any questions that may arise for determination under paragraph (*a*) of this rule shall be determined within a period of three clear days from the date upon which the question to be determined first arose; and any question to be determined by the umpire shall be determined within seven clear days from the said date, or such further time as the umpire shall appoint in writing. The colliery representative and the district miners' agent shall be entitled to attend and represent the employers and workmen respectively before the umpire.

9. A certificate in writing of any decision by any person or persons under the last preceding rule shall be given by such person or persons to both or either of the parties when requested, and such certificate shall be conclusive evidence of the decision. Any certificate so given as to the infirmity of a workman may be cancelled or varied on the application of either party after the expiration of six weeks from the date of the certificate. Any application to cancel or vary such certificate shall be determined as a question under the last preceding rule. The expenses and charges of the umpire shall be paid by the Joint District Board and apportioned in the same manner as the expenses of the Joint District Board.

10. Except as expressly varied by those rules, all customs, usages and conditions of employment existing at the respective coalmines to which these rules are applicable, shall remain in full force unless altered by mutual agreement.

11. Overmen, traffic foremen, firemen, assistent firemen, bratticemen, shotfirers, master hauliers, farriers, and persons whose duty is that of inspection or supervision, are not workmen to whom the Coal Mines (Minimum Wage) Act applies.

12. In the event of any question arising as to the construction or meaning of these rules, it shall be decided by the independent chairman of the Joint District Board.

July 5, 1912. (Signed) St. Aldwyn.

THE VIEWS OF WORKMEN.

New Order under the Coal Mines Act.

An Order (Statutory Rules and Orders, 1912, No. 634) has been issued by the Home Secretary, dated June 22, 1912, under section 118 of the Coal Mines Act, 1911 (1 and 2 Geo. 5, c. 50), prescribing the procedure to be observed for ascertaining and certifying the views of workmen. The text of the Order is as follows:—

In pursuance of section 118 of the Coal Mines Act, 1911, I hereby make the following rules:—

1. In any case where the views of the workmen or any part of the workmen in any mine are required to be ascertained for any of the purposes of the Act, they shall, unless a ballot is expressly required by the Act, be ascertained by a show of hands at a meeting of the workmen entitled to vote of which not less than three days' notice shall be given by a notice posted at the pithead specifying the time and place of meeting. A certificate stating the result of the voting and signed by the person presiding at the meeting shall be forthwith delivered to the owner, agent or manager of the mine.

2. If within seven days after a meeting as aforesaid the owner, agent or manager of the mine, or not less than one-tenth of the workmen entitled to vote by signed notice served on the owner, agent or manager, demand a ballot, or if the Secretary of State in any matter in which he is concerned by notice served on the owner, agent or manager, directs that a ballot shall be taken, or in any case where the Act requires a ballot to be token, a ballot shall be taken in the manner hereafter provided.

3. Within 21 days after the date of the meeting or after the receipt of a notice as aforesaid as the case may be, or (in a case where the Act requires the views of the workmen to be ascertoined by ballot) after receipt of a notice signed by not less than one-tenth of the persons employed at the mine that it is desired that a ballot shall be taken, the manager shall cause a register to be prepared of the workmen entitled to vote.

4. The register shall be open to inspection by the workmen at the mine and by the checkweigher or other representative of the workmen as hereinafter defined, for at least one week before the ballot is taken.

5. The taking of the ballot shall be carried out by a representative of the owner, agent or manager, and the checkweigher or other representative of the workmen, and shall take place on the second Saturday after the completion of the register, or any earlier day agreed upon by the said representatives.

6. The hours during which the ballot shall be taken shall be such hours as may be agreed upon by the said representatives, or, in default of agreement, between 8 a.m. and 8 p.m.

7. Notice of the purpose for which and the place at which the ballot is to be taken and the day and hours fixed for the ballot shall be posted by the said representatives at the pithead not less than three days before the day fixed for the ballot.

8. The ballot paper shall be in the form set out in the Schedule hereto, and shall not be marked in any way whatsoever so as to identify the person voting.

9. A ballot paper shall be delivered by the said representotives to any person applying to them and entitled to vote, who shall forthwith mark his vote thereon, fold the paper so as to cover the mark, and deposit it in a box to be provided for the purpose.

10. Arrangements shall be made to enable a workman to mark his vote screened from observation.

11. The ballot papers shall be examined and the votes counted by the said representatives, and a certificate in the form set out in the Schedule hereto of the result of the ballot and of the total number entitled to vote shall be signed by them in duplicate: one copy to be retained by the representative of the workmen, the other copy to be delivered to the owner, agent or manager, who in the case of any matter under sections 86 and 87 and the Second Schedule to the Act, shall forward it forthwith to the Secretary of State.

12. If any dispute arises as to how any particular ballot paper shall be counted, the matter shall be referred to the inspector of mines for the division, who shall decide the matter so as to give effect, as far as possible, to the intention of the person voting and whose decision shall be final.

R. McKenna,
One of his Majesty's Principal
Secretaries of State.

Whitehall,
June 22, 1912.

SCHEDULE.

A.—Form of Ballot Paper for use Except in the Case of Election of Workmen's Representatives.

Are you in favour of*

Write "Yes" or "No" in the space below.

* Specify question on which the poll is to be taken, *e.g.*:—
[Accommodation for taking baths and drying clothes being provided at the mine.]
[Accommodation for taking baths and drying clothes being provided no longer at the mine.]
[The wages of persons employed in or about the mine being paid weekly.]

B.—Form of Ballot Paper for use in Election of Workmen's Representatives.

Election of Workmen's Representatives.

Names of Candidates.	Place a Cross below against the Name of each Candidate for whom you wish to Vote. You must not Vote for more than .

C.—Form of Certificate of Result of Ballot.

We, the undersigned, representing respectively the owner, agent or manager of the Mine, and the workmen employed at the said mine, hereby certify that on the a ballot was duly taken, in accordance with the rules made by the Secretary of State, on the question*

and that the result of the ballot was as follows:—
Number voting in favour ,
Number voting against ,

	Names of Candidates.	Votes Recorded.
or, in case of election of workmen's representatives:—		

Total number of workmen employed at the mine and entitled to vote .

Signed { 1.
2.

Dated this day of , 19 .

* Specify question on which the poll was taken, *e.g.*:—
[Whether accommodation for taking baths and drying clothes should be provided at the mine.]
[Whether accommodation for taking baths and drying clothes should no longer be provided at the mine.]
[Of the election of the representatives of the workmen on the Baths Committee.]
[Whether the wages of all persons employed in or about the mine should be paid weekly.]

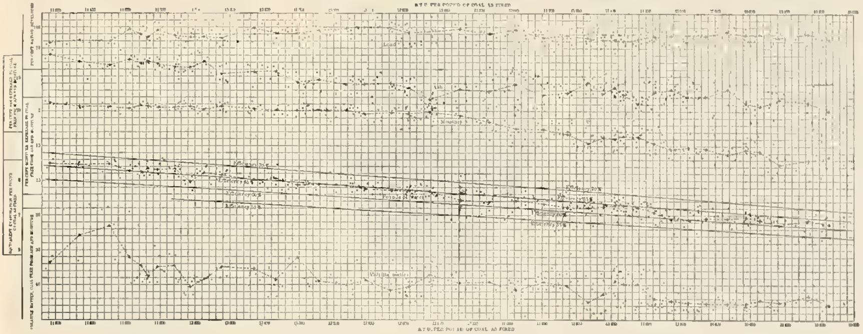
Edward Medal.—The King has been graciously pleased to award the Edward Medal of the First Class to John Mitchell and James Green in the following circumstances:—On December 23, 1911, water in large quantities broke into the Bamfurlong Mine, near Wigan, and by a heavy fall of earth a party of 13 were cut off from safety. Mitchell succeeded in boring a passage through the fall, thereby rescuing all the men who had been cut off. In another part of the workings Green went down the dip to warn the men under his charge, although he met the water already rushing down the roads. He extricated all his men. Green has since died, and the medal will be given to his widow. The King has been graciously pleased to award the Edward Medal of the Second Class to James A. Wright, a timberman at the Rand Klip Mine, Boksburg; to Robert Greenlees, of the British South Africa Explosives Works, Modderfontein; and to George Edwards, in the following circumstances:—On April 25, 1911, a baling tank was accidentally lowered too far down a shaft, and two natives were pinned under water. Wright made repeated efforts to extricate them by diving. He was unsuccessful, but the action showed a high degree of courage. On February 27, 1911, Greenlees was engaged with a fellow-workman named Greig in destroying bags of collodion cotton when one of the bags ignited, and both men were severely burned. Greenlees, in spite of the fact that he was suffering from severe pain, went to Greig's assistance and extinguished the flames in time to save his life for the moment, though he subsequently succumbed. On July 22, 1911, a road was being driven at the Bryncethin Colliery, near Bridgend, in order to release an accumulation of gas, which, in a sudden outburst, rushed through a borehole in the roof. Edwards, with a rope tied round his legs, tried to reach three men who had not been rescued. He was overpowered by gas, and had to be dragged out. On recovering he made further attempts and succeeded in attaching a rope to two of the men, who were drawn up, but too late to save their lives. Edwards undoubtedly ran considerable risk.

THE STEAMING VALUE OF COAL.

Bulletin 23 of the United States Bureau of Mines contains a complete account of the boiler tests of coal carried out by the United States Geological Survey prior to the establishment of the Bureau. The period covered is from September 1904 to December 1908, and the authors of the bulletin are Messrs. L. P. Breckenridge, Henry Kreisinger and Walter T. Ray. The diagram given herewith has been extracted from the report and is a graphical summary of the results of all the steaming tests made at the fuel-testing plant at St. Louis, Mo. It shows how the chemical composition and the heating value of coal affect the economic results in steam production. The abscissae of the plat are the heat values of the coals as fired. The ordinates are values giving the approximate composition of coal and the two most important items of the results of the steaming tests, the capacity and the evaporation together with the efficiency.

When studying this figure careful note should be made of the scale to be used with each curve. The ordinates giving the percentages of ash, moisture and the volatile matter in coal read from the top down; that is, when the curves drop these percentages increase. Attention is also called to the fact that the basis of these percentages is coal free from ash and moisture; that is, the percentage of moisture and of ash is that amount which would be present if the moisture and ash increased in the same ratio as actual combustible is increased to 100 per cent. The ordinates giving the capacity of boiler developed during each test and the evaporation read from the bottom up; that is, when these two curves drop the capacity or the evaporation drops also.

Each of the plain points on the chart represents a single test. The points with the crosses through them represent the arithmetic averages of the surrounding groups of single tests. These average points are connected with broken lines to show the general tendency of the variation.



Through the group of evaporation points are drawn four lines of constant over-all efficiency of the steam-generating apparatus; that is, all tests falling on the same line were run with the same over-all efficiency. The top curve, or rather the top group of points, gives the capacity of the boiler that has been developed during each test. The average of this group runs between 90 and 100 per cent. of the capacity as rated by the builders, and is nearly constant for all heat values of the coals. The fact signifies that by proper manipulation of the fires it is possible to obtain the rated capacity of the boiler with almost any coal, no matter what its heat value may be.

The second and the third group of points show that as the heat value of 1 lb. of coal as fired decreases from 14,600 to 10,200 B.T.U., the ash and moisture increase from about 5 to 20 per cent. Undoubtedly this increase in moisture and ash is the direct cause of the low heat value of the coals at the right of the plat. The lowest curve (marked "volatile matter") shows that for the above decrease in the heat value of the coals the volatile matter increased from about 30 to 45 per cent., indicating that in general the coals used in the tests shown at the right of the plat are of lower grade than those at the left of the plat.

The second group of points from the bottom of the chart (marked "evaporation") gives the evaporation per pound of coal as fired. It is the most interesting group of points in the figure. The significant feature of this group is that the average drops very nearly in proportion to the heat value of the coal. It is worthy of note that the over-all efficiency drops only about 4 per cent. when the heat value of the coal drops from 14,600 to 10,200 B.T.U. This drop in efficiency is not due to the low heat value of the coal, but to the large percentages of ash, moisture and volatile matter in the coal as fired.

It has been stated in the discussion of the effects of ash on the economy in steam production that a large percentage of ash reduces the efficiency by causing a large local air supply, and at the same time may be also the cause of incomplete combustion. In the section on the effects of the moisture on economy, it has been shown that high moisture increases incomplete combustion, and on account of the high latent and specific heats of water causes large chimney losses, thereby reducing the efficiency. High-volatile coals are always difficult to burn on account of the heavy hydrocarbon gases and tar vapours, which are distilled from the fuel bed and must be burned in the combustion space of the furnace. Consequently when coals distilling larger quantities of these heavy gases and tar vapours are burned, the combustion is not as complete as when their quantity is small. Therefore, one is justified in stating that the high volatile matter of the coals used in the tests shown at the right of the plat is responsible for a part of the 4 per cent. drop in the over-all efficiency.

Inasmuch as the evaporation per pound of moist coal in any steam-generating apparatus is nearly proportional to the heat value of the coal, it is plain that wherever possible coal should be bought on the B.T.U. basis. Moisture and ash-free coal coming from the same coal bed does not vary appreciably in heat value. Therefore, after the heat value of a coal has been once determined with a calorimeter, the heat value of other lots of coal from the same bed may be closely computed from the moisture and ash determinations which any intelligent boiler-room operator can make. Inasmuch as large percentages of moisture, ash and volatile matter in the coal increase the chimney losses, and are the causes of less complete combustion, a proper correction ranging from 1 to about 5 per cent. should be made on the heat value of the coals.

The preceding deductions are drawn from the results of tests made in a hand-fired furnace under a Heine boiler, and are strictly applicable to that type of furnaces. However, the authors are confident that the same deductions hold true to a large measure with all mechanical methods of stoking coals.

A largely attended general meeting of the Scottish branch of the National Association of Colliery Managers was held in the Heriot-Watt College, Edinburgh, on Saturday last. Mr. George W. Gibb presided, and introduced Mr. Charles C. Reid, Cowdenbeath (Fife Coal Company), the newly-elected president. Appreciative reference was made to the admirable work which Mr. Gibb had done for the branch since its inception in Scotland. Mr. Reid, in the course of his presidential address, touched on the trend of recent legislation and its effect on mining in the country. He suggested directions in which the colliery managers, by diligence, perseverance, and probably invention, might effect economies in management. Following the address of the president, a critical discussion took place on the new Coal Mines Act, those taking part including Messrs. Kerr (Glasgow), Archibald (Lassodie), Black (Airdrie), Mackay (Newbattle), Parker (Cowdenbeath), Gibb (Rutherglen), Wilson (Giffnock), Williamson (Hamilton), and the president.

A NEW SHOTFIRING APPLIANCE.

At the Westminster Palace Hotel, on the 4th inst., a demonstration was given of a method of shotfiring that has been devised by Messrs. Abraham Price and William Pryse, two employés of Messrs. the Ocean Coal and Wilsons Limited. The object of the invention, which is covered by British Patents No. 29406 of 1910 and 7651 of 1911, is to minimise the liability to missfire, when firing by electricity, and to protect the workmen in cases where shots missfire.

An essential part of the appliance consists of a detonator shield of copper or other suitable material, to the base of which the cables are attached, so that the detonator itself is relieved of all stress. For the insertion of the detonator and shield an appliance is used, consisting of an external copper tube graduated for measuring the depth of the hole, and an internal copper rod, fitted with a removable spike. In operation the base of the primer is opened up with the copper spike to a convenient depth for accommodating the detonator and shield. These are then passed through the tube by means of the copper rod, from which the loose spike has previously been removed, and inserted in the primer. To provide against the dislodgment of the detonator upon the withdrawal of the rod, the shield is provided with tongues engaging with the cardboard base of the primer. These tongues are designed to collapse under a pull of about 10 lb., to enable the detonator to be withdrawn, in the event of a missfire, by tugging on the shotfiring cables. The detonator having been placed in position, the hole is stemmed, a semi-circular rammer being used for the purpose, whilst the balls of stemming employed are shaped on a former to fill the section of shothole unoccupied by the inserting appliance. This has the advantage that the cables, which pass through the tube, are not subjected to force liable to cause abrasion of the insulation—a conspicuous cause of missfires. When the stemming has reached to within from 4 to 6 inches of the mouth of the hole, the copper tube is withdrawn and the orifice is completely stemmed. The shot is then fired in the usual way.

Should a missfire occur, the detonator and shield, as above indicated, can immediately be withdrawn by hauling on the cables, after which the hole may be approached with impunity and a fresh detonator inserted in a manner similar to that already described, the mouth of the hole being again closed with stemming.

Amongst the advantages claimed for this appliance are greater safety in handling and simplicity in use. The principal advantage, however, is clearly the obviation of the possibility of unspent detonators being left in the coal to the peril of the workman and the consumer. The dangerous search for unexploded detonators is rendered unnecessary, and the hazardous and costly process of drilling another hole alongside in the case of a missfire is entirely dispensed with. The saving of time under such circumstances is a factor of much importance, as, employing the method devised by Messrs. Price and Pryse, it is possible to remove a detonator and insert a substitute within the short period of three minutes. The invention is also well adapted to cases in which a decision to fire shots in a district may be revoked in consequence of an outburst of gas or the occurrence of other dangerous conditions that may render it inadvisable to fire the shots already charged. Under such conditions the detonators would be removed, either temporarily or permanently, from the area of danger. The practice of leaving a portion of the shothole void of stemming is said to increase the rending action of the explosive, enabling it to displace a greater quantity of ground. Further it is claimed that there is less danger to be apprehended from blown-out shots.

The appliances which we inspected were light and durable and their cost is reasonable. They are already being used, we are informed, with satisfactory results in several mines in South Wales.

MR. W. E. GARFORTH HONOURED BY BIRMINGHAM UNIVERSITY.

At a degree congregation held at the University of Birmingham on Saturday, the honorary degree of Doctor of Laws was presented to Mr. William Edward Garforth, president of the Institution of Mining Engineers. The principal (Sir Oliver Lodge), in making the presentation, observed that in September Birmingham was to be honoured by a visit from the Institution of Mining Engineers, and the University was anxious to afford facilities and to recognise with due honour a scientific profession which applied the principles of science to reaping the underground harvest of ages past. Their Department of Mining, started under Prof. Redmayne, and continued under Prof. Cadman, was in a highly satisfactory condition, and they welcomed the opportunity of interesting mining engineers in that and other branches of University work. Unfortunately when the delegates met in Birmingham most of those connected with the University would be away, and the Senate and Council had therefore anticipated the visit of the institution by inviting some very distinguished mining engineers from the district to be present that day, and by granting an honorary degree to their president. Accordingly, he summoned Mr. W. E. Garforth to the platform. He said Mr. Garforth was one of the captains of a great and important industry, being managing director and general manager of large collieries in South Yorkshire. As an engineer, his energy and ability had been vigorously devoted to the progress of mining science. By his efforts in the systematic application of scientific principles to coalmining he had rendered high service to the country, and had done much to further the safe working of mines. Turning to the Pro-Vice-Chancellor, Sir Oliver Lodge said: "As an honoured representative of a great profession, himself an investigator and inventor, I present to you, for the honorary degree of Doctor of Laws, William Edward Garforth."

Shipment of Bunker Coals.—During June 1,561,215 tons of coal, &c., were shipped for the use of steamers engaged in foreign trade, as compared with 1,674,456 tons in June 1911 and 1,696,426 tons in June 1910. The aggregate shipment in the first half of the present year was 8,125,897 tons, as compared with 9,558,647 tons and 9,329,460 tons in the corresponding periods respectively of 1911 and 1910.

North Wales Permanent Relief.—A special meeting of the North Wales Permanent Relief Society was held at Wrexham, last week, for the purpose of considering the advisability or otherwise of forming a "separate section" of the society for working the Insurance Act. If the meeting decided to form a separate section the question of altering the existing benefits would also have had to be considered. The board of management recommended the following alterations:—To provide such of the sick and medical benefits hitherto given by the Colliery Sick Club as are not covered by the Insurance Act, viz:—(*a*) Sick pay for the first three days of sickness, except in accident cases covered by the Workmen's Compensation Act. (*b*) Medical attendance on the families of members except in maternity cases. (*c*.) Medical certificates required by the Relief Society. To provide funeral allowances as follow:—£10 in respect of a member dying from causes other than accident covered by the Workmen's Compensation Act; £5 in respect of a member's wife dying from any cause in the lifetime of her husband. To discontinue the existing funeral and disablement benefits in case of accident. These are now completely covered by the Workmen's Compensation Act and the National Insurance Act. A ballot had been taken of the members on the questions asked, and this was declared as follows:—Are you in favour of the society forming a "separate section" for working the National Insurance Act (Part I.)?—Yes, 735; No, 3,608. If it is decided to form a "separate section," are you willing to join the "separate section?"—Yes, 632; No, 3,702. Are you in favour of altering the existing benefits of the society as set out in the statement of proposals attached?—Yes, 545; No, 3,665. Are you in favour of continuing the existing society as at present constituted?—Yes, 956; No, 3,489. The number of voters was 4,394; spoiled votes, 111; total, 4,505. The total membership was 11,612, 7,107 members did not vote, leaving 39·36 per cent. who did. By an overwhelming majority the members decided to take no further action in the matter. The board of management will now consider the question of altering the present scale of payments and benefits.

COALMINING IN NEW ZEALAND

Report of Royal Commission.

(*Continued from page* 17.)

Underground Sanitation.

In the course of the investigations it was found that the mines, with one or two exceptions, were in a very unsatisfactory condition in regard to sanitary matters. Only one coalmine had made any attempt to provide sanitary arrangements underground. The medical evidence is strongly in favour of such being provided to ensure the health of the miners.

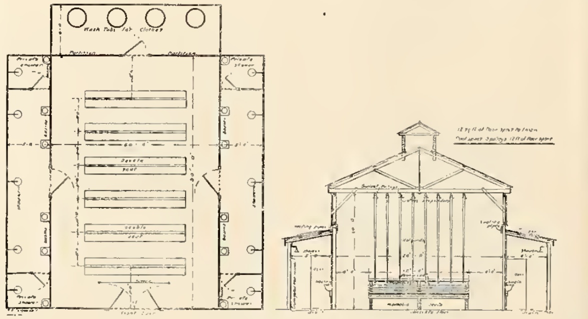
In regard to coalmines the Commission recommend that suitable and sufficient latrines should be provided, and their use should be compulsory, they are not to be placed in the line of the intake airway, and preferably in a return. All latrine receptacles must be emptied once in every 24 hours. With regard to deodorants to be used, the evidence shows that coaldust is a sufficient deodorant in coalmines, but chlorine disinfectants are not considered suitable for underground latrines.

A supply of good wholesome drinking water, not collected in the mine, should be provided by means of a pipe, or be kept in covered vessels at points reasonably accessible to working places.

Change and Bath Houses

With regard to the question of providing change and bath houses at all mines, the Commission find the request for the same to be quite unanimous. The medical evidence also emphasises the necessity for such provisions in the interest of general health, and as a particular preventive against phthisis. It is, therefore, recommended that both change and bath houses be provided at all mines. On this point the suggestions have met with a favourable reception from the mineowners and managers. In order that small mines may not be unduly burdened, a limit is suggested in the number of men employed for whom bathing accommodation should be provided, but that there should be no limit so far as change houses are concerned.

All change and bath houses should be, as far as possible, erected and fitted on a uniform plan. To this end the Commission have prepared a plan of a change and bath house which would suit all mines. The floor space in every change room must be not less than 12 square feet for each man; bath houses must be fitted with hot and cold showers, hand-basins, with an adequate supply of water, and suitable tubs for the men to wash their clothing; there must be one shower bath and one basin for every five men employed underground on the largest shift at one time, and two-fifths of such shower baths are to be partitioned off to secure complete privacy; the floors shall be of concrete and properly drained; the cost of erection, care, and management of change and bath houses is to be borne by the mineowners; but no mineowner is to be compelled to erect bath houses until a vote be taken of the miners working underground in the mine, nor unless 75 per cent. of the men where the number is 20 or under, 50 per cent. where the number is 50 or under, and 30 per cent. where the number is over 50, request the erection of the same; if satisfactory use is not made of the baths the manager may give notice to the workmen's inspector that he proposes to take a tally of the men using the baths for a period of one month; and full facilities shall be given to the workmen's inspector to take a similar tally over the same period.



Suggested Design for Changing Room and Baths for Miners.
(Capacity, 50 men on one shift.)

Miners' Phthisis.

Owing to the absence of adequate statistical and direct information regarding the prevalence of pulmonary diseases amongst miners in New Zealand, the Commission have not been able to formulate such definite scientific opinion as is necessary for the purpose of comparison with the somewhat copious information, statistical and otherwise, regarding the occurrence and cause of diseases and deaths amongst miners. They have, however, adequate evidence to prove that in New Zealand miners' phthisis has not assumed serious proportions, as in Transvaal, Cornwall, or Bendigo. During the period between October 10, 1908, and December 24, 1909, when pneumoconiosis was a disease in contracting which a miner was entitled to compensation under the Workers' Compensation Act, not a single claim was made for compensation in respect of the disease.

The Commission recommend that every working place where rock drills are in use shall be furnished with an approved waterblast or suitable appliance for laying the dust, smoke and gases after a blast, and no man shall return to an end, rise, winze or other close place until the air is free from dust, smoke and fumes caused by blasting; that miners suffering, or suspected to be suffering, from fibrosis or superimposed tuberculosis of the lungs shall have free medical advice from the Government, such advice to be given by a medical expert appointed for the purpose; and that in addition to the homes and sanatoria already established adequate relief be provided from the Goldminers' Relief Fund for those suffering from miners' phthisis, which for that purpose shall be subsidised £1 for £1 by the Government.

The Utilisation of the Soft Bituminous and Lignite Coals.

The question of the profitable utilisation of the soft coals of the Westport district is one upon which little evidence was forthcoming. Upon investigation it was found that, approximately, there is an area of 5,000 acres of unmined soft coal carrying seams varying in thickness from 5 ft. to 20 ft. In addition to this there was produced in 1910 from the Westport district, from 831,200 tons of coal mined, 230,049 tons of slack, equivalent to 27·7 per cent. of the total output. It is a reasonable assumption that at least 25 per cent. of the output of the mines in the future will be slack.

There have been only two uses to which this slack has been put—firstly, as bunker coal for steaming purposes; and, secondly, for the manufacture of briquettes and eggettes at Westport by the Government. In regard to the former the market is limited, and the demand is not nearly sufficient to utilise the large quantity of slack produced during the operations of mining. A small quantity may in the future be used for manufacture into coke, the Westport Coal Company having recently erected six coke ovens at Granity in connection with their Millerton mine. But, again, the New Zealand market in this direction is limited, and the demand for coke is not likely to absorb any great quantity of the surplus soft coal and slack.

Attention has been directed to a new steam boiler in which pulverised coaldust is used as a fuel. If this type of boiler were to come into general use in New Zealand no doubt a market would be created for slack coal.

Dealing with the question of the manufacture of briquettes and eggettes by the Government, the evidence goes to show that these operations have not resulted in a financial success, though the article produced is of a good marketable quality. The works were established in 1907, and up to the present the bulk of the output has been used by the Government Railway Department. The returns for the year ending March 31, 1911, show that out of a total of 8,564 tons manufactured 7,343 tons were used by the Railway Department, 4 tons by other Government departments, and 1,217 tons by the general public. It has been shown in evidence that the value per ton of briquettes and eggettes for railway purposes is less by 2s. and 1s. 6d. respectively than that of screened coal. The outside market has been particularly small. It has been suggested that this market has not been sufficiently pushed, but the evidence does not justify such a suggestion. Moreover, the loss does not lie in the lack of sufficient outside market, but in the cost of manufacture. The proportion of pitch used in the production of briquettes or eggettes is, approximately, 8 per cent. The average cost of pitch imported is £4 12s. per ton. This, on an 8 per cent. basis of pitch, gives the cost of pitch per ton of briquettes or eggettes at 7s. 7·98d. The total cost of manufacture is 16s. 6·69d. To this must be added the cost of freight, handling, general trading expenses, interest, and depreciation, amounting to 11s. 3·5d.; making a total cost of £1 7s. 9·16d., leaving a loss of 6s. 1·3d. per ton. It does not appear that any material saving can be effected in the manufacture.

The Commission suggest the advisability of offering a premium or bonus for some process, including a suitable bond, which will produce briquettes or eggettes of a good quality from New Zealand soft coals or slack, and at a marketable price.

In a minority report, Messrs. Dowgray and Parry, the miners' representatives on the Commission, recommend the prohibition of the midnight shift, the abolition of the contract system, and the payment of workmen's inspectors.

ROYAL VISIT TO THE YORKSHIRE COALFIELD.

The King Descends Elsecar Colliery.

On Tuesday the King and Queen began their short tour of the Yorkshire industrial districts by visiting Silverwood and Elsecar Colliery, where his Majesty delighted the mining population by descending Lord Fitzwilliam's new pit and working for a time at the coal.

The neighbouring borough of Rotherham was first visited. The procession passed through crowded streets into the Clifton Park, where their Majesties alighted and were welcomed by the Mayor (Alderman Coward). From Rotherham the cars travelled to the Silverwood pit of the Dalton Main Collieries Limited, where the Royal visitors spent an hour watching the winding of coal to the pit top, and the processes of screening and washing, afterwards visiting the engine-house and the coke ovens, and inspecting the by-products plant.

Leaving Silverwood, the King and Queen drove to the model village of Woodlands, belonging to the Brodsworth Main Colliery Company. Half-way up the main avenue of the village the Royal car suddenly stopped at the cottage of a miner named William Brown, and a visit of inspection was made. The King and Queen next went to lunch with Lord and Lady Halifax at Hickleton Hall, afterwards driving through more mining villages to the Elsecar Colliery. Here the King, accompanied by Lord Fitzwilliam and the chief colliery officials, entered the cage, which was promptly lowered to the bottom of the shaft 350 yards below. Provided with a safety lamp and guided by Lord Fitzwilliam, the King journeyed along the main road past corves loaded with coal, visited the stables, where he admired the 39 pit ponies, and then explored some of the workings. Bending low to avoid the overhanging roof, he entered one of the working places. He found two men named Thomas Edward Burgin and George Fox getting coal, and, taking Burgin's pick, he himself worked at the face for a few minutes. A little pile of coal rewarded his efforts, and the King carried some pieces away with him as mementoes.

Before leaving the workings the King watched the full corves being loaded into the cage and carried up the shaft. The King spent 40 minutes below ground. Before leaving the colliery premises the King was shown an old Cornish pump which has been in use at Elsecar for a century and more, also one of the earliest steam hammers invented by Nasmyth, who was an apprentice at Elsecar.

The King returned to Wentworth-Woodhouse at 5.30, after an absence of seven hours and a-half.

At Edinburgh University on the 15th inst., the honorary degree of LL.D. was conferred upon Dr. J. S. Flett, D.Sc., the well-known geologist.

OBITUARY.

By the death of Mr. William Henry Pickering, H.M. chief inspector of mines for the Yorkshire and North Midland Division, who lost his life on Tuesday under such tragic circumstances—whilst engaged in rescue operations following the explosion at the Cadeby Colliery, near Doncaster—the Home Office has been deprived of the services of one of its most able officials, whilst the entire mining industry has suffered an irreparable loss. It is not too much to say that the late Mr. Pickering stood in the very front rank of those upon whose shoulders the interests of the industry are supported, and that he was clearly marked out for the highest positions that the country could offer to members of his profession. The foregoing, however, will give but a poor conception of the calamity of his death, for it must bring sorrow and affliction to a wide circle of friends both here and in India, whose affection and respect the late inspector enjoyed in a peculiar degree.

Mr. W. H. Pickering was born on October 1, 1858, he being the second son of the late Mr. James Pickering, colliery agent, Gathurst, Wigan. He was educated at St. Peter's School, York, and served his apprenticeship at Pemberton Colliery, Wigan, and Peases West Collieries, Durham, attending whilst there the lectures at the Durham College of Science for two sessions. In 1879 he was appointed assistant manager at Rainford Colliery. In 1881 he obtained his first-class certificate. He sat in the examination for candidates for the position of inspector of mines, in which he was placed first. Appointed an inspector of mines in 1883, he acted as assistant inspector in South Staffordshire until 1901, when he was promoted to be chief inspector for the Yorkshire and Lincolnshire district on the death of Mr. Wardell. Three years later he was lent by the Imperial Government to the Government of India, acting as chief inspector of mines in India in the three years 1904-7, carrying out, during his occupation of that post, the difficult work of introducing into practice the Indian Mines Act of 1901. Mr. Pickering returned to Doncaster to resume his duties in Yorkshire in 1907, and was appointed divisional inspector for the Yorkshire and North Midland Division on June 1, 1910. Mr. Pickering was a vice-president of the Midland Institute of Mining, Civil and Mechanical Engineers, and was also a member of the council of the Institution of Mining Engineers. Mr. Pickering was likewise a member of the councils of the Midland Institute of Mining, Civil and Mechanical Engineers, and of the Midland Counties Institution of Engineers. He was prominent in the establishment of the Mining and Geological Institute of India, acting as the first secretary. At the time of his death he was president of the Indian Mining and Geological Club, of which he was the founder. He was also a Fellow of the Geological Society. Mr. Pickering had the great distinction of being one of the holders of the Edward Medal, a medal of the First Class having been awarded to him in 1910 for his display of conspicuous gallantry on the occasion of an accident at a Yorkshire colliery. The act which won for Mr. Pickering the Edward Medal was performed at the Oulton Colliery, near Leeds, where a shaft was being sunk. A platform supporting six men gave way, and five were hurled to the bottom and killed. The sixth, named McCarthy, was held by the legs between the the heavy scaffold and the side of the shaft, and lingered in agony for over seven hours. A Mr. Hodges and a Mr. Moore went down the pit and decided to build a temporary scaffold. The official account continues:—

Photo. by J. Rosemont, Bradford.

The Late Mr. W. H. Pickering

Mr. Pickering, H.M. inspector of mines, arrived on the scene just when this was completed, and accompanied by Mr. Hodges and Silkstone, Moore, and Hosey, he entered the pit and reached the place where poor McCarthy was held a prisoner. In this descent Silkstone's head was severely injured by a falling stone, and Mr. Hodges and Hosey were also slightly injured. They found McCarthy still alive, but the water was rising fast in the shaft, and had reached his shoulders. It was evident that he would soon be drowned, and that nothing could be done further to rescue him unless the water were lowered. Mr. Pickering at once sent all his fellow rescuers to the surface to enable a larger hawk to be put on, and more men to be sent down to bale the water. In the meantime Mr. Pickering resolutely stayed by McCarthy—now almost delirious with his sufferings—and, supporting his head on his arms and breast, he administered such comfort as he could to the dying man. Realising that McCarthy could not live until the water was baled out, Mr. Pickering decided that the only hope was immediate amputation of the legs, and at his request Mr. Hodges brought down two doctors and a Roman Catholic priest, but McCarthy's terrible sufferings came to an end just as they reached him. Mr. Pickering ran imminent risk of losing his life during the time that he stayed with McCarthy.

Mr. Pickering had contributed several papers to the *Transactions* of the Institution of Mining Engineers, all attesting the practical attitude which he at all times adopted in regard to mining questions. Some of his principal contributions were the following:—"Fence Gates for Collieries," *Trans.* Inst. Min. Engin., vol. xxxv., 271; "Notes on Systematic Timbering," ditto, vol. xxiv., 95; "The Dust Danger," ditto, vol. xxix., 134; "Notes on Contrivances Designed to Prevent Overwinding, with Instances of Their Failure" (in collaboration with Mr. Granville Poole), ditto, vol. xli., 496. He was joint author with Mr. R. R. Simpson of a paper, "Fighting a Colliery Fire," read before the Mining and Geological Institute of India (vol. ii., 127).

It is a matter of tragical significance that the last contribution of Mr. Pickering to the literature of mining was a paper entitled "Why Leave Shaft Pillars?" which excited keen discussion at the recent meeting of the Institution of Mining Engineers in London, the subject having a direct connection with the question of gob-fires, which, it is safe to assume, were responsible in the first instance for the recurring explosions at Cadeby. It may be mentioned that in the authorship of this paper Mr. Pickering was associated with his son, Mr. Basil H. Pickering, who all but lost his life in Tuesday's disaster. To this question of gob-fires—one of the most difficult of those surrounding the development of the new district in South Yorkshire—Mr. Pickering had devoted earnest attention. Some valuable notes on "Gob-fires in the South Yorkshire Coalfield" were submitted by him at the Home Office enquiry into the fatal explosion at the Bignall Hill Colliery, and are to be found in the *Colliery Guardian* of January 12, 1912. Mr. Pickering was chairman of the Departmental Committee recently appointed to consider the provision of washing and drying accommodation at mines. He was also a member of the Advisory Committee on mining at the University of Leeds.

To the other questions, technical and social, that have arisen as a consequence of the extension of the industry in the Doncaster area, Mr. Pickering had devoted the full weight of his ability. Mr. Pickering was keenly interested in the great scheme for building churches and mission rooms in the new mining villages in the district. The scheme, as is well known, was inaugurated by the Archbishop of York, and Mr. Pickering acted, along with Canon Sandford, as hon. secretary to a large and influential committee appointed to carry on the work. On the subjects of housing, education, and industrial advancement generally, Mr. Pickering was a progressive force, and the mining community of South Yorkshire must suffer a severe loss in the absence of his influence and guidance. Mr. Pickering's advice was solicited in the highest quarters, and we are informed that he had been requested by his Majesty King George to meet him at Hickleton Hall for the purpose of discussing the industrial future of the district.

Mr. Pickering resided at Lawn House, Doncaster. The greatest sympathy will be felt for Mrs. Pickering, who is the daughter of the late Rev. W. H. Simpson, vicar of Towlaw, Durham. Mr. Pickering's funeral takes place to-morrow (Saturday) at Doncaster.

Mr. Henry Richardson Hewitt was a senior mines inspector for the district, and lived at Sheffield. He was formerly stationed at Derby when that town came within the area of the late Mr. A. H. Stokes' Midland district, and was well known to mining engineers in Notts and Derbyshire, with whom he was exceedingly popular. Mr. Hewitt, who was 46 years of age, was born at Swanwick, near Alfreton, and was son of the late Mr. John Richardson Hewitt, M.I.C.E. He was educated at Derby School, and became a pupil to Mr. E. B. Wain, manager of the Chatterley-Whitfield Collieries, Stoke-on-Trent. During the latter part of his training he was certificated manager of the Brownlees Colliery, Black Bull. In 1891 Mr. Hewitt was appointed assistant inspector of mines to the Midland district, and was stationed at Derby. On leaving Whitfield Colliery Mr. Hewitt was presented with a framed address expressing the goodwill of the officials. At Derby he was under the late Mr. A. H. Stokes, the chief inspector, for 18 years. Upon the re-arrangement of the mine inspectors' districts in 1910, Mr. Hewitt removed to Nottingham. In March 1911 he took up his residence in Sheffield, on being promoted to the senior inspectorship of the Yorkshire district.

He was a member of the Midland Counties Institution of Engineers, and was vice-president of the council. He frequently entered into discussions at the general meetings.

Mr. Hewitt leaves a widow and two young children.

Mr. G. Y. Tickle, junr., was one of his Majesty's junior inspectors of mines. He was the eldest son of Mr. H. Elliot Tickle, formerly of Liverpool. He was born in the neighbourhood of Stanley Park about 35 years ago, and was partly educated at Merchant Taylors' School, Great Crosby, and after his removal to Scotland in 1890, completed his education at the George Watson School, Edinburgh. After leaving school he served his articles with Messrs. Geddes and Sons, and was afterwards connected as surveyor with several leading colliery proprietors in Scotland. He was also engaged in a similar capacity at the Bispham Hall Colliery, Orrell, and for several years immediately prior to his appointment as inspector of mines was surveyor to a large firm of colliery proprietors at Accrington.

Mr. Douglas Chambers, who was also a member of the ill-fated rescue party, was a brilliant young mining engineer, who was lately given charge of the older colliery, Denaby Main, by his uncle, Mr. W. H. Chambers, after serving an apprenticeship at the Manvers Main Collieries. He was the only son of Mr. J. E. Chambers, managing director of the Cortonwood Collieries. Mr. Douglas Chambers was married only a few months ago.

PARLIAMENTARY INTELLIGENCE

HOUSE OF COMMONS.—July 8.

Miners' Housing Schemes in South Wales.

Mr. Masterman, in a written reply to Sir Ivor Herbert says that provident societies registered under the Housing Acts, 1890-3, whose members are miners, are not debarred by rules laid down by the Public Works Loan Commissioners from participating in the benefits of public money by way of loan for the execution of building scheme under the Housing of the Working Classes Acts.

Sir Ivor Herbert also asked the Secretary to the Treasury whether his attention had been drawn to the schemes which have been initiated in connection with recent colliery developments in Monmouthshire for the improvement of the housing conditions of miners, and what are the grounds of inexpediency which have induced the Commissioners to refuse consideration to applications for carrying out building schemes in the Monmouthshire colliery districts.

Mr. Masterman writes:—"I am informed that an application was made to the Public Works Loan Commissioners in February 1911, for a loan for the erection of workmen's dwellings in Monmouthshire and that the loan was refused, the Public Works Loan Commissioners not being satisfied with the security offered. At the same time these Commissioners considered that it was not a case which would justify a loan of public money. The general question involved is receiving the special attention of the Government. The Government are considering the question of the powers of the Public Works Loan Commissioners with reference to advances for the building of workmen's dwellings under the Housing Act."

For some time past the Cannock Chase colliery owners have been considering the desirability of providing a rescue station for miners in the district, and it has now been decided to erect a station in connection with the new Technical Institute at Hednesford, if the land adjoining can be secured. A small sub-committee, consisting of Messrs. J. Hunter (manager of the Cannock and Leacroft Colliery), A. I. James (manager of the Littleton Colliery), and J. Smithurst (manager of the West Cannock Colliery), met Mr. F. D. Bumsted, who kindly gave the land for the institute, and he is favourably disposed to the application of the colliery owners for additional land for this purpose.

THE "PHOTOS" MINER'S ELECTRIC LAMP.

The new statutory requirements which prescribe the provision of electric hand lamps as part of the equipment of rescue brigades, and the growing tendency to employ portable lamps of this class for ordinary lighting purposes below ground, invests with interest the new types that are being placed upon the market. We have had an opportunity recently of inspecting a lamp that has, we understand, given a considerable amount of satisfaction in several collieries—especially on account of its adaptability and high illuminative capacity. This lamp, which is the invention of Dr. Kenneth Smith, of Paignton, South Devon, is shown in the accompanying photograph.

The lamp is of the accumulator type, and great care and ingenuity has evidently been exerted in providing against danger from accidental sparking or short-circuiting. The two cells are connected by a fusible wire which melts immediately when the two poles are connected by a short circuit, and so prevents the possibility of fire from this source. The fusible wire is completely covered and protected from acid. In the terminals the conducting wire is brought into direct contact with the lead lug of the plates, and held firmly against it by the screw stopper. The socket into which the screw stopper fits forms a complete protection of this junction, and the spot where connection and disconnection is made, and where consequently sparking may occur, is completely enclosed. The stopper may be used to switch the current on and off, and may also be removed, *e.g.*, for changing batteries in any mine with safety. There is no exposed metal on the accumulator, and the terminals protect the points of electrical contact from the acid. The accumulator is rendered non-spillable by means of long vent stoppers, and the provision of ample space above the level of the ends of these to contain all the electrolyte if the accumulator is inverted. The vent stoppers allow gases to escape freely, and need not be removed during charging.

The lamp itself is constructed to focus about one-half of the light to illuminate objects at a considerable distance, and diffuse the other half over a wide area for nearer objects. The bulb holder is of the bayonet catch type. The lamp may be carried either attached to the accumulator or apart from it, either in the cap or in the hand.

The accumulator case has a rigid handle which enables the light to be readily turned in any direction; also a hook for hanging it up, a flattened hook, by means of which it may be carried in the belt, and catches for a shoulder strap. Throughout the whole arrangement the only electrical junctions which are detachable and therefore possibly capable of sparking, are those at the terminals and at the incandescent bulb. The sealing of the lamp protects the latter, and the construction of the terminals makes their junction safe.

The "Photos" lamp, as it is termed, is being made at the James Works, Queen's-road, Battersea.

The new address of the Merryton Coal Company and the Plean Colliery Company Limited is 113, St. Vincent-street, Glasgow.

CONTINENTAL MINING NOTES.

Germany.

Ruhr Coal Market.—After enjoying a comparatively long period of activity, the market is slackening off to some extent in certain classes of coal. This is due, on the one hand, to consumers having laid in large stocks at the time of the English strike, so that they have not to cover their requirements now; and on the other hand, English coals are reappearing in the German markets at normal prices. Nevertheless, the position must not be considered unfavourable. As before, the industrial demand is large, and the intention of the Syndicate not to curtail the output any further so far as the present month is concerned shows that no decrease of business is anticipated. The export trade is extensive, and even increasing; but the market in South Germany is quieter again, for the same reasons as expressed above. The river is in good order, and large shipments are being sent up, but stocks are not anything like as large as last year. The coke market is undoubtedly going back; and though the Syndicate has imposed a further 2½ per cent. restriction on the output, it is very uncertain whether this measure will be sufficient. Briquettes meet with a normal sale.

Coal Market in South Germany.—Though current sales are small, the market is in a steady position, owing to the favourable condition of the consuming industries and the consequent regularity in taking deliveries under contract; in fact, the demand for small nuts is still greater than the supply, and the large available stocks of coarser grades have to be drawn on to satisfy consumers' requirements. In addition to the activity displayed in getting in the kinds of house coal which will go up in price on August 1, large bituminous nuts are in improved request, buyers taking their full summer quota in order to maintain their rights for full delivery in the winter. For the time of year, business in gas coke is good, and the same applies to Rhenish lignite briquettes, which are being forwarded in large quantities by water to make up for the small traffic by rail. The Rhine is still in such condition that craft can reach the highest ports without lightening cargo; but a considerable portion of the arrivals is being put into stock.

Coal Market in Upper Silesia.—During the first half of June the traffic returns show a total delivery of 122,600 wagonloads of coal, as compared with 100,780 for the same period of 1911; and the second half of the month exhibited a further improvement, though the official figures have not yet been published. It is therefore evident that the situation remains favourable, a condition in which it is expected to continue for some time. Up to the present there is no falling off in the demand for industrial coals, and buyers are taking large deliveries of large and cube coals, the business being facilitated by heavy requirements of the railways and the favourable condition of the river for traffic. In these kinds the output can be disposed of without difficulty, and stocks are also being drawn upon to keep pace with the demand. Both coking coal and gas coal are in active request; and even in the house coal there is little to grumble at. Exports continue heavy, especially to Russian Poland, and Austria is taking considerable quantities; but in the northern districts English coal is again becoming a formidable competitor. The coke market is also favourable, blastfurnace and foundry coke being greatly sought after, so that the output is got rid of at once, while the smaller kinds are comparatively neglected.

Official Coal Prices, Essen Exchange.—The following list is issued by the Syndicate, prices being per ton ex-pit:—Gas and open-burning coals: Open-burning gas coal 12 to 14 marks, *ibid.* through-and-through 11·50 to 12·50 marks; open-burning coal through-and-through 11 to 11·50 marks; large 13·50 to 15 marks; semi-screened 13 to 14 marks; washed nuts I./II. 13·75 to 14·50 marks, III. 13·75 to 14·50 marks, IV. 13 to 13·75 marks; nuts slack 0 to 20/30 mm. 8·25 to 9·50 marks, 0 to 50/60 mm. 9·75 to 10·50 marks; slack 6·75 to 9·75 marks. Bituminous coals: Through-and-through 11·25 to 12 marks; best mixed 12·50 to 13 marks; large 13·50 to 14 marks; washed nuts I./II. 13·75 to 14·50 marks, III. 13·75 to 14·50 marks, IV. 13 to 13·75 marks; coking coal 12·25 to 13 marks. Lean coals: Through-and-through 10·50 to 12 marks, mixed 11·75 to 12·75 marks, improved 12·75 to 14·25 marks, according to proportion of large; large 13·25 to 15·75 marks; washed nuts I./II. 15·25 to 18·50 marks, III. 16 to 19·50 marks, IV. 11·50 to 13·75 marks; anthracite nuts I. 20 to 21·50 marks, II. 21·50 to 25·50 marks; through-and-through slack 9·50 to 10·50 marks; slack less than 10 mm. 6·25 to 9 marks. Coke: Blastfurnace coke 15·50 to 17·50 marks; foundry coke 10 to 20 marks; broken coke I. and II. 20 to 23 marks. Briquettes 11 to 14·25 marks, according to quality.

Coal Traffic in the Ruhr Harbours, May.—The total railway consignments of coal, coke and briquettes in May were: To Ruhrort 1,056,487 tons, Duisburg 394,443 tons, Hochfeld 36,500 tons, or 1,487,430 tons in all. Total shipments outward: From Ruhrort 1,048,275 tons, Duisburg 351,765 tons, Hochfeld 35,096 tons, Rheinpreussen 102,777 tons, Schwelgern 90,119 tons, Walsum 88,856 tons, aggregate 1,716,888 tons. Of this quantity, 768,389 tons were consigned to Coblenz and places higher up river, 13,753 tons to places below Coblenz, 489,608 tons to Holland, 374,937 tons to Belgium, 42,879 tons to France and 27,622 tons to other destinations.

THE COAL AND IRON TRADES.

Thursday, July 11.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week, 153,989 tons of coal and 257 tons of coke were despatched from Tyne Dock, an increase of 7,594 tons of coal and a decrease of 1,492 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 57,851 tons of coal and 4,792 tons of coke, a decrease of 8 936 tons of coal and an increase of 275 tons of coke. The Blyth shipments totalled 79,515 tons of coal and coke, a decrease of 4,295 tons. The following gas coal sales have been reported during the week:—30,000 tons of good Durham seconds have been sold for delivery over 12 months, at 11s. 6d. per ton f.o.b.; from 25,000 to 30,000 tons of New Pelton-Holmside quality have been sold for delivery over the same period, at 12s. 6d.; the contract to supply the Malmo Gasworks with 14 000 tons of Londonderrys, delivery over the season, has been placed with Swedish merchants, at 19s. c.i.f.; a Newcastle firm has secured the Naples Gasworks contract for 100,000 tons of New Pelton-Holmside coal, for delivery over the next 12 months, at about 12s. 9d. f.o.b. (the quantity taken is about 20,000 tons more than is usual with these works); and the Landscrona Gasworks have arranged for 4,000 to 5,000 tons of Easington coal for over-season shipment at 19s. 6d. c.i.f. Further particulars with reference to the Christiania Gasworks' contract for 35,000 tons of gas coal for delivery over the season, show that the allotment was as follows:—5,000 tons Londonderrys at 13s. per ton f.o.b., 15,000 tons Holmside at 12s. 9½d., 5,000 tons Benwell at 12s. 9d., 5,000 tons Towneley at 12s. 9d., and 5,000 tons Easington at 12s. 9d. The following gas coal enquiries are in circulation:—The Helsingfors Gasworks want offers of 14,000 tons of Wear specials for shipment this year, tenders due in on July 11; the Eastbourne Gasworks, which lately postponed allotment of their contract on account of the highness of prices, are again enquiring for about 40,000 tons of coal for delivery over 12 months; the St. Gillies Gasworks, Brussels, invite tenders, to reach them by July 23, of 60,000 tons of Durhams for delivery over 12 months; the Palermo Gasworks want 25,000 tons of bests for August-December shipment; and the Thistadt Gasworks want 2,000 tons of similar coal. It is stated as probable that the metropolitan gas companies—whose contracts are usually arranged in the spring of the year—will very shortly be making their annual arrangements. Several of the large south coast gas companies which have deferred buying for their requirements over the ensuing 12 months are likely to reappear in the market at an early date, prices having undergone no modification in their favour. Some 3,500 tons of Broomhill best steams have been sold for August-October shipment at 12s. 6d. f.o.b. The Gefle-Dala Railways are again in the market for about 25,000 tons of Durham or Northumbrian steam coal, shipment over the remainder of the season, the previously announced contract having evidently fallen through. The Norwegian State Railways invite tenders, to be to hand by 10 a.m. on July 13, of 39,650 tons of Durham or Yorkshire steams, for shipment up to November 18. The following classes of coal are to be offered:—Shireoak, Langwith, Kiveton Park, Lambton, Hetton and Sherwood. These railways have delayed their contracts long beyond the usual period also. The British Admiralty is reported to be in close treaty for their annual requirements of steam coal for dockyard purposes. An enquiry is circulating from Gefle for 15,000 tons of steams and 5,000 tons of nuts for shipment up to the end of the year. Advices from Genoa are to the effect that buyers of best gas coal are offering 25s. per ton c.i.f. and are showing more disposition to operate, stocks being unusually low. The prompt coal market has been active during the week, and prices are generally very well maintained, with supplies hardly equal to the demand. Coal tonnage is offering more freely, which is helping matters considerably. Quotations for prompt shipment are as follow:—Best steams, Blyths (D.C.B.), 13s. per ton f.o.b., inclined to advance; Tynes (Bowers, &c.), 12s. 3d. to 12s. 6d., 3d. dearer; seconds, Blyths, 11s. 3d., 3d. increased; Tynes (Hastings or West Hartleys), 11s. 6d. to 11s. 9d., similarly improved; unscreened, 10s. 6d. to 10s. 9d., 6d. increased; smalls, Blyths, 9s., 9d. up; Tynes, 6s. to 6s. 3d., from 6d. to 9d. dearer; specials, 9s. 3d., 3d. reduced; smithies, 11s. 3d. to 11s. 6d., 3d. higher; gas bests (New Pelton or Holmside), 12s. 10½d., 1½d. more; seconds (Pelaw Main or similar), 11s. to 11s. 3d., 3d. increased; specials, 13s. 6d. to 14s., 6d. enhanced; unscreened bunkers, Durhams, 10s. 6d. to 11s. 3d., 3d. advanced; Northumbrians, 10s. 6d., from 3d. to 9d. more; coking coal, 10s. 3d. to 11s., 6d. advanced; smalls, 10s. to 10s. 3d., 3d. higher; households, 14s. 6d., steady; coke, foundry, 23s., from 1s. to 1s. 6d. up; blastfurnace, 19s. 6d., from 6d. to 1s. dearer; and gas coke, 18s., 3d. dearer.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 109,255 tons of coal and no coke, as compared with 96,845 tons of coal and 255 tons of coke for the corresponding period of 1911, being an increase of 10,410 tons of coal and a decrease of 255 tons of coke. The coal trade is active, and with full shipments and a number of contracts in course of negotiation, prices are inclined to firm up. For prompt shipment, however, second-class gas sorts are plentiful. It is reported that Swedish merchants have secured the Malmo contract for 14,000 tons of Londonderry, at a price stated to be 19s. c.i.f. Household coals are dull. Bunker coals are in fuller enquiry, but the supply is adequate. Coking and smithy coals are in fair enquiry, without much alteration in price. There is a strong demand for coke. General quotations are as follow:—Special gas, Londonderry and Wearmouth, 13s. 6d.; best gas, New Pelton-Holmside, 13s. 3d.; seconds, Washington, &c., 11s.; households, 14s. to 15s.; coking unscreened 10s. 6d. to 11s.; smalls, 10s. 3d.; smithies, 13s., 14s.; peas and nuts, 13s. to 14s. Morrison's Marley Hill bunkers, 11s. 6d.; Priestman's, Consett, Burnhope, 11s.; Pease's, South Derwent, Framwellgate, 10s. 6d.; South Hetton, 11s; Ryhope, 11s. 6d.—all f.o.b. South Dock. Foundry coke, 22s. 6d. to 23s.; furnace coke, 20s. 6d. to 21s. per ton, at the Teesside blast furnaces; gas house coke, 18s. The freight market is firm all round, with the exception of coasting, which is quiet, on the basis of 5s. Havre, 4s. 9d Boulogne, 4s. 10½d. Antwerp, 4s. to 4s. 3d. Hamburg. Baywards is represented by Bilbao at 8s. 6d., and Santander 8s. 6d. The Baltic is stronger, with Cronstadt 6s. 6d., Swinemunde 6s., Malmo 6s. 9d., Fairwater 6s. 3d., Gefle 7s. 3d. Mediterranean rates are also firm, Genoa paying 11s. 6d. to 12s. and Alexandria 11s. 6d.

Middlesbrough-on-Tees.

COAL.

The coal trade is steady and fairly active. Many contracts are in course of negotiation, and there is a firm tone generally. Gas coal is in pretty good request and several fairly large sales are reported. A local company is understood to have purchased 40,000 tons at a price near 11s 3d., whilst the Neapolitan contract for 80 000 tons is said to have been decided, as well as one for Malerno for 15,000 tons of special quality. The general market quotation for best Durham gas coal is 13s f.o.b., and second-class kinds range from 11s. to 11s. 6d. A very ample supply meets the large demand for bunker coal. Unscreened Durhams run from 10s. 6d to 10s. 9d f.o.b. for ordinary kinds, and for special classes up to 12s. is named. Household coal is dull. Coke is in good request especially for local consumption, and no difficulty is experienced in obtaining 19s. 6d. for average blastfurnace kinds delivered at Teesside works. Foundry coke for shipment is quoted 22s. to 23s. f.o.b.

IRON.

The valuable and interesting returns of the Middlesbrough Chamber of Commerce show that at the end of June of the 79 blastfurnaces in Middlesbrough 54 were in operation and produced during the second quarter of the year 520,000 tons of pig iron, of which 330 000 tons were Cleveland pig, and 190,000 tons hæmatite, spiegel, basic and other special irons. For the previous three months the total make was 420,000 tons, 280,000 tons being Cleveland pig and 140 000 tons hæmatite, &c., and for the second quarter of last year the output was 580 000 tons, 380,000 tons being Cleveland iron and 200,000 tons hæmatite, &c. The imports of foreign ore to Middlesbrough last quarter reached 338,378 tons, as compared with 495 216 tons during the previous three months and 436,926 during the second quarter of 1911. The total value of goods, other than coal and coke, exported to foreign and colonial destinations from Middlesbrough last quarter was £1,941,747, as compared with £2,122 575 for the corresponding three months last year, thus showing a decrease of £180,828; but such exports for the first half of this year reached a value of £4 281,318, as compared with £4 225,793 for the first half of 1911—an increase of £55,525. Values of Cleveland pig iron are rather unsteady, owing to somewhat erratic movements of Middlesbrough warrants caused by operations of outside speculators. Some sales have this week occurred at 57s. for early f.o.b. delivery of No. 3 g.m.b. Cleveland pig iron, but the ruling quality can now be purchased from second hands at 56s. 9d. No. 4 foundry is reported very scarce, and is about the same price as No. 3 quality. No. 1 is also scarce, and is 61s. 9d. to 62s.; whilst No. 4 forge is 56s. 6d., and mottled and white iron each 56s. There are fair enquiries for east coast hæmatite pig. Makers quote 53s. 6d. for both prompt and forward delivery of mixed numbers. Foreign ore is firm. Some sales have been recorded for delivery over the first half of next year. Market rates are based on 21s. 6d. to 22s. ex ship Tees for best rubio. Producers of all descriptions of manufactured iron and steel are working at full pressure. Quotations, though not actually changed, tend upward.

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South-West Lancashire.

COAL.

In the inland household coal trade there is nothing new to report. Deliveries are naturally on a summer basis, and prices are unchanged, these being approximately 15s 6d. for the best grades, 14s. for good medium sorts, and kitchen coals about 11s. 6d., all per ton at the pit. Forges and users of screened manufacturing coal continue to take full supplies, with prices ranging up to 12s. per ton at the pit. During the past week some progress was made with the renewal of bunkering contracts. At the moment contract requirements are well up to the average, and the coastwise excursion steamers are now approaching the period of maximum demand. Open sale enquiry, however, is only quiet. Prices of screened Lancashire steam coals remain as before, ranging from 11s. 6d. f.o.b. upwards. The coastwise and cross-Channel trade in household coals continues for the time of the year above the average. Best coal rules at 14s. 6d. to 15s., good seconds 13s. 6d. to 13s. 9d., both f.o.b. Garston and net. Small fuel of all descriptions is scarcely produced to equal the demand, and the little cessation of delivery caused by the annual holidays now coming on at the manufacturing towns is more of a relief than otherwise. List prices are from 9s. 9d. to 10s. for best rough qualities, 9s. to 9s. 3d. for good medium grades, and 8s. 6d. or near that for the smaller and commoner grades, all per ton and at the pit.

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South Lancashire and Cheshire.

COAL.

There was only a moderate attendance on the Coal Exchange on Tuesday last, the holiday season probably accounting for some of the absentees. The demand for household coal is much as last week, the warm weather affecting sales. Prices are steady at from 16s. to 16s. 9d. for best coal, 14s. 6d. to 15s. 6d. for medium, and 11s. 9d. to 12s. 9d. for kitchen qualities, all at pit. Furnace coal continues to be called for in large quantities with prices up to 12s 6d. per ton at the pit. Shipping coal is in improving demand, and prices are steady at from 12s. to 14s. f.o.b. Partington. Slack is still in good demand and prices firm at from 9s. to 9s. 9d. for the best qualities, with seconds at 8s. to 8s. 6d., all at the pit.

IRON.

Good foundry iron continues to be available at 65s. 6d. to 66s. 6d., Lincolnshire being the cheapest. Founders are not busy, neither are engineers, although there is a better report as to enquiries and orders coming in in that branch. All the iron forges are extremely busy, and deliveries of finished material from them is very hard to get. Prices remain as previously quoted, viz., £8 for crown, £7 10s. second quality, hoops £8 7s. 6d., sheets £8. Steelworks are also very busy, and the price of bars is £8, less 2½ per cent., billets £5 17s. 6d. to £6 net. Wagon builders are extremely busy.

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Yorkshire and Derbyshire.

Leeds.

COAL.

All sections of the trade were represented at the market on Tuesday, and a fair amount of business was done in steam-raising qualities. All pit prices were firmly held both for current and forward contracts, especially the latter. Colliery agents reported an exceedingly strong demand for washed nuts, manufacturing fuel and coking slacks, for all of which prices have a hardening tendency. There were a large number of shipping agents present seeking supplies of steam coal, the only dull feature of the market being in the house coal trade. The pits have worked on the average five days this week, and very little has been added to stocks. London merchants are buying sparingly, as the retail trade has fallen off. There is no weakening of pit prices, however, which average as follows for London and the eastern and southern counties:—Haigh Moor selected, 14s.; Wallsend and London best, 13s.; Silkstone best, 13s.; Silkstone house, 12s. to 12s. 6d.; house nuts, 10s. 6d. to 11s. 6d. A few additional contracts have been booked at the official advance, and a good many stocking orders are being dealt with at slight concessions from current rates. The coastwise trade is fairly brisk, and several boats have been loaded this week for the Thames. Current f.o.b. Hull quotations:—Haigh Moor house coal, 15s. 6d. to 16s. 6d.; Silkstone best, 14s. 9d. to 15s. 6d.; Silkstone house, 13s. 9d. to 14s. 6d.; house nuts, 12s. 6d. to 13s. 6d. In the West Riding, merchants are fairly well employed for the time of the year, and are placing forward contracts more freely. Current pit prices.—Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. to 16s.; ordinary house coal, 14s. to 15s.; secondary sorts, 12s. to 13s. 6d. Trade generally in Bradford, Leeds, Huddersfield, the Spen and Colne valleys, and the heavy woollen district is brisk, and the consumption of works fuel is very heavy. The following pit prices are realised without great difficulty:—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small engine nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slacks, 8s. to 9s.; small slacks, 7s. to 7s. 6d.; coking smalls, 6s 3d. to 6s. 9d. Supplies of washed furnace coke are still inadequate, and makers are able to command 15s. 6d. per ton at the ovens for current sales, and about 16s. for contract to the end of the year. The gas coal position shows no sign of weakness. Many gas engineers are seeking quietly to place their contracts at about 1s. 6d. per ton advance, but the collieries generally refuse to accept less than the official advance of 2s. to 2s. 6d. per ton. In several cases where public authorities declined the tenders submitted to them during May, they now find, on coming into the market a second time, that prices are higher, and in some instances that offers are withdrawn altogether. Current pit prices:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal, 9s. to 10s. The export of gas coal is fully up to the season's average, and the following f.o.b. Hull prices are firmly quoted:—Screened gas coal, 12s. 6d. to 13s. 3d.; gas nuts, 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d. to 12s. 6d.

Barnsley.

COAL.

There has been nothing to check the active state of trade in this district during the week, but the Royal visit during the earlier days and the consequent holidays has had a material effect on the output at a time when the maximum product was needed. Again, the deplorable Cadeby disaster will shut off from the market a big daily tonnage, which will in a considerable degree have to be supplemented from other collieries. In fact, so brisk is the demand at the present time that the slightest reduction in the output is quickly felt, and, obviously, buyers find it impossible to secure deliveries of fuel at less figures than a week ago. The optimism of sellers has been fully realised, for there is evidence of the expansion of the business for export, and apparently shippers are entering into the market more freely now that it is realised that prices are firmly settled and the season is so well advanced. The position in regard to contract deliveries is unusual, for owing to the strike and other interruptions there is still a good bulk of arrears to be taken, and in many cases the necessity for the arranging of new contracts is not a pressing one. Possibly from this point of view buyers are delaying coming to conclusions in the hope that the market might turn more in their favour, but for the present there is no indication of this being the case. The home demand for large steam fuel continues to be especially active, the daily tonnage taken by the railway companies now being at its height, whilst, as indicated, the demand by way of Hull is daily reaching something of a record. Best hards are firmly quoted up to 11s. per ton, and are still chiefly taken for home purposes, whilst secondary descriptions of fuel are more largely shipped, and values are also strongly held at from 10s. 3d. to 10s. 6d. per ton. The demand for smalls required by the large industrial firms near at hand is again of a great volume, and late prices are readily realised, up to 10s. per ton being paid for the best washed sorts, whilst secondary grade kinds are making from 9s. to 9s. 6d. per ton. Slacks are in big request, particularly for the West Riding textile districts, the best sorts making up to 8s. per ton, with secondary qualities 6s. 6d. to 7s. per ton. Generally, contracts for the smaller classes of fuel are being readily renewed now, the average increase in price from a year ago being 1s. 6d. to 2s. per ton. Though considerable progress has been made with regard to the renewal of gas coal contracts, generally the attitude of consumers is that of wait. The arrears of supplies are more than adequate to meet the present lighter needs, but there seems little likelihood of any material reduction being accepted. Current sales are being made at rates equivalent to the prices asked for new contracts. The consumption of house coal has again fallen away, owing to the warmer weather, but prices are strongly held for. Collieries where both steam and house sorts are produced from the same seem feel little effect of the quieter enquiry for house sorts, and a good many contracts for the southern and eastern counties have already been ratified at the advanced rates; late quotations are therefore firmly held, for stocks are not troublesome, and merchants are still having to pay the prices of a week ago, viz:—Best Silkstone, 13s. 6d. per ton; best Barnsley softs, 12s. 6d. per ton; seconds, 10s. 6d. to 11s. 6d. per ton; house nuts, 10s. per ton. There is no change to report in regard to coke, the output of which is fully cleared, and prices are as a week ago—14s. per ton for ordinary brands at the ovens.

Chesterfield.

COAL.

The condition of the coal trade of this district is unchanged on the week. The demand for house coal is quiet, with prices firm. The renewal of contracts for the ensuing 12 months is proceeding slowly, but surely, at an advance of 2s. 6d. per ton. As time goes on, it is becoming more and more evident that merchants who, by delay, hoped to secure more favourable terms, will be no better off, and that the inevitable must be faced. Colliery owners are taking a firm stand in the matter. There is still a very active market for manufacturing fuel. The demand is strong, and prices have a hardening tendency. A very satisfactory business is being done in cobbles and nuts for the large steelworks of Sheffield and district. Slack for boiler-firing continues in brisk request, and prices remain firm at the recently advanced figures. Several important contracts have been renewed during the last few days at a minimum advance of 2s. per ton. Supply is still below the requirements of the market, and there are no stocks either at the collieries or at the various centres of consumption. The cotton mills of Lancashire continue to draw a heavy tonnage of small fuel from North Derbyshire. The active demand for steam coal for locomotive requirements continues, and large deliveries are going forward daily to the various railways. The export trade is brisker, and there are signs of a revival of demand for steam coal, due to a larger supply of ships. It is believed that a gradual increase in the matter of shipping tonnage will bring about a period of great activity during the next few months in the Humber ports. Prices are again tending upwards, and steam coal is fully 6d. per ton dearer than it was a week or ten days ago. There are no stocks at the pits, all of which are now working full time. To-day's price for best Derbyshire Top Hards is 14s. per ton delivered free alongside steamer at Grimsby. There is a satisfactory demand for cobbles and nuts for near Continental ports. Washed fuel continues to move freely, and substantial orders are being booked for delivery over the remainder of the shipping season. Prices of washed nuts and slack are becoming increasingly firm, and are fully 3d. per ton dearer than they were two or three weeks ago. The coke trade continues to maintain the strong tone which has characterised it during the last few months. There is a heavy demand for all qualities, and supplies are difficult to obtain. Coking fuel continues scarce and dear. Quoted prices are as follow:—Best 13s. 6d., seconds 12s. 6d., cobbles 11s., nuts 10s., slack 8s.

IRON.

Every department of the iron trade of the district continues in a state of great activity. Pig iron for forge and foundry requirements is in good demand, and prices recently advanced are firmly held by makers. Bar iron manufacturers are very busy, and are all in possession of well-filled order-books. Their difficulty just now is to get the work turned out as quickly as the customers' wants require. All kindred trades are equally well employed, and can look forward to an active autumn and winter trade.

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Nottingham.

COAL.

There has been a rather steadier tone in the coal trade of Nottinghamshire during the past week, in consequence of a decline in the house coal section, following the spasmodic rush on the announcement of an advance in prices this month. The increased rates are causing both the public and merchants to purchase sparingly, and orders for contracts at the new list prices are comparatively few, merchants waiting in the hope of a more favourable time. With the additional cost imposed upon owners by recent legislation, there is not much likelihood, however, of prices going down. Values are keeping firm, the quotation for hand-picked brights being 12s. to 13s. per ton, good house coal 11s. to 12s., seconds 9s. 6d. to 10s. 6d., common kitchens 7s. to 6s. Activity is the dominating note in the steam coal section, and most pits turning this quality of fuel are making good time. Stocks at collieries are small. Compared with last year's prices, there is an advance of 2s. 6d. per ton on contract renewals. The ruling rates are 10s. 9d. to 11s. 3d. per ton for best steams and 9s. to 10s. for seconds. Slack is in good demand, best qualities making remunerative prices. A fair amount of business is being done in gas fuel.

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Leicestershire.

COAL.

There is a small improvement in business in this district since last week. Buyers are much more in the mood to transact business, with the result that orders have come to hand with considerable freedom. There is now a satisfactory total of orders placed, and the collieries are keeping up their output. There is also a very free delivery so that there is no accumulation of stock as a rule. There is a good amount of season orders being placed generally at a satisfactory advance on last year. The enquiry for household coal is very active and shows an increase in all sorts of these coals. There is a good demand for steam coals, both cobbles and slacks. Specials slacks are in very good enquiry. Local merchants are busier and their customers are more largely taking in supplies than are usual at this period. The aspect of business here generally is of a cheerful character. The market responds to the continued activity by fully maintaining prices, and business is only concluded on the full rates lately current, and there is certainly no trend downwards.

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South Staffordshire, North Worcestershire and Warwickshire.

Wolverhampton.

COAL.

It is almost remarkable how much more important commodities in association with the conduct of the iron and steel industries of the Black Country coal and slack rank to-day compared with even a twelvemonth ago. Not that the consumption is greatly larger now than a year ago, though even here there has been an increase, but it is because of their high price and their comparative scarcity that coal and slack have taken on considerably additional consequence. The situation has been especially marked this week owing to the holding of the July quarterly meeting. Consumers of steam and manufacturing coal and slack have taken advantage of the quarterly gathering to compare notes in unusual numbers and interested vigour upon the all-pressing price question, and it is surprising how unanimous and emphatic the reports brought to 'Change have been. All the reports confirm with details the previous impression only which prevailed on the market that values were never before so high, except at the time of the late strike. No matter from what part of the Black Country or manufacturing Warwickshire buyers have come, the accounts have been the same. Consumers are having to pay excessively dearly for every class of forge, boiler, or mill fuel, yet coalmasters state they are making by no means undue profits. As a rule, contracts maintain 2s. to 2s. 6d. per ton above last year's figures, but it is reported this week by some of the Leicestershire manufacturing fuel consumers who have been present at the Midland quarterly meeting, that on that adjoining field contracts are being let at not more than 1s. 6d. per ton increase. The statements of the Leicestershire buyers have been received with surprise by many of the colliery people in South Staffs, and it is an open secret that these latter have indulged in some sharp criticism at the expense of the Leicester pit owners. It is believed that the abatement on contracts of 1s. per ton off what had been generally agreed by the Midland districts can be shown to have been unnecessary. The existing state of high activity at the Cannock Chase collieries is taken as strong evidence in this direction. Most unusual as it admittedly is, it is none the less a fact that numbers of the Cannock Chase pits are making full time in July.

IRON.

Employment continues steady at the various works, and with the prospect of a good summer-end and autumn and winter, thanks to the orders brought back from the Midland iron trade quarterly meeting. A good amount of business has resulted from that gathering, and values have been well sustained. Large outputs are being made of pig iron of all grades, but chiefly of ordinary forge sorts, with part-mines next in point of quantity. There is also a steady call for best all-mine forge at 90s., for foundry at 95s. and for cold blast at 120s. South Staffordshire common forge iron is quoted 56s. to 58s. 6d., and part-mine 62s. 6d. to 63s. Good accounts are to hand from North Staffordshire, where manufacturers are well engaged and quote 63s. to 64s. for forge sorts, with 68s. 6d. to 69s. 6d. for best. The blast-furnaces in Northamptonshire and Derbyshire are actively engaged. Sellers quote 60s. 6d. to 61s. 6d. for the former sorts and 63s. to 64s. for the latter. Some descriptions of Staffordshire part-mine pig are being quoted this week about 2s. 6d. or 3s. per ton higher than three months ago. In the manufactured iron trade the rolling mills are kept very busy upon bars and sheets and plates, and also upon hoops and strip. Puddled bars command £5 15s. to £5 17s. 6d. per ton, an advance of some 30s. upon this time two years ago. The merchant bar firms are doing very well, and have been quoting £8 2s. 6d. to £8 5s. delivered by canal and £8 5s. to £8 7s. 6d. delivered by road. Puddled bars are in some instances being quoted at about 4s. increase on the quarter, and merchant bars show an advance of about 7s. 6d. Nut and bolt bars are in good demand at £7 17s. 6d. to £8. Some of the marked-bar houses who are full up with work have been offered 5s. per ton above the recent basis figure. They have more business in hand than for a long while past. The serious cost and inconvenience which will be entailed by the new Insurance Act are being much discussed among most of the iron and steel manufacturers. Hoops and wide strip are in good request; and tube strip has attracted considerable notice for some three months forward. In nearly all departments consumers are pressing for the early execution of specifications. Fairly large quantities of Belgian iron bars have been booked at £6 15s. Most of the works are booked to the end of September. There is a good demand for hoops and strip. The half-year's shipments of hoops and strips improved in value to Egypt from £9,666 to £11,486, and to India from £52,307 to £60,620. The other markets show a decline. Most of the Staffordshire finished iron and steel works are now booked up to the end of September, and in some cases almost up to Christmas. Wiremakers still find difficulty in getting sufficient rods for their mills; there is no dearth of orders in this department, and prices are better. The reason some of the finished iron makers have been hanging back somewhat recently in the matter of declaring further advances, is that they do not wish by additional increases to give the pig iron producers and sellers a further reason for putting up prices. The foreign demand for galvanised sheets is picking up again, the figures for June being better than a year ago; but the complete half-year's statistics make only a poor showing. The quantity exported during the half-year was 289,574 tons, which were valued at £3,663,469. Compared with a year ago, this was a decline in quantity of 32,322 tons, and in value of £319,732. Compared with two years ago, it was a decline in quantity of 8,692 tons, and in value of £8,827. All the Staffordshire mills are well engaged, but prices are somewhat elastic, ranging from £12 up to £12 7s. 6d. Large quantities of plain black sheets are being produced, and are going into early use. Singles are quoted £7 17s. 6d., doubles £8 2s. 6d. to £8 5s. and trebles £8 12s. 6d. Some descriptions of galvanised corrugated sheets are being quoted 7s. 6d. per ton higher than three months ago. Additional engagements have this week been entered into by the steelmakers, who can now therefore see their way a long while ahead. Considerable quantities, both of semi-finished and of constructional steel, are being regularly absorbed by customers. Bessemer sheet bars are quoted £6, with Siemens qualities 2s. 6d. extra; joists £7, and angles £7 10s. to £7 12s. 6d. Makers' figures for joists have increased 5s. per ton on the quarter, and for Bessemer sheet bars 10s. Plates are in brisk demand. It is reported that Germany is offering steel plates at 5s. per ton below the British quotations, and also that a consignment of about 500 tons of American steel plates has recently been received. All the steelmaking districts are trying to satisfy the demands of the shipbuilders, who are very busy. Steel tees and channels are quoted £8 2s. 6d. Ferro-manganese is quoted £9 10s.; for mild steel bars, rounds, £7 15s. is asked, and for flats £8. There is not much call for steel scrap, but good iron scrap is being enquired for, and commands about 60s. Structural engineers' and rolling stock makers have this week been good customers for various descriptions of steel.

Hednesford.

COAL.

The condition of the coal trade throughout the Cannock Chase district is remarkably good for the time of the year. The demand is satisfactory for most qualities, and prices are well maintained. Many of the collieries are working full time, this being very unusual for the month of July. There is no falling off in the demand for coal for manufacturing purposes, and the house coal trade is keeping up very well. Slack is selling freely at good prices. There is not very much coal in stock on the colliery sidings.

Birmingham.

COAL.

A slightly lower demand is experienced than a week ago, though trade is quite good for the time of year. Merchants, who are in a position to do so, are gradually accumulating stocks at the rates now prevailing, in anticipation of the autumn demand, at enhanced figures. In the general manufacturing trade large quantities of fuel are wanted, and in this department the pits are regularly engaged. Several South Wales agents who attended the market reported that contracts were being completed there, but owners were asking only an advance of 1s. 6d. a ton on last year's rates, compared with 2s. 6d. in the Midland and other Federation districts.

IRON.

There was a very large attendance on Thursday at the quarterly meeting of the South Staffordshire iron trade. Lancashire, Yorkshire and North and South Wales sent the usual contingents, and the reports from all districts were practically the same, abundance of trade at high prices, customers clamouring for deliveries, and difficulty in getting full supplies of raw material. Production is unequal to the wants of consumers, whose orders will require several months to execute. It is a long time since we heard of new works being established in the Black Country, a district which a few years ago was said to be on the decline so far as iron producing was concerned, but at the moment preparations are in progress for commencing new puddling mills in the Walsall district and a new rolling mill at Wolverhampton. In only one or two instances did the market yield a higher range of prices. The Staffordshire Tinned Sheet Association, for instance, announced an advance of £1 a ton, making present prices for best charcoal 34s. per cwt., charcoal 32s., and coke (unassorted) 27s. per cwt., 20-gauge basis; and best tin sheets 25s. to 31s. per box, I C basis. Northamptonshire pig iron stiffened to the extent of about 1s. a ton, and the minimum prices is in the neighbourhood of 60s., ranging up to 62s. for the best qualities. Derbyshire pigs, which are used for better classes of work, are firmly upheld at 62s. 6d. to 63s. 6d, and South Staffordshire common iron is unaltered at 58s. The output of pig iron is below the wants of the district, and had makers of standard bars made any advance on the £9 basis, as was expected, an all-round rise in pigs would doubtless have followed. But bar producers, after careful consideration, decided to make no change. The present price leaves a fair margin of profit; trade is plentiful, with three months' work on the books, and they felt it would be unwise to rush things. In the unmarked bar branch the output is larger than it has been for years, and no difficulty is experienced in getting £8 2s. 6d. to £8 5s. a ton delivered Birmingham. Lancashire bars, of which large quantities are consumed in this district, sell freely at £8 a ton, and £6 is quoted for steel billets from Wigan. Galvanised sheets remain strangely weak compared with the other branches. Although the supply is much larger than it was, yet the demand is well maintained, and large quantities are going regularly to the South African, South American, and Indian markets. The general range of quotations is from £12 2s. 6d. to £12 7s. 6d. (f.o.b. Liverpool). Sales of strip are made at £8 a ton, and for rods and rivet iron £9 is recorded. In the finished steel trade the mills are congested with work, and difficulty is experienced in getting supplies of raw material, the cost of which, too, is considered out of proportion to the finished article. Sheet bars and billets are still quoted £6 to £6 2s. 6d., though large consumers can make slightly more favourable terms. No change was made in the official quotations of angles and joists, though some makers demand a premium. Copper sheets have dropped £4 a ton during the last fortnight, the current price being £92. Business is reported rather flat.

Forest of Dean.

Lydney.

COAL.

The market for the house coals of this district continues in much the same condition as reported during the past month or two. Signs of improvement are still lacking, and the collieries are only doing sufficient business to keep the pits running about half-time. The scarcity of vessels is interfering considerably with the shipping business, and there are fairly good stocks to be noticed at the docks. In the railborne branch of the trade there is no relief from the quiet tone which has characterised it during the past few weeks. Prices continue on the basis of block 15s. 6d. at pit and 17s. 3d. f.o.b. Lydney. All the steam coal pits are busy.

Gloucestershire, Somersetshire and Wilts.

Plymouth.

COAL.

Messrs. W. Wade and Son report that there is an average demand for house and steam coal at current prices, but the somewhat high freights now demanded for sailing and steam tonnage are somewhat impeding business with regard to contracts for house, steam, and gas coal. Many large buyers are resisting the advanced prices required by collieries, and the negotiatory powers of buyers and sellers have been fully exercised during the past week or two. In some instances the contracts have been completed at a satisfactory advance.

THE LONDON COAL TRADE.

THURSDAY, JULY 11.

The London coal trade for the past week has not recovered from the set-back of the first week in July. The advance in pit prices—dating from July 1 both for the current prices and also for the renewal of contracts—has never been fairly recognised by the London merchants, and every opportunity of moderating the price has been adopted, even to the extent of withholding orders and wagons so that colliery stocks may accumulate to an abnormal extent. The heat also has had a telling effect on the number of house coal orders, delaying a good number of public orders, and preventing any pressure from being placed upon the delivery trade for any immediate requirements. The attendance on the market has been well maintained, and although it is evident that neither merchants or factors are prepared to purchase any large quantities, there is a keen disposition to buy fairly freely if the market prices are low; in fact, many tempting offers are made to break through, if possible, the standard advance as from July 1. In some cases a coal and wagon price is mentioned, or a rebate at the end of the month suggested, but all overtures at present are put aside, and all districts remain as firm as ever. Meanwhile the buying is restricted to the immediate necessities, and consequently very slow. The large coal, both for house and manufacturing purposes, has sold fairly freely during the week, and no great stocks are reported, but house nuts and bakers' nuts have accumulated to an alarming extent. Bakers and confectioners are said to be trying various methods of heating and cooking, and gas stoves are reported to be largely on the increase. Other expedients with patent fuel, coke, and a variety of methods are discussed, and the slack summer months are always the best for trial purposes, as there is an adequate supply of coal to fall back upon if the new venture should fail. Many of the London merchants have arranged for their rolling stock to be overhauled and repainted during the quiet summer months, so that empties are not moving about so rapidly as in former seasons, and this may account for the diminished output, and the small demand for the usual qualities of fuel. The flow of orders, however, from the general public is reported to be evenly balanced, so that any great movement to curtail the supplies coming forward to the Metropolis may easily be found to be an inconvenience in the near future. The period also is rapidly approaching when railway wagons are exceedingly scarce. The withdrawal of so many for the transit of farm produce and market stuffs of various kinds invariably lessens the number available for use in the coal traffic, and regularly every autumn much time is lost at the collieries for want of empties. The principal topic of conversation on the Wednesday market was the terrible explosion at the Cadeby Colliery and the awful loss of life. So much of this coal is brought up both by sea and rail into the metropolitan area that many of the London merchants are greatly interested in the quality produced, and some of those amongst the lost are well known names on the London Coal Exchange. Hopes of the ending of the dock strike and the trouble with the lightermen on the River Thames seem doomed to disappointment. Barges, however, are being towed up and down the river far more freely, and steamers are being unloaded with greater regularity, but still the difficulties abound on almost every side, and serious conflicts are constantly being reported. The seaborne house trade has become very dull. Prices are quite nominal, best Durham Wallsend being quoted 20s. and seconds 19s. per ton. Yorkshires are not quoted. The iron trade is reported very brisk. On Monday 25 steamers were reported as arrived in the river, but these are for the most part sold under contract and afford no test as to the market value. Very few contracts have been renewed by the larger merchants yet, and as far as can be ascertained both sides are "marking time," and simply trying who can hold out the longest; at the same time many of the smaller merchants are closing with the present offers in order to be prepared when the winter demand sets in. Small nuts are still very quiet, but slacks are selling freely.

From Messrs. Dinham, Fawons and Co.'s Report.

Friday, July 5.—The seaborne house coal market was again without supplies of either Durham or Yorkshire house. Best (Durham), 20s.; seconds, 19s. Cargoes 19.

Monday, July 8.—The seaborne house coal market was without alteration to-day, no cargoes being offered. Best (Durham), 20s.; seconds, 19s. Cargoes 25.

Wednesday, July 10.—The enquiry for seaborne house coal was good to-day, but no cargoes of either Durham or Yorkshire on offer. Best (Durham), 20s.; seconds, 19s. Cargoes 6.

THE SCOTCH COAL AND IRON TRADES.

THURSDAY, JULY 11.

Glasgow and Lanarkshire.

COAL.

There has been general activity in the coal trade since last report. In view of the annual holidays which begin at the end of this week, and will extend over ten days or a fortnight in the principal districts of Lanarkshire, coalmasters and shippers have been doing their utmost to complete engagements for the time, and the volume of business has consequently been greater than usual. The aggregate shipments at Scotch ports in the past week amounted to 361,258 tons, showing an increase of 6,839 tons compared with the preceding week, and of 37,772 tons over the quantity despatched in the corresponding week of last year. At Glasgow, the clearances were 42,086 tons foreign and 45,973 tons coastwise, the total of 88,059 tons comparing with 81,844 tons in the preceding week, and 68,209 in the corresponding week of last year. There has been a considerable increase in the coastwise shipments, which is attributed to the desire of consumers to obtain supplies before the holidays. The foreign trade has likewise been well maintained and current enquiries seem to indicate that a good business may be experienced in the near future. The better qualities of house coal have been in specially good demand for export. Splint coal has been selling with great readiness, both for home use and shipment at the former prices noted last week. The run on single nuts has been so strong that prices have been advanced 6d. per ton for present month's contracts, and shipping values are likewise tending higher. A good regular business has been done in steam coal. Prices f.o.b. at Glasgow are for steam 11s. to 11s. 6d., ell 11s. 6d. to 11s. 9d., splint 12s. to 12s. 6d., treble nuts 12s. 3d. to 12s. 6d., doubles 11s. 9d. to 12s., singles 11s. 6d. to 12s. per ton. Fine weather has, to some extent, reduced the demand for house coal for inland consumption. Having had their wages adjusted on the whole to their advantage, the miners have been working very well and supplies of coal have been satisfactory.

IRON.

A very large business was done in pig iron warrants towards the end of last week, and the total week's transactions are reported to have amounted to close upon 90,000 tons. Speculators have been selling on the head of the substantial advances that took place last week, and this brought about a reaction in values. Since last report Cleveland warrants have been done from 56s. 11½d. to 56s. 2½d., 57s. 4½d. to 56s. 9½d. one month, and 57s. 9d. to 57s. 1d. three months. A quantity of Cleveland iron has also been sold at 56s. 9½d. for delivery in 25 days. There was a strong upward movement in Cumberland hæmatite, which sold towards the end of last week at 74s. cash, buyers offering 74s. 9d. for three months delivery. Scotch hæmatite has been advanced 1s., merchants now quoting 78s. per ton for delivery at west of Scotland steelworks. Prices of ordinary and special brands of Scotch pig iron are in some instances 6d. higher. Govan and Monkland are quoted f.a.s. at Glasgow, Nos. 1, 66s. 6d., Nos. 3, 65s.; Carnbroe, No. 1, 69s. 6d., No. 3, 65s. 6d.; Clyde, No. 1, 73s. 6d., No. 3, 69s.; Calder and Summerlee, Nos. 1, 74s., Nos. 3, 69s.; Gartsherrie and Langloan, Nos. 1, 74s. 6d., Nos. 3, 69s. 6d.; Coltness, No. 1, 89s. 6d., No. 3, 70s.; Eglinton at Ardrossan or Troon, No. 1, 66s., No. 3, 65s.; Glengarnock, at Ardrossan, No. 1, 74s., No. 3, 69s.; Dalmellington, at Ayr, No. 1, 67s., No. 3, 65s.; Shotts, at Leith, No. 1, 74s. 6d., No. 3, 69s. 6d.; Carron, at Grangemouth, No. 1, 75s., No. 3, 70s. per ton. The shipments of pig iron at Scotch ports in the past week amounted to 3,019 tons foreign and 3,471 coastwise, the total of 6,490 tons showing an increase of 2,947 tons compared with the corresponding week. The arrivals at Grangemouth of pig iron from Middlesbrough and district were 9,137 tons, being 3,619 tons more than in the corresponding week of last year. The finished iron and steel works are well supplied with contracts, but owing to the coming holidays comparatively little fresh business has been done.

Renfrew, Ayr and Dumbarton.

COAL.

The amount of business in the shipping department of the coal trade, although not quite so large as in the preceding week, has still been well over the average. The clearances have been at Bowling 223 tons, Greenock 258, Irvine 1,886, Ardrossan 4,033, Troon 11,199, and Ayr 18,570—total 36,169 tons, against 48,229 in the preceding week and 37,769 in the corresponding week of last year. Of the total of 36,169 tons shipped, 5,830 went abroad and 30,339 coastwise. The smallness of the shipments at Greenock is explained by the fact that the annual holidays are being held in that town and district. The consumption of coal for manufacturing purposes in Renfrewshire has also been reduced for the same reason. Business has been very active throughout Ayrshire, and the coastwise and Irish traffic has bulked exceedingly well. Warm weather has reduced the demand for house coal for home use. Prices of all sorts of coal are steady.

Stirling, the Lothians and Fife.

COAL.

A very full business has been done at Firth of Forth ports, with the exception of Granton, where the shipments have been smaller than usual. The clearances have been at Granton 5,150 tons, Bo'ness 24,902, Grangemouth 46,352, Leith 54,747—total 131,151 tons, against 110,727 in the preceding week, and 81,973 in the corresponding week of last year. Of the total of 131,151 tons, 110,460 went abroad and 20,691 coastwise. The demand has been active for all kinds of small hard coal, and the output at the collieries is reported to be sold for several weeks ahead. Best screened steam coal is quoted f.o.b. at Leith 11s. 6d. to 12s., secondary qualities 10s. 9d. to 11s. 3d., treble nuts 11s. 9d. to 12s. 3d., doubles 11s. 3d. to 11s. 9d., and singles 11s. 9d. to 12s. 3d. per ton. The shipments at Fife ports have embraced at Methil 53,591 tons, Burntisland 46,400, Dysart 2,039, Alloa 1,737, Wemyss 1,245, Tayport 370, Charlestown 362—total 105,879 tons, compared with 113,619 in the preceding week, and 135,535 in the corresponding week of last year. There has been great activity in the last few days in anticipation of the annual holidays, which begin in the colliery districts on Saturday of this week. First-class screened navigation coal is quoted at Methil and Burntisland 15s. to 16s., unscreened 13s., first-class steam coal 12s. 6d. to 13s., third qualities 10s. 6d. to 11s., treble nuts 12s. to 13s., doubles 11s. 6d. to 12s., and singles 11s. 6d. per ton.

THE TIN-PLATE TRADE

Liverpool.

There has been a fair enquiry during the week, a moderate business resulting. Prices are steady, manufacturers standing firmly to their quotations for forward delivery. Current rates may be called:—Steel coke tins: I C 28 × 20 (112 sh. 216 lb.), 29s. 3d. to 29s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 1½d. to 15s. 3d. per box; I C 14 × 20 (112 sh. 108 lb.), 14s. 7½d. to 14s. 9d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 14s. 14½d. to 15s. per box; I C 14 × 19¼ (120 sh. 110 lb.), 14s. 10½d. to 15s. per box; I C 20 × 10 (225 sh. 156 lb.), 21s. 3d. to 21s. 6d. per box; I C squares and odd sizes, 14s. 10½d. to 15s. 1½d. basis. Charcoals rule firm at 16s. 6d. basis and upwards according to finish. Ternes are quiet at 26s. to 26s. 3d. for I C 28 × 20 unassorted. Black-plate stands firm at £10 15s. per ton basis for 30 gauge, pickled and close annealed. Coke wasters are in steady demand, and prices rule firm as follow:—C W 14 × 20, 13s. 9d per box; C W 28 × 20, 28s. 3d. per box; C W 14 × 18¾, 13s. 9d per box; C W 20 × 10, 19s. 9d. per box—all f.o.b. Wales, less 4 per cent.

Important Sale of Minerals in Derbyshire.—At the Victoria Station Hotel, Nottingham, on Wednesday, there was offered for sale by auction by Messrs. Walker, Walton and Hanson, an important freehold Derbyshire estate belonging to the Right Hon. Earl Stanhope in the parishes of Stanton-by-Dale, Dale Abbey, Ilkeston, and Sandiacre, the whole containing upwards of 2,500 acres. It included nearly the whole of the Derbyshire estates of Earl Stanhope. The ungotten minerals were included in the sale of property as a whole, with the benefit of the provisions of an indenture of lease dated March 12, 1896, and made between Earl Stanhope and the Stanton Ironworks Company, the Earl of Mansfield and the Hon. Philip James Stanhope of the second part, the Stanton Ironworks Company, and Mapperley Colliery Company, and various agreements. The mineral lease provided that if on or before March 25, 1911, the lessees should not have commenced to work any beds or seams of coal thereby demised other than the bed or seam called the Ladywood or Kilburn coal, the mineral lease so far as it refers to such beds or seams of coal other than the Ladywood or Kilburn coal should cease and determine. The lessees have not worked any of the above other beds and the mineral lease as to these consequently determined on March 25, 1911. It had been arranged to first offer the estate as a whole in one lot, and at £110,000 Mr. Longden secured the estate for the Stanton Ironworks Company.

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(A Classified List appears on page 94.)

⁂ The offices of this Journal are at 30 & 31, Furnival-street, Holborn, London, E.C. Cheques, &c., to be made payable to the COLLIERY GUARDIAN CO. LIMITED. All remittances should be crossed ——— & Co. Postage stamps should not be remitted for amounts exceeding one shilling.

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Wanted Colliery Manager for Midland colliery contemplating extensive developments, to act under agent, must be 7 o'clock man, thoroughly practical, experienced with extensive haulage and coal cutting machinery. State age, experience, references, and salary required, to Box "X.," 4835, *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

Colliery Manager Wanted for Colliery in Midlands, accustomed to longwall working; salary to commence at £250 with house; age 30 to 35.—Apply, Box 4039, *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

Wanted by well-known London Firm, AGENCY for Midland and Welsh Colliery; all accounts guaranteed; correspondence strictly in confidence.—"X. Y. Z.," Box 4840, *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

TO COLLIERY PROPRIETORS AND OTHERS.
The Corporation of Birkenhead are prepared to receive TENDERS for the supply of SCREENED COAL, THROUGH-AND-THROUGH, and COAL NUTS, for gas making purposes, for a period of nine months, commencing from the 1st October, 1912.
Forms of tender, together with any further information, may be obtained from Mr. F. O. Paterson, C.E., Gas Engineer, Gas Works, Birkenhead.
Tenders (accompanied by copy of recent analysis) stating the price per ton delivered to the Gas Works railway siding, must be sent in to me, sealed and endorsed "Tender for Gas Works Coal," not later than five o'clock in the afternoon of Thursday, the 18th July, 1912.
All deliveries to be made from time to time according to the requirements of the Engineer.
The person or firm whose tender may be accepted will be required to enter into a contract containing a clause as to the payment of the rate of wages, and the observance of the hours of labour recognised and agreed upon between the trades unions and the employers in Birkenhead or in the locality in which the work for carrying out the contract is executed, as the case may be.
The Corporation do not bind themselves to accept the lowest or any tender.
Town Hall, By order,
Birkenhead, JAMES FEARNLEY,
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The Colliery Ready Reckoner and Wages CALCULATOR. By JAMES IRELAND. "Will be the means of preventing many disputes between pay clerks and colliers."—*Mining Journal. Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C. Cloth limp, price 1s. 6d.; post free, 1s. 7d.

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⁂ *For other Miscellaneous Advertisements see Last White Page.*

Forthcoming Annual Meetings.

Institution of Mining Engineers—Provincial Meeting (Birmingham)	September 11, 12 & 13, 1912
North of England Institute of Mining and Mechanical Engineers ...	August 3, 1912
Midland Counties Institution of Engineers	Sept. 1912
Manchester Geological and Mining Society,	Oct. 8, 1912
North Staffordshire Institute of Mining and Mechanical Engineers ...	October 14, 1912
South Staffordshire and Warwickshire Institute of Mining Engineers ...	October 1912 (2nd week)
Iron and Steel Institute—Autumn Meeting ...	September 1912
Association of Mining Electrical Engineers—	October 4 & 5, 1912 (Provis.)

The Colliery Guardian.

LONDON, FRIDAY, JULY 12, 1912.

During June 5,916,432 tons of coal, coke and manufactured fuel were exported, valued at £3,602,414, as against 5,442,775 tons, valued at £3,045,853, in June 1911, and 6,138,810 tons, valued at £3,637,771, in June 1910.

The total of exports in the first half of the present year amounted to 27,196,714 tons, valued at £17,126,514, as compared with 32,808,385 tons, valued at £18,724,682, and 31,024,446 tons, valued at £18,441,028, in the corresponding periods respectively of 1911 and 1910.

The average value of coal, coke and manufactured fuel exported from the United Kingdom during June was 12s. 2·1d. per ton, as compared with 11s. 2·3d. in June 1911 and 11s. 10·2d. in June 1910.

The value during the first six completed months of the present year is 12s. 7·1d. per ton, as compared with 11s. 4·3d. and 11s. 10·6d. respectively in the corresponding periods of 1911 and 1910.

Of the total exports of coal during June, the mean value of the large coal exported was 13s. 11·05d.; through-and-through (unscreened) coal, 10s. 3·5d.; and small coal, 9s. 8·1d. The average value of all kinds of coal exported was 12s. 0·7d., a decrease of 9·6d. as compared with the preceding month. Otherwise divided, it fetched the following values:—Steam coal, 12s. 6·1d.; gas coal, 10s. 4·8d.; anthracite, 16s. 1·4d.; household coal, 11s. 5·3d.; and other sorts of coal, 10s. 5·1d. The value of the coke exported was 17s. 0·2d. per ton, and of the manufactured fuel 16s. 0·4d. per ton.

The award of Sir William J. Collins, independent chairman of the Cumberland Coal Joint District Board in reference to the colliery company's application for special lower rates and to the men's application for special higher rates under the Minimum Wage Act, has been issued. The colliery companies named in the award have 3d. deducted from the general district rate and workmen at Whitehaven 3d. added.

Lord St. Aldwyn, independent chairman of the South Wales Coal Board, has presented his award under the Minimum Wage Act. The chief rates decided on are:—Colliers (piece work), 4s. 7d.; colliers (day work), 4s. 3d.; colliers' helpers, 3s. 4d.; timbermen (piece), 4s. 7d; and timbermen (day work), 4s. 3d. Boys under 15 are to be paid 1s. 6d. per day and up to 3s. per day for boys under 21. A workman will forfeit his right to wages at the minimum rate during any pay period in which he has not worked at least five-sixths of his possible working days, unless prevented from working by accident or illness. It is also stipulated that every collier and collier's helper shall do an amount of work equivalent to the minimum rate.

An Order has been issued by the Home Office, under section 118 of the Coal Mines Act, 1911, prescribing the procedure to be observed for ascertaining and certifying the views of workmen.

The opinion of Sir Robert Romer, the chairman of the Cleveland District Board under the Minimum Wage Act, has been sought as to the method by which the minimum datal rates are to be made up. The miners submitted that the base rates should be increased so that, with the 25 per cent. added, as recognised by the two associations, they would equal the minimum fixed by Sir Robert; and that in future advances the percentage should be added to these figures. The owners contended that it was not in accordance with the Act or the award that the minimum rates should vary with the district percentage. Sir Robert Romer is of opinion that on the points submitted to him the employers are right and the workmen are wrong.

The International Miners' Congress was opened at Amsterdam on Monday. Mr. Smillie was elected president in place of the late Mr. Enoch Edwards.

In regard to clause 61, subsection 2, in the Coal Mines Act, which places an obligation upon coalowners to provide explosives to the men at net prices, a question has arisen in the Welsh anthracite district as to whether the net cost includes the cost of distribution. It has been decided to take a test case to the county court, and, if necessary, carry the matter to the higher courts.

Mr. Asquith has informed the Miners' Federation of Great Britain that he will receive a deputation consisting of the executive of that body on Monday, July 15, in order that they may lay before him certain complaints regarding the working of the Minimum Wage Act.

An explosion occurred on Saturday at the Barnsley Main Colliery, by which three men lost their lives.

At Nottingham on Wednesday practically the whole of the Derbyshire estates of Lord Stanhope were sold by auction to the Stanton Ironworks Company.

The *London Gazette* states that the King has awarded the Edward Medal of the First Class to John Mitchell and James Green, for their gallantry in rescuing men who were cut off through an inrush of water in Bamfurlong mine, near Wigan, last December. Green has since died, and the medal will be given to his widow. The King has also awarded the Edward Medal of the Second Class to George Edwards, for his gallant action at Bryncethin Colliery, near Bridgend, last July.

At a degree congregation of Birmingham University on Saturday, the honorary degree of Doctor of Laws was conferred on Mr. W. E. Garforth, president of the Institution of Mining Engineers of Great Britain.

At a meeting of the executive committee of the Miners' Federation of Great Britain, held in London on the 5th inst., it was resolved to draft a bill for the nationalisation of mines, and to commence an active propaganda in the mining and industrial centres in order to present the case for nationalisation from the point of view of the mining industry and also that of public utility.

In the Court of Appeal on the 5th inst., before the Master of the Rolls and Lords Justices Farwell and Kennedy, the hearing was concluded of the appeal of three Lancashire miners from the decision of Mr. F. Willis Taylor, the Deputy of the Vice-Chancellor of the County Palatine of Lancaster. The Master of the Rolls, without calling upon counsel for the respondents, in the course of his judgment held that the dispute in question was a trade dispute, and that no action could be maintained against the defendant Federation, having regard to the provisions of the Trade Disputes Act, 1906. He also held that so far as the defendant Mr. Twist was concerned, they could not interfere with the finding of fact, that there were no threats, and therefore that the action was not maintainable against him.

An explosion occurred early on Tuesday morning at the Cadeby Main Colliery of the Denaby and Cadeby Main Colliery Company Limited. By a subsequent explosion practically the whole of a rescue party, including Messrs. Pickering, Hewitt and Tickle, inspectors of mines, and Mr. Douglas Chambers, manager of the Denaby Colliery, were killed, the total death roll at the time of writing being estimated at 86. A relief fund has been opened.

Questions were put to the Home Secretary, yesterday, in regard to the appointment of additional inspectors of mines. Mr. McKenna said he believed the result of the examinations recently held for mines inspectorships had just come into the Office, and he had every hope that a sufficient number of candidates would qualify to enable him to fill up all the vacancies.

"Who Track the Steps of Glory to the Grave."

It is difficult to find language with which to speak of the terrible disaster at the Cadeby Main Colliery. Nothing can so deeply wound the soul of a nation as a mining disaster, with its panoply of sorrow and heroism. It is the crowning instance of the power of Nature to frustrate the machinations of mankind. This Yorkshire disaster, however, shows her in a mood so cruel and spectacular as to make the most callous amongst us shudder.

Our King and Queen upon that fateful Tuesday were passing through this great industrial district, and learning with their own eyes and ears some of the incidental joys and troubles of their toiling subjects. King George himself had descended into the bowels of the earth to wield the pick and see an "abnormal place" within a few miles of Conisborough. Like a flash came this terrible unrehearsed explosion to show them the uttermost depths of human misery, upon the brink of which the miner ever treads. We cannot think that our Sovereign and his Queen will be any the worse in years to come for having shared with the humblest of their subjects the pangs of this ordeal, which compelled a Queen to mingle her tears with those of the collier's widow; but the cost is terrible.

The death of every man who fell at Cadeby represents the microcosm of a tragedy, but the death of William Henry Pickering, the lion-hearted inspector of mines, is a catastrophe that reaches far wider. Mr. Pickering had numbers of dear friends in two Continents who will deeply feel his loss for many years to come. They will know also how great a loss is his death to the profession of mining engineering and the coal-mining industry as a whole. We cannot well say more here than to add that this great inspector combined with conspicuous ability and judgment all the qualities of a good and brave man. No one ever more truly deserved a lasting memorial at the hands of his brother mining engineers, and we have hopes that this may take practical form. His example must shine in the eyes of generations to come as that of one who, in the daily monotony of work or in the moment of sudden danger, never flinched from his duty. It would be a graceful honour to one who sacrificed his life in the service of his country if some distinction could be conferred upon Mrs. Pickering.

The awful holocaust that killed Mr. Pickering involved practically the whole of the brave little band that he led, and the deaths of Mr. Hewitt, Mr. Tickle and Mr. Douglas Chambers only add to the poignancy of the calamity. They were all men of outstanding ability.

Of the circumstances of the disaster it is not possible to say very much here. The Home Secretary has stated that a special investigation will be instituted under the Coal Mines Act. It is fairly certain, knowing the previous history of this colliery, that the initial cause of the explosion was a gob fire, and Mr. McKenna intimates that the entire question of dealing with these fires is at present engaging the attention of the Chief Inspector. The prevalence of gob-fires in the new collieries in the Doncaster district has recently excited much discussion and not a little concern. In February of this year three men were killed by a sudden explosion at the Bentley Colliery, in the same district, due to a gob-fire; and similar occurrences have been comparatively frequent in this and other mines working the Barnsley bed at these depths. The fight against these fires is one that has exhausted the ingenuity of the best experts, and Mr. Pickering had devoted earnest attention to the subject.

It was due very largely, we believe, to the conditions prevailing in this district that the proviso was added to section 29 (3) of the Coal Mines Act, varying the normal standard of ventilation in mines subject to spontaneous combustion. In the course of the Home Office enquiry into the fatal explosion at the Bignall Hill Colliery, in January of this year, Mr. Pickering submitted some valuable notes on the subject which were reprinted in the *Colliery Guardian* at the time.* It is one of the cruel ironies of fate that a gob fire should have led to his death. In these notes he strove to dispel the popular belief that the danger from gob-fires in the Barnsley seam in this area is by any means new, and recalled that the Denaby and Cadeby Main pits have had serious trouble from them for the past 30 years; but he added that the danger was possibly greater in the new pits, for the fires had been more numerous and extraordinary quantities of firedamp are found, whilst in some cases petroleum drips from the roof and saturates the timber. The gob fires occur for the most part at the edge of the shaft pillars, or in places where ribs or pillars of coal have been left or lost, and where timber has been left in the goaf; but they occasionally occur in roadways in the coal, and at times in the shale above the seam. At the recent London meeting of the Institution of Mining Engineers, Mr. Pickering, in collaboration with his son, read a paper of a highly contentious and suggestive nature, in which he advocated the entire elimination of shaft pillars as a possible remedy. In the notes already referred to, he describes the various methods of combatting these fires, for which we must refer readers to the paper. He pointed out that at times the fires reach the burning point, and even die out, before they are suspected. Mr. Pickering himself had the experience of witnessing a very violent and extensive explosion whilst a colliery fire was being sealed.

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* *Colliery Guardian*, January 12, 1912, p. 89.

During 1911 no less than 17 cases of gob fires were reported in the new collieries in the Doncaster area, but at the Denaby and Cadeby Main collieries there have been no less than 56, or two a year, since the pits were opened, and the absence of any serious disaster up to the present time is, under the circumstances, a testimony to the skill and unremitting care of Mr. W. H. Chambers, the managing director and his staff of managers. A most interesting account of the long struggle was given by Mr. Chambers in a paper read before the Midland Counties Institution in 1900*. In this paper he characterised gob fires as "undoubtedly one of the most dreaded contingencies of the unavoidably perilous operation of coalmining," and told how a gob fire in 1879 almost led to the abandonment of the whole of the then existing workings at Denaby. He added the significant warning that "as the workings became deeper, and the normal temperature of the mine increased, there would be greater risk of these fires occurring."

It is certain, however, that depth in itself is not the only factor, and the question presents different aspects in Yorkshire, North Staffordshire, South Staffordshire and Warwickshire, in each of which districts spontanteous combustion has been a continual danger and trouble to managers. We may add that Mr. Redmayne, in his report on the Bignall Hill Colliery explosion,† which was also due to a gob fire, under somewhat different circumstances, also makes some suggestions, including the adoption of water-flushed packing, which has now a considerable vogue on the Continent. Mr. Pickering himself urged that "further research work is desirable, and could be most efficiently done by the collaboration of a first-class chemist and a thoroughly experienced and practical mining engineer."

The case for exhaustive investigation is now, of course, undeniable, but it is a sorrowful fact that Mr. Pickering should have had to sacrifice his life in order to give the final impetus to action: for the Royal Commission on Mines never even broached the subject.

"E'en in their ashes live their wonted fires."

Honoris Causâ.

The distinction bestowed upon the president of the Institution of Mining Engineers at Birmingham University on Saturday last is a well merited recognition of the many services which Dr. W. E. Garforth has rendered to practical mining. It was particularly fitting also that Birmingham University should have elected to confer this honour upon Dr. Garforth. for it is here that the study of mining has sprung into special prominence, and although perhaps the youngest of the several departments of the University, has become by no means the least distinguished. Sir Oliver Lodge, in presenting the recipient, referred to him as an honoured representative of a great profession, and as both an investigator and an inventor. With every word of this eulogy all will cordially agree, and it is difficult to say upon which of the terms of this oration the greatest stress should be laid. But perhaps a still greater claim to recognition is the object lesson which Dr. Garforth has afforded of the value of system and organisation in mining methods. Dr. Garforth has the good fortune to represent, in the capacity of president of the Institution of Mining Engineers, a profession which is growing in greatness and in the importance of its work—especially upon the side of humanity. Modern conditions of mining are making continually larger calls upon the engineer, and it is no mean thing to have established, as Dr. Garforth has done, a reputation for the sincerity of his interest in the progress of mining science. At the same time, in honouring the president, Birmingham University has paid a great compliment to the institution which he so worthily represents. The honour will certainly be treasured in its annals *in sæculis sæculorum.*

Trade Summary.

The London coal trade continues very sluggish. Household qualities are firm but quiet, and hard and bright nuts are accumulating to an alarming extent. Various methods are being tried to circumvent the present advance in pit prices. Both orders and wagons are withheld to an unusual extent. So far both sides are solid and firm. Public orders are increasing. Stocks are heavy. The river traffic is still seriously interfered with, but more barges and vessels are being dealt with. Small nuts are easier, but slacks continue selling freely.

The market at Newcastle is active, and prices are well maintained. Tonnage is offering freely. Small steam coals are dearer. House and gas coals are steady. All classes of coke are dearer.

The Durham coal trade is active, and prices show a tendency to firm. For prompt shipment, however, secondary gas sorts are plentiful. House coals are dull. Bunkers are in good request. Coking and smithy coals are steady. There is a strong demand for coke.

The Lancashire house coal trade continues on a summer basis. Forges and manufacturers generally are taking full supplies. Bunkering contracts are now being completed, but the open sale is dull. Slack continues scarce.

In West Yorkshire the demand for house coal is light, but prices are well held. Steam-raising qualities are in good request, and washed sorts find ready buyers. The gas coal position shows no sign of weakness.

In South Yorkshire there is, if anything, increased pressure for supplies of hard coal of all descriptions. Gas coal buyers are holding off, but with little prospect of securing reductions in price. The consumption of house coal has fallen away, but rates on forward account are firmly held. The coke trade continues strong.

In Derbyshire, the demand for house coal is weak, but prices are firm. There is an active market for manufacturing descriptions, and prices have a hardening tendency. The export trade is brisker, and prices are moving upwards.

There is an exceptionally full demand for all descriptions of works fuel in the Birmingham district. House coal is fairly steady considering the season.

The tone of the market at Cardiff is stronger, especially as regards forward business. Increased chartering on Admiralty account has had a strengthening influence. The small coal market is rather easier. Monmouthshire coals are firmly held on forward account. Bituminous coals are unaltered. Shipments of patent fuel have been exceptionally heavy.

The Scottish coal trade is active, in view of the approaching trade holidays. Splint coal has been selling with readiness both for home use and export, and prices continue firm. There has been a strong run on nut coals.

BOOK NOTICES.

Proceedings of the Association of Mining Electrical Engineers. Vol. II. (Session 1910-1911). Edited by E. Kilburn Scott, M.I.E.E. London: *Iron and Coal Trades Review.* Price 6s.

This volume of *Proceedings* makes a handy little brochure, which contains much interesting matter. Apart from the addresses, there are papers on "Inspection and Repair of Electrical Plant," by R. R. Smith; "Oil for Transformers," by Geo. Humphrey; "Considerations for Small Colliery Installations," by Thomas Thomas; "Use of a Milli-ampère Testing Set," by E. E. Beardsmore; "Maintenance of Colliery Electrical Plant," by H. H. Williams; "Limitations of 'Fool-proof' Devices," by W. A. Wilson; "Three-phase Motors for Haulages," by James Simpson; "Overhead Lines Leading into Sub-stations," by G. B. Burrows; "Turbine Pumps for Collieries," by R. H. Willis; "Compressed Air and Electricity in Mines," by J. R. Benson; "Electricity in New South Wales Collieries," by E. Kilburn Scott; "Expert Engineering at a Colliery," by Alexander Anderson; "Earthing, Coal-cutters, and Switchgear," by H. Gordon Fraser; "Avoidance of Electrical Accidents in Mines," by Robert Nelson. The character of these papers and of the discussions upon them attest the vigour and usefulness of this the youngest of our technical institutions. The text of the examination papers set by the association is given in an appendix, whilst the volume concludes with a list of members.

LABOUR AND WAGES.

North of England.

The award of Sir William J. Collins, independent chairman of the Cumberland Coal Joint District Board, in reference to the colliery companies' application of special lower rates and to the men's application for special higher rates under the Minimum Wage Act, was issued this week. Ellenborough, Broughton Moor, Seaton Moor, and Camerton colliery companies have had 5s. 9d. free of all deductions substituted as the rate for hewers at their pits instead of the general minimum rate of 6s. settled on May 18; and hewers at Whitehaven pits have been granted a special minimum rate of 6s. 3d. instead of the general district rate of 6s. For their shift labourers the colliery companies named in the award have 3d. deducted from the general district rate, and the workmen at Whitehaven 3d. added.

The following arrangement has been entered into between the North of England Steamship Owners' Association, Sunderland Shipowners' Society, Hartlepools Shipowners' Society, and the North of England Trimmers' and Teemers' Association and the Amalgamated Society of Railway Servants with the trimmers, which will apply as from the 1st inst., to the ports of Amble, Blyth, the Tyne, Sunderland and Seaham Harbour:

"It is hereby agreed that, except as hereinafter provided, work shall cease at 4 p.m. on Saturdays, and at 5 pm. on the day preceding Christmas Day, New Year's Day, and Good Friday, to be resumed at 6 a.m. on Mondays, and on the day following Christmas Day, New Year's Day, Good Friday, Easter Monday, Whit Monday, and the first Monday in August. If, however, either the shipowner, colliery owner or shipper requires that loading shall proceed during the excepted hours above named, work must be continued up to midnight on Saturday, or on the day preceding any of the public holidays referred to, and recommence at midnight on Sundays, or such public holidays, the shipowner, colliery owner, or shipper agreeing to pay overtime. The overtime to be paid to the trimmers and teemers actually retained to do the work to be at the rate of sixpence per man per hour or part of an hour. Overtime on Monday mornings and the days following public holidays shall count from the time men are called out, up to 6 a.m. Orders for overtime to be given in writing to the staithmaster, the chargeman trimmer, or the foreman teemer before noon on Saturdays and the day preceding the said holidays. This agreement shall come into operation on the first day of July, 1912, and shall be open for revision at the end of twelve months at the request of either side."

The Wages Committee of the Northumberland Colliery Mechanics, who recently applied for an advance in wages, have received a reply from the Coalowners' Association to the effect that the men's request for a minimum wage of 5s. 3d., and an advance of 6d. in the present rate of pay cannot be granted.

An adjourned conference of delegates representing the night workers at Northumberland collieries was held at Blyth on Saturday to consider a variety of questions relating to the "forward" movement started to remedy grievances which have arisen through the operation of the Eight Hours Act. A "down tools" policy in regard to the restoration of the short shifts which had been discontinued under the county agreement was carried.

Correspondence has taken place between the Cleveland mineowners and miners and Sir Robert Romer in regard to the latter's award, a question having arisen regarding the methods in which the minimum datal rates are to be made up. Each party, in submitting their lists of proposed minimum rates in April last made it clear that the figures given as the existing rates payable to the various classes of men were made up by adding 25 per cent. to the base rates. The miners' representatives now contend that, as the result of the award, the base rates should be increased to an extent which, with the 25 per cent. added, would equal the minima fixed, and that all future advances in the district percentage should be calculated on such increased base rates, thus making, when such advances are granted, the minimum rate higher than fixed. Or, if the foregoing interpretation is not in accordance with the award, the men asked to have all future wage advances applicable to each grade of workmen made on the following basis, viz.:—Take a workman having a daily wage of 3s., plus 25 per cent., equals 3s. 9d.; add 2d. per day, which was given by Sir David Harrel's award, making 3s. 11d. per day; add the additional 4d. per day given by Sir Robert Romer's award, giving him a daily wage of 4s. 3d. They asked that in all future advances obtained by the selling price of No. 3 pig iron, the 4d. secured by the award should remain intact. The mineowners disagree entirely with the above contentions of the miners' representatives. They hold that it is not in accordance with the award, nor in accordance with the Act of Parliament, that the minimum rates should vary with the district percentage, and that the minimum rates as fixed are simply minimum rates below which the wages of the respective classes cannot fall, and are not affected in any way by agreements that may be come to between the two associations to vary the rates of wages. Sir Robert Romer's reply is as follows:—

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* *Transactions* of the Institution of Mining Engineers, vol. xviii., p. 154.

† *Colliery Guardian*, May 3, 1912, p. 881.

21, Queen's Gate-gardens, London, S.W
July 2, 1912.

Dear Sirs,—The following gives my opinion on the points submitted to me by your letter of June 25.

The Act under which I was appointed chairman only provided for the settlement of minimum rates of wages. It was not intended to, and did not in terms, otherwise affect wages, or the methods by which in different districts those wages were ascertained. My award was in strict conformity with the Act. It did not purport to, and did not, in fact, affect wages or the methods by which they were ascertained beyond settling the minimum to be paid. I thought I had made that plain by the memorandum accompanying my award. So that while on the one hand the men's wages that were higher, according to the method adopted for arriving at them, than the minimum wage, would not be lowered or affected by my award; so, on the other hand, the wages that were lower would not be ascertained in a different way from that existing before my award, but would simply have to be added to by a sufficient amount to raise them up to the minimum.

For these reasons I am of opinion that on the points submitted to me by your letter, the employers are right in their contention, and the workmen are wrong in their contentions.—Yours faithfully (signed) Robert Romer.

A ballot vote of the members of the Northumberland Colliery Enginemen and Firemen's Association is to be taken on the question of the men giving in their notices to enforce demands for a reduction of hours in some cases and an advance of wages in others.

A meeting of the Wages Board of the Northumberland Miners' Association was held at the Burt Hall, Newcastle, on the 4th inst., when the business with the coalowners respecting the question of weekly pays was discussed. The owners put forward a proposal to pay on the Saturday in each week, while the Wages Board representatives on their part made the counter suggestion that the pays should take place on Friday in each week. The consideration of the matter was adjourned pending the issuing of regulations by the Home Office. In connection with the ballots that, according to the new Mines Act, are necessary to be taken before weekly pays can be brought into operation, the Wages Board are of the opinion that where collieries have not already taken a vote, they should await instructions about to be issued by the Home Office.

Federated Area.

The troubles which arose at Westminster and Bersham Collieries in this district have now been satisfactorily settled, and work resumed.

At the Staffordshire Assizes on Monday, Mr. Justice Phillimore delivered his reserved judgment in the case of the prisoners concerned in the Talke intimidation charges. His lordship said that John Gater, 23, labourer; and John Lowndes, 29, labourer, were found guilty on Friday of intimidation and threatening workmen, with a view to compelling them to abstain from working for their employers, the Talk-o'-th'-Hill Colliery Company Limited. Wm. Singleton, 41, labourer, and Edward Hodkinson, 30, labourer, had pleaded guilty to intimidation. Gater, Lowndes and Hodkinson were sentenced to four weeks' imprisonment. Singleton was sentenced to two months' hard labour.

Scotland.

Another dispute has arisen at the Summerlee Coal Company's Braidhurst Colliery, Motherwell, in consequence of which the men have resolved to request the county union to declare a strike should their grievance—which is one of alleged under-paying in the tonnage rate—not be remedied. The Braidhurst miners were on strike for fully a year, and less than three months ago resumed work at the rate of wages against which they had struck.

The Iron, Steel, and Engineering Trades.

The average net selling price of No. 3 Cleveland pig iron for the quarter ending June 30 last has been certified at 50s. 0·43d. per ton, as compared with 48s. 4·16d. for the previous three months. There was thus an advance in price of 1s. 8·27d. per ton in the second quarter of the year. This carries an advance in blastfurnacemen's wages of 2·25 (2¼ per cent.), raising wages from 20·25 per cent. above the standard to 22·50 per cent. above the standard.

At a meeting of Stanton Ironworks' employees, it was stated on Saturday that the masters had agreed to increase the wages of the pipe pitmen by 2½ per cent., and all labourers rated at £1 per week by a similar amount, the new rates to come into force on July 15. The masters had now agreed that the present prices should be regarded as the minimum below which the wages should not go.

Miners' Federation of Great Britain.

Mr. Asquith has intimated to the Miners' Federation of Great Britain that he will be pleased to receive from them on Monday afternoon, July 15, a deputation to lay before him certain complaints regarding the working of the Coal Mines (Minimum Wage) Act. Particular points to be laid before the Prime Minister by the deputation will be the failure of the Act to provide at least the "5 and 2" minima in every district, and also the extreme stringency of some of the regulations governing the paying of the minimum wage. The deputation will be headed by Mr. Robert Smillie, acting president of the Federation since the death of Mr. Enoch Edwards.

A meeting of the executive of the Miners' Federation of Great Britain was held at the Westminster Palace Hotel on the 5th inst., Mr. Robert Smillie presiding. A number of resolutions were considered which had been referred to the executive from the last annual conference. Amongst these is one dealing with the question of the nationalisation of mines. The executive appointed a committee to draft a Bill for the nationalisation of the mines of the country, and further decided to initiate an active propaganda in all mining districts and industrial centres, to present the case of mines nationalisation from the point of view of the mining industry, and also from the point of view of British trade generally.

Miners' International Congress.

The Miners' International Congress was opened at Amsterdam on Monday. The congress is one of the largest which has been held, all the affiliated nations being represented by delegates.

Mr. Smillie, at the outset of his presidential address, paid a eulogy to the memory of Mr. Enoch Edwards. Coming to the recent trouble in the coal trade of Great Britain and also on the Continent of Europe, the president said there were two features about the national strike of which the miners of Great Britain were justifiably proud. The first was the solidarity of the movement. The second and equally remarkable feature of the national stoppage was the lack of disturbance. The miners of Great Britain admitted that the concession of the principle of an individual minimum wage was a satisfactory advance on anything which had previously existed in the coal trade; but they were not, and could not, be satisfied until they had further legislation to give practical effect to the principle embodied in the Minimum Wage Act. Matters could not stand where they did to-day. There must be a minimum rate of wages fixed by law for every grade of workmen employed in the mines, and that rate must be a living wage.

Herr Sachse (Germany), M. Lamendin (France), Mr. Germer (United States) and M. Desjardin (Belgium) reported on the conditions and events in their respective countries.

The first resolution, moved by Holland, was that the safety and health of miners could be secured only by the appointment of mine inspectors selected by the miners and paid by the State. The resolution was heartily supported by the Scottish and German delegates. On Tuesday the resolution was passed unanimously.

After discussion, three proposals made by Great Britain, Belgium and France in favour of the nationalisation of mines were passed unanimously. The British proposal, as amended by Germany, read thus:—"That this Congress is of opinion that all land, mines and railways should be nationalised in the interests of the community of the different countries." The Congress also adopted another proposal by Great Britain in favour of the principle that five days' work a week is sufficient for miners.

South Staffordshire Mines Drainage.—At a meeting of South Staffordshire Mines Drainage Commissioners, held last week at Dudley, Mr. Homfray, who presided, said the rainfall for the last four weeks had been 5·34 in. This was the largest rainfall for the month of June since records had been taken at Trindle House, extending over 22 years. He moved that every occupier of a mine within the drainage area be required to make a return of the number of acres of mines occupied by him and of the number of tons of mineral raised by him during the half-year ending June 30 last. It was decided that in accordance with the provisions of an award of the arbitrators dated June 18, a mines drainage rate for one year, from July 1, payable in two half-yearly parts, be assessed and levied upon all occupiers of mines in the Tipton district, of 3d. upon every ton of fireclay and limestone, and 9d. upon every ton of ironstone, coal slack and other minerals.

THE IRISH COAL TRADE.

Thursday, July 11.

Dublin.

Business continues to be very quiet in the coal trade generally, and prices of all classes remain unchanged. There is a fairly good demand for coke at present, and coal contracts issuing are numerous, the most important being for locomotive steam for some of the principal railways for the usual twelve months' supply. City prices stand as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 21s.; best Orrell slack, 21s.; "bell" coal, 1s. 5d. per sack; best coke, 23s. per ton. The coaling vessels arriving during the week totalled 49, as compared with 61 the week previously, chiefly from Garston, Girvan, Newcastle-on-Tyne, Ayr, Newport, Cardiff, Glasgow, Liverpool, Maryport, Saundersfoot, Troon, Point of Aire, Campbeltown, Workington and Swansea.

Belfast.

There is no change in the local trade since last week, but prices are keeping firm, although the demand has fallen off considerably during the past fortnight, more particularly as regards house coal. There is a fair amount of contract business offering for house, steam, and gas coals. City prices are as follow:—Best Arley coal, 25s. per ton; best Wigan, 24s.; Orrell nuts, 24s.; Scotch, 21s.; Orrell slack, 21s. Quotations ex quay are about from 15s. to 17s. 6d. per ton for steam coals, households from 18s. to 21s. 4d. per ton. The number of coal vessels arriving in this port from June 16 to 29, totalled 131. Cargoes arriving during the past week were chiefly from Garston, Swansea, Preston, Glasgow, Ayr, Troon, Ardrossan, Manchester, Maryport, Irvine, Newport, Port Talbot, Girvan, Whitehaven, and Ellesmere Port. The supply is still plentiful and freights are keeping firm.

THE WELSH COAL AND IRON TRADES.

Thursday, July 11.

North Wales.

Ruabon.

COAL.

The sales of fuel in this locality have been up to the normal summer standard during the past week. The household trade has improved somewhat and landsales have sold more fuel than they have done recently, prices being about the same as reported last week, an average of 18s. 4d. per ton delivered. Steam coal is in good demand, and the prices realised vary. The average is about 13s. f.o.r. Gas coal is also readily disposed of, and the average contract price, which is based on the 2s. 6d. advance, is about 12s. 6d. to 13s. per ton for good gas coal f.o.r. Slack is obtaining varying prices according to quality, up to 7s. 6d. per ton, and gas coke from 15s. to £1 in some cases. At Ellesmere, where the gasworks is owned by the Council, a motion was made to charge ratepayers 18s. and the 20s. to others, but this was not carried into effect, as all the coke made was readily disposed of at the higher figure. This Council have renewed their gas coal contract at 14s. 4d. per ton delivered.

Monmouthshire, South Wales, &c.

Newport.

COAL.

There has been little of notable change during the past week in the steam coal trade, steamers for loading have not come into port so numerously as expected, so prompt tonnage is still badly required by most leading collieries. Under these conditions quotations remain steady, with, perhaps, a tendency to favour buyers who can ensure immediate delivery, while for forward delivery a similar tendency to higher figures seems developing. For smalls, a good demand is being sustained, while supplies available are not excessive; quotations, however, are not any higher than last week. The house coal market is depressed, the demand being at the minimum. Patent fuel remains a steady trade, while pitwood rules rather firmer on the week, although sellers are hampered by a scarcity of empties. In the freight market a deficiency of tonnage has operated against business, and with a brisk enquiry rates all round are on the upward trend. Last ruling quotations may be taken as follow, coal prices cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 3d. to 15s. 6d.; western-valleys, ordinaries, 14s. 3d. to 14s. 9d.; eastern-valleys, best, 14s. to 14s. 3d.; other sorts, 13s. 6d. to 13s. 9d.; colliery smalls, best, 9s. 6d. to 9s. 9d.; seconds, 8s. 9d. to 9s.; inferiors, 8s. to 8s. 6d.; screenings, 9s. 9d. to 10s.; through coals, 10s. 3d. to 10s. 9d.; house coals, best, 18s. to 18s. 6d.; seconds, 17s. to 17s. 6d.; nuts, best washed, 11s. to 11s. 3d.; patent fuel, 18s. 3d. to 19s. 3d. Coke: Furnace, 21s. to 23s.; foundry 25s. to 27s. Pitwood: Best French fir, 21s. to 21s. 6d. ex-ship.

IRON.

The healthy conditions recently reported in all departments of the local iron and steel trades are well maintained, and with good enquiries on the market a busy time is anticipated for some time ahead. Works generally are well employed, and there is every indication of a larger demand during the next six months than there has been during the past half-year. Tinplate and sheet bar mills continue very active, and with works well booked the prospect is satisfactory. While official quotations of £5 12s. 6d. to £5 15s. Bessemer, and £5 15s. to £5 17s. 6d. remain unaltered, makers who are able to give prompt delivery can easily obtain higher prices. Better enquiries are coming to hand at the rail mills, where values are firm on the basis of £6 7s. 6d. to £6 10s. for heavy sections, with the usual 10s. extra for light ditto. Welsh hæmatite has again increased in value on the week, and now stands firm at 78s. 6d. to 79s. 6d. delivered in the district. A quieter tone is apparent in the tinplate market, where the recent demand has been decidedly moderate. Officially quotations remain unchanged at 14s. 9d. to 14s. 10½d. Bessemer, and 14s. 10½d. to 15s. Siemens for I C 20 × 14, with other sizes and grades accordingly.

Cardiff.

COAL.

The tone of the market this week is decidedly firmer, and the hopeful view which for some time has prevailed amongst sales agents, who are accustomed to take a more extended outlook of the coal trade than other people, is receiving satisfactory confirmation. Although, in consequence of the large accumulation of stocks, buyers with prompt boats are still able to make purchases at prices lower than those quoted for forward delivery, there is no doubt that the unusual amount of chartering done on Admiralty account is having a very beneficial effect on the market. When it is mentioned that no fewer than 300 ships are engaged in the naval manœuvres, it will readily be understood that an enormous quantity of coal will be needed. By some experts it is estimated that the heavy requisitions on Admiralty account will amount in the aggregate to something like 150,000 tons in excess of the regular requirements. The high rates paid for boats to follow the fleet—averaging as they do 12s. 6d. per ton per month on the gross registered tonnage, with 15 days' service guaranteed—have naturally attracted considerable tonnage to the port. As compared with the figures paid for a number of years past they show an advance of as much as 4s. 8d. In one case 14s. 6d. was obtained for a small vessel. Unfortunately many collieries, in order to release their wagons and to keep the pits going, have been obliged still to accept prices ranging around 17s. 3d. for best steams, and 16s. to 16s. 3d. for second Admiralties, but as regards future supplies there is no doubt that the tendency is towards higher prices. One factor, which undoubtedly has great influence with buyers, is the immense amount of chartering that has recently taken place. Last week the tonnage taken up amounted to 483 460 tons, being an increase of 277,700 tons as compared with the previous six days. This is a record for a very considerable time past, and with the approach of the holiday season, when outputs of coal will be greatly reduced, must have a perceptible effect on prices. Already it is found that the men are not turning out nearly as much coal as they did during the month of May, and collieries which are well stemmed are holding out firmly for 17s. 6d., and in some cases even for 17s. 9d. per ton for prompt shipment. For August the quotations are firm at 18s., although here again those collieries which are not well sold for that month would no doubt be found willing to accept 3d., or even 6d., per ton less. The Cunard Steamship Company, who came into the market a week or two ago for 120,000 tons of best steams for delivery over six months commencing from November next, are said to have placed their contracts. The coal to be supplied is the Cambrian and the Penllyn (the latter being that of Messrs. Mann, George and Co.), but up to the present the price to be paid has not been disclosed, though there is reason to believe that it is apppreciably higher than the price paid in the case of the last contract. It is also currently reported that the contract of the Bombay, Baroda and Central India Railway Company, who invited tenders for 23,000 tons of steam coals, has again been secured by Messrs. Watts, Watts and Co., but as the price to be paid is a c.i.f. one, it is impossible to say what it is. The coal is to be delivered at Bombay in equal portions in September and December next, and in February and May of next year. It is said that Messrs Watts, Watts and Co., and Messrs. Pyman, Watson and Co., have obtained the contract for 30,000 tons of large steam coals for the French State Railways. A good deal of interest has been excited by the action of the Navigazione Generale Italiana. This company formerly used Welsh coal almost exclusively, but for some time past they have been taking supplies from America, and the British Consul at Genoa reported the other day that they had made agreements for the supply of between 200,000 and 250 000 tons per annum for a period of five years. The coal is to be carried by a Newcastle steamer on time charter at £1,200 per month, and it is to be bunkered at Dakar. To the readers of these reports the news will occasion no surprise, as it was mentioned some time ago that a movement was on foot for the conveyance of large quantities of American coal to the Mediterranean, and for the return on the backward voyage of cargoes of Spanish ore to Philadelphia. Several steamship lines already bunker at Dakar, and with the contracts made by the Navigazione Generale Italiana, it is estimated that the quantity of American coal to be handled in future at this and other Italian coaling stations will amount to nearly half-a-million tons per annum, and will, of course, be a serious loss to the South Wales trade. There is, however, one crumb of consolation The awards which have lately been made under the Minimum Wage Act at the various collieries in this country are beginning to attract considerable attention, not only in America, but in all the foreign coalfields. The miners there will, it is thought, before long take action to secure similar concessions from their own employers, and in that event there will be some chance of the Welsh coalowners winning back some of the trade which through the recent strikes has been lost to the district. Although Viscount St. Aldwyn's award, which was issued on Monday, does not entirely meet the demands of the Welsh miners, the difference between the amounts asked for and those granted is so small that there is not much fear of any trouble. It is too early yet to speak definitely as to the effect of the awards on the wages payable by the collieries, but a considerable amount of apprehension prevails on the subject The small coal market is rather easier than last week, 10s. 6d. being the top figure obtainable for bunkering qualities, whilst in some cases 10s. 3d. has been accepted. Best ordineries are 9s. 6d. to 10s. and cargo qualities 9s. 3d. to 9s. 6d. Washed nuts are 14s. 6d. and washed peas 12s. 6d. for best, and 11s. 6d. to 12s. for secondary qualities. It is reported that Messrs. Pyman, Watson and Co., Messrs. Morgan, Wakley and Co., and Messrs. Moxey, Savon and Co. have secured the bulk of the contract for 30,000 tons of small coal required by the French State Railways for delivery from August to December. There is no material change in Monmouthshire coals so far as spot loading is concerned, but with the placing of the Egyptian State Railway contracts, coalowners are not inclined to accept current prices for forward delivery. Black Vein coals on spot are 15s. 6d., western-valleys 14s. 9d. to 15s., best eastern valleys 14s. 3d. to 14s. 6d., and seconds 14s., in each case f.o.b. Cardiff. Bituminous coals are about the same as last week, Rhondda large being 17s. 3d. to 17s. 6d., through-and-through 14s. 6d. to 14s. 9d., and small between 12s. and 12s. 6d. No. 2 large is still irregular, and whilst some sellers ask 12s. 3d., others have accepted 11s. 9d.; through-and-through is 10s. 6d. to 10s. 9d, and small 8s. 9d. to 9s. per ton. The following table, showing the exports from the Welsh ports to the chief countries of the world from January 1 to May 31, together with the increase or decrease as compared with the corresponding period of last year, strikingly emphasises the serious effect which the great coal strike had upon the trade of the district:—

	Exports Jan. to May. Tons.		Increase. Tons.		Decrease. Tons.
Russia	75 815	...	20,618	...	—
Sweden	57,675	...	7,242	...	—
Norway	36,785	...	—	...	5,459
Denmark	11,402	...	—	...	1,071
Germany	88,883	...	—	...	20,827
Netherlands	45,965	...	—	...	12,974
Dutch possessions in Indian Seas	9,910	...	3,109	...	—
Belgium	92,939	...	—	...	119,030
France	1,880,095	...	—	...	457,608
Algeria	182,800	...	—	...	55,740
French Somaliland	12,833	...	—	...	1,119
Portugal	238,204	...	—	...	37,735
Azores	12,365	...	5,176	...	—
Madeira	29,529	...	3,963	...	—
Spain	363,934	...	—	...	37,477
Canary Islands	281,185	...	—	...	103,724
Italy	1,684,914	...	—	...	373,021
Italian East Africa	22,628	...	18,234	...	—
Austria-Hungary	23,131	...	—	...	50,829
Greece	101,586	...	—	...	22,456
Bulgaria	18,251	...	—	...	2 805
Roumania	33,760	...	—	...	13,845
Turkey (European)	40,537	...	—	...	21,795
„ (Asiatic)	38,776	...	—	...	29,647
Egypt	564,521	...	—	...	237,197
Tunis	34,400	...	—	...	6,162
Siam	1,966	...	—	...	6,148
China (exclusive of Hong Kong)	10,683	...	4,434	...	—
Mexico	7,064	...	—	...	4,375
Chili	222,883	...	22,132	...	—
Brazil	487,972	...	—	...	76,476
Uruguay	258,787	...	—	...	118,867
Argentine Republic	914,841	...	—	...	305,109
Channel Islands	26 969	...	—	...	3,795
Gibraltar	113 899	...	28,588	...	—
Malta	103,519	...	—	...	44,009
Cape of Good Hope	11,074	...	—	...	2 904
Mauritius	6 698	...	688	...	—
Aden	80,229	...	5,727	...	—
British India	31,953	...	—	...	24,602
Straits Settlements	6,110	...	—	...	4,467
Ceylon	87,332	...	—	...	33,793
Hong Kong	20,708	...	3,321	...	—
British West Indies	1,781	...	—	...	3,831
West Africa, French	34,232	...	—	...	8,400
„ Portuguese	114,551	...	—	...	8,396
„ British	40,226	...	6,694	...	—

Java, in the five months, imported from the Bristol Channel 18 695 tons; in the same period last year its imports were *nil*. Tripoli in the five months imported 4,240 tons, as against nothing for the corresponding period of last year. The quantity of coal shipped coastwise during the month of May was 549,041 tons, as against 396,230 tons in the corresponding month of last year, being an increase of 152,811 tons. From Cardiff alone the shipments amounted to 359,746 tons, of which Southampton took 43,200 tons, Portland 41,140, Liverpool 41,000, London 38,500, Devonport 31,780, Bristol 24,786, Chatham 18,450, Sheerness 16,350, and Portsmouth 12,570 tons. The shipments from Newport were 78,585, Swansea 44,938, Port Talbot 9,242, and Briton Ferry 16,726 tons. The *Cardiff Journal of Commerce* publishes a table showing the average declared price per ton of coal exported from the principal ports during the month of May. The following relates to the chief South Wales ports:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	17	2	15	8	17	5	16	2
Through-and-through	14	3	11	9	10	2	10	5
Small	9	5	10	7	8	7	8	4
Large anthracite	26	6	—		18	9	17	3
Household	—		—		14	10	15	0

For the month of May last year, the prices were:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	13	6	14	4	14	9	14	5
Through-and-through	8	0	11	10	9	10	10	0
Small	8	6	9	10	7	6	7	8
Large anthracite	21	7	—		14	1	16	1
Household	15	2	—		—		—	

Shipments of patent fuel have been exceptionally heavy, amounting in the aggregate to 44,293 tons, a record for a very considerable time past. The Crown Fuel Company shipped 6,862 tons (other local companies 5,000 tons), Swansea 23,381 tons, and Newport 9,050 tons. Best brands for prompt shipment are still quoted at 19s. per ton. North's special foundry coke is 28s., and ordinary qualities 25s. per ton. There is a better enquiry for pitwood and 21s. 6d. is being readily paid. This price would, no doubt, be exceeded if wagons were more plentiful.

IRON.

All the tinplate mills continue to be very busily employed, some of them not having yet made up the arrears into which they fell during the recent strike in the coal trade. Receipts from works last week amounted to 197,909 boxes, whilst the shipments totalled 150,214 boxes. This left a balance of 47,695 boxes to be added to stocks, which are once again over half a-million—namely, 508,006 boxes. Although block tin has fallen £5 per ton, manufacturers hold out for fully late rates, but very little fresh business is doing. Prices are on the basis of 14s. 7½d. to 14s. 9d for Bessemer standard cokes. There is more enquiry coming forward from Japan and South America. In steel bars there is no change, Bessemer still being quoted at from £5 12s. 6d. to £5 15s., and Siemens at £5 15s. to £5 17s. 6d. Orders for galvanised sheets have apparently been withheld pending the result of the Birmingham quarterly meeting. As regards prices the tendency is rather easier, and £11 17s. 6d. seems to be the general quotation for 24-gauge corrugateds. Rails are firmer, heavy sections being £6 5s. to £6 10s., with the usual extras for light sections. Welsh pig iron is 75s. to 76s. f.n.t. Iron ore is very firm, and 21s. 6d. is being offered for rubio on a 56 per cent. basis. Steel scrap is advancing, new crop ends realising from 62s. to 62s. 6d. f.o.t. As a result of the audit of the iron and steel workers' books for the quarter ended May 31 the wages of the workmen have been advanced 5½ per cent.

Swansea.

COAL.

Last week the trade of the port was very satisfactory. Both the coal and patent fuel trades experienced exceptional activity, the shipments amounting to 114,821 tons. There was an average attendance on 'Change this morning, and the conditions prevailing on the anthracite coal market were without any material alteration, the undertone being steady to firm. There was an excellent demand for Swansea valley large, but sellers are experiencing difficulty in obtaining tonnage. Red Vein large was very weak, and for prompt delivery sellers were prepared to accept very low prices. Machine-made nuts and cobbles were slightly harder, but French and German nuts barely held their own. Beans and peas were very firm. Rubbly culm was in a little better request, whilst duff continued very firm, with values harder. In the steam coal market a better tone was in evidence, and quotations for both large and small were again marked up. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 16s. to 18s. less 2½ per cent.; Red Vein large, 12s. to 13s. 6d. less 2½ per cent.; machine-made cobbles, 22s. to 24s.; Paris, French, and German nuts, 23s. to 25s.; beans, 22s. to 23s. 6d.; machine-made large peas, 14s. 3d. to 15s.; ditto fine peas, 13s. 6d. to 14s. 3d., all net; rubbly culm, 7s. 9d. to 8s. 3d., less 2½ per cent.; duff, 4s. 6d. to 5s., net. Steam: Best large, 18s. 6d. to 18s. 9d.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s 6d. to 11s. 6d.; small, 9s. 6d. to 10s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 18s. to 19s.; through-and-through, 15s. to 16s. 6d.; small, 10s. 6d. to 11s. 6d., all less 2½ per cent. Patent fuel, 16s. 6d. to 17s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

Last week employment at the blast furnace at Landore was regular, and the yield of pig iron compared well with any similar period since the coal strike. The steel-smelting establishments throughout the district continued to have ample and pressing demand for all metal produced. The tin-plate trade continued brisk. The shipments last week were 150,214 boxes, receipts from works 197,909 boxes, and stocks in the dock warehouses and vans 508,006 boxes.

Llanelly.

COAL.

There are sufficient orders on the market to keep pits going well, but the tonnage question is still a great source of trouble. Stocks for most kinds are very heavy awaiting shipment, and, until this has been removed, prices will not be as satisfactory as they should. Pits are often in difficulties owing to the shortage of empties. The market is getting somewhat firm, owing to the holidays in August, but for works coal the position is easing, as most of the manufacturing works will be closing down for a week's holiday. Nearly all the anthracite collieries are fairly well placed with orders, large is rather a weak market, but most of the machine-made kinds are busy. Steam and bituminous kinds are weak and prices are quite a contrast to what they were a few weeks ago. Bunkers are being very much out. Prices this week are:—Best malting large, 21s. to 23s.; second malting large, 20s. to 22s.; Big Vein large, 16s. to 18s.; Red Vein large, 13s. to 14s.; machine-made large cobbles, 21s. to 23s.; German nuts, French nuts, Paris nuts, 22s. to 24s.; machine-made large beans, 21s. to 23s.; machine-made peas, 14s. to 14s. 6d.; rubbly culm, 8s. 3d. to 8s. 9d.; duff, 5s. to 5s. 8d.; large steam, 13s. to 14s.; through-and-through, 10s. 6d. to 11s.; small steam, 8s. 6d. to 9s. 6d.; bituminous small, 10s. 8d. to 11s.—all f.o.b.

THE BY-PRODUCTS TRADE.

Tar products:—The market generally is very firm, and in the case of benzols and pitch there has been an upward tendency. Carbolics keep steady, while naphthas are firm, with the prospect of an improvement. Nearest values are:—

Benzols, 90's, 1s.; ditto 50's, 11½d.; toluol, 10½d.; carbolic acid, crude (60 per cent.), 2s. 6d. to 2s. 6d.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 11d., as in quality and package; crude ditto, 4½d. in bulk; creosote, 2¾d. for ordinary qualities; pitch, 52s. 6d. to 54s. 6d. f.o.b. east coast; ditto, 52s. 6d. to 53s. 6d. f.a.s. west coast; ditto, 55s. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—The market is quiet, and prices on paper are easier. The forward position is uncertain, and prices the same in the absence of real business. The period of low prompt values is upon us, but it is as well to discount the attitude of the would-be "bears," and there are signs that show the wisdom of so doing. One small sale at a reduction does not represent the market as a whole. Closing prompt prices are:—

London (ordinary makes), £13 10s.; Beckton, £14 1s. 3d.; Liverpool, £14 10s.; Hull, £14 8s. 9d.; Scotch ports, £14 10s.; nitrate of soda (ordinary), 11s. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

An important intimation as to the employment of boys in mines has been made by Mr. T. Richardson, M.P, at a meeting of the executive council of the South Wales Miners' Federation. He said that a reply had been received from the Home Secretary stating that boys under the age of 14, even if already at work in the mine, must under the new Mines Act discontinue to do so, as there could be no exception to the clause under the Act, which provides that boys under the age of 14 years shall not be employed in or about a colliery.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Lord St. Aldwyn's Award—Miners' Re-organisation—Sectional Unions Denounced—The Enormous Burden of Taxation on Mining: Increase Equivalent to 5 per cent. Dividend—Wholesale Discharge of Collier Boys under New Law—Barry Railway Company's Decrease in Shipment—Coal Exports for June—Decrease in Tin-plate Export—Port Talbot Strike Settled—Cwmtillery Strike Settled.

The award of Lord St. Aldwyn has now been issued, somewhat later than expected, for the original idea was that it would have been available before the end of June. By way of comparison we give (1) the demand of the men in the different classes, (2) the owners' offer, and (3) the independent chairman's award. It has, however, to be emphasised that the men's demands were to carry with them a minimum percentage of 50 above the standard, whereas the owners wished to maintain the present minimum percentage of 35 above the standard, these to vary from that point to 60, according to the terms of the existing agreement. The following sums in the men's demand and the owners' offer include respectively the 50 or the 35 per cent., whilst the award is shown at the present rate of 51¼ per cent.

	Men's demand.	Owners' offer.	Chairman's award.
	s. d.	s. d.	s. d.
Colliers and timbermen	8 0	5 0·75	6 5·25 to 6 11·30
Rippers	8 0	4 8·70	6 0·60
Assistant timbermen & rippers	6 6	3 9·90	5 0·50
Hauliers	7 0	4 10·05	5 6·55 to 6 3·62
Hitchers	7 0	4 8·70	5 3·52 to 5 9·57
Ropemen and trafficmen	7 0	4 0·60	4 9·47 to 5 0·50
Ostlers and labourers	5 0	3 9·90	4 9·47
Boys (14 to 21)	2 6 to 4 6	1 9·60	2 3·22 to 4 6·45
Enginemen (large haulage)	7 6	—	5 0·50
,, (small haulage)	5 0	—	4 9·47
Pitmen and masons	8 0	—	6 3·62
Rope splicers	7 6	—	5 9·70
Electric wiremen	7 0	—	5 2·00
Motormen	6 6	—	4 9·47 to 5 0·50
Coal-cutters	7 6	—	6 5·25
Roadmen	7 0	4 0·60	5 5·03
Riders	7 0	4 0·60	5 8·06
Blocklayers	7 0	4 0·60	4 9·47
Trammers	7 0	4 0·60	4 10·88

The full award is published on page 69 of this issue.

The award had a mixed reception in South Wales, but on the whole the criticism was not unfavourable. Mr. Watts Morgan expressed disappointment that workers in a coalfield like South Wales should have a lower minimum than those in an inferior coalfield like Derbyshire, whilst Mr. Noah Ablett, however, hoped that by next year they would "have attained something like the level of their wishes." Mr. Tom Smith, Trealaw, and Mr. Mark Harcombe, of the Cambrian workmen's committee, did not favour the award, saying that it would be unsatisfactory. At Merthyr, it was stated that the award fell short of the men's expectations, and the leaders were disappointed. Similar expression was made by Mr. George Barker in the western valleys, but in the eastern valleys gratification was expressed at the "great and certain increase." Speaking generally the effect of the award will be to "level up" the lower paid workmen, but the majority of the colliers remain unaffected.

The executive council of the South Wales Miners' Federation have given initial consideration to the proposals—revolutionary in their nature—for re-organising that body. Advocates of the change declare that their intention is to "get rid of the bureaucracy," while opponents declare that it is only an endeavour of the extremists to obtain control. Really, the new proposals have a singular resemblance to the fundamental question which has been at issue in the Roosevelt-Taft struggle across the Atlantic: Shall the primaries determine the policy? In South Wales the "primaries" are the miners' lodges.

The sub-committee recently appointed for that purpose, submitted to the executive a draft scheme of re-organisation. Admittedly, this was only tentative, and it aims at greater centralisation, thus running counter to the district freedom (almost autonomy) which hitherto has prevailed. It is suggested that an executive council composed of the officials and of elected delegates should be established upon a basis of representation which is outlined, and that quarterly conferences and an annual conference should be held, the local lodges initiating proposals upon which those conferences (composed of specially elected delegates) shall decide.

Friday's meeting referred back several points for the sub-committee to consider further, and the ultimate procedure will be to call a new conference of delegates, to whom the approved scheme must be submitted. There is an evident intention to keep a very close hand upon expenditure, particularly in salaries and allowances to officials, and at the same time to make the organisation of a more concentrated and therefore more effective character.

It is significant that at this same meeting of the council wherein such an effort at concentration is made, there should have been reports as to the starting of sectional unions in different parts of the coalfield, and the passing of a resolution that the executive deprecated such action and would oppose it to the utmost.

One statement made in the meeting was that workmen were being asked to contract out of the Minimum Wage Act, and enquiry is to be instituted concerning this.

In connection with the very heavy burden of taxation, it is worth while referring again to the observations of Mr. J. Brailsford, chairman of the Ebbw Vale Company, at the recent meeting of shareholders. His remarks make manifest the very great increase which has taken place during a number of years in the burdens upon industry, and particularly the heavy decline in return upon capital which has been thereby occasioned. Mr. Brailsford said that during the year the Ebbw Vale Company had paid in local rates and Imperial taxation a sum of no less than £54,797. To this must now be added the large amounts entailed by the Minimum Wage Act, the new Coal Mines Act, and the Insurance Act. When he joined the board 20 years ago their local rates totalled £10,281, and that was the extent of the burden. The difference of the annual fiscal burden as between then and now was well over £40,000, which in itself was equivalent to a dividend of more than 5 per cent. on the entire share capital of the company.

Mr. Brailsford added a remark with which every investor will agree, namely—"The time has come when all classes of shareholders—and particularly those of slight means—should be made aware of this huge mass of legislative burden with which industry is handicapped, and the very large sum of money that has to be earned in order to discharge that burden before anything whatever can be allocated to the payment of debenture interest or to a return upon ordinary share investments."

It is estimated that the provision of the new Coal Mines Act, which forbids the employment of boys under 14 years of age, will necessitate the discharge of some hundreds of boys in the Rhondda Valley alone, and the number will run into thousands throughout the coalfield. A serious matter from the colliers' point of view is the reduction of family earnings thereby occasioned. An idea seems to have prevailed that those lads who were already at work would be exempted, and that the new law would apply only to those engaged subsequent to July 1, but special enquiry has shown this idea to be erroneous.

At Aberbeeg Colliery, Monmouthshire, owned by Messrs. Budd and Co., considerable developments are indicated. A contract has been let for new machinery which will deal more effectively with the water, the outlay entailed being several thousands of pounds.

It is announced that Mr. G. Rowlinson, who for a quarter of a century has been miners' agent in the Forest of Dean coalfield, has decided to resign that position. But for considerations of health, Mr. Rowlinson might have taken a far wider range of activity in Labour circles, including Parliamentary service.

Last week was noted the money loss to the Barry Railway Company by reason of the strike, and a return since issued shows that the decrease in coal shipments was more than 450,000 tons as compared with the corresponding period of last year.

But this is not all the loss. The recurrent stoppages have caused diversion of business to an extent which, as yet, is not fully realised or even realisable. Just as Swansea has lately suffered through lack of shipping—vessels being sent elsewhere because of the strike in sympathy with London—so all South Wales has sustained heavy and even permanent loss because of the uncertainty which has been occasioned by the repeated strikes.

Italian business has been captured by the Americans (as our market report has shown), among the orders being that of the Navagazione Generale, which amounts to close upon a quarter of a million tons annually. The Americans, like the Germans, have seized their opportunity, utilising the fear of British unrest in order to secure orders for a long period forward—this Italian contract is said to be for three years, and during that period South Wales, of course, loses the trade. Seeing that wages take anything from 72 to 80 per cent. of the price, there is a heavy loss which it is to be hoped the wage-earners will begin to recognise. One firm, formerly buying in South Wales, is now handling on Italian account at least 200,000 tons of American coal in addition to the above, whereas formerly they were buyers of British, chiefly from this district. Orders for Egypt have also been lost, America here being once more the gainer.

Nevertheless, the outlook in South Wales is bright, and notwithstanding the seriously heavier costs entailed by legislation, there is every prospect of better business at higher prices. Tonnage is returning. Coalowners and merchants are not now under such stress to accept reductions of price in order to ensure clearance and keep the mines at work. Largely increased output (due to colliery developments), good demand, and the increasing needs of consumers, all point to higher prices and heavier shipments, with better results in every direction.

The coal exports for June from the South Wales ports show a total tonnage below that of May, but higher than that of the corresponding month of 1911. The increases in foreign export over June 1911 are Cardiff 171,691, Newport 50,827, Swansea 10,357, Port Talbot 20,191, and coastwise there was an increase at Newport of 4,514, but decreases at Cardiff of 12,769, Swansea 3,459, Port Talbot 370, and Neath 1,718. The total export for June of this year was 2,418,064 as against 2,183,005 in June 1911. The returns for patent fuel and coke were for June 1912, 120,703 tons; June 1911, 133,528 tons.

The Board of Trade returns for tin-plate exports for June show a decrease on the figures for June 1911, as do also the returns for the six months' export ending June. The figures are:—June 1912, 30,471 tons, as against 41,968 for June 1912; and for the six months ended June 1912, 216,089 tons, as against 257,847 tons for the six months ended June 1911. In value the figures for June 1912 were £429,474, as against £591,207 in June 1911, and for the six months of 1912 £3,022,128, as against £3,640,504 in 1911. The export of black-plates shows a reduction for the month of June, being 3,891 tons, as compared with 5,965 tons in June 1911; and for the six months 26,794 tons, as against 34,542 tons for the first half of 1911. In galvanised sheets the return shows that there was a slight increase on the month's export, but a decrease on the half year. The figures are:—June 1912, 50,978 tons, as against June 1911 49,757 tons; six months ending June 1912, 289,574 tons; six months ending June 1911, 321,906 tons.

At the end of last week the strike at the Port Talbot docks changed for the worse, the dockers' representative withdrawing a statement he had laid with the management with the object of securing a settlement. The tippers and hoistmen, on Saturday, refused to down tools, and the strikers hoped to secure a stoppage of the local railway men in order to force the tippers to cease work. In this endeavour, however, they failed, and on Monday morning, after a conference between the general manager of the dock (Mr. Lowther) and representatives of the dockers' union and the trimming union, it was agreed to re-start work, a deputation in the meantime waiting on Mr. Lowther, who would act as arbitrator, regarding the 30 odd men alleged to have been victimised by the trimmers.

At Aberavon, on Saturday, the ballot was taken for the post of miners' agent for the Avon Valley. There were 16 applicants, and Wm. Jenkins, Cymmer, Port Talbot, was elected by 2,227 votes, as against 202, the next highest.

The Mines Act was criticised at Saturday's meeting of the Anthracite Association at Swansea.

Mr. J. D. Morgan, agent, reported on clause 61, sub-section 2, regarding explosives. The men had been advised, he said, that "net cost" could mean nothing beyond the price less cost of delivery, but the owners had been told that the "net cost" meant also the cost of storing but not of distribution. It was decided to test a case if necessary. The opinion was expressed that to bring explosives out at the end of each shift would not only be inconvenient but would increase the danger.

At the monthly meeting of the Western Miners' District at Swansea, on Saturday, a resolution was carried that in the event of the pay-day being changed from Wednesday or Friday to Saturday, "we ask Mr. John Williams to call the attention of the Home Secretary to the matter."

On Saturday last the new arrangement for weekly pays in the South Wales tinplate trade came into vogue, and satisfaction was expressed at the change by the day workmen. The pay day may later be changed to Friday. All the Welsh mills are in full work, but the scarcity of bars is being felt at some works.

Speaking at a meeting of the Eastern Valley District on Saturday at Pontypool, Mr. W. Harris, registration agent, said there was a probability "sooner or later" of the miners putting forward a Labour candidate for the division.

At the Brynteg Colliery in the Dulais Valley on Sunday two men were injured in a shotfiring accident. The men had charged some holes for shotfiring and retired. Believing that the shots had gone off they returned, but at that moment one of the shots exploded. Elias Jones, of Coynant, and David Hughes, of Skewen, were injured—the former rather seriously.

The strike at the Lancaster Steam Coal Collieries, Cwmtillery, which has lasted since June 26, and which has been attended by some disorder—as reported last week—ceased on Sunday, and the men returned to work on Monday. The trouble arose over the posting of a "show cards" notice, and at a meeting on Sunday morning Mr. George Barker, the men's agent, read an offer made by the management agreeing that any person in the capacity of secretary should be allowed to post notices, and offering also facilities for "show cards," providing that the notices meet with the approval of the management. The meeting decided that, provided the men were reinstated in their old positions, they would resume work on Monday morning.

At a meeting of the Bristol Channel Dock Owners' Association, held at Cardiff on Tuesday, Mr. Beasley, general manager of the Taff Vale Railway and Dock Company, was re-elected president for the seventh time. Responding, Mr. Beasley said that six years ago he had intended to resign, but had not done so yet.

At Pontardawe Steelworks, owned by Messrs. W. Gilbertson, the sheet mill men decided on Tuesday evening that unless a dismissed rollerman was reinstated, every man in the departments—500 men in all—would cease work on Wednesday evening. It is stated that the man in question was dismissed for breaking a roller, and the company, failing to get another rollerman, stopped that mill and threw out 20 men.

During a Local Government Board enquiry held last week at Doncaster by Mr. H. A. Macewen, M.B., into the apportionment of representation and contribution to the Doncaster and Mexborough joint hospital board, it was stated that the Doncaster district is changing more rapidly than any other provincial district in England, and therefore it was not fair to take the contribution upon the basis of population. The population of the rural area had increased by 60 per cent. in ten years, and Doncaster was like a gigantic mother, producing children, knocking them off, and letting them go forth into the world. The County Council were making provision for the following large schools in the new colliery districts named:—Aspern Spa, 2,000 children; Rossington, 1,000; Edlington, 1,500; Carcroft, 1,000. Mr. Marshall, the clerk to the Doncaster Rural District Council, stated it was expected that the new colliery villages would be erected in an up-to-date sanitary condition, and that therefore they would not produce as many cases of infectious disease as colliery villages erected ten years ago. The clerk to the Bentley Council, Mr. Pye, stated he believed it was proposed to spend a large sum of money in extending the present hospital, but the feeling of his Council was that a small branch hospital should be erected in the northern area to serve Askern, Skellow, Carcroft, Bentley and the immediate neighbourhood. The inspector, who will make his report in due course, was thanked for his services.

COLLIERY ACCIDENTS.

Cadeby Main.

At the Cadeby Main pit of the Denaby and Cadeby Colliery Company at Conisborough, near Rotherham, a terrible disaster took place on Tuesday. In the early morning an explosion occurred which killed nearly all the men working in the south side district. About noon a further explosion overwhelmed a rescue party, the total loss of life being estimated, at the time of writing, at 88. Conisborough was visited on Monday afternoon by the King and Queen, and the only consoling feature about the calamity is that but for that fact it is highly probable the loss of life would have been much greater. The Cadeby men made holiday for the Royal visit, and as a result there were only about 35 men instead of the usual 136 working in the district where the first explosion occurred.

The first rescue party was headed by Mr. W. H. Pickering, H.M. chief inspector of mines for the Yorkshire and North Midland Division, who was accompanied by Messrs. Hewitt and Tickle, H.M. inspectors, and by Mr. Douglas Chambers, manager of the Denaby pit. All these perished together with practically the whole of their followers. Five of the party were afterwards found and brought to the surface unconscious but still alive. These included Mr. Charles Bury, manager of the pit.

The Cadeby pit, which is one of the two large collieries owned by the Denaby and Cadeby Main Colliery Company, is sunk to the well-known Barnsley seam, which here lies at a depth of 750 yards. The first explosion occurred at about 4.30 a.m., while the night shift was at work. Two men, Edward Humphries and Albert Wildman, who were a mile away, carried the first news to the shaft. Humphries stated that his first impression was of a puff of air in his face. "I knew that was the return air," he said, "and a moment later the place was filled with dust. I was confident that something serious had occurred, and this was confirmed when I went down the district. I found a lot of dust accumulated on the rails and on the road. I was working with a man named Joseph Farmer, and we sent for another road layer from another district, named Jack Bullock, of Firbeck-street, Denaby Main. We went steadily on investigating, doing all we could to locate the mischief, but it was not until we came to a level known as 14 level that we found the real cause of the disaster. Here we found tubs smashed into atoms, girders twisted all shapes, and everything scattered up and down the working-place, showing the force of the explosion. We sent for the pit manager. It would be a little after half-an-hour after the first intimation given by the puff of air in our faces when we discovered the real cause. We went on further and came across a lot of foul air. That pulled us up, and we thought we had gone as far as it was safe to go. We then sent for another deputy, George Fisher, and were now emboldened to proceed further, and in a while found the air good. After travelling some distance we came across the body of a man flung across the road and half buried in dirt. From his attitude we could tell he had been hurled down by the force of the explosion, and when we turned him over we saw he was dead. After that I was too upset to proceed, and I went straight back to the pit bottom to summon further aid. I did not go back to the scene of the disaster, but rendered what assistance I could elsewhere."

News of the accident quickly spread, and there was a rush to the colliery. Rescue parties were organised, but for a time little could be done owing to the peril of afterdamp. When the mine began to clear, numbers volunteered to go into the pit. The task of searching for the bodies was then begun, and had been proceeding for some time when a second explosion, more serious than the first, occurred. The noise was heard 2 miles away. Within a very short time members of the Denaby and Cadeby rescue party went down the pit. Other rescue parties were summoned, and they made their way to the southern side of the pit where the two explosions had occurred. By 8 o'clock six bodies had been recovered. They bore evidence of the severity of the blast. Coaldust was burned on their bodies, and it was apparent that in most instances death had been instantaneous. The work of the rescue parties was seriously hampered by the heavy falls of coal and stone which followed the explosion. Mr. W. H. Pickering, the chief inspector, and Mr. Hewitt and Mr. Tickle, went down the pit, and rescue parties with breathing appliances came from Wath. The managing director of the company, Mr. W. H. Chambers, was in Sunderland when the accident occurred, but he returned during the day. In his absence his nephew, Mr. Douglas Chambers, of the Denaby pit, joined the party who went into the mine, as did Mr. Basil Pickering, son of the Government inspector. These gentlemen were superintending the operations below when a further explosion occurred about 11.30 a.m., followed by two others. Men were soon brought up in a state of collapse, overcome by the fumes. The reports they gave when they were able to speak were distressing in the extreme. Most of the rescue party, the mine inspectors and the officials, had been caught by one of the last two explosions, and many of them had perished there. Mr. C. Bury, manager of the pit, was brought out of the workings in an insensible condition, but still alive. Mr. Witty, the agent, also escaped, though his condition when rescued was very critical. Men were still ready to descend the pit, and later in the afternoon the work of rescue was resumed. By 5 o'clock 31 bodies had been recovered.

Percy Murgatroyd, who was the last man to see Mr. Pickering and the other members of his rescue party alive, said:—

"Never shall I forget the horrible sight that met my eyes when I got to the point where the explosion had taken place. The bodies were shattered most awfully. I should think it was about 11 o'clock, when 28 bodies had been got out, that I joined a little exploring party, assisted by Mr. Bury, Mr. Pickering, and two or three gentlemen. We were trying to find out what was the cause of the explosion. There is this rather important point. I was the only man who wore a respirator. The air was very good, and there really seemed to be no need for one, but it was my business to penetrate into any part of the workings that they might tell me to, and so it was advisable that I should wear one. We were talking quite casually when all at once there was a trembling in the air. We had no time to seek a place of safety. The explosion was upon us. I remember a fearful roar, and then clouds of dust and smoke were surging all round. I have a very confused recollection of what happened. I think I must have been stunned for the minute. I remember seeing Mr. Pickering and Mr. Bury lying on the ground as if asleep. I don't think they could have lived more than two minutes in that fearful atmosphere. I staggered about in the thick darkness and tried to find my way out, but suddenly realised that I was lost. I came to a great fall and was so exhausted that I collapsed. After a minute or two it occurred to me that I might find a telephone. I found one and rang up, and presently I heard footsteps approaching and two rescuers came upon me and brought me out."

In the House of Commons on Wednesday night, in reply to Mr. W. E. Harvey, the Derbyshire miners' agent, the Home Secretary read a series of telegrams which he had received from Mr. R. A. S. Redmayne, the Chief Inspector of Mines, who had immediately proceeded to the scene of the disaster. These conveyed briefly the facts stated above. Mr. Redmayne stated that late on Tuesday night the total number of bodies recovered was 69 and three or four bodies still remained in the pit. It was presumed that they were beneath the fall. The sealing stoppings had been built, one a little way in-bye side of the fall in the intake, the other in the return airway. The evidence, he said, pointed to the possibility of the explosion being due to an underground fire, as there were indications of spontaneous heating near the face of the district in question on Saturday morning, which was being dealt with by the management during the week-end.

On Wednesday morning Mr. Redmayne reported that a further slight explosion had occurred at about 3 a.m., and three of the men working at the stopping in the intake were overcome, one of them rather badly, and sent to the surface. After consultation, Mr. Chambers, Mr. Wilson, H.M. inspector of mines, and Mr. Redmayne arranged, as soon as the stopping was repaired, to stop search for remaining bodies, and withdraw all the men from the mine except six, who were to inspect the stoppings at intervals of four hours, to see that they were intact. All other operations to cease for 24 hours unless the stoppage should be damaged by further explosions, in which case it would be necessary to erect stoppings much further out-bye. Mr. Redmayne added that he did not think there was any fear, even were another explosion to take place, of its reaching the shafts, or indeed arriving much further out-bye through the stoppings, as, though the roads were dusty, the dust was not dangerous dust, being practically stone dust.

Another telegram, received later from the Chief Inspector, stated the bodies brought to the surface numbered 71. Possibly three more remained to be recovered at a future date. Five persons were in hospital more or less seriously injured.

Mr. R. A. S. Redmayne, H.M. Chief Inspector of Mines, on his arrival at the scene of the disaster, received the following telegram from the Home Secretary:—

> "The Home Secretary is greatly shocked by the terrible news of the death of three inspectors and 30 others in the second disaster at Cadeby Main. Will you make known to the relatives, and at the mine, his deep sympathy with all concerned in this great sorrow and his admiration of the heroism of men who lost their lives in the work of rescue? The Home Secretary feels it impossible to measure the extent of the loss which the Department has suffered by the death of one of its ablest and most experienced inspectors and a true and devoted colleague."

The inquest on the bodies was opened at the colliery buildings on Tuesday night by Mr. F. Allen, the district coroner. As many identifications as possible were proceeded with, without calling any of the near relatives of the victims. The coroner continued his enquiry on Wednesday afternoon on the bodies of five men, two of which were not identified. The coroner said he had called the jury together that day simply to establish the identification of the bodies of the three men which had been claimed by relatives. He would then formally adjourn to the 23rd inst. at 4 p.m.—Mr. W. Wilson, timber merchant, of Conisborough, a member of the jury, expressed the sympathy of the people of Conisborough. There were bright patches even in the darkest calamities, and the brightest part of this disaster was the magnificent way in which volunteers came and offered to go down the mine, even after the second explosion. His son had told him that when the call came for volunteers quite an army offered their services.—Mr. A. Moody, another juryman, said there were remarkable instances of heroism. William Davis got out of the pit safely on finishing his work, and offered to join a rescue party. His offer was accepted, and he went down. In five minutes he was dead.—The coroner said he knew about one-third of the men who had lost their lives, from the chief inspector of mines down to pit boys.

Mr. McKenna stated in the House of Commons on Wednesday that the Home Office would be represented at the inquest, and he thought it would probably be desirable that the Chief Inspector should hold an enquiry under section 83 of the Coal Mines Act of last session.

The following is an official list of the victims, the number, as recorded at the company's offices on Wednesday, being 75. This is not a complete record, for, as a result of the proceedings at the coroner's enquiry, evidence of identification was given in regard to 13 men whose names are not in this list. The total death roll, according to these returns, is therefore 88. The following is the company's list:—

J. Ross, 64, North Cliff View, Conisborough.
R. Wimpenny, Tickhill-square, Denaby.
Charles Tuffrey, 30, North Cliff-road, Conisborough.
W. Neal, 2, School-terrace, Conisborough.
F. Walton, 10, Strafforth-terrace, Denaby.
W. Summerscales, Tickhill-square, Denaby.
J. Phillips, Wood View, Denaby.
D. Chambers (manager), Conisborough.
S. Webster, 19, Ivanhoe-road, Conisborough.
J. Carlton, Tickhill-square, Denaby.
G. Whitton, 24, Maltby-street, Denaby.
J. Hancock, Yew-terrace, Conisborough.
J. W. Kelsall, 1, Bolton-street, Denaby.
W. H. Pickering (inspector), Doncaster.
H. R. Hewitt (inspector), Sheffield.
G. Y. Tickle (inspector), Doncaster.
F. Horsfall, 149, Tickhill-street, Denaby.
J. Boycott, 30, Ivanhoe-road, Conisborough.
W. Franklend, Rowena-road, Conisborough.
J. Fletcher, 40, Edlington-street, Denaby.
M. Garnett.
C. Halerdson, Sheardown-street, Hexthorpe.
J. Marrow, 62, Loversall-street, Denaby.
W. D. Waters, 28, Firbeck-street, Denaby.
T. Burns, 21, Marr-street, Denaby.
J. Roodhouse.
A. Dungworth, 13, March Gate, Conisborough.
J. McDonagh, 17, Cliff View, Denaby.
J. W. Thompson, 6, Adams-yard, Mexborough.
C. Rodgers, 48, Ivanhoe-road, Conisborough.
H. Thompson, 2, Sprotborough-street, Denaby.
P. G. Evans, 68, Annerley-street, Denaby.
W. Green, 9, Marr-street, Denaby.
E. Henderson, 65, Balby-street, Denaby.
T. Walsh, 7, Wood View, Denaby.
G. Denton, 42, Firbeck-street, Denaby.
M. Jordan, 61, Loversall-street, Denaby.
Thomas Coady, 76, Clifton-street, Denaby.
M. Mulrooney, Mexborough.
G. Steadmen.
A. E. Rowell.
J. Bevan.
J. Beech.
G. Hindson.
W. Dove.
A. Carroll.
P. Nicholson, 5, Beech-hill, Conisborough.
A. Godswark.
John Smith.
C. W. Fletcher, 47, Maltby-street, Denaby.
C. Bywater, Lime-grove, Conisborough.
J. Hailes, 44, Firbeck-street, Denaby.
G. Lovell, 16, Blyth-street, Denaby.
W. Whitaker.
H. Hayton, 30, Edlington-street, Denaby.
M. Noble, 41, Loversall-street, Denaby.
G. Holey, 8, Scowsby-street, Denaby.
S. Ellis (surveyor), Holywell-lane, Conisborough.
E. Tuffrey.
Eli Croxall, Denaby.
C. Prince, Mexborough.
W. Humphries, Denaby.
T. Williams.
— Evans, mining student, South Wales.
T. Sandars, Denaby.
W. Wraithmell, Denaby.
J. Springthorpe, jun., Denaby.
A. Flynn.
F. Richardson, Tickhill-square, Denaby.
John Smith, 65, Firbeck-street, Denaby.
C. W. P. Redley, 75, Balby-street, Denaby.
C. Hunt, 97, Clifton-street, Denaby.
J. Mulhearn, Denaby.
F. Stone.
H. Cusworth (assistant manager), Cadeby.

The coroner's list contains the following additional names:—

Ben Ward, 1, Tickhill-street, Denaby.
R. N. Eddington, Holywell-lane, Conisborough.
Wm. Lambert.
M. Hayden, 77, Firbeck-street, Denaby.
J. Turner, 66, Warmsworth-street, Denaby.
Wm. Davis, Drabbles Yard, Conisborough.
W. H. Wallace, 14, Barnborough-street, Denaby.
J. Shuttleworth, Conisborough.
T. Stubley, 49, Edlington-street, Denaby.
T. Talbot, Denaby.
J. Tarbrook, 20, Firbeck-street, Denaby.
J. Burdekin, Firbeck-street, Denaby.
J. Fox, Earnshaw-lane, Conisborough.

Those lying injured in Fullerton Hospital and at home are:—

Joseph Pearson, 3, Melton View.
W. Rafferty.
Percy Murgatroyd.
William Green.
W. C. Birch.
W. McArthur.
Fred Power.
Albert Farmery.
Arthur Silvester.
P. Holland.
C. Bury (manager of Cadeby).

On learning of the disaster, which occurred within a short distance of Conisborough Castle, where the King and Queen were entertained to tea on Monday, their Majesties were much distressed, and the following message was at once telegraphed by Lord Stamfordham to Mr. Chambers, the managing director of the company:—

> "The King and Queen are shocked to hear of the terrible accident at your colliery. The fact that their Majesties were near to the scene, in the midst of so much rejoicing when they visited Conisborough yesterday, brings home to them still more the sorrow and sadness which now prevail amongst you.
>
> "I am desired to express their Majesties' heartfelt sympathy with the families of those who have perished and with the sufferers in this grievous calamity."

The Queen was moved to tears when she heard the details of the accident, and the King was also much affected.

The King and Queen left Wentworth-Woodhouse at 6.30 and arrived at the colliery offices at Cadeby, close to the pit, before 7 o'clock, where they were received by Mr. Chambers, managing director of the company, and Mr. Robinson Wilson (H.M. inspector of mines). Mr. Chambers showed them a plan of that part of the colliery where the explosion occurred, and explained how the force of the blast travelled and the manner in which the men met their death. When the King and Queen left the offices it was plain to everybody that they were very much affected by the details which they had learned.

After their departure, the management issued the following message:—

> "Their Majesties the King and Queen have visited Cadeby Colliery to-day to ascertain personally and on the spot particulars of the sad calamity which has deprived so many of us of those we love. They have commanded me to express to all those who have suffered the loss of any who are dear to them their deep sympathy with them in their grief."

Mr. W. H. Chambers, asked if he could give the cause of the explosion, replied:—"I can only say it is most mysterious. It was not due to shotfiring, because shots are not used in the mine, and neither was it caused by electricity, because electricity was not used in that part of the mine."

The story of a remarkable escape is told by Sergeant Winch, who was a member of the first rescue party, and many of whose comrades were killed. He states that he felt a puff of air and fell to the ground, where he remained with his face close to the earth while the blast passed over him. He then cautiously made his way out of the danger zone. Another of the rescuers owes his life to the fact that he was equipped with a respiratory apparatus.

Mr. McKenna, after he had read the messages above referred to, was asked by Mr. Harvey if he had any knowledge as to whether the explosion was caused by the use of coal-cutting machines. And further, seeing that there were many coalpits in that district subject to spontaneous combustion and giving off gases at the face and this being such a serious matter owing to the loss of life, whether he could have a special enquiry into the whole of the district subject to this spontaneous combustion? Mr. McKenna said he understood that the Chief Inspector had been for some time making an enquiry with regard to this class of mine He had not been able to find out whether in fact machines were used of the kind named. [As a matter of fact no such machines were in use.] The Chief Inspector said that the evidence points to the possibility of the explosion being due to an underground fire. He thought the special enquiry for which the hon. member asked with regard to this particular kind of mine was already in hand, but if it was not he would certainly see that it was started.

At a meeting of the Hulton Colliery Disaster Fund, held at Bolton Town Hall on Wednesday, it was resolved, upon the motion of Sir Charles Behrens, that, subject to the approval of the Court of Chancery, 1,000 guineas should be applied at once to the relief of the sufferers in the Cadeby accident. The editor of the *Yorkshire Post* has opened a fund for the widows and orphans.

MINING AND OTHER NOTES.

A feature of the Royal Agricultural Show at Doncaster, last week, was the introduction of two pit pony classes, due, no doubt, to the circumstance that the show was being held in a town which is not only a growing centre of the colliery industry, but a long-established centre for the distribution of imported pit ponies. There were 39 entries of two ponies each, and the judge (Mr. Nathaniel Clark) commented on the excellent condition of the ponies, as well as the high standard of height and build exhibited all round. There were no ponies under 11·1 hands, a fact which may be attributed to the comparatively early stage of development in the collieries from which they were drawn. In the older collieries, in Northumberland and elsewhere, it is necessary to employ Welsh and even Shetland ponies owing to the smaller size of the workings. The honours were divided between the Hickleton, Bentley, and Ackton Hall collieries as follows:—Two pit ponies, not exceeding 13 hands, Hickleton Main Colliery Company; 2, F. K. Robinson, Tackley Colliery, South Elmsall; 3 and reserve, Ackton Hall Colliery Company, Featherstone. Two pit ponies, over 13 and not exceeding 14 hands, Barber, Walker and Co., Bentley; 2, Ackton Hall Colliery Company; 3, Barber, Walker and Co.; reserve, Brodsworth Main Colliery Company. Special prize of £5 for the best four ponies the property of one exhibitor, Barber, Walker and Co.; reserve, Ackton Hall Colliery Company.

At Chesterfield County Police Court on Saturday, Laurence Naughton, a corporal in Williamthorpe Colliery, was charged with cruelty to a pit pony. It was stated that the pony kept backing, and in his anger the defendant struck it on the head six times with an iron bar. Mr. F. B. Pearson, veterinary surgeon, of Chesterfield, described its condition as pitiable. The sight of one eye was completely destroyed, and there was an ugly wound on the jaw. There were other injuries on various parts of the body. Thinking it was the most humane course, he destroyed the animal. The value of the pony was £13. The chairman said that it was the most scandalous and brutal thing he had ever heard in the court. Defendant was ordered to pay £7 towards the cost of the pony, and was sentenced to 14 day's hard labour.

Important discoveries of coal and other minerals have been made, it is stated, in the Longtown district of Cumberland, and operations are to be commenced immediately to develop the workings. Concessions have been granted by Sir Richard Graham to a local syndicate for the purpose of developing the minerals on the Netherby estate.

At the monthly meeting of Helensburgh Town Council it was agreed to confirm the purchase of 5,000 tons of coal for the gas works at an average cost of 15s. 0½d., as against the average price of 12s. 11d. during the preceding year.

A special delegate meeting of the Northumberland and Durham Miners' Permanent Relief Fund was held in the Connaught Hall, Blackett-street, Newcastle, last week, for the purpose of adopting the rules of the society as agreed to by the National Health Insurance Commissioners. After some discussion the rules were adopted by 1,037 votes to 58.

A serious outbreak of fire was discovered on Friday at the Prescott Pit, Crawford Village, belonging to the White Moss Colliery Company, Skelmersdale. Rescue brigades from the Standish and Wigan districts have been engaged in the task of subduing the outbreak and of saving the colliery company's property.

Messrs. Strakers and Love, the owners of Brandon Collieries, are now proceeding with a number of costly improvements. The proposal is to remove the present beehive ovens and to replace them with by-product ovens of the latest design. Also to erect power plant, purification plant, to electrify the haulage gear and to commence to work the top seam of main coal. A similar scheme is in vogue at Brancepeth A Pit, which is situated at Willington, and which also belongs to Messrs. Strakers and Love. At Littleburn Colliery, owned by the North Brancepeth Coal Company, a similar scheme has been adopted, which is expected to be in full operation in about four months' time. At Littleburn, the Huessener ovens have been installed, and a new Luhrig washer is to be introduced. It is also contemplated putting in a large reserve hopper to hold 2,000 tons of reserve coal in case of stoppage, breakdowns, or strikes.

At the annual meeting of the Rhymney Iron Company Limited, last week, Mr. John Varley, the chairman, said the past year had been one of the most anxious and difficult years for South Wales collieries that he had known in the course of his experience. In consequence of so many stoppages the output of the company, instead of showing a considerable increase, was down, and the cost of production higher. He did not think the Eight Hours Act had benefited the men one whit, and it had given incredible trouble to the managers of the collieries. They had to face a further expenditure under the Mines Act and under the nsurance Act. They had gone as carefully as they could into the latter, but they could only act on mere estimates, and the cost and trouble involved would be very considerable. They were as a company going to consider whether it was not desirable to reduce the capital. In their case it would mean an Act of Parliament, and if they did not find the cost of getting the Act and the necessary valuation too high, they would propose this course, if it was the wish of the shareholders. Last year it was suggested by the South Wales shareholders that a director with a good knowledge of the South Wales coal trade should be put on the board, and he was glad to say that Mr. D. A. Thomas was to be asked to join the board as an additional director.

Mr. Justice Scrutton, at the Newcastle Assizes, this week heard an action in which Robert Brown, farmer, of Chevington, and Thomas Ritson, engineer, of Gateshead, sought damages from Cuthbert David Giffard Riddell, of the Swinburne estate, near Barrasford, who, they said, had refused to ratify an agreement to allow them to search for coal on the Swinburne estate. In their statement of claim, plaintiffs specified sums of money they had expended on the work, amounting in all to £1,535 13s 7d., and, with the consequential damages, such as loss of profit through not being permitted to work the royalty, their claim was brought up to £2,500. His lordship found that there was no concluded agreement between the parties, and therefore the plaintiff's claim for damages failed.

Mr. Tom Westgarth, of Middlesbrough, the joint managing director of Messrs. Richardsons, Westgarth and Co. Limited, engine builders, of Hartlepool, Middlesbrough, and Sunderland, has resigned his position, but will retain a seat on the board. Mr. D. B. Morison, who will now be sole managing director of the company, has appointed Mr. E. Hall-Brown to be general manager of the Middlesbrough works. Mr. Hall-Brown is at present president of the Institution of Engineers and Shipbuilders in Scotland.

Last Friday the Pilkington Coal Company reached the Six-feet seam at their new sinkings at Astley Green, near Manchester. There are already small batches of miners at work at these pits and preparations are being hurried forward for the starting of the collieries at full stretch, many working places having already been opened out.

A correspondent learns from authoritative sources that following upon the closing of Messrs. Andrew Knowles' Fogg's Pit, Little Lever, near Bolton, other mines in the adjoining Swinton township will be closed at an early date.

Amongst the contracts recently closed by Messrs. Ed. Bennis and Co. Limited, of Little Hulton, Bolton, and 28, Victoria-street, S.W., for stokers are the following:—The City of Birmingham Gasworks; The South Staffordshire Mond Gas (P. and H.) Company Dudley Port, Tipton; Borough of Luton Electricity Works; Whalley Asylum; R. Silcock and Sons, Liverpool; The Broxburn Oil Company Limited, Roman Camp Works, near Glasgow; The North-Eastern Steel Company Limited, Middlesbrough; The New Silkstone and Haigh Moor Coal Company Limited, Allerton Bywater, Castleford. Several orders for elevators and conveyors have also been placed with Messrs Bennis, including one from Messrs. Clarke, Chapman and Co. Limited, Gateshead-on-Tyne, for a "Bennis" scroll conveyor 6 in. diameter by 16 ft. 9 in. long, with extended shafting at one end and delivery shoot at the other

The students of the Technical Mining Classes at Porth and Ynyshir have presented their teacher, Mr. William Thomas, M.Inst.M.E. of the Cambrian Mining School, Porth, with a gold pendant, &c., as a token of the esteem and regard in which the members of the above classes held him. The presentation was made by Mr. John Hughes. Another striking testimony to the excellent and practical coaching which is given by Mr. William Thomas at the Cambrian Mining School, Porth, is furnished by the results of his students at the last Cardiff mine managers' examinations. At the above examinations 172 students from the Cambrian Mining School sat. Of these, 140 students, i.e., 81½ per cent., passed: 44 students sat for first class certificates, 35 of them received their certificates; 128 students sat for under-managers' certificates, and 105 of them passed.

At the last meeting of the Salford Town Council the question of secrecy and the non-advertising for coal contracts was raised by Mr. Alderman Jackson, who objected to the minutes of the gas committee on the ground that some 38,000 tons of coal had been purchased without advertisements being published according to the standing orders. —Mr. Alderman Phillips, chairman of the gas committee, said he was prepared to inform any member of the Council privately what it was proposed to pay for the coal, but if publicity were given, the ratepayers would lose a considerable portion of the sum it was estimated should be allocated to the relief of rates. The gas committee had adopted a new plan. They had received offers instead of advertising owing to the state of the coal market, and it had led to the best results in the way of business. He moved that the council suspend the standing order under which they would have been compelled to advertise and to accept the tenders submitted. They had not purchased all the coal they required, and they desired to get the remainder on the best possible terms.—The resolution was carried.—Mr. G. Billington, chairman of the electricity committee, stated that the price paid for coal by that committee was 1s. 11d. per ton higher than last year.

The Scottish branch of the National Association of Colliery Managers have agreed to unite with the west of Scotland branch of the Association of Mining Electrical Engineers in a pleasure excursion, to be held ere the close of the present summer.

The Electrical Engineering and Equipment Company Limited, Bank Buildings, 109-111, New Oxford-street, London, W.C., inform us that they have been appointed sole agents for Great Britain and the colonies, for the word-renowned firm of Dr. Albert Lessing of Nurnberg, whose name is a household word in connection with dry cells and carbon brushes. In addition to these cells, Dr. Lessing's products cover carbon brushes of all kinds, carbon contacts for switches, circuit breakers and so on, carbon battery plates, welding carbons, and electros up to the largest sizes for electrical furnaces.

At a social function held in the Duntreath Inn, Kilsyth, the employees of Gartshore No. 11 Pit, belonging to Messrs. Wm. Baird and Co., presented Mr. Alexander Laird, their under-manager, with a pair of marble ornaments for himself, together with a tea-set and cake basket for Mrs. Laird. Mr. Laird, it may be noted, has been appointed under-manager in connection with Forniegair Colliery, Hamilton.

Sheriff-Substitute Guy has issued his decision in the case brought in Edinburgh Sheriff Court at the instance of the United Collieries Limited, against the Calder District Committee of the Mid-Lothian County Council. Pursuers complained that the defenders had, by a closing order dated April 1, 1912, prohibited the use of 26 dwelling houses at Woodmuir, and of four houses at Higher Blinkbonny, Woodmuir, by which, pursuers stated, they were aggrieved, in respect that the said properties were not unfit, and were in a fair tenantable condition, and were not injurious to health. They craved the court to recall the order complained of. His lordship has sustained the second and third pleas in law for the pursuers, which state:—(1) That the closing order was inept in respect that it proposed to close by one order separate and distinct blocks of buildings instead of a particular dwelling house; (2) that the closing order was inept in respect that it had not, in terms of the statute, been served on every owner of the dwelling houses in respect of which it was made. He accordingly sustained the appeal, recalling the closing order appealed against, and found the defenders liable to the pursuers in expenses.

Mr. Robert Rankin, Burnbank, Hamilton, who less than a year ago secured his certificate, has received an appointment as one of the management staff of Parkneuk Colliery, Motherwell.

The Liverpool address of the Abram Coal Company Limited is now 88, The Albany, Old Hall-street, Liverpool.

THE FREIGHT MARKET.

There has been a fair volume of outward chartering on the north-east coast this week, and rates have been very firmly upheld in most directions, for, although tonnage supplies continue to improve, the vessels arriving are promptly taken up and more steamers could be done with. At South Wales chartering has been very active. Rates are steady for prompt loading, but weaker for forward shipment. South America is steady, and the Bay and coasting ports are firm. At the Clyde, rates are steady and business is quiet. At the Humber, the market is dull and rates are inclined to ease. Homewards, comparatively little has been done. New York advices report an unchanged market, with business inactive. Rates show little alteration, as the tonnage offering is very small. Black Sea advices report that business is severely restricted by the lack of grain supplies and the lower prices ruling in consuming markets, which have caused shippers to withdraw orders for the time being. Forward business also is in abeyance, as shippers prefer to wait until the crop reports become more definite. The Eastern markets are quiet and rather easier. The Azof and Danube are suffering from the same influences as the Black Sea. The Mediterranean and ore trades are steady. The Baltic is firm. The River Plate is weaker.

Tyne to Alexandria, 3,500, 12s.; 4,500, 12s., 500; 4,800, 11s. 6d., July 15; 4,300, 12s.; Antwerp, 2,500, 4s. 10½d.; Algiers, 6,600, 10s. 1½d., 600; Barcelona, 6,500, 11s. 3d. coal, 13s. 3d. coke; Boulogne, 2,000, 4s. 9d.; Bilbao, 1,700, 8s. 6d.; Barletta, 2,800, 13s., from Dunston; Bagnoli, 5,300, 11s. 6d.; 6,100, 11s. 6d.; Cherbourg, 800, 5s. 9d.; Carthagena, 2,000, 11s. 6d.; 2,000, 10s. 6d.; 2,000, 11s.; Cronstadt, 4,700, 6s.; Fairwater, 1,500, 6s. 3d.; Fredericia, 2,000, 6s. 6d.; Genoa, 4,000, 12s.; 5,800, 11s. 9d.; 5,000, 11s. 9d.; 8,300, 11s. 3d.; 4,500, 11s. 9d.; 5,500, 11s. 9d.; 4,500, 12s., ppt.; 7,300, 11s. 6d.; Gefle, 2,000, 7s. 3d.; Gibraltar, 2,000, 10s.; Havre, 1,200, 5s.; Hamburg, 1,800, 4s.; 1,800, 4s. 3d.; Kjoge, 1,000, 7s.; Karrabeksminde, 1,500, 6s. 4½d.; Konigsberg, 1,800, 6s.; Las Palmas, 3,800, 11s. 6d., from Dunston; Monaco, 2,000, 13s. 6d; Norresundby, 2,000, 6s. 1½d.; Naples, 5,000, 11s. 3d., and 900, 11s. 3d., 1,000; Port Said, 7,500, 11s., reported; Piræus, 5,300, 11s.; Porto Ferrajo, 5,300, 11s. 3d.; 6,100, 11s. 3d.; Rouen, 1,100, 6s. 3d.; St. Petersburg, 2,700, 6s. 4½d.; 1,500, 6s. 3d.; Savona, 4,200, 12s.; St. Brieux, 600, 6s. 10½d.; Svendborg, 2,000, 6s. 3d.; Santander, 2,000, 8s. 6d.; Terneuzen, 1,600, 11s. 7½d.; Tunis, 3,500, 14s.; Veile, 600, 8s.

Cardiff to Alexandria, 5,600, 11s., mid-July; 5,000, ditto; 5,000, 10s. 3d., 700, ppt.; 4,400, 12s.; 6,300, 11s. 7½d., 500, ppt.; 4,200, 11s., July 22; 4,200, 11s., 500, ppt.; Algiers, 3,600, 13 fr., July; Bombay, 6,000, 12s. 6d., July; Catania, 2,800, 12s. 9d., 500, ppt.; Colombo, 6,500, 13s., July; Cronstadt, 4,100, 7s., ppt.; 4,000, 7s. 3d, spot; Devonport, several steamers, 4s.; Genoa, 3,500, 11s. 9d., ppt.; 4,200, 11s. 6d., ppt.; 6,500, 11s., July 15; 6,500, 11s., ppt.; 4,500, 11s. 6d.; Greek waters, calling at Malta for orders, 2,200, 10s. 6d.; Honfleur, 1,500, 6s.; Islands, 4,000, 11s. 3d., ppt.; 11s. 9d., spot; Leghorn, 11s. 6d., ppt.; Las Palmas, 4,000, 11s. 3d.; 3,000, 11s. 9d., ppt.; 2,700, 11s., July 17; 4,550, 11s. 6d.; Lisbon, 3,300, 9s., 350, ppt.; Monte Video, 7,000 max., 19s., July 15-22, with options; end July, 6,500, 19s.; Messina, 2,800, 12s. 9d., 500, ppt.; Malta, for orders, 10s. 6d.; Naval manœuvres, 12s. to 14s. 6d. per ton on gross register, according to size, several vessels; Naples, 4,500, 11s. 6d., ppt.; Port Said, 6,000, 10s.; 6,500, 10s. 6d., end July; 6,500, 10s. 6d., July 18; 5,600, 11s., ppt.; 6,500, 10s. 9d., July 15-31; 6,200, 10s. 9d.; 4,100, 11s.; Palermo, 5,000, 12s. 1½d., July 15; Piræus, 3,400, 12s.; 3,300, 12s., July 15; Portland or Portsmouth, 4s. 1½d.; Admiralty, Rosario, 4,000, 22s., July 15-22, with options; River Plate, 5,100, 21s.; 6,000, 20s. 3d., end July; 5,700, 21s., July; 5,000, 21s., July 15; Reval, 2,200, 6s. 9d.; 2,200, 6s. if 350, 6s. 6d. if 500, July 17; Rosyth, 1,500, 5s 6d., with options; Rio de Janeiro, 18s. 9d., 300, July 15-25; Sables, 1,200, 8½ fr.; St. Nazaire, 2,200, 8 fr., ppt.; St Petersburg, 2,200, July 15, 7s. 6d.; 2,200, 7s. 6d., ppt.; Singapore, 5,500, 14s. 9d. and 15s. 6d.; 5,600, 14s. 9d., Admiralty; Savona, 2,400, 13s.; Teneriffe, 3,000, 11s. 9d., ppt; 2,700, 11s., July 17; Venice, 5,000, 12s. 3d., July 20; 5,000, 12s. 3d., 500, ppt.; 6,000, 12s., ppt.; Valencia, 1,850, 12s. 6d., ppt.; 1,300, 12s. 6d.; 1,000, 12s. 9d.; Marseilles, 6,600, 13 fr., July 18.

Barry to Bahia Blanca, 21s., July 15-25.

Newport to Genoa, 3,500, 11s. 6d., July 26; Gibraltar, 2,700, 7s. 10½d., Admiralty terms; Seville, 1,700, 11s., ppt.; Alexandria, 5,300, 11s., 700, July 15; 4,700, 10s. 9d., July 16; 5,000, 10s. 3d.; several vessels, 11s.; Falmouth, 250, 4s. 9d.; Cape Verds, 7,400, 11s. 7½d., ppt.; Naples, 3,700, 11s. 3d., 800, ppt.; 5,200, 11s. 6d.; Torre, 3,700, 11s. 3d., 800, ppt.; Marseilles, 5,200, 13 fr., mid-July; 5,000, 13s.; Arzew, 2,500, 15 fr., ppt.

Swansea to Oran, 1,650, 15 fr.; 1,800, 15 fr.; Alexandria, 4,100, 12s., 400, July 15; Port Said, 4,700, 12s., ppt.; 11s. 6d., July 15; Barcelona, 4,500, 12s. 6d.; Rouen, 1,200, 6s. 7½d.; 1,700, 6s. 6d.; 1,200, 6s. 9d., ppt.; 1,250, 6s. 6d.; Dieppe, 1,150, 6s.; Spezzia, 11s. 9d.; 2,700, 12s. 3d., ppt.; Leghorn, 3,500, 11s. 9d, July 12; Honfleur, 850, 6s. 1½d.; Guernsey, 550, 5s. 3d.; Dover, 450, 5s. 6d.; Trouville, 1,000, 6s.; St. Brieux, 650, 6s. 6d.; Stettin, 2,200, 7s.; Naples, 11s. 3d. coal, 12s. fuel; 5,000, 11s. 3d.; Granville, 6,500, 6s. 1½d.

Sweden to Melbourne, sail, 60s., July-August.

Newport River to Arzew, 1,500, 15 fr., fuel.

Port Talbot to Antwerp, 1,200, 6s.; Genoa, 7,300, 11s., July 17.

Grimsby to Pernau, 2,000, 6s. 6d.; Oxelosund, 1,700, 7s.

Wear to Hamburg, 2,500, 4s.; Buenos Ayres, 20s., July; Monte Video, sail, 18s.; Gefle, 2,500, 7s. 3d.

Hull to Cronstadt, 2,200, 6s. 7½d., ppt.; 2,200, 6s. 6d., July 18; 2,900, 6s. 9d., August loading; 2,200, 6s. 6d., July 10; 3,500, 6s. 6d.; 4,400, 6s. 6d., ppt.; Monte Video, 22s.; St. Petersburg, 2,200, 6s. 6d., ppt.; 1,500, 6s. 6d., ppt.; Pernau, 2,000, 6s. 6d., ppt.; 2,200, 6s. 3d., ppt.; 2,000, 6s. 6d., from Immingham Dock; Holtenau, 1,500, 6s. 6d., ppt.; Kiel, 6s. 6d.; Buenos Ayres, 22s.; Alexandria, 4,800, 11s. 3d.; 2,500, 11s. 3d.; Genoa, 5,000, 11s. 6d., ppt.; Oxelosund, 1,700, 7s., from Immingham Dock.

Goole to Aarhuus, 200, £90, lump sum, iron pipes.

Wales to Callao, sail, 2,250 reg., 21s.; direct nitrate port, sail, 2,250 reg., 19s.; West Coast South America and home to United Kingdom-Continent, sail, basis 41s., in and out; 41s. in and out, 41s. 6d. stiffened, less 1s. insurance, ppt.; Shanghai, 18s., ppt.; Iquique, sail, 18s., coal, October; 18s., coal, October-November.

Blyth to Swinemunde, 2,100, 6s.; Gibralter, 1,300, 10s., Admiralty; Hudiksvall, 1,700, 7s.; Antwerp, 1,800, 4s. 10½d.; Cronstadt, 5,000, 6s.

Hartlepool to Genoa, 5,500, 11s. 9d.; St. Nazaire, 2,000, 7s.; Nantes, 2,000, 7s. 3d.

Grangemouth to Buenos Ayres, 23s.

Partington to Sydney, C.B., 2,500, 8s. 6d., slag.

Forth to Cronstadt, 2,500, 6s. 9d., August.

Sundswall to Monte Video, sail, 18s.

Tees to Civita Vecchia, 3,300, 14s., 400, pig iron.

Liverpool to Sydney and Newcastle (N.S.W.), sail, 16s.

Boston to Lerwick, 600, 5s. 6d.

Antwerp to River Plate, sail, 17s. 3d.; Buenos Ayres or Boca, sail, 17s. 3d., July-August.

Rotterdam to La Rochelle, 2,600, 6s. 9d., ppt.; 1,600, 6s. 9d., ppt.; Rochefort, 2,600, 6s. 10½d., ppt.; 1,600, 6s. 10½d., ppt; Marseilles, 13½ fr., steam coal, 14½ fr., fuel, ppt.; St. Nazaire, 2,600, 7s., July 11; Bordeaux, 1,800, 7s. steam coals, 7s. 9d. fuel, July 11; Leghorn, 4,800, 11s. 9d. steam coals, 12s. 6d. fuel, 13s. 9d. coke, July 20.

Hamburg to Honolulu, sail, 24s., August.

Homeward charters:—Kurrachee, 2,441 net, United Kingdom-Continent, p.p., 19s. 9d, July; 5,600, p.p., 20s., July; 21s., Naples; Gulf, one or two ports, 2,262 net, Montrose and Aberdeen, 85s., fist terms, August 18; San Lorenzo, 1,814 net, United Kingdom-Continent, 18s. o.c., less 6d., option Mediterranean 1s. extra, Adriatic 1s. 6d. extra, ppt.; 18s. 6d. o.c., less 6d, ppt.; United Kingdom-Continent; 5,500, 10 per cent., Genoa, 18s. 6d., spot; 4,000, 10 per cent., United Kingdom-Continent, 18s. o.c, less 6d., ppt.; 5,300, 10 per cent., 17s. 9d. o.c., less 6d., ppt.; Buenos Ayres or La Plata, 2,432 net, United Kingdom-Continent, 17s. o.c., less 6d., ppt.; Port Larath, 4,000, Middlesbrough, 9s. 3d.; July; Carthagena, 4,200, Rotterdam, 6s. 6d., f.d., mid-July; Genoa, 3,400, Stockton, 8s. 3d., d.w., July; Bilbao, 2,200, Rotterdam, 6s. 6d., ppt.; 2,900, 6s. 7½d., ppt.; 3,400, 6s. 6d., ppt.; Bordeaux, 2,590, Rotterdam, 6s., ppt.; Puget Sound, sail, 40s., United Kingdom-Continent, September-October; time charter, States and West Indies, £1,650, one round trip, in continuation, 4s. 6d.; time charter, White Sea trade, 960 stds., £1,000, two round trips; Fernandina, 37s. 6d., United Kingdom-Continent; Sulina, 4,200, Rotterdam 10s., Antwerp 10s. 3d., ppt.; 3,300, Italy, 12 fr., July; 4,300, Antwerp or Rotterdam, 10s. 9d, July 20-August 10; 5,900, 10s. 6d., July 25-August 5; Savannah district, 1,165 net, p.p. United Kingdom-Continent, 42s. 6d. one port, 45s. two ports, Form O, August; Aguilas, 4,500, Rotterdam, 7s. 7½d., f.d., July; Tunis, 2,800, Ayr, 10s., phosphate, ppt.; Finland, middle zone, 700 fathoms, Cardiff, 46s., props; Portland, Or., sail, 40s., United Kingdom-Continent, October; time charter, Australian trade, 5s. 10½d., four months, delivery Geelong, re-delivery Newcastle, N.S.W.; Natal, 7s. 6d, Kurrachee, Azof, 3,400, Bergen-Christiania Range, 17s. 6d. one port, 14s. 9d. two ports, 15s. three ports, ppt.; Kherson or Nicolaieff, 5,200, London, 10s. 9d. one port loading, 11s. both ports loading, ppt.; Azof, 5,200, Weser, 12s, with 3d. less barley, days, July 22; 2,500, West Italy, 13 fr. one port, 13½ fr. two ports, ppt.; Danube, 3,300, Italy, 13 fr. one port, 13½ fr., two ports, July; 2,500, Italy, basis 13 fr., voyages

EXPORTS OF COAL, COKE, AND MANUFACTURED FUEL FROM THE UNITED KINGDOM

During June, and the first six months of 1910, 1911 and 1912.

To	June, 1912.						June.					
	Coal—Small.		Coal—Through-and-through (unscreened).		Coal—Large.		All coal. Quantity (tons).			All coal. Value (£).		
	Tons.	£	Tons.	£	Tons.	£	1910.	1911.	1912.	1910.	1911.	1912.
Russia	79,009	45,659	35,383	20,962	423,672	271,520	559,541	437,467	538,154	336,498	238,588	338,132
Sweden	85,037	40,012	18,195	9,485	246,936	147,719	411,207	353,895	350,163	225,194	174,281	197,216
Norway	45,589	18,601	8,311	4,908	101,250	60,330	145,687	124,473	155,150	71,874	57,172	83,839
Denmark	40,764	21,435	71,322	40,628	132,632	81,998	241,263	202,324	244,718	128,223	101,109	144,061
Germany	321,724	156,464	432,080	209,523	213,526	124,257	852,731	764,896	967,330	421,520	353,200	490,244
Netherlands	109,883	51,305	50,041	24,882	44,406	26,913	204,791	169,969	195,330	106,066	85,195	103,100
Belgium	51,275	20,263	39,600	19,726	39,279	22,422	105,009	128,103	130,154	46,219	54,279	62,411
France	376,780	171,903	281,180	144,035	286,912	201,931	866,597	809,163	944,872	472,053	429,927	517,869
Portugal, Azores, and Madeira	22,352	11,154	17,281	8,695	61,694	46,304	108,093	79,252	101,327	71,726	50,273	66,153
Spain and Canaries	33,894	18,494	83,162	46,669	154,886	115,393	215,010	210,254	271,942	139,809	131,384	180,547
Italy	112,467	47,870	193,708	102,649	409,938	315,429	906,190	824,006	716,113	538,351	473,086	465,948
Austria-Hungary	25,768	12,843	6,114	3,169	36,934	22,369	100,686	82,050	68,816	51,411	40,085	38,381
Greece	4,715	2,390	9,763	5,099	8,712	6,299	26,939	55,738	23,190	16,114	31,748	13,788
Turkey	1,809	1,017	—	—	27,649	18,427	50,030	32,009	29,575	37,249	20,084	19,444
Egypt	11,249	5,427	29,607	14,744	139,848	97,948	214,500	224,477	180,704	146,896	143,144	118,119
Algeria	19,434	9,521	33,073	17,009	27,766	19,747	84,798	93,021	80,156	47,153	53,209	43,277
United States of America	—	—	—	—	100	118	2,083	126	100	1,722	154	118
Chile	1,645	1,607	—	—	87,689	71,800	97,076	71,986	89,334	68,717	53,476	73,407
Brazil	991	1,048	7,703	5,060	138,376	113,711	121,530	106,339	147,070	95,839	79,356	119,819
Uruguay	4,564	3,611	50	88	59,268	48,348	89,814	51,319	63,882	72,189	33,709	51,997
Argentine Republic	9,652	7,142	—	—	238,257	183,830	262,591	203,630	247,909	201,922	143,030	190,972
Gibraltar	3,983	1,820	1,284	690	8,099	6,078	33,225	37,477	13,366	21,995	25,591	8,588
Malta	1,810	779	8,393	4,263	2,767	2,084	20,491	18,934	12,970	13,382	12,360	7,126
British South Africa	686	646	1,575	945	3,562	2,403	5,947	2,346	5,823	3,339	1,369	3,094
" India	68	58	—	—	9,255	5,249	5,953	14,839	9,323	3,554	8,774	5,298
Straits Settlements	972	1,478	—	—	—	—	170	294	972	267	442	1,478
Ceylon	105	158	—	—	20,301	15,886	27,964	16,994	20,406	21,976	13,278	16,044
Other countries	22,205	15,078	11,711	6,457	113,874	85,890	164,739	123,512	147,790	122,158	83,689	107,425
Total Anthracite	87,898	67,144	69	45	102,006	85,900	229,999	183,150	189,973	174,897	134,285	153,989
Total Steam	998,104	450,798	244,584	128,586	2,685,511	1,878,501	4,336,198	3,846,978	3,928,199	2,603,318	2,178,627	2,457,885
Total Gas	74,562	35,821	956,863	489,867	130,165	78,535	979,378	858,468	1,161,590	510,435	412,390	604,223
Total Household	46,792	24,397	—	—	108,064	64,258	134,416	100,387	154,856	70,499	52,021	88,655
Total Other sorts	172,164	89,614	138,020	71,129	11,842	7,200	244,614	249,910	322,026	124,567	119,678	167,948
Total	1,379,520	667,774	1,339,563	689,627	3,037,588	2,114,394	5,924,605	5,238,893	5,756,644	3,483,716	2,897,901	3,471,795
Total (June 1911)	*1,201,962*	*532,477*	*1,123,472*	*536,566*	*2,913,459*	*1,827,958*	—	—	—	—	—	—
Total (June 1910)	*1,343,832*	*594,627*	*1,060,624*	*541,287*	*3,520,149*	*2,347,802*	—	—	—	—	—	—
Coke	—	—	—	—	—	—	61,145	60,670	51,139	47,808	54,277	43,516
Manufactured fuel	—	—	—	—	—	—	153,060	134,212	108,649	106,247	94,575	87,103
Total of coal, coke & manufactured fuel	—	—	—	—	—	—	6,138,810	5,442,775	5,916,432	3,637,771	3,045,853	3,602,414
	First six months of 1912.						First six months.					
Total Anthracite	448,311	320,145	79	55	525,803	454,267	1,162,100	1,169,675	974,193	919,075	876,344	774,467
Total Steam	4,341,083	1,972,137	1,219,298	670,535	13,159,786	9,461,689	21,875,572	22,985,294	18,720,167	13,158,905	13,324,161	12,104,361
Total Gas	269,771	125,264	3,791,962	1,961,100	426,104	267,186	4,792,351	5,074,073	4,487,837	2,488,523	2,472,143	2,353,550
Total Household	177,863	93,799	1,452	1,061	461,140	284,741	709,056	713,568	640,455	381,697	375,548	379,601
Total Other sorts	662,263	349,837	623,664	332,791	64,741	41,095	1,284,300	1,551,349	1,350,671	655,852	741,790	723,723
Total	5,899,291	2,861,182	5,636,455	2,965,542	14,637,577	10,508,978	29,823,397	31,493,959	26,173,323	17,599,652	17,783,986	16,335,702
Total for six months of 1911	*7,062,917*	*3,111,340*	*6,397,378*	*3,075,452*	*18,033,664*	*11,597,194*	—	—	—	—	—	—
Total for six months of 1910	*6,649,568*	*2,980,821*	*5,391,937*	*2,747,941*	*17,781,892*	*11,870,890*	—	—	—	—	—	—
Coke	—	—	—	—	—	—	412,572	462,559	388,108	301,610	351,547	301,701
Manufactured fuel	—	—	—	—	—	—	788,477	851,867	635,283	539,766	589,149	489,111
Total of coal, coke & manufactured fuel	—	—	—	—	—	—	31,024,446	32,808,385	27,196,714	18,441,028	18,724,632	17,126,514

commencing August; West Australia, 4,000 loads, South Africa, 38s., July-August; Gulf, 2,750 net, Hamburg, 47s. 6d., Form O, August; Finland, one to two places middle zone, 1,700 fathoms, Cardiff, lump sum, £3,800, if Swansea £3,900, props; Portland, Or., sail, 40s., United Kingdom-Continent, November-December; Newcastle, N.S.W., sail, 43s. 6d., West Coast South America and home, January-February, loading N.S.W.; time charter, Trans-atlantic trade, 6s., delivery New York; 6s., delivery Gulf; 7s., delivery South Atlantic; Philippines, 40s. 8d., Marseilles-United Kingdom-Continent, August-September.

A case of considerable interest was decided by Judge Moss at Wrexham County Court on the 9th inst. The plaintiff, a miner named Thomas Morgan, sued the Broughton and Plas Power Colliery Company for £3 in lieu of notice of discharge. In support of the claim it was shown that last April the manager of the Gatewen Colliery told Morgan that he and his two partners must stop working, as 14½ tons of coal (the quantity got by them in the preceding week) would not pay three men. They must go to their working place on the following day and clear their holing. The plaintiff was consequently out of employment for ten days when he obtained work at another colliery. His partners were only "playing" a day or two before the defendants found another working place for them. The defendants contended that the only reason why plaintiff and his partners were stopped was that the coal had been worked to within a reasonable distance of the boundary or barrier. There were no written conditions of service, and the company's invariable practice in these cases was to give no notice. His Honour said he was bound by the custom of the colliery, and must therefore enter judgment for the defendants, with costs. At the same time, he did not say that the management were entitled to make a handle of this case for getting rid of men who might be unsatisfactory to them, or in any way not to "play the game."

COAL, IRON AND ENGINEERING COMPANIES.

Arniston Coal Company Limited.—The directors have declared an interim dividend of 8s. per share.

Atherton and Co.—This private company has been registered, with a capital of £3,000 in £1 shares, to take over as a going concern the business of a colliery proprietor, coal sales agent, &c., carried on by S. Atherton at Hanwood and at Cruckmeole, Salop, as Atherton and Co. Managing director, S. Atherton. Qualification, £50.

Bessemer (H.) and Co. Limited.—The directors have decided to pay an interim dividend of 5s. per share (less tax) on the preference shares, and 6d. per share (free of tax) on the ordinary shares to shareholders on the company's books on the 12th inst.

Brown (E. J.) and Co. Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of foundry and colliery furnishers, &c. Qualification of first directors, who are to be appointed, £200.

Brunton's (Sudbury) Limited.—This private company has been registered, with a capital of £5,300 (5,000 preference shares of £1 each and 6,000 ordinary shares of 1s. each), to carry on the business of engineers, millwrights and iron and brass founders as formerly carried on by L. R. Rolfe at the Stour Valley Ironworks, Sudbury, Suffolk, as Barton and Co.

Cambrian Collieries Limited.—An extraordinary general meeting of the shareholders was held on the 5th inst., when a resolution passed at the general meeting held on June 20 to divide the £10 preference shares into 10 shares of £1 each, upon each of which the sum of £1 is paid up, was confirmed.

Chinese Engineering and Mining Company Limited.—Applications have been invited for £1,200,000 6 per cent. first mortgage debentures (Kailan bonds). The company has a share capital of £1,000,000 in £1 shares, and a debenture capital of £1,200,000, and was incorporated on June 27 last to acquire the property, rights and undertaking of the English company of the same name (incorporated in December 1900), including the Kaiping Collieries, near Tongshan, Chihli, North China, buildings, plant and equipment; land, harbour works and other property at the Port of Ching Wang Tao; depots at various ports in China, steamers, stocks of coal and stores on hand. An agreement has since been arrived at whereby the businesses of the company and of the Lanchow Mining Company are to be combined and worked as one. The debentures now offered will be a floating charge on the property and assets of the company and of the General Mining Company of Peyang and Lanchow.

Coalite Limited.—Mr. A. M. H. Walrond, the chairman, presiding at the ordinary general meeting held at Salisbury House, London, on the 4th inst., stated that the capital of the company had been increased by about 81,100 shares, and that they had issued a further 410 shares at an average price of £1 8s. per share during the current year. Referring to the expenditure and the receipts, the chairman said that the total year's profit amounted to £2,084, which, added to the old balance, made a sum of £16,077 to be carried forward. A good deal had been done to pay off old creditors. The report was adopted.

Davy Brothers Limited.—The report to April 30, 1912, shows:—Balance brought forward £902, gross profit for the year £18,022, from which has to be deducted interest on mortgages and other loans (£2,326), depreciation (£2,034), and interim dividend on preference shares, leaving an available balance of £13,738, to be appropriated as follows:—Final dividend on preference shares at the rate of 5 per cent. per annum, dividend at the rate of 4 per cent. per annum on ordinary shares (free of income-tax), and transfer to land and buildings, fixed plant, and machinery account, £5,000; to reserve, £2,500; leaving to be carried forward, £1,811.

Durham Collieries Electric Power Company Limited.—Mr. A. W. Tait presided in London, on the 4th inst., at the ordinary general meeting, and, in moving the adoption of the report, said it would be observed that the company had again made a loss. In consequence of the report which the directors obtained from an independent electrical engineer, the prospects were considered so unsatisfactory that the position was placed before the debenture stock holders. An endeavour was made to try and arrive at some settlement of the situation by means of getting some amelioration of the conditions under the contracts, but that was found impossible. The directors afterwards entered into negotiations with the Newcastle-on-Tyne Company for the sale of the company's undertaking, and those negotiations looked as if

COAL AND COKE EXPORTED FROM PORTS IN ENGLAND, SCOTLAND AND WALES

During the month of June 1912, compared with the corresponding month of 1911.*

Port.	June 1912.		June 1911.		Coals.		Coke.	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle	910,088	13,920	801,661	18,127	108,427	—	—	4,207
North Shields	123,384	1,846	92,465	2,709	30,919	—	—	863
South Shields	152,462	1,019	137,734	4,499	14,728	—	—	3,450
Sunderland	296,081	2,109	266,075	295	30,009	—	1,814	—
West Hartlepool	155,490	1,417	138,623	738	16,867	—	679	—
Goole	92,359	2,234	64,862	1,094	27,497	—	1,140	—
Blyth	347,161	233	299,318	296	47,843	—	—	63
Newport	378,453	1,953	327,626	1,553	50,827	—	395	—
Liverpool	27,458	1,127	37,140	622	—	9,691	505	—
Methil	209,369	—	228,551	273	—	19,182	—	273
Glasgow	182,477	844	105,676	2,166	—	13,199	—	1,322
Kirkcaldy	8,134	—	6,866	—	1,268	—	—	—
Burntisland	123,795	286	135,976	—	—	12,181	286	—
Cardiff	1,345,574	3,219	1,173,883	3,136	171,691	—	83	—
Borrowstoness	60,492	1,238	55,847	2,130	4,645	—	—	892
Llanelly	—	—	14,111	—	—	14,111	—	—
Middlesbrough	2,222	659	4,436	4,240	—	2,214	—	3,581
Seaham	95,695	—	74,638	48	21,057	—	—	48
Swansea	220,568	174	210,211	370	10,357	—	—	196
Granton	10,004	1,115	12,654	958	—	2,650	157	—
Port Talbot	152,337	255	132,146	803	20,191	—	—	548
Alloa	15,818	—	15,896	—	—	78	—	—
Grangemouth	165,460	9,744	140,636	5,172	24,824	—	4,272	—
Neath	11,244	—	—	—	11,244	—	—	—
Hull	372,575	753	287,878	1,962	84,697	—	—	1,209
Amble	50,435	—	36,561	—	13,874	—	—	—
Troon	4,966	—	8,090	—	—	3,124	—	—
Grimsby	106,106	—	127,628	65	—	21,522	—	65
Ayr	4,021	—	—	—	4,021	—	—	—
Greenock	1,933	—	1,415	2,253	518	—	—	2,253
Leith	159,782	—	131,862	176	27,920	—	—	176
Ardrossan	—	—	2,179	—	—	2,179	—	—
Stockton	—	—	—	—	—	—	—	—

COAL AND COKE SHIPPED FOR LONDON AND OTHER PORTS IN THE UNITED KINGDOM.*

Port.	June 1911.		June 1912.		Port.	June 1911.		June 1912.	
	Coals.	Coke.	Coals.	Coke.		Coals.	Coke.	Coals.	Coke.
	Tons.	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.	Tons.
Newcastle	339,288	1,350	279,253	67	Ayr	53,768	—	85,452	—
North Shields	—	—	1,300	—	Irvine	11,673	—	9,798	—
South Shields	2,990	—	7,670	—	Alloa	3,958	—	3,296	—
Blyth	8,185	—	15,600	—	Whitehaven	18,143	—	24,572	—
Amble	10,102	—	2,317	—	Liverpool	113,203	478	155,482	—
Sunderland	117,705	—	105,279	—	Grimsby	5,624	—	12,749	—
Seaham	82,665	—	65,632	—	Granton	17,260	—	13,083	—
Hartlepool	23,601	590	39,490	—	Borrowstoness	11,152	—	10,203	—
Stockton	—	—	—	—	Burntisland	1,464	—	—	—
Middlesbro'	55	290	330	—	Kirkcaldy	1,904	—	2,719	—
Hull	58,676	—	69,331	—	Methil	15,328	—	24,302	—
Goole	68,736	—	90,546	—	Port Talbot	11,416	304 c 525 pf	11,046	400 pf
Swansea	16,759	—	13,300	10	Glasgow	36,199	472	48,251	437
Cardiff	228,169	60 c 1100 pf	215,400	236	Grangemouth	19,677	25	17,159	50
Llanelly	4,774	—	—	—	Greenock	2,016	4	1,371	—
Newport	51,854	631	56,368	9 c 2 pf	Neath	12,056	—	13,774	—
Troon	25,757	—	21,679	—	Leith	15,263	16	9,138	6
Ardrossan	6,055	—	12,337	—					

* From *Browne's Export List.*

they would ultimately be successfully concluded. He was afraid, however, that the negotiations, even if they were concluded, would mean that the property would be sold at a price which would leave nothing whatever for the shareholders. In fact, there would be a substantial loss to the debenture stock holders. From the shareholders' point of view, he need only say that if they took the intangible assets standing in the balance-sheet they got the figure of £118,114, which more than represented the total capital. The report of the independent expert showed that not only was the position unsatisfactory at the moment, but that, as the load grew, there was no great prospect of better results. This was due, he thought, to the mistake which was made originally with regard to the load factor in working the collieries. At the time the feeling was that the load factor would be very much higher than it had actually turned out to be. It was therefore proposed that the company should be voluntarily wound up. The trading account showed a profit of £4,214 17s., but, after charging head office expenses, cable rentals, fees of trustees for debenture holders, and rent and royalty to the Sunderland District Electric Tramways Limited, this profit was reduced to £850 3s. Against this amount had to be debited the charge for prior lien bond and debenture interest for the year under review, with the result that there was a loss of £10,294 13s. 5d. Mr. T. O. Callender seconded the adoption of the report, which was carried; and at an extraordinary meeting, subsequently held, a resolution was passed voluntarily winding up the company, and appointing Mr. A. W. Tait liquidator.

Electric Construction Company Limited.—The accounts show that the net profit for the year ended May 31 last amounts to £20,364, to which has to be added £6,131 brought forward. The total amount available for distribution is £26,495, which the directors recommend should be appropriated as follows:—Dividend at the rate of 7 per cent. per annum on the preference shares (whereof a moiety was paid on January 31), £4,394; dividend at the rate of 3¾ per cent. per annum on the ordinary shares, £8,407; transfer to general reserve fund, £8,000; balance carried forward, £5,693.

Fletcher (Henry) and Co. Limited.—This private company has been registered in Dublin, with a capital of £8,500 in £1 shares (6,500 ordinary), to acquire and carry on the business of colliery owners and coal merchants, &c., carried on by H. Fletcher at 32, Bachelor's-walk, Dublin, and at Garston, Liverpool. First directors, H. Fletcher and L. R. Fletcher. Qualification, £100 shares. Registered office, 32, Bachelor's-walk, Dublin.

Fraser and Chalmers Limited.—The directors have declared an interim dividend of 3 per cent. on the ordinary shares, less income-tax.

Furness, Withy and Co. Limited.—The directors, in their annual report for the year ended April 30, 1912, state that the profits for the 12 months are the largest recorded since the formation of the company. The earnings, including the balance brought forward, amount to £768,622 2s. 5d. After charging directors' fees and income-tax, there remains a sum of £756,121 0s. 3d. The usual half-yearly dividend on the preference shares and the interim dividend on the ordinary shares, at the rate of 5 per cent. per annum, were paid on November 1 last, and there has been transferred to depreciation account £240,000, leaving an available balance of £430,810 16s. 7d. In view of the continued unrest, the directors have deemed it prudent to strengthen the trades contingencies fund, created last year as provision against loss entailed by strikes, dislocations, and similar causes, and have, therefore, transferred a further sum of £100,000 to that account, thus increasing this precautionary reserve fund to £150,000. It is also proposed to add £25,000 to the reserve account for insurance and repairs, bringing it up to £225,000. The directors have decided to recommend a bonus distribution of 5 per cent. on the ordinary shares for the past twelve months, making 10 per cent. for the year, free of income-tax. The coal strike and the strike of transport workers have involved a loss to the company of over £50,000. As the special fund for such contingencies was initiated only last year by the transfer of £50,000, and this being merely a nucleus, it was considered undesirable to encroach upon it, and the loss has, therefore, been taken into account in the ordinary way prior to the ascertainment of profits. The working of the various steamship services has been satisfactory, with the exception of collier steamers put out of commission by the coal strike. This strike, which was the culmination of the spirit of general unrest in the country, had a very serious effect also on the income from the company's investments in colliery properties, which, during the period covered by the accounts, has been exceedingly small. Mr. R. J. Thompson, who has charge of the coal department at the Newcastle office, and has been in the service of the company for 20 years, has joined the board.

General Electric Company Limited.—An issue is announced at par of 15,000 6 per cent. cumulative preference shares of £10 each. The company's authorised share capital is £800,000, divided into 40,000 6 per cent. cumulative preference shares of £10 each and 40,000 ordinary shares of £10 each. All the ordinary share capital and 25,000 of the preference shares hve been issued, the present issue representing the remaining unissued preference share capital. Four per cent. first mortgage debenture stock amounting to £200,000 has also been issued.

Gibbons (B.) and Co. Limited.—This private company has been registered, with a capital of £6,000 in £1 shares, to take over the business of an engineer, founder and smith carried on by H. W. Gibbons at Hungerford, Berks., as Gibbons and Son.

Glamorgan Coal Company Limited.—An extraordinary general meeting was held on the 5th inst., when a resolution which the general meeting passed in June last, when it was agreed that each of the existing £10 ordinary and preference shares should be divided into 10 shares of £1 each, upon each of which the sum of £1 was to be credited as paid up, was confirmed.

G.N. Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to take over the business of general engineers, &c., carried on by H. R. Godfrey, A. G. F. Nash and C. M. Whitehead, at Elm Works, The Burroughs, Hendon, N.W., as "Godfrey and Nash" and "G.N."

Harper Syndicate Limited.—This company has been registered, with a capital of £2,500 in 2s. shares, to carry on the business of engineers, manufacturers of mechanical equipment and accessories, &c., used in connection with steam and other engines, &c.

Harris Furnace Company Limited.—This private company has been registered, with a capital of £5,000 in £10 shares, to carry on the business of manufacturers of mechanical furnaces, machinists, engineers, &c., also to acquire certain patents for inventions relating to mechanical ore roasting furnaces and to adopt an agreement with J. Harris and the Sheffield Chemical Company Limited. First governing directors, H. Ellison and J. Harris (both permanent). Registered office, Windsor-street, Attercliffe-road, Sheffield.

Harvey United Steel Company Limited.—The directors call a meeting for July 15 to consider a proposal for the voluntary winding up of the company, in view of the fact that the profits have been materially affected by the expiry of the last patent rights upon which royalties had been paid to the company. The present issued capital is £102,126, in shares of 5s. each.

Highmeadow Iron Company Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of iron and general miners, colliery proprietors, &c., and to acquire the Highmeadow and Staunton Iron Mines in the Hundred of St. Briavels, Glos., and to adopt an agreement with the Highmeadow Iron Company Limited (incorporated in 1875) and A. J. Skinner, the liquidator thereof. First directors: A. J. Skinner, E. H. Crawshay and S. W. Hadingham. Qualification, 10 shares.

Laing (Sir James) and Sons Limited.—The report for the period from January 1, 1911, to March 31 states that, after charging interest on the first and second debentures amounting to £8,439 9s. 5d., the debit balance on interest account £366 6s. 2d. and the trading loss for the period £8,536 6s., there is a debit balance of £14,642 1s. 7d., which, added to the balance of £3,698 16s. 9d. brought from the last account, leaves a debit balance of £18,340 18s. 4d. to be carried forward to next account.

Lochgelly Iron and Coal Company Limited.—The directors have declared a final dividend of 15s. per share, less tax, on the ordinary shares.

Nova Scotia Steel and Coal Company Limited.—The directors announce a quarterly dividend of 1½ per cent. on the common shares.

Pollard Engine Syndicate Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of engine and machinery manufacturers and dealers. First directors, J. L. Elliot and A. Bonnin. Registered office, Capel House, New Broad-street, E.C.

Russian Agency Limited.—This private company has been registered, with a capital of £35,000 in £1 shares (5,000 deferred), to acquire, deal with and turn to account any collieries, mining rights, &c. Qualification of first directors, who are to be appointed, £250. Remuneration, £50 each per annum (chairman £50 extra), and a percentage of the profits. Registered office, 2, Queen Anne's-gate, Westminster, S.W.

Scottish Coal Consumers' Association Limited.—This association has been registered in Edinburgh, with a capital of £10,500 (100,000 shares of 2s. each and 10,000 shares of 1s. each), to carry on business of coalminers, owners and merchants. First directors, W. B. MacGuire, J. Nelson, and J. B. McCallum. Qualification, £100. Remuneration, £100 each (chairman £50 extra). Registered office, 45, Renfield-street, Glasgow.

Scottish Tube Company Limited.—This company has been registered in Edinburgh, with a capital of £750,000 in £1 shares (300,000 5 per cent. preference), to acquire and carry on the business of the Caledonian Tube Company, Coatbridge; Coats Tube Company, Coatbridge; James Eadie and Sons, Rutherglen; Hendry Brothers Limited; John Marshall and Sons, Glasgow; David Richmond and Co. Limited; Tradeston Tube Company Limited; and Wilsons and Union Tube Company Limited. Signatories, Sir Thomas Mason, Craigiehall, Bellahouston; Thomas Davie, 5, Wellington-street, Glasgow; P. W. Hendry 28, Robertson-street, Glasgow; A. Eadie, Clydesdale Tube Works, Rutherglen; David Marshall, Glasgow Tube Works, Swanston-street, Glasgow; J. A. Richmond, City Tube Works, 35, Rose-street, Glasgow; and J. Symington, Union Tube Works, Coatbridge. Registered office, 5, Wellington-street, Glasgow.

Tubes Limited.—The report for the year ended April 30 states that after providing for debenture interest, directors' fees, depreciation, maintenance and all expenses, there remains a net profit of £9,757 9s. 9d., to which must be added £9,126 14s. 11d. brought forward from last year, making £18,884 4s. 8d. The directors recommend that this balance be applied as follow: To pay a dividend of 1s. per share (free of income-tax), £5,000; to carry forward to next account, £13,884 4s. 8d.

Wales (Thomas) and Sons Limited.—This private company has been registered, with a capital of £5,000 in £1 shares (1,500 6 per cent. cumulative preference), to carry on the business of manufacturers of steel and iron goods, &c. First directors: A. Wales, J. Wales and W. Barlow. Qualification, £250.

Wheatrigg Coal Company Limited.—This private company has been registered in Edinburgh, with a capital of £6,000 in £1 shares, to carry on the business of coalmasters, &c. First directors: G. K. Walker, R. T. Walker and T. Donaldson. Qualification, 1 share. Registered office, 105, West George-street, Glasgow.

Whitehaven Hæmatite Iron and Steel Company Limited.—The profit for the year ended March 31 amounted to

£10,866, which extinguishes a debit balance of £9,162. The balance of £1,704 is placed to furnace relining account.

Wilkin and Co. Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to carry on the business of smiths, engineers, founders, &c. First directors, C. Turnbull, J. Thompson, J. Crosby, F. G. Skelly, R. A. Holt, W. Bell, and G. S. Easten. Qualification, £10. Registered office, Bondgate Without, Alnwick, Northumberland.

Willow Bridge Engineering Company Limited.—This private company has been registered, with a capital of £500 in £1 shares, to carry on the business of engineers, founders, manufacturers of machinery, toolmakers, &c., also to acquire the goodwill and assets of the Precision Tool Company, of Leicester. First directors: J. Green and H. Collins. Qualification, £50. Registered office, 172, Willow-street, Leicester.

Wood (Edward) and Co. Limited.—The annual report records a net profit of £7,527. The directors propose a final dividend at the rate of 7 per cent. on the ordinary shares (making 6 per cent. for the year). There will then remain a balance of £4,340, which the directors recommend shall be disposed of as follows:—To general reserve fund, £2,000; to be carried forward to next year, £2,340.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Abstracts of Contracts Open.

Barnsley, July 22.—For seconds house coal, for the Lady Harriet Wentworth and Barnsley Charity.

Barnstaple, July 15.—For coal and coke, for the Barnstaple Grammar School.

Barnstaple, July 15.—For coal and coke, for the Education Committee.

Belfast, July 16.—For about 31,000 tons of coal, for the Corporation.

Belfast, July 16.—For steam and house coal, for the Police Committee of the Corporation.

Birkenhead, July 16.—For screened coal, through-and-through, and coal nuts, for gasmaking purposes, for the Corporation.

Bishop Auckland, July 24.—For best household and steam coal, for the Auckland, Shildon, and Willington Joint Hospital Board.

Bridlington, July 22.—For 500 tons of best South Yorkshire screened hard steam coal, for the Waterworks Committee of the Corporation.

Brigg, July 17.—For 240 tons of household coals, for the Glanford Brigg Guardians.

Bristol, July 19.—For coal, for the Guardians.

Bushey, July 17.—For coal, for the Urban District Council.

Christiania (Norway), July 13-August 2.—Tenders are invited by the Norwegian State Railway Authorities for the supply of (1) 39,650 tons of best quality locomotive coal (Shireoaks, Langwith, Kiveton Park, Hetton, Sherwood, &c.), and, for supply in Bergen, 1,200 tons of smokeless double-screened Cardiff coal; (2) 672,700 kilogs. of petroleum. Conditions of tender for both (1) and (2) can be seen by British firms at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Clacton-on-Sea, July 22.—For house and steam coal and coke, for the Middlesex Hospital Board.

Cleator Moor, July 19.—For 2,000 tons of round gas coal or nuts, for the Urban District Council.

Cork, July 16.—For best double-screened steam coal, for the Harbour Commissioners.

Cork, July 16.—For best double-screened steam coal, for the Harbour Commissioners.

Coventry, July 16.—For coal, for the Education Committee.

Croydon, July 15.—For coal, for the Corporation.

Darlington, July 15.—For 6,000 tons steam coal, small or rough, for the Electricity Committee.

Darwen, July 24.—For rough gas slack and nuts, for the Corporation.

Downpatrick, July 19.—For household steam and gas coals, for the committee of management, Down District Lunatic Asylum. Probable quantities: Household coal, 200 tons, more or less; steam coal, about 1,200 tons; gas coal, about 300 tons.

Dublin, July 17.—For the following approximate quantities of coal, &c., to the establishments in charge of the Commissioners of Public Works, in the Dublin and Kingstown districts: House coal, 7,400 tons; best Scotch steam coal, 1,600 tons; best Welsh steam coal, 1,100 tons; best anthracite beans and smith's coals, 250 tons; best gas coke, 1,300 chaldrons.

Dublin, July 29.—For 200 tons of house, 60 tons of Welsh steam coal and 200 tons of coke, for the Board of Governors.

Dumbarton, July 15.—For about 110 tons of house coal and 210 tons of washed nuts or tripping, for the board of directors of the Joint Hospital.

Dundee, July 17.—For coal, for the Trustees of the harbour of Dundee.

Dunmanway (Ireland), July 18.—For from 50 to 70 tons of best Newport red ash coal, for the Guardians.

Eccles, July 15.—For coal and coke, required by the various departments of the Corporation. The requirements include 5,000 tons of slack per annum, for the electricity works.

Epsom, July 16.—For the following separate supplies of coal, for the Urban District Council:—300 tons of bituminous double-screened nuts, from 1 in. to 1¼ in. and not to exceed 1½ in., with a calorific value of about 13,000 British thermal units on the lower scale; 200 tons of anthracite washed nuts, from 1 in. to 1½ in. and not to exceed 2 in., with a calorific value of about 14,800 British thermal units; 300 tons of Welsh through-and-through steam coal, to contain about 40 per cent. of large.

Erith, July 15.—For coal and coke, for the Erith Education Committee.

Evesham, July 30.—For from 500 to 3,500 tons (or less if required) of best screened gas coal, for the Corporation.

Exeter, July 15.—For coal and coke, for the Guardians.

Exeter, July 16.—For steam coal and house coal, for the Corporation.

Exmouth, July 26.—For about 7,000 tons of best gas coal (screened or unscreened), for the directors of the Exmouth Gas Company.

Glasgow, July 20.—For coal and dross, for the Corporation.

Great Yarmouth, July 19.—For house and steam coals, for the Guardians.

Great Yarmouth, July 26.—For house and steam coal, for the Corporation:—Requirements approximate to 620 tons of house coal and 200 tons of steam coal, and 200 tons of coke.

Hailsham, July 17.—For about 80 tons Wear or Hetton Lyons Wallsend coal, and about 60 tons of Linby hard steam coal, for the Guardians.

Halifax, July 16.—For engine coal (washed peas), for the Royal Halifax Infirmary.

Harrington, July 23.—For best steam washed nuts, for the Harrington and Distington Joint Water Committee.

Hastings, July 24.—For fuel, for the Education Committee; about 330 tons machine-broken coke (from local tradesmen), about 230 tons (from local tradesmen), about 44,000 bavins.

Holcombe, July 20.—For coal, for the Bury and District Joint Hospital Board.

Hull, July 15.—For house, steam, and gas coal, for the Committee of Visitors of the Hull City Asylum.

Hull, July 15.—For coal, for the Property Committee, Works Committee and Baths Committee of the Corporation.

Hull, July 15.—For house, steam, and gas coal, for the Hull City Asylum, Willerby, near Hull.

Kanturk, July 17.—For 300 tons coal, for the Guardians.

Keighley, August 5.—For coal, for the Keighley and Bingley Joint Hospital Board.

Kendal, July 22.—For 6,500 tons of screened or unscreened gas coals and nuts, for the Corporation.

King's Lynn, July 15.—For 500 tons (more or less) of coal (hand-picked hards), for the Corporation.

Leeds, July 15.—For coal (best, thirds and riddled slack) and coke, for the Corporation Education Committee.

London, July 15.—For coal and coke, for the Metropolitan Water Board.

London, July 18.—For about 10,000 tons of large steam coal, for the directors of Grenville United Mines Limited.

London, July 22.—For coal and coke, for the Metropolitan Water Board.

London, July 25.—For 450 tons of coal; also for the supply of steam and other coal, for the Stepney Guardians.

Luton, July 16.—For coal and coke, for the Corporation.

Lymm, July 17.—For cannel and best screened gas coal, for the Urban District Council. The probable quantities required will be about 300 tons of cannel and about 2,500 tons of gas coal.

Maidstone, July 26.—For 200 tons of coal, for the trustees of the Edmett charity.

March, July 23.—For coal and coke, for the Isle of Ely Education Committee.

Market Harborough, July 27.—For about 4,500 tons of best screened gas coal and nuts, for the Urban District Council.

Mirfield, July 23.—For 11,000 tons of best screened gas coal, for the directors of the Gas Company.

Mossley, July 16.—For 14,000 tons of screened gas coals, for the Corporation.

New Mills, July 16.—For 3,000 tons of best gas coal and nuts, for the Urban District Council.

Norwich, July 15.—For coals and coke, for the Education Committee.

Norwich, July 16.—For steam coal, for the Guardians.

Nottingham, July 16.—For coal, for the Electricity Committee of the Corporation.

Nottingham, July 25.—For screened slack and screened nuts, for the Public Baths Committee of the Corporation.

Oakham, July 22.—For coal and coke, for the Rutland Education Committee.

Oldham, August 6.—For gas coals, for the Gasworks Committee of the Corporation.

Oxford, July 22.—For Warwickshire or Leicestershire hand-picked cobbles, for the Education Committee.

Penrith, July 23.—For gas coal and cannel, for the Urban District Council.

Plymouth, July 15.—For steam coal and good large house coal (free from small), for the Guardians. Estimated quantity of the steam coal is 850 tons, and of house coal 450 tons.

Port Louis (Mauritius), July 15.—The Crown Agents for the Colonies, acting for the Government of Mauritius, invite tenders for the supply of 12,500 tons of South Wales steam coal, delivered into lighters at Port Louis, Mauritius. Forms of tender and conditions of contract can be obtained at the Crown Agent's Office.

Portsmouth, July 15.—For 1,200 tons of steam coal, either Middle Duffryn small nut, Pentre small, Powell Duffryn washed peas, or Bwllfa, for the Committee. Also for the supply of 100 tons of house coal, either Trimdon Grange, South Hetton Hawthorn, Hetton Lyons Main, Newmarket Silkstone, Ashington Wallsend, Wheldale diamond Silkstone, or Hardwick cubes.

Ramsbottom, July 29.—For coal, for the Bury and District Joint Hospital.

Rathmines (Ireland), July 16.—For 1,000 tons of coal, for the Rathmines and Rathgar Urban District Council.

Rawmarsh, July 22.—For 3,000 or 5,000 tons of screened gas coal or nuts, for the Urban District Council.

Rochdale, July 17.—For steam coal, for the Electricity Committee.

Skipton, July 25.—For about 6,000 tons of best gas coal (screened, unscreened and nuts), for the Urban District Council.

Stirling, July 24.—For coal, for the Governor of the Poorhouse.

Stourbridge, July 16.—For about 16,000 tons of good screened gas coal, for the Urban District Council.

Sunbury, July 25.—For 2,000 tons of gas coal, for the directors of the Sunbury Gas Consumers' Company Limited.

Tipperary, July 15.—For best coal (all round and free from slack), for the Managing Committee of the County Tipperary Infirmary.

Tonbridge, July 15.—For 9,500 tons of gas coals and nuts, for the directors of the Tonbridge Gas Company.

Torquay, July 22.—For 3,000 tons of approved gas coal, for the Corporation.

Wanstead, July 15.—For 30 tons of Creswell large nuts, Derby brights, or bright house coal of equal quality, and 50 tons of coke, more or less, for the Essex Education Committee (Wanstead District Sub-committee).

Watford, July 18.—For coals and coke, for the Governors of the Watford Grammar School.

Watford, July 22.—For coals and coke, for the Watford Urban and Bushey Urban School Managers.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Aberdare, July 29.—*Electricity Plant.*—For plant, &c., for the Urban District Council (Electricity Supply Works), (*a*) machinery foundations, trenches, &c.; (*b*) engines, dynamos, static balancer, booster, switchboard and connections, piping, &c.

Ashton-under-Lyne, July 30.—*Motor Generator.*—For (Section F) one 400-kw. motor generator; (G) for one 320-pipe fuel economiser (Green's type); (H) for two boiler feed pumps; (I) for coal elevator and conveyor and ash elevator, for the Corporation.

Bristol, July 22.—*Coal Elevating Plant.*—For coal elevating and coal conveying plant, for the Corporation.

Bourne (Lincs.), July 15.—*Cast Iron Pipes, &c.*—For about 1,900 lineal yards of 3 in. and 600 lineal yards of 2 in. cast iron pipes and valves, for the Rural District Council.

Coventry, July 15.—*Motor Fire Pump.*—For a motor fire pump and a motor first aid appliance, for the Corporation.

Dublin, July 16.—*Transformers.*—For transformers, for the Corporation.

Enniscorthy (Ireland), July 17.—*Motor.*—For a continuous-current electric motor, for the District Asylum, Enniscorthy.

Guildford, July 17.—*Motor Fire Engine.*—For a motor fire engine, for the Corporation.

Huddersfield, July 31.—*Telescopic Gasholder.*—For a three-lift telescopic gasholder (about 4¼ million cubic feet) and guide framing, together with the mild steelwork connected with the tank, for the Corporation (Contract No. 3).

Kettering, July 22.—*Steel Roofing.*—For steel roofing, comprising four trusses with purlins, the weight of the whole amounting approximately to 6 tons, for the Urban District Council.

London, July 16.—*Pumps.*—For three 16 in. centrifugal pumps and three two-crank compound vertical enclosed steam engines, with piping and accessories, for the London County Council.

London, July 16.—*Steel Tires.*—For steel tires, for the directors of the Bombay, Baroda, and Central India Railway Company. Mr. C. Crommelin, secretary, Gloucester House, 110, Bishopsgate, London, E.C.

London, July 17.—*Tram Rails.*—For 6 miles of steel girder tram rails of British standard section No. 2, 95 lb. per yard, with fishplates, bolts and nuts, tie bars, and copper bonds, for the Durban (Natal) Corporation. Messrs. Webster, Steel and Co., agents to the Durban Corporation, 5, East India-avenue, Leadenhall-street, London, E.C.

Newcastle-under-Lyme, July 15.—*Cables.*—From C.M.A. firms for about 1,000 yards of V.B. mains, for the Corporation.

Nuneaton, July 16.—*Feed Pump.*—For one electrically driven, turbine type, boiler feed pump, together with pipework, valves and accessories, for the Corporation.

Porthcawl, July 16.—*Water Mains.*—For about 1,000 yards of 6 in. cast iron water mains, together with all necessary valves, hydrants, chambers and other incidental works, for the Urban District Council.

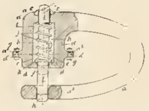
Waddon, July 22.—*Lancashire Boiler, Pumps, &c.*—For (No. 1) one steel Lancashire boiler, (No. 2) steam circulating mains, pumps, valves and other steam fittings, &c., for the Croydon Corporation.

Walthamstow, July 19.—*Cables.*—For extra high tension cables and low-tension cables, for the Urban District Council.

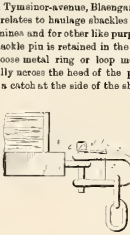
Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, July 2, 1912, is as follows:—Amsterdam, 1,231 tons; Abo, 187; Antwerp, 223; Bandholm, 2,115; Bremen, 2,431; Christiania, 1,435; Copenhagen, 201; Civita Vecchia, 4,363; Cronstadt, 29,579; Drontheim, 272; Dantzig, 800; Flekkefjord, 46; Gefle, 1,823; Guernsey, 682; Ghent, 498; Gothenburg, 200; Hamburg, 4,643; Harlingen, 1,499; Harburg, 7,037; Hargshamn, 1,538; Heligoland, 167; Jersey, 425; Konigsberg, 1,066; Libau, 407; Malmo, 3,010; Nakskov, 1,003; Porsgrund, 166; Riga, 665; Rouen, 1,697; Rotterdams, 10,232; Ronneby, 1,820; Savona, 2,467; St. Malo, 630; Stege, 769; Stockholm, 933; Stettin, 173; St. Petersburg, 6,053; Tuborg, 1,203; Victoria, 49; Wyk, 116; total, 93,936 tons. Corresponding period, July 1911, total, 29,617 tons; corresponding period July 1910, total, 65,933 tons.

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

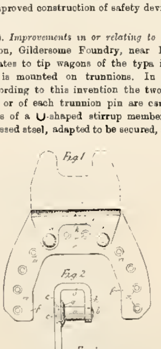
1317 (1912). *Improvements in or relating to Colliery Tram or Wagon Couplings or Shackles.* D. R. Evans, of Sunnycroft, Llansamlet, near Swansea, Glamorgan.—This invention relates to a colliery tram or wagon coupling or shackle, and consists essentially in the formation of a recess or cavity within a limb or member itself—which recess or cavity does not project above the upper limb or member—and the disposal within said recess or cavity of a locking-pin or bolt projecting spring. The drawing represents in longitudinal section a coupling piece or shackle in which one arrangement of carrying the invention into effect is embodied. (Four claims.)



1780 (1912). *Improvements in Couplings for Trams or Wagons such as are used in Mines and for other like purposes.* J. H. Floyd, 35, Tymsinor-avenue, Blaengarw, Glamorgan.—This invention relates to haulage shackles for wagons such as are used in mines and for other like purposes of that type, in which the shackle pin is retained in the coupled position by means of a loose metal ring or loop mounted in a slot formed diagonally across the head of the pin, and adapted to engage with a catch at the side of the shackle in order to secure the pin in place. The invention consists of a similar arrangement so devised that the loop is approximately parallel with the side of the shackle when engaged with the catch and the pin is in place; and also the formation of the catch in one piece with the usual strengthening cross-bar of the shackle. The drawing is a side elevation showing the detached end of a tram or wagon fitted with a coupling having the improved construction of safety device attached. (One claim.)



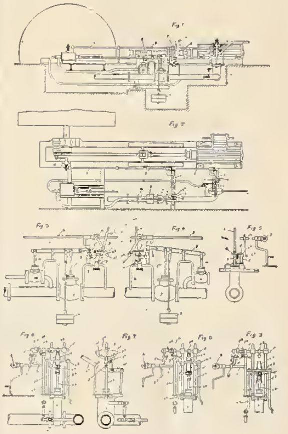
5895 (1912). *Improvements in or relating to Tip Wagons.* W. S. Hudson, Gildersome Foundry, near Leeds.—This invention relates to tip wagons of the type in which the wagon body is mounted on trunnions. In a trunnion mounting according to this invention the two ends of the trunnion pin or of each trunnion pin are carried by the opposite limbs of a ∪-shaped stirrup member, formed it may be of pressed steel, adapted to be secured, as by rivets, to the wagon body. Figs. 1 and 2 of the accompanying drawing show in front elevation and side elevation respectively, a trunnion mounting according to the invention. Fig. 3 shows one of the trunnion pins removed from its carrying member. The mounting illustrated is provided with two trunnion pins *a*, and is suitable for application to a wagon adapted to tip to either side. (Two claims.)



8849 (1912). *Improvements in and relating to Brakes in connection with Hoisting Gear.* Aktiengesellschaft Brown, Boveri et Cie., of Baden, Switzerland.—This invention relates to brakes in connection with hoisting apparatus and more particularly to devices for preventing the slipping of the rope in hoisting machines with driving pulleys. The invention consists in the provision of brakes auxiliary to those acting on the driving pulleys, which brakes are used simultaneously with brakes acting on the driving pulleys. In carrying the invention into effect in one form by way of example a hoisting gear is provided with driving pulleys on the ground level and rope guide pulleys in a shaft tower. Brakes are also arranged to operate simultaneously on both sets of pulleys. By this means the adhesion existing between the guiding pulleys and the rope is made useful for exerting a braking action throughout the whole rope, which is greater than the braking effort possible with devices in which the amount of adhesion utilised is merely that between the rope and the driving pulleys. The invention also enables the not inconsiderable kinetic energy of the rope pulleys to be damped out, without the same being transmitted to the driving pulleys owing to the adhesion of the rope on the aforesaid rope pulleys, whereby the amount of braking effort which has to be exerted on the rope is considerably further reduced. The kinetic energy of the rope and rope pulley, and the load on the rope pulleys can thus be braked to such an extent that the rest of the necessary braking effort can be exerted on the driving pulley, the adhesion of the rope on the same sufficing for this. At the same time the driving pulley can be braked and its kinetic energy dissipated, whereby the possibility of slipping of the rope is prevented. To increase the adhesion between the guide pulleys and the rope, these and the driving pulleys can be provided with wood or leather linings at the working faces. (Four claims.)

11554 (1911). *Improvements in and relating to the Production of Fuel Briquettes.* N. Testrup, of 6, Broad-street-place, London, and T. Rigby, of Station Hotel, Dumfries, Scotland.—This invention consists in a briquetting process for wet carbonised peat in which the material is freed from water in a filter press and drying completed to the desired extent, or in which the material is in some other suitable way given high porosity and the briquetting is then effected by rapid compression. In carrying the invention into effect in one form, the wet carbonised peat pulp, after it leaves the carboniser, is freed from the bulk of its water in a filter press, the resultant cake being then dried in a suitable drier directly or after suitable further treatment in a press of a different type (*see* British Patent Application No. 4684 of 1911). The moisture content may in this way be reduced to 8 per cent. or 10 per cent. or thereabouts. The material, which has been heated in the drier to about 100 degs. Cent., may now be fed directly into a suitable briquetting press. The press which it is preferable to employ is one of the open die type. If tapered ties are employed care should be taken that the taper is not excessive and such as to lead to a disturbance of the pressure distribution, it having been observed that if dies of too great a taper are employed a product lacking in homogeneity may result. In such a case the product has a brownish hue in parts, as against the black coal-like appearance which it possesses when properly briquetted. (Three claims.)

13452 (1911). *An Appliance for Preventing Overwinding of Pit Cages and the like.* J. M. Thomson, jun., Denend, Kirkcaldy, Scotland.—This invention relates to an appliance for preventing overwinding of pit cages and the like by automatically controlling the engine and operating the brake towards the end of the wind, and is of the kind wherein an arm making one revolution during a complete wind is caused to release a trip gear for the purpose of shutting off the steam supply to the engine and applying the brake. The arrangement of the appliance is such that in the event of the cage being overwound and passing the pithead, the steam power of the winding gear is instantly shut off and simultaneously a brake applied to the winding gear; and the appliance is also arranged to operate the ordinary foot or steam brakes on the winding engines should the enginemen fail to shut off steam as the cage approaches the landing or pit bank. Fig. 1 is a side elevation of a winding engine fitted with the appliance; fig. 2 a plan view of same; fig. 3 a side view of the overwind preventing device shown in action with the steam shut off; fig. 4 a similar view from the opposite side to fig. 3 showing the device set ready for operation; fig. 5 an end view of same, on line A—B, fig. 4; fig. 6 an end view of the automatic device to shut off steam on the cage approaching the pit bank; fig. 7 a side view of same; fig. 8 an end view of the upper part of fig. 6, with the throttle valve as shut by engineman; fig. 9 an end view of the same parts as fig. 8, but with the throttle valve shut automatically and steam being admitted to the brake. The free end of the rotating lever has a pinching screw c^2 passed through it, the end of which strikes a hinged catch *d*, which has a hook portion formed on it to hold down the crossbar *e*, which has a spiral spring *f* below it. When this crossbar is released from under the hinged catch, it is instantly forced up by the spring *f*, and in so doing knocks up the knuckle joint of a short horizontal lever *g*, the breaking of this lever causing the steam valve to close and the brake valve to open. This is effected as follows:—One arm of a horizontal lever *h* carried by brackets on the steam pipe has a heavy weight *i* suspended from it, and the same arm is in connection with the spindle j^1 of the engine stop valve *j*. The extremity of this overhead horizontal pivoted lever is in connection with a double arrangement of bell cranks *k* and *l*, one end of the bell crank *k* being connected to the lever *h*, the other end having a slot in which a pin carried by the other bell crank *l* works, the bell crank *l* being pivoted to the bracket *p*, and its other end pivoted to the lever *g*. When the knuckle jointed short lever *g* is unbroken, it holds the end of the overhead pivoted lever *h* through the medium of the bell cranks *k* and *l*, but immediately the joint of the said short-jointed rod is knocked upwards and broken, the arm of the bell crank *l*, which is connected thereto simultaneously, falls downwards and destroys the support of the end of the balanced lever *h*, the suspended weight *i* bringing it down, and in so doing it pulls down the vertical rod j^1 of the steam valve *j*, and thereby instantly shuts off the steam supply. Simultaneously the other end of the balanced lever *h* is elevated, and the depending rod m^1 of the valve *m* of the steam brake is pulled up, whereby the brake is put into action. To reset the appliance after it has been in action, all that it is necessary to do is to restore the broken joint of the short horizontal lever *g* into its straight position, which is effected by depressing the joint *g* downwards, and at the same time the hand-lever *n* pivoted at one end to the fixed support *p* is pushed towards the bell cranks, the other end of the jointed rod *g* being hinged to the hand-lever at a little distance from the pivoted end of the lever, the said hand-lever having a pivoted catch *q*, which drops into a notch in the support of the hand-lever for the purpose of holding it in the "set" position. With reference to the appliance for operating the throttle and applying the brake in the event of the engineman not shutting off the steam as the cage approaches the pitmouth, the throttle valve is shut and a small auxiliary valve opened, thereby allowing a small quantity of steam to be admitted to the steam brake, thereby bringing the engines and cage to rest gradually and without any jar. The operation of the device is as follows:—When the hand-lever u^1 of the throttle valve is lifted up, the hereinbefore-mentioned moving frame u^2 is held by the spring catches u^4 engaging with the arrow-headed catch t^8 on the short shaft, and the quadrant t^6 is secured to the shaft by means of its clutch, so that in the event of the engineman not shutting off steam when the cage is approaching the surface, the wiper s^1 engages with the arm t^1 on the overhead shaft, and causes the said arm to partially rotate the quadrant t^6 and shaft *t*, thereby swinging the catch t^8 clear of the spring catches u^4, and allowing the frame and valve spindle to fall and so close the throttle valve, the hereinbefore-mentioned depending arm u^5 also opening the steam valve and admitting steam to the brake, and thereby gradually bringing the engine to rest. Should the engineman lower the throttle valve lever at the proper time, the action of doing so lets out the quadrant clutch, thereby rendering the gear inoperative, the wiper on the shaft merely swinging the quadrant on the short overhead shaft without rotating it. Consequently the catches are not released, and the moving frame is held in position, and the steam valve of the brake is not opened. (Four claims.)



14057 (1911). *A Method of Systematically Exploring Large Parts of the Interior of the Earth.* H. Löwy, of 16, Kurzestrasse, and G. Leimbach, of 4, Goldgraben, Gottingen, Germany.—The method described below for the systematic exploration of large areas of the interior of the earth is employed (1) in flat areas (lowlands, plateaux), (2) in mountainous districts, (3) on islands and peninsulas. Flat area.—At suitable points in the surface of the earth vertical holes of 200 m. in depth are bored, which are intended for the reception of antennæ wires. These wires are about 200 m. long. In the middle of the same is the sparking distance and detector. If electric waves, which are transmitted from the transmitter S (fig. 1) be received by the receiver E^1, but not indicated by the receiver E^2, which is at

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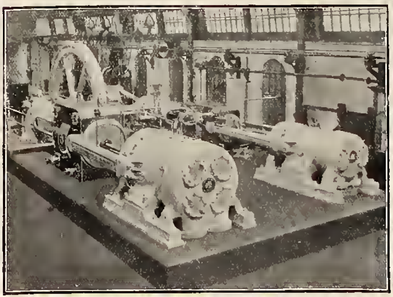
Codes—A. B. C. 5th, Liebers, Western Union, Moreing and Neil Mining.

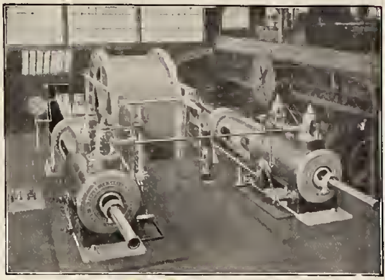


Horizontal Compound Corliss Steam Two-Stage Air-Compressing Engines with Air Valves to Walkers' Latest Patents.

Wilde and Petries Patent Overwind and Overspeed Device.

Positive Action.

No Centrifugal Governor.



Horizontal Winding Engines with Drop Steam and Corliss Exhaust Valves.

WINDING & HAULING MACHINERY.

AIR COMPRESSORS

with Valves to Recent Patents 1909, now at work (or on order) to these new designs

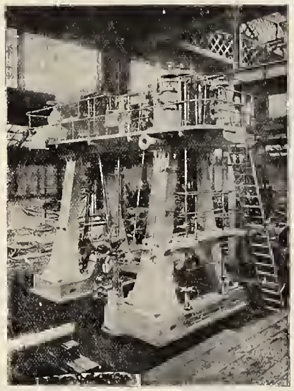
INDICATING OVER

65,000-H.P.

raising our total output of this class of machinery during the last 40 years to

OVER **415,000** INDICATED H.P.

These new designs are quite applicable to existing Engines.



Vertical Corliss Compound Engines for Fan Driving or General use.

VENTILATING FANS

OF THE WALKER

"INDESTRUCTIBLE" TYPE

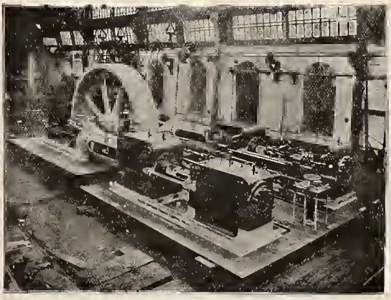
Capacity of Fans at work or on order over

75,000,000

cubic feet of air per minute.

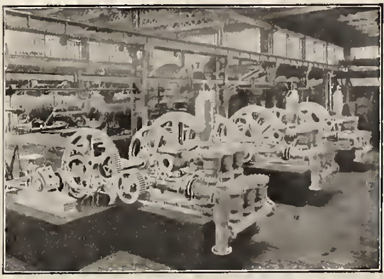
High Mechanical Efficiencies whether driven by Steam or Electricity.

GENERAL MINING MACHINERY.



Four Cylinder Triple Expansion Engines with Corliss Valve Gear.

Improved Unloading Device (Provisionally Protected) Regulating Output in Cradual Stages for Power Driven Air Compressors.



Three Sets of Three-thrown Ram Pumps, Rope Driven, with Friction Clutches.

PAGEFIELD IRONWORKS, WIGAN.

London Office—NEW BROAD STREET HOUSE, E.C.

an equal distance, it signifies that electrically conductive bodies (ores, coal, water) are embedded in the course of the rays from S to E^2, which prevent the passage of the waves partly by reflection, partly by absorption. At a distance between the antennæ 300 kiloms. points above 1,000 m. deep are traversed by the waves in consequence of the curvature of the earth. The area to be investigated is divided into square areas, with sides of 50 kiloms. in length, in the angular points of which holes of 200 m. depth are bored. Mountainous districts:—In this case no bored holes are required. The antennæ are placed vertically on the slope of the mountainous area to be investigated (as far as possible on steep sides for the purpose of avoiding reflection). Figs. 3 and 4 will be understood without explanation. Islands and peninsulas:—The antennæ wires are sunk vertically on the coast or in proximity thereto in the water from the ship. In other respects as in 2. (One claim.)

Fig. 1

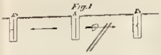


Fig 3

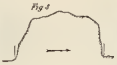


Fig 2

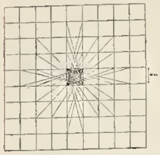
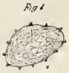


Fig 4



18223 (1911). *Improvements in Shoring and Strutting Appliances for use in Mines and the like purposes.* H. Smith, 11, Cennock-street, Hillsborough, and S. Buckley, Admiral Works, Holme-lane, Sheffield, Yorkshire.—This invention relates to an appliance for use in facilitating the propping and strutting of the workings in mines, and consists of a strut or prop, the primary use of which is to hold the cross-pieces or lids until the ordinary props are placed and wedged in position. Fig. 1 is a front elevation of the improved appliance when extended for use, fig. 2 being a side view of the same when telescoped down into the outer tube. The appliance is formed with a telescopic standard formed with two tubes, the outer tube *a* being provided with a longitudinal slot *b*, and the inner tube a^1 being provided with a longitudinal rack *c* of the same width as the previously-mentioned slot *b*. At a convenient distance from the bottom of the outer tube *a* is fixed a bracket *d* carrying a short shaft *e* and pinion wheel *f* which is geared into the longitudinal rack *c*, the spindle of the rack wheel being provided with a square end or square ends by which the pinion may be actuated and with a ratchet or pawl by which the rack may be sustained in any desired position, or as an alternative the rack pinion may be actuated by worm *g* and pinion *h* with suitable handles *i*, in which case the ratchet or pawl can be dispensed with. The top end of the inner telescopic tube a^1 is provided with a screw *j*, which can be projected in or out of the tube by means of a screwed collar *k* provided with actuating handles or levers *l*, and by which the final adjustments can be effected. The outer end of the screw is provided with a cap and socket *m*, which can be turned in any direction and with a headpiece *n* pivoted to the said cap to allow of its being tilted to any desired inclination. This headpiece *n* is also provided with screwed stays *o* by which it can be retained at any desired angle. At the bottom of the outer tube or standard is provided an adjustable base *p*, such base being extended either in the form of a circular stand or as a cross, suitable adjusting screws *q* with steel points being placed in the base piece to allow of the easy adjustment to any irregularities on the bottom of the working. (One claim.)

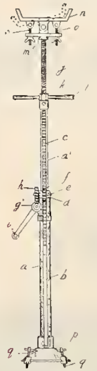


FIG 1

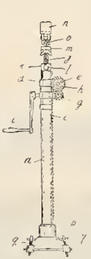


FIG 2

NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

15273. Manufacture of coke. T. Twynam.

15274. Semi-collapsible safety gate suitable for mine cages. F. Rosy.

15276. Brake release springs for railway carriages and wagons. L. W. Williams.

15283. Furnaces for heating copper ingots and for other like uses. G. B. A. Gibbons and R. Masters.

15327. Metal coating for iron or steel articles. H. W. Jordan.

15329. Locomotives. T. Döring.

15337. Smoke-consuming appliances and fuel economiser for steam-boiler furnaces. J. R. Brunton.

15341. Regulator of the pressure for steam, compressed air, or compressed fluid. Akt.-Ges. Jesselburger Hütte, vorm. Johann Nering Bögel et Cie.

15342. Leading-in conductors for electrical apparatus. British Thomson-Houston Company Limited.

15371. Railway sleepers. W. H. Morgan and W. V. Hartzell.

15422. Mechanical cooling-beds for rolling-mill trains. Rombacher Hüttenwerke.

15428. Gas compressor. G. Portielje and J. C. A. Jas.

15429. Electric heater. H. W. Purle.

15443. Safety mechanism for the winding gear of coalpits and the like. J. F. Staley.

15479. Processes and apparatus for electric welding. L. W. Chubb.

15480. Furnaces. T. Shoenberger Blair, jun.

15481. Apparatus for generating steam. E. E. Romanet.

15489. Disintegrators. R. Haddan.

15490. Tool for breaking down coal and the like after undercutting. N. Field.

15515. Apparatus of the rotary type used for charging gas retorts. W. Dempsey.

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MINES AND QUARRIES REPORTS, 1911: South Wales, 1s. 1d.; Scotland, 1s. 9d.; Liverpool and North Wales, 1s. 0½d.

PUBLICATIONS RECEIVED.

"The Compressed Air Magazine" (Vol. 17, Nos. 5 and 6), May and June; "Zeitschrift für das Berg.- Hutten u. Salinen Wesen" (Band 60, 3 Statistische Lieferung); "Bulletin of the American Institute of Mining Engineers" (No. 66), June.

Grimsby Coal Exports.—The following is the official return of the quantities of coal exported from Grimsby during the week ended July 5, 1912:—To foreign destinations (tons): Gefle, 6,039; Narvik, 2,736; Gothenburg, 2,689; Solvesborg, 2,440; Gudhjem, 231; Rotterdam, 471; Antwerp, 1,333; Esbjerg, 846; Norkoping, 3 891; Langesund, 654; Treguier, 252; Dieppe, 593; Helsingfors, 2,910; Hamburg, 293; Christiania, 740; Cehus, 4,181; Videy, 740; Malmo, 2,679; Halmstad, 80; and Dantzig, 1,120 tons; total, 34,968 tons. To coastwise destinations (tons): Topsham, 200; Lerwick, 1,023; and Cowes, 181 tons; total, 1,404 tons. The export for the corresponding week of last year was: Foreign, 22,231; and coastwise, 2,005 tons. Only 7,403 tons of coal were exported from Immingham during the past week, 5,956 to Cronstadt, and 1,447 to Rotterdam. There are, however, three or four vessels in dock taking in cargoes.

The Railway Bill.—A large and influential deputation, under the auspices of the Association of Trade Protection Societies of the United Kingdom, waited upon the Board of Trade on the 4th inst. to urge the adoption of certain amendments in the Railways Bill now before Parliament. The deputation was received by Mr. J. M. Robertson, M.P. (Parliamentary Secretary of the Board of Trade), and Mr. W. F. Marwood, C.B. (Railways Department).—Mr. Athelston Rendall, M.P., who introduced the deputation, said a point they particularly had in mind was the provision to remove from the railway companies to the trader the onus of proving that any particular increase of rates was unreasonable, and also clauses 8 and 9 concerning working agreements and amalgamations between the different companies.—Mr. Robertson said that it might be interesting to the deputation if he briefly explained the real object of clause 2, relating to the increase of rates, as this clause appeared to have given rise to considerable misconception. In the past, when a railway company raised a rate to meet an increase in wages, and the increase of rate was challenged, the Commissioners would call upon the company to justify the particular rise of rate that was complained of, and unless they could show, with regard to that one rate, that the rise in wages justified it, the increase might be disallowed. It was not sufficient for the company to say that they had had to raise wages, and must, therefore, raise the rates. The Government pledged themselves in effect to secure to the companies that, in future, whenever a rise of rates was complained of, it should suffice if they showed that the rise was part of a general rise, entailed by increase of wages to the employees, but the onus would still lie on the companies to prove that a general rise in rates was justified by increased working expenses, and they would have to satisfy the Railway Commissioners on the genuineness of the justification. The actual wording of the clause, however, was at present under consideration. He further mentioned that the Bill provided some check on working agreements and amalgamation between the companies. Whether the Board of Trade should be empowered to lay down the conditions of such agreements was a matter for further consideration.

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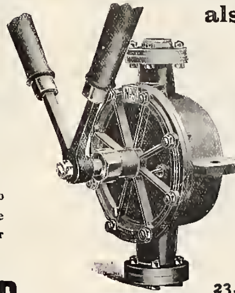

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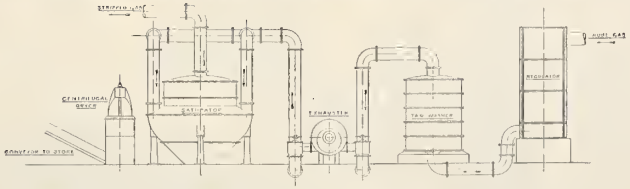

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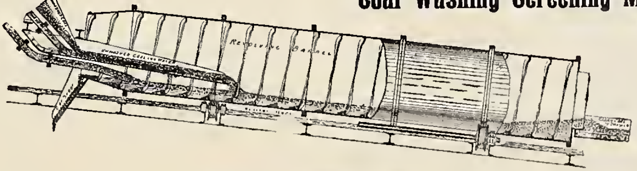

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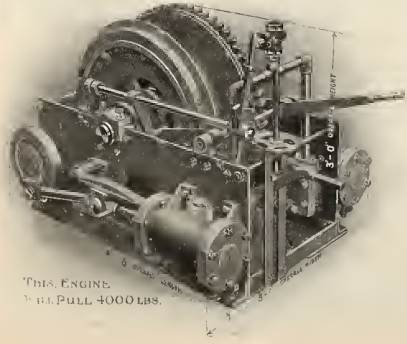

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Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Ryland-street Works, Birmingham

CREEPERS

CUT-OFF GEAR
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Wood, John, and Sons Ld., Wigan

DETONATORS
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

DISINTEGRATORS
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Middleton, Robert, Sheepscar Foundry, Leeds
Simon-Carves Ld., 20, Mount street, Manchester
Yeadon, Son and Co., Albion-place, Leeds

DIVING APPARATUS
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Pulsometer Engineering Co. Ld., Reading
Siebe, Gorman and Co. Ld., Westminster S.W.

DOCKS
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DOG SPIKES
Frost, Albert, and Co., Sheffield
Renton, R. M., & Co., Midland Works, Sheffield

DOUBLE HELICAL GEAR (MACHINE CUT)
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Citroen, Andre, and Co., 27. Queen Victoria-street, London
Deutsche Maschinenfabrik A.G., Duisburg, Germany

DRAIN COCKS
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United States Metallic Packing Co. Ld., Soho Works, Bradford

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Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

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Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Evans, Joseph, and Sons Ld., Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Pearn, F., and Co. Ld., West Gorton, Manchester
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Wood, John, and Sons Ld., Wigan

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Lewis, Wm., and Son, Bilston
Theedam, E. C., Ld., Dudley

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Mavor and Coulson Ld.. 47, Broad-st., Glasgow
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Longbotham, R. H., and Co. Ld., Wakefield
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Mavor and Coulson Ld., 47, Broad-st., Glasgow
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Wright, Joseph, and Co., Tipton

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Wood, John, and Sons Ld., Wigan

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Wailes, Dove and Co. Ld., Newcastle-on-Tyne

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Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

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Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

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Reavell and Co. Ld., Ipswich
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Walker Brothers (Wigan) Ld.. Wigan
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Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Jones, G. H., 74, Blackfriars-road, Salford
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.

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Railway and General Engineering Co. Ld., Nott
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld.. Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, R., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

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Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Jones, G. H., 74, Blackfriars-road, Salford
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

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Stringer, John, and Son, Blackburn

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British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

ENGINES PUMPING) (See PUMPS)

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Hathorn, Davey and Co. Ld., Leeds
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Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

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Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

EXHAUST TURBINE SAFETY VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow

EXHIBITIONS

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Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

EXPLOSIVES
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

EXPLOSIVES (PERMITTED)
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FANS (AIR PROPELLER)
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Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Jones, G. H., 74, Blackfriars-road, Salford

FANS (EXHAUST)
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Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Jones, G. H., 74, Blackfriars-road, Salford
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

FANS (VENTILATING
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Jones, Geo. H., 74, Blackfriars-road, Salford
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

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Wright, Joseph, and Co., Tipton

FEED-WATER HEATERS
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Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Jones, Geo. H., 74, Blackfriars-road, Salford
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

FILES
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Spencer, Matthias, and Sons, Sheffield
Waterfall, H. & R., & Barber, Bridge-st., Sheffield

FILTERS (OIL)
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Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

FILTERS (WATER AND GREASE)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

FIRE APPLIANCES
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

FIRECLAY GOODS
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FIREWOOD MACHINERY
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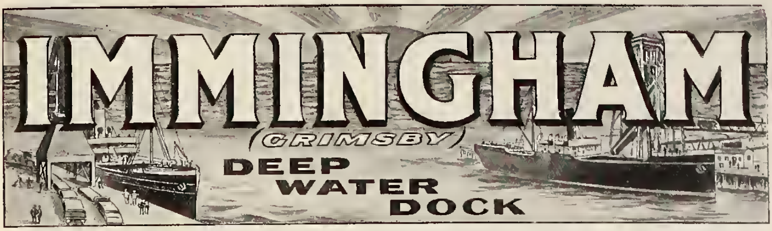
The NEW COAL PORT



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SAM FAY, General Manager.

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Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

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Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

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Theedam, E. C., Ld., Dudley
Treasure, J. S., & Co., 8 & 12, Vauxhall-rd., L'pool

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Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

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Yorkshire Boiler Co. Ld., Bradford

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Brown, David, & Sons (Hudd.) Ld., Huddersfield
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Lancaster and Tonge Ld., Pendleton, Manchester
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Tangyes Ld., Cornwall Works, Birmingham

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Planing Machinery and Appliances (Wood)
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Stewarts & Lloyds Ld., Birmingham & Glasgow
Stringer, John, and Son, Dept. 11, Blackburn

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Firth, William, Ld., Leeds
Heenan & Froude Ld., Worcester
Isca Foundry Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Ld., Albion Works, Sheffield

Portable Railways
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington

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Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Mining School, Porth, Glam.

Preservative (for Plant)
Kalbitum Paint Co. Ld., Belvedere Works, Belvedere
Walles, Dove and Co. Ld., Newcastle-on-Tyne

Publications
Colliery Guardian Co. Ld., 30 & 31, Furnival-st., Holborn, London, E.C.
Griffin, Charles, and Co. Ld., London, W.C.
Southern, T. A., Universal Mining School, Cardiff

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Deutsche Maschinenfabrik A.G., Duisburg Germany
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Frost, Albert, and Co., Sheffield
Humble, Stephen, 9, Victoria-st., London, S.W.
Jardine, John, Deering-street, Nottingham
Jones, G. H., 74, Blackfriars-road, Salford
Llewellyn and Cubitt Ld., Pentre, R.S.O. Glam.
Spencer and Co. Ld., Melksham, Wilts
Steel, Alfred, and Sons Ld., Brightside, Sheffield
Thompson and Southwick Ld., Tamworth
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Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

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Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Spencer and Co. Ld., Melksham, Wilts
Steel, Alfred, and Sons Ld., Brightside, Sheffield
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Hathorn, Davey and Co. Ld., Leeds
Isca Foundry & Engineering Co., Newport, Mon.
Jones, G. H., 74, Blackfriars-road, Salford
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co. Ld., West Gorton, Manchester
Phillips, C. D., Newport, Mon.
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.
Wood, John, & Sons Ld., Brook Foundry, Wigan

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British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Tickle Brothers, Vulcan Ironworks, Wigan

PUNCHING SHEARS

Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street, Birmingham

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Deutsche Maschinenfabrik A.G., Duisburg, Germany
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
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Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley

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Deutsche Maschinenfabrik A.G., Duisburg, Germany
Youngs, Ryland-street Works, Birmingham

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Bute Works Supply Co. Ld., Cardiff
Firth, William, Ld., Leeds
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Railway and General Engineering Co. Ld., Notts
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Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

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British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester
Lancashire and Yorks. Wagon Co. Ld., Heywood
Lincoln Wagon and Engine Co. Ld., Lincoln
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld. Midland Works Birmingham
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Rigley, Wm., Bulwell, Nottingham
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Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Bute Docks, Cardiff
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Firth, William, Ld., Leeds
Gt. Central Railway, 216, Marylebone rd., London
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Heenan & Froude Ld., Worcester
Isca Foundry and Engineering Co., Newport, Mon.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld. Midland Works Birmingham
Benton, B. M., and Co., Midland Works, Sheffield
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British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lincoln Wagon and Engine Co. Ld., Lincoln

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British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Heenan & Froude Ld., Worcester
Lancashire and Yorkshire Wagon Co. Ld., Heywood, near Manchester
Lincoln Wagon and Engine Co. Ld., 11, St Mary-street, Lincoln
Moy, Thomas, Ld., Railway Works, Peterboro'
Rigley, Wm., Forest Wagon Works, Bulwell, Nottingham

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Allen, W. G., and Sons (Tipton) Ld., Tipton
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British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester

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Hardy Patent Pick Co. Ld., Sheffield

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Knowles Oxygen Co. Ld., Wolverhampton
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., 187, Westminster bridge-road, S.E.

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Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., Westminster

RIVETS

Baker, John, and Son, Bilston, Staffs
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley
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Spencer, Matthias, and Sons, Sheffield
Stephens, R., and Son, Carn Brea, Cornwall

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Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Sheffield
Steel, Alfred, and Sons, Ld., Brightside, Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

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Norton's (Tividale) Ld., Tipton
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Kenyon, Wm., & Sons Ld., Dukinfield
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ROPES (DRIVING)

Kenyon, W., & Sons Ld., Dukinfield Manchester

ROPES (HEMP AND MANILLA

Wright, J. and E., Ld., Birmingham

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Wright, J. and E., Ld., Birmingham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

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Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Cooke, William and Co. Ld., Tinsley, Sheffield
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Haggie Brothers Ld., Gateshead-on-Tyne
Latch and Batchelor Ld., Hay Mills, Birmingham
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Wright, John & Edwin, Ld., Garrison st., B'ham

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Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

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Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
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Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

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Spencer and Co. Ld., Melksham, Wilts
Uskside Eng. Co. Ld., Newport Mon.
Wright, Joseph, and Co., Tipton

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Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
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Theedam, E. C., Ld., Dudley

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Baker, John, and Son, Bilston, Staffs
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Benton, B. M., and Co., Midland Works, Sheffield

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Wright, Joseph, and Co., Tipton

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Siebe, Gorman and Co. Ld., Westminster, S.E.

SPEED-REDUCING GEARS
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

SPHINCTER GRIP ARMOURED HOSE
Reddaway, F., & Co. Ld., Pendleton, Manchester

SPRINGS
British Wagon Co. Ld., Rotherham
Lancaster and Tonge Ld., Pendleton, Manchester
Skinner, J. P., and Co. Ld., Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

STAMPINGS
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

STEAM EXPERTS
Tickle Brothers, Vulcan Ironworks, Wigan

STEAM FITTINGS
British Mannesmann Tube Co. Ld., London Wall
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Russell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staffs.

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Stewarts and Lloyds Ld., Birmingham & Glasgow
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Wellington Tube Works Ld., Great Bridge, Tipton

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Proctor, James, Ld., Burnley
Yorkshire Boiler Co. Ld., Bradford

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Auld, D., and Sons, Whitevale Foundry, Glasgow
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Hopkinson, J., and Co. Ld., Huddersfield
Lancaster & Tonge Ld., Pendleton, Manchester
Stewarts & Lloyds Ld., Birmingham and Glasgow
United States Metallic Packing Co. Ld., Soho Works, Bradford
Wright, Joseph, and Co., Tipton

STEAM WINCHES
Bridge, David, & Co. Ld., Castleton, Manchester
Clarke, Chapman & Co. Ld., Gateshead on Tyne
Phillips, C. D., Newport, Mon.
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

STEEL
Cooke, William, and Co. Ld., Tinsley, Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Latch and Batchelor Ld., Hay Mills, nr. B'ham
Mining Engineering Co. Ld. (The), Sheffield
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Spencer, Matthias, and Sons, Sheffield
Stewarts & Lloyds Ld., Birmingham and Glasgow
Thompson and Co., Wigan
Waterfall, H. & R., & Parker, Bridge-st., Sheffield

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Benton, B. M., and Co., Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

STEEL FLATS AND ROUNDS
Scott, Walter, Ld., Leeds Steel Works, Leeds

STEEL TINBARS
Scott, Walter, Ld., Leeds Steel Works, Leeds

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Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln

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Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Wright, Joseph, and Co., Tipton

SULPHATE OF AMMONIA PLANT
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

SULPHUR RECOVERY PLANT
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

SUPERHEATERS
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
Pulsometer Engineering Co. Ld., Reading
Stringer, John, and Son, Dept. 11, Blackburn

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White & Wright, 93, Renshaw Street, Liverpool

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Auld, D., and Sons, Whitevale Foundry, Glasgow
Hopkinson, J., and Co. Ld., Huddersfield

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Thomas, Wm., Cambrian Mining School, Porth

SURVEYING (INSTRUCTION)
Thomas, Wm., Cambrian Mining School, Porth

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Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavement, London
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

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Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne

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British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne

SWIVELS (BALL-BEARING)
Bridge, David & Co., Ld., Castleton, Manchester
Youngs, Ryland-street Works, Birmingham

TAMPING PLUGS

TANKS
Bagnall, W. G., Ld., Stafford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Harvey, G. A., and Co. Loampit Vale, Lewisham
Isca Foundry & Engineering Co., Newport, Mon.
Jones, G. H., 74, Blackfriars road, Salford
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Valor Co. Ld., Rocky-lane, Aston Cross, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

TANKS (FERRO-CONCRETE)

TAR DISTILLING PLANT
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

TECHNICAL EDUCATION
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

TELEPHONES
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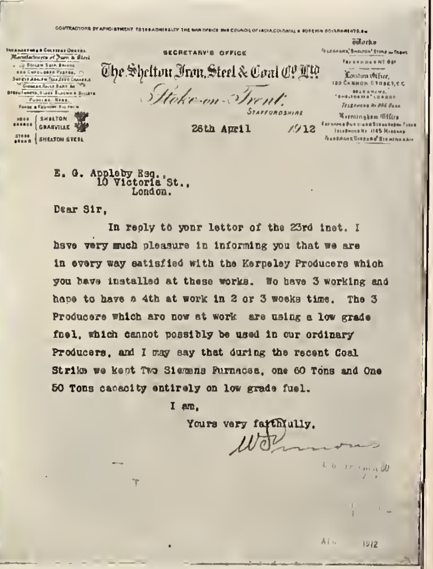

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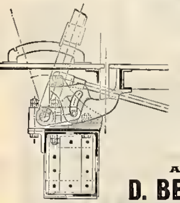

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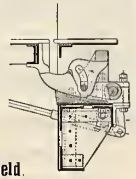

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June, 1912.
PETER MACNAUGHTON, S.S.C.,
Clerk.

⁂ *For* **later Advertisements** *and* **Scale of Charges**, *see* **Page 78 (Leader Page).**

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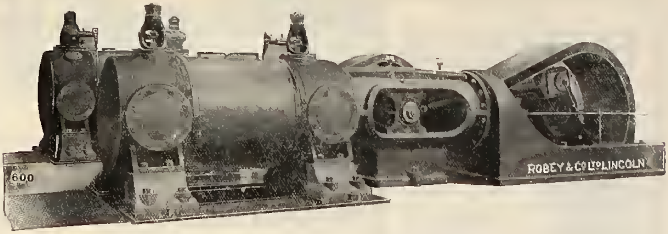

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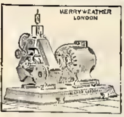

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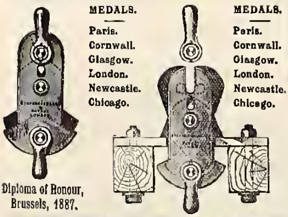

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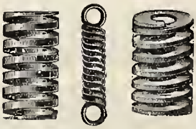

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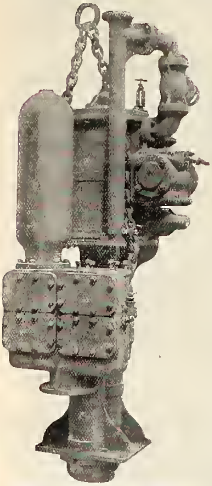

Fig. 620.—"CORNISH" SINKING PUMP, "Bucket" Type, 300 feet Pattern.

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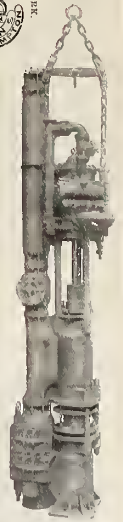

Fig. 622.—"CORNISH" SINKING PUMP, "RAM" TYPE, 600 feet Pattern.

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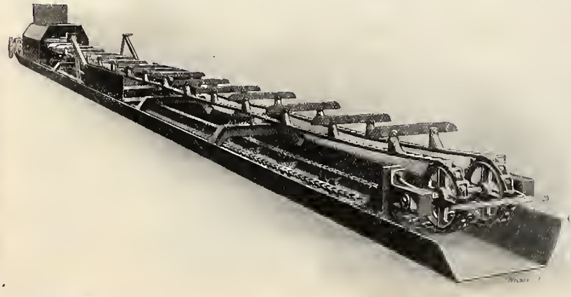

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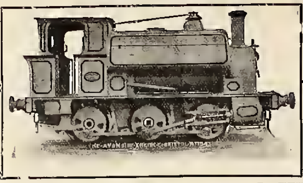

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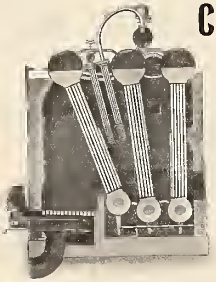

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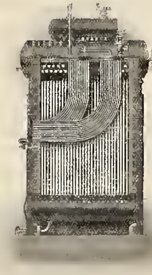

Sectional view of Boiler showing Superheater in position.

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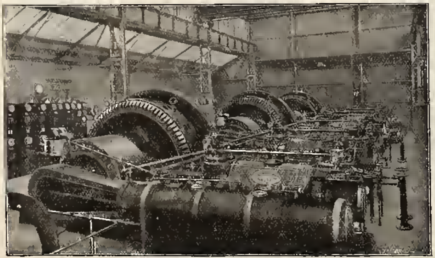

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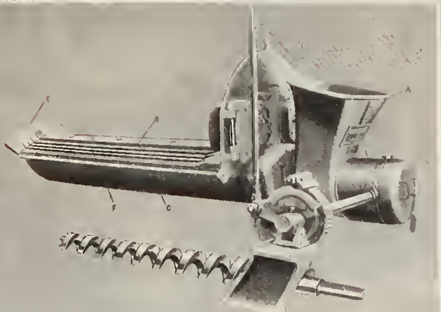
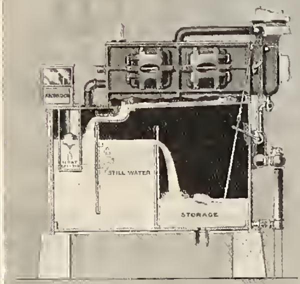


Gear driven Stoker with
Taper feeding conveyor removed,
for Internally fired Boilers.



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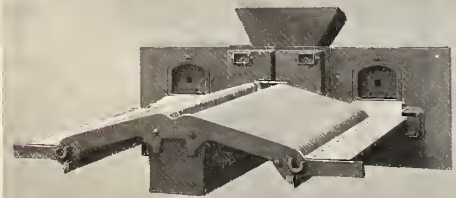
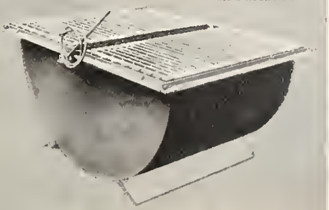


Rear view of Class 'E' Stoker
for Water-tube Boilers.



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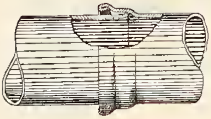

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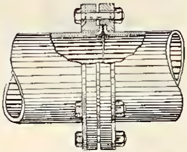

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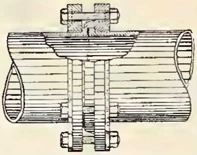
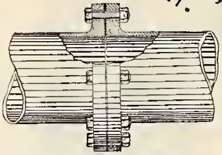


ALBION LOOSE FLANGE JOINT.



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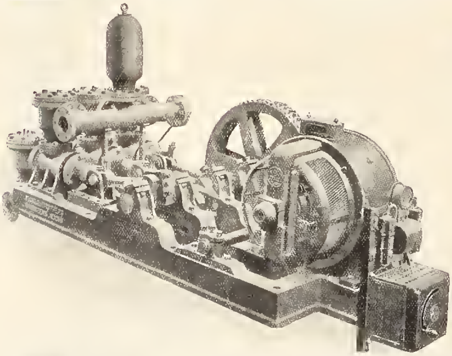

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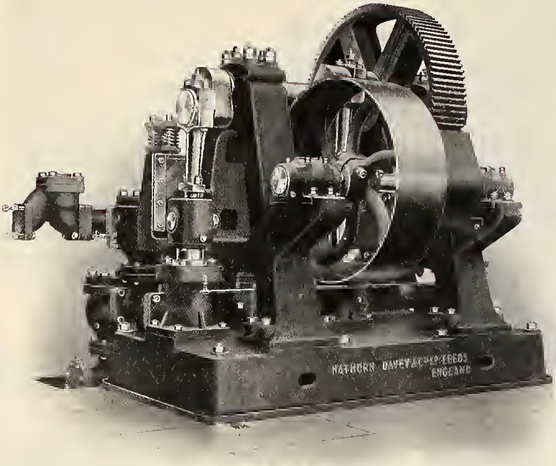

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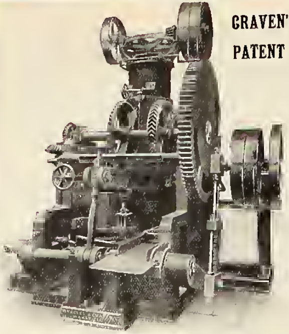

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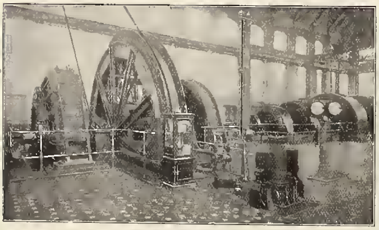

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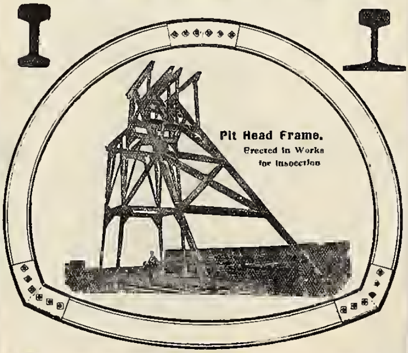

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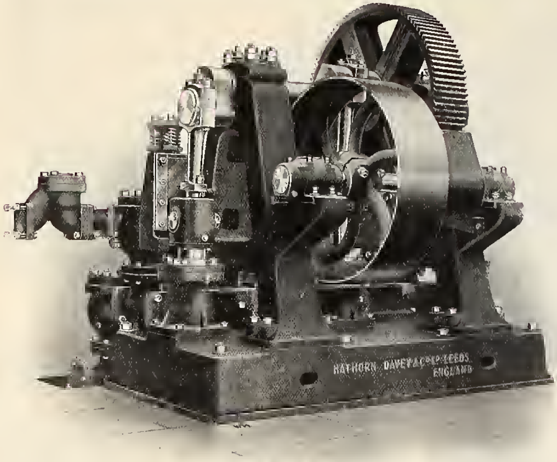

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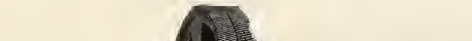

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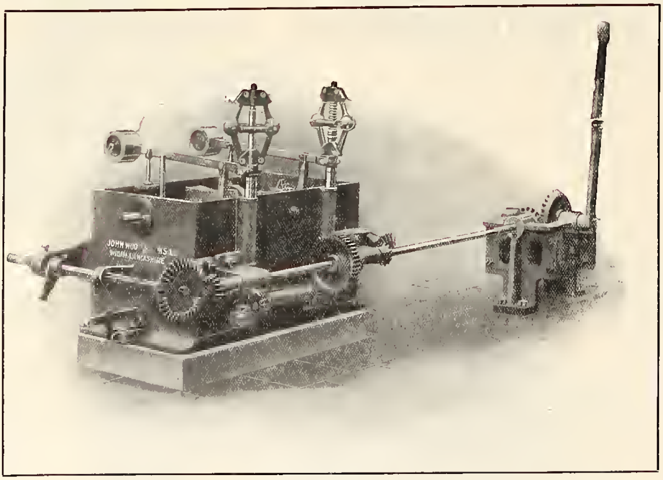

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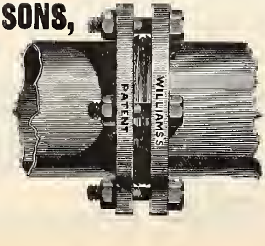

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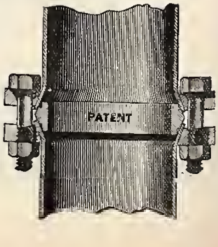

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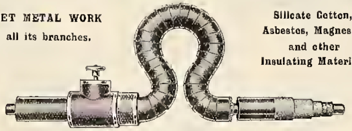

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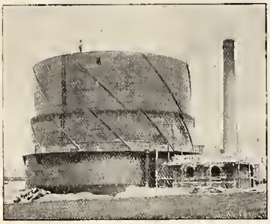

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— For —
WATER GAUGES.
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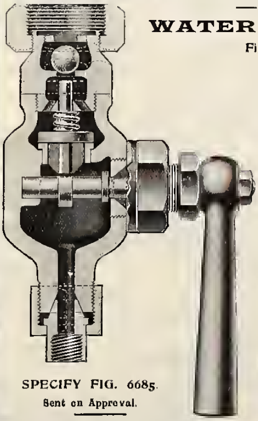

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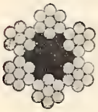
Fig. 2. HAULING.



Lang's Lay Ropes.

Fig. 26. WINDING.

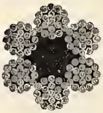


Fig. 1½ HAULING.

Patent Flattened Strand Ropes.

Fig. 4. WINDING.

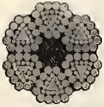
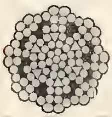


Fig. 13a. SINKING.



Advantages of Patent Flattened Strand Ropes

1. Greater wearing surface, therefore longer life of rope and less wear upon pulleys.
2. Greater strength, thereby admitting of smaller ropes being used for existing loads, or of increased loads without increase in size of rope.
3. Spliced easily and more effectively.
4. Less tendency to twist and stretch in working.

Fig. 13a for Sinking and Fig. 11b for Cranes, &c., are non-twisting.

Fig. 11b. CRANE, &c

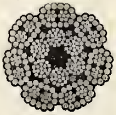
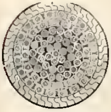


Fig. 15a.



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Smooth surface reduces wear to a minimum.
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Fig. 20.

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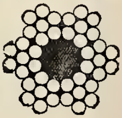

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VOL. CIV. FRIDAY JULY 19, 1912 No. 2690.

NOTES ON THE ANALYSES OF MINE AIR CONDUCTED AT THE LEWIS MERTHYR CONSOLIDATED COLLIERIES LIMITED, TREHAFOD.*

By J. W. HUTCHINSON, M.I.M.E., and EDGAR C. EVANS, B.Sc., A.I.C.

The new Mines Act of 1911 has caused considerable attention to be devoted to the accurate investigation of mine air. This is the first time that any Act of Parliament has stated definite percentages of various constituents which must not be exceeded. The average percentage of inflammable gas has to be determined by an inspector taking six samples of air at intervals of not less than a fortnight, and mining engineers and managers generally will naturally come to the conclusion that it is necessary to have duplicate samples of air taken, in order that they may ascertain the percentage for their own information, as well as act as a check to the samples taken by the inspectors. The samples taken by the manager will therefore either have to be analysed at the colliery or sent to an analyst for the purpose. It is very rarely, in well ventilated collieries, that the limits allowed in the case of oxygen and carbon dioxide are exceeded, and the matter resolves itself into the accurate testing of the air for inflammable gas. The means we have at our disposal for detecting firedamp can be summarised thus (*see* Report of Royal Commission):—

(1) Instruments depending on the comparative rates of diffusion of methane and air. This method requires that a reservoir of fresh air should be constantly at hand to serve as a standard, and this fact alone makes it difficult to use underground, whilst the presence of CO_2 in the air further vitiates results obtained. Even in the laboratory it is difficult to make the method sensitive enough, and for these reasons the method has not hitherto been successful.

(2) Instruments depend on specific gravity, for instance, observing how much a light ball is heavier in the suspected air than in air of normal quality. This method required instruments too delicate to be of practical use in a mine.

(3) Observation of the glowing appearance of a platinum wire rendered incandescent by electricity, and round which the suspected air is allowed to circulate. This method gives a striking result at first, but in some cases the platinum rapidly becomes clogged.

(4) Instruments depending on the fact that the electrical resistance of a platinum wire increases in the presence of methane. This method seems decidedly promising, and quite recently an electric lamp was described by Mr. George Ralph, at the Newcastle meeting of the Institution of Mining Engineers, which it was hoped could be used for the detection and estimation of small amounts of methane under underground conditions. Unfortunately the lamp, although it worked well in the presence of many other inflammable gases, has not as yet proved satisfactory in the estimation of methane, and until the difficulties which have been encountered in this respect can be overcome, we are afraid the method will not be of service to the mining engineer.

(5) The method of observing the flame of a safety lamp is universal, and is of such importance that it can with advantage be discussed in some detail.

The Safety Lamp as a Means of Testing for Firedamp.

A vast amount of work has been published on this subject. Extensive researches have been performed in various laboratories with regard to the percentage of methane denoted by different caps, and in some cases actual photographs have been taken showing the caps produced by different amounts of firedamp. Yet when it is a question of estimating the amount of gas present in a certain place by the height and appearance of the cap on a safety lamp, it is surprising what a divergency exists, especially when a small amount is in question. Instances will doubtless recall themselves of occasions when several recognised authorities have been making an examination together of some colliery, of the divergent results that have been obtained when a lamp test is made. The personal equation has, we consider, a great deal to do with it. It must be remembered that we are dealing with the blue end of the spectrum, a portion which to many people, otherwise perfectly normal sighted, is almost invisible. Then again, when low amounts are in question, say from 1 to 2 per cent., a good deal depends on the fact as to whether the observer wants to find gas or not. It is quite conceivable, for instance, that an inspector might be apt to over-estimate, possibly unconsciously, the amount of methane present in a certain place, whilst the colliery official, on the other hand, would quite as naturally have a tendency to under-estimate the amount. When it is a question of testing by a fireman the matter becomes still more involved. He has a certain amount of work to do, and sometimes a limited time to do it in. Again, he cannot test as carefully as possibly he might be able to do, owing to the fear of his lamp going out. Undoubtedly under these conditions many firemen would fail to detect the presence of less than 2½ per cent. of gas.

Now, however, with the statutory limit of 2½ per cent. it has become an absolute necessity that the fireman should be trained to detect the presence of low percentages by means of the safety lamp. Practically everything depends on the operator and not on the lamp itself, although there are lamps the burners of which are so designed as to make it easier to get the proper standard flame necessary to give the correct percentage of methane in the air. A fireman who could not be trained to operate the flame of a safety lamp so as to detect the presence of 2½ per cent. of gas would not, in our opinion, be a suitable man to occupy the position of fireman. With careful training it is possible for a skilled man to detect as low as 1½ per cent., although from analyses made at the Lewis Merthyr Collieries we have come to the conclusion that it is possible for some men to detect down to 1 per cent.

The Glamorgan County Council classes are in this respect doing excellent work. By means of the Winstanley apparatus it is possible to show in a class-room the effect of different percentages of gas on the flame of a safety lamp. Unfortunately, however, this apparatus, although excellent in many respects, does not in all cases give thoroughly reliable results. In some cases, say, with air containing 2½ per cent. of gas, the cap indicated by the lamps connected with the apparatus is undoubtedly a 2½ per cent. cap, whilst in other cases the cap shown is much smaller than is consistent with the amount of gas present in the chamber. This discrepancy can in some cases be accounted for. The lamps may not be in good condition, the wicks may be dirty, or the temperature of the lamps themselves may vary, and this has an important influence on the results obtained. The greatest care is thus necessary in order that reliable results may be obtained with this apparatus, and even then, when apparently all precautions have been taken, there sometimes might be a wide divergency in the results, as proved by actual results taken at the same time with different types of lamps and fitted with different types of burners. Undoubtedly systematic analysis of the air of the mine with concomitant cap observations is the best method of training the fireman for gas testing. He then gradually familiarises himself with the appearance of the cap for a certain percentage, and his readings in consequence become considerably more accurate. We have for a few months past, especially at one of our collieries, been gradually training a number of firemen in the detection of low percentages of methane. They have, by means of the hundreds of analyses that have been made, become thoroughly familiar with the caps shown by various percentages, and perhaps the table showing the results of firemen's observations, will be the best method of showing what has been accomplished in that direction.

Each fireman after making a cap test, notes down the percentage which he thinks is present, with any further particulars he may care to mention. He then immediately takes a sample of the air, which is afterwards analysed—when convenient, in his presence. The notes he has made are collected previous to the analysis, so that there can be no question as to the fairness of his observations. The tests were made for the most part with an ordinary bonneted Clanny (Cambrian) lamp, fitted with a round wick. In making a lamp test the fireman lowers his flame until the luminous tip is barely visible; he then bases his estimate on the appearance of the cap, the height, density, and condition of tip all being taken into account.

As a result of this training, the firemen, in their personal reports to the manager, and when sending samples to the laboratory, very rarely state their ordinary working tests in terms of height of cap, but definitely state that a place contains such and such a percentage of gas—with, in most cases, quite considerable accuracy. The results shown in the table are only those which we have been able to check ourselves, but are quite typical of those obtained in daily working. It must be pointed out that unless a fireman is trained to specify the percentage of gas present in the air from the caps shown on his lamp, he will not be able to decide what the percentage is. We must not forget that firemen have always stated the gas present in a place by the height of the cap on their lamps, and when such cap exceeded a fixed standard the place is not considered fit to work in, and is fenced off. It is therefore necessary for the firemen to have information as to what percentage is represented by various heights of caps. Unless this is done a number of practical firemen who are now thoroughly acquainted with the varying conditions of the roof, the timbering, and safe keeping of their districts, will fail to obtain their certificates under the conditions imposed by the new Mines Act.

With regard to the kind of lamp best suited for gas-testing, we commenced making observations with various lamps as to the heights of caps shown by different lamps. Shortly, however, after commencing this work, Cadman and Whalley's Report to the Royal Commission on Mines came into our hands, and the admirable and extensive series of tests made by them in this connection rendered further work in this direction quite unnecessary. Perhaps, however, we may add, after observations extending over several months, that tests made with an ordinary bonneted Clanny lamp fitted with a round wick are, with training—and for percentages from 1 per cent. upwards—quite as reliable as those made with lamps specially devised for gas-testing. Of the latter, the Clowes hydrogen lamp is undoubtedly the most sensitive, and indicates with accuracy percentages down to 0·75 per cent. It is, however, cumbrous, and is hardly a lamp that could be put into the hands of, say, a fireman. Of the others, Naylor's lamp, fitted with a bi-fold burner, the Hepplewhite-Gray and improved Gray are excellent. The screw adjustment, especially for the wick in the Naylor lamp, is a most valuable accessory. It allows the height of the testing flame to be adjusted to a nicety, which is quite impossible with an ordinary pricker.

Our experience of lamps fitted with the Cadman-Cunynghame device or with the copper loop advocated by other authorities does not warrant our confirming the statements made concerning their sensitiveness in the detection of low percentages of methane.

Chemical Analysis of Mine Air.

We now come to the method of estimating methane by chemical analysis. This is undoubtedly the best and most accurate of all methods available for the examination of mine air. Unfortunately it is a method that cannot be made universal, as it requires a considerable degree of training to accomplish satisfactorily. In conjunction, however, with the safety lamp it becomes a most valuable accessory to the colliery manager, and it is our object in this paper to indicate some of the uses to which this systematic analysis of mine air can be put.

Some Results Obtained by Means of Systematic Analysis of Mine Air.

We can now proceed to discuss some of the uses of systematic analysis of the mine air, with some of the results obtained at the Lewis Merthyr Collieries by its means.

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* From a paper read before the South Wales Institute of Engineers, and published in the *Transactions*.

We have already treated in some detail its application in the study of firedamp caps and in the training of firemen, and need not pursue the subject further.] {The detection of leakage underground by means of analysis is also so obvious that it need only be mentioned here. We can, however, assert that chemical analysis is far more delicate than anemometer readings in this respect.

The chemical analysis of the return air especially is of the highest importance. The main return current represents, as it were, the main sewer of the mine, and the air contains the gases given off from the various ventilating and working districts. Systematic analysis of the return air will then reveal to the mine manager any serious dislocation in the ventilation. It will also call his attention to any increase in the amount of gas given off, such as may be due to increased blowers of gas, decreased speed and efficiency of the fan, &c., and if these analyses are combined with anemometer readings the quantity of gas produced by a colliery can be directly ascertained. The estimation of carbon dioxide is sometimes of especial value, but in this paper we will limit ourselves solely to results obtained of methane determinations, as we consider those to be of far greater importance to mining engineers of the South Wales coalfield.

Shortly after receiving our apparatus at Trehafod the question arose, in connection with the Mines Bill then before Parliament, as to the percentage of methane present in the main (return) haulage roads. It will be remembered that the Bill then contained the clause stating that the percentage of methane in the return airways used for the hauling of coal should not exceed 0·5 per cent. It became, therefore, of the highest importance to know what exactly was the condition of the air in the returns in this respect. It will be unnecessary to give particulars here of the results obtained, as all the results which are given in this paper were obtained in the main returns as per plans shown, and it will be sufficient to state that in no single case did the returns conform to the limits laid down above. This condition was not limited to the Lewis Merthyr Collieries, but was quite typical of the majority of the South Wales (steam coal) collieries. Had the clause been persisted in, it would practically have meant the shutting down of a large number of collieries in South Wales, with a consequent loss of coal output of enormous dimensions.

The results, however, obtained during this investigation were so interesting that we decided to continue systematic analysis of the air in the returns, with a view to accounting thoroughly for the variations which we found taking place. The first and most obvious influence to be looked for was that of barometric pressure. We therefore commenced daily examinations of the air in the main returns of two of our upcast pits, with a view to finding how far barometric variation affected the amount of methane given off, and we can now proceed to examine some of the results obtained in fair detail.

Variation of Methane Percentages due to Barometric Variation.

The scheme of ventilation in the first colliery examined is shown in Plan A. Samples were taken daily at each of four places marked respectively 1, 2, and 4 on the Plan A, by one of the officials, and the barometric pressure noted. The analytical results obtained are given in Tables A_1 and A_2. These results are to a certain extent not thoroughly satisfactory. They certainly show, on the whole, the influence of barometric pressure on the percentage of methane in the return airways. A substantial rise in the barometer is accompanied by a drop in the percentage of methane and *vice versâ*, but a close examination will show several local variations which cannot be accounted for by barometric variation. It must be remembered, however, that we are dealing with a matter which is influenced by a very large number of factors. As we shall show later, the amount of gas given off is influenced very largely by the rate at which the coal is worked, and thus varies at different periods of the shift. Then, again, the regular and constant speed of the fan producing the ventilation has a distinct influence on the percentage, and in this particular case the discrepancy was undoubtedly due to a variation in the speed of the fan from causes which were well understood at the time, thus causing a variation in the quantity of air passing along the roadway.

Results obtained at Colliery B.—The seam at this colliery gives off large quantities of gas wherever it is worked. Samples of the return air were taken daily at this colliery at the point marked (1) on the Plan B. These were taken with extreme care by the colliery surveyor. The spot at which they were taken was marked on the wall of the roadway, and they were taken each day at exactly the same time (10 a.m.), the barometric pressure being simultaneously recorded The results obtained in a period of about six weeks are

TABLE A_1

Results of Analyses at places (1) and (2) of Colliery A—Plan A

Date.	Percentage of methane.		Barometer in inches.
	Place (1)	Place (2)	
1912.			
January 8	1·02	1·52	29 00
" 9	1·35	1·66	29·40
" 10	1 38	1·70	29 80
" 11	1·21	1 77	29 87
" 12	1·24	1·57	30 09
" 13	1·36	1 80	29 90
" 14	—	—	—
" 15	1·34	1·75	29 63
" 16	1·45	1·72	29·47
" 17	1 32	1 62	29 71
" 18	1·32	1·56	29 70
" 19	1·20	1 59	29·90
" 20	1·42	1·83	29·73

TABLE A_2.

Results of Analyses at places (3) and (4) of Colliery A—Plan A.

Date.	Percentage of methane.		Barometer in inches.
1912.	Place (3)	Place (4)	
January 8	1·20	—	29·00
" 9	1 31	—	29 40
" 10	1·28	1 42	29·80
" 11	1 26	1·27	29·87
" 12	1·16	1·24	30 09
" 13	1·37	1·57	29 90
" 14	—	—	—
" 15	1 45	1 62	29·63
" 16	1·53	1 60	29 47
" 17	1 32	1 50	29·71
" 18	1·24	1·45	29 70
" 19	1 31	1·35	29 90
" 20	1·46	1 71	29·73

TABLE B_1.

Results of Daily Analyses at Colliery B—Plan B.

Date.	Methane. Per cent.	Barometer In	Date.	Methane. Per cent.	Barometer. In.
Jan. 9	1·34	29·20	Jan. 24	1·22	29 22
10	1 12	29 60	25	1·20	29·30
11	1·20	29 67	26	1·17	29·50
12	1·12	29·89	27	1·14	29 80
13	1·13	29·70	28	1·09	28 85
14	1 22	29·55	29	1·10	29·92
15	1·25	29 43	30	1·10	29 90
16	1·34	29 27	31	1·31	29·72
17	1·20	29 51	Feb. 1	1·42	26·46
18	1·32	29 50	2	1·52	29 07
19	1·13	29 70	3	1·58	29·21
20	1·31	29·55	4	1·26	29·70
21	1·03	29·73	5	1·58	29 20
22	1·36	29·57	6	1·36	29·74
23	—	29 33			

TABLE B_2.

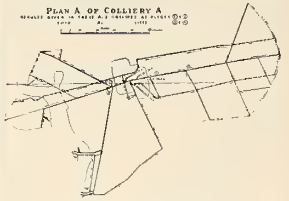
Analyses made at Colliery B—Plan B.

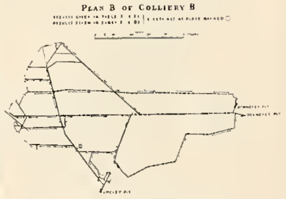
Date.	—	Time.			
		6 a.m.	10 a.m.	3 p.m.	10 p.m.
Feb. 13	CH_4 per cent.	—	—	1·13	1·11
	Barometer	—	—	29 45	29·47
" 14	CH_4 per cent.	1·96	1·16	1·05	1·0
	Barometer	29 61	29 65	29 70	29 72
" 15	CH_4 per cent	1·13	1·17	1·35	1 05
	Barometer	29 66	29 68	29 70	29·71
" 16	CH_4 per cent	1·17	1·15	1·29	1·14
	Barometer	29 70	29 73	29·75	29 70
" 17	CH_4 per cent.	1·35	1·34	1·30	1 30
	Barometer	29 66	29 68	29 75	29·67
" 18	CH_4 per cent.	1·21	—	—	—
	Barometer	29 40	—	—	—
" 19	CH_4 per cent	1·33	1·34	1 49	1·35
	Barometer	29 10	29·03	28·95	28·85
" 20	CH_4 per cent	1·25	1·25	1·27	1 06
	Barometer	29 14	29·21	29 38	29 06
" 21	CH_4 per cent.	1·26	1·32	1·27	1·06
	Barometer	29 45	29 45	29·50	29·52
" 22	CH_4 per cent.	1·17	1·32	1·38	1 29
	Barometer	29 55	29·54	29 53	29 56
" 23	CB_4 per cent	1 39	1·35	1·37	1 23
	Barometer	29·50	29·50	29 50	29 56
" 24	CH_4 per cent.	1 16	1 33	—	—
	Barometer	29·55	29·56	—	—
" 25	CH_4 per cent.	1 27	—	—	1·08
	Barometer	29·57	—	29 50	29·64
" 26	CH_4 per cent.	1 22	1·29	1·33	1·22
	Barometer	29 60	23 56	29 56	29 54
" 27	CH_4 per cent	1·20	1·23	1·17	1·19
	Barometer	29·70	29 78	29 82	29 77
" 28	CH_4 per cent.	1·19	—	—	—
	Barometer	29 77	—	—	—

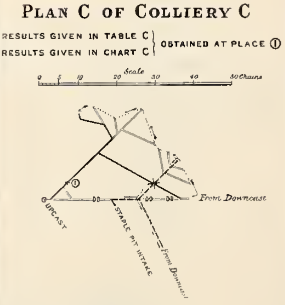
TABLE C.

Analyses made at Colliery C—Plan C.

Date.	—	6 a.m.	10 a.m.	3 p.m.	10 p.m.
Jan. 29	CH_4 per cent.	1·14	1·19	1 25	1·19
	Barometer	29·90	29·90	29 92	29 92
" 30	CH_4 per cent.	1·12	1·20	1·34	1·29
	Barometer	29·92	29 90	29 90	29 90
" 31	CH_4 per cent.	1·38	1·40	1·56	1·50
	Barometer	29 72	29·72	29·72	29·70
Feb. 1	CH_4 per cent.	1·42	1·42	1·60	1·35
	Barometer	29·44	29·44	29·44	29·48
" 2	CH_4 per cent.	1·42	1·42	1·60	1·55
	Barometer	29 70	29 70	29 50	29 30
" 3	CH_4 per cent	1·50	1·58	—	—
	Barometer	29 20	29 20	—	—







RESULTS OF FIREMEN'S OBSERVATIONS AT LEWIS MERTHYR COLLIERIES.

	Place taken	Notes made by firemen.	Estimate of fireman from cap.	Percentage of CH_4 by analysis.
April 13	No.			Per cent.
1	1	Very pale blue cap about ⅓ in	1¼ to 1½ per cent.	1·13
2	2	Cap pale blue, jagged edge, bare ⅓ in.	About 1 to 1¼ per cent.; if anything nearer 1 per cent.	0·9
3	3	Very small pale blue cap, about ⅛ in.	Would say 1 per cent.	0·75
4	4	Size of flame about ⅛ in.	Bare 1 per cent.	0·55
April 20				
5	5	Colour of cap light blue, point of cap not properly defined	Approximately 1½ per cent.	1·59
6	6	Size of cap ⅛ in.	Approximately 1½ per cent.	1·51
May 1				
7	7	Size of cap not quite ⅓ in., colour bluish	Approximately 1¼ per cent.	1 0
8	8	Size of cap ¼ in.	1⅛ per cent.	2·0 (face of old roadway)
9	9	Size of cap ¼ in., colour light blue	1½ per cent.	1·06
10	10	—	1½ per cent.	1·21
11	11	Nearly ¼ in.	1½ per cent.	1·73 (face of old roadway)

given in Table B_1. This curve shows in an unmistakable manner the enormous influence the barometer has on the amount of methane given off by the coal, with the consequent variation in the percentage of gas found in the return air. The results, on the whole, are exceedingly consistent. A drop in the barometric pressure is accompanied by a rise in the methane percentage, and a barometric rise with a corresponding fall in percentege throughout the period taken. The curve obtained is certainly more consistent on the whole than in the case of A_1 and A_2. This is partly due to the care which was taken in obtaining the samples at the same time daily, but there is no doubt also that the fan at this colliery was working at a regular fixed speed and a constant water-gauge.

Variations in Composition of Mine Air Due to Coal Working.

Results obtained at Colliery C.—Whilst the estimations shown in Table B_1 were going on an attempt was made to find whether the time at which the return air was sampled had any effect on the percentage of methane in the return air, or, in other words, to find out whether—apart from those due to barometric influence—any variations occurred during the period of the working shift. For this reason another seam was chosen, the scheme of ventilation of which is shown in Plan C.

Samples were taken at the point marked (1) four times daily—viz., 6 a.m., 10 a.m., 3 p.m., and 10 p.m., readings of the barometer being made simultaneously. The results were of decided interest, and are given in Table C. Fortunately during the first two days the barometer remained practically steady, and its influence was practically eliminated. Thus, any variation in the methane percentage—assuming, of course, that other factors remained constant—was due to the working of the coal.

It will be seen that the percentage is at a minimum at 6 a.m., before the day shift starts, but increases throughout the period of the working shift until the end (3 o'clock); then it falls gradually throughout the night to a minimum on the following morning. This is repeated periodically day by day throughout the period taken. Thus the peaks of the curve all represent the methane percentage at the end of the working shift; the troughs—the minima—represent periods when no coal was being worked. The influence of the barometer is also plainly marked. Corresponding with the sudden fall in the barometer the methane curve, as a whole, takes an upward tendency, fluctuates a little on the Thursday, in accordance with the fluctuating barometer, and rises again on the Saturday, in agreement with the falling barometer. This can also easily be seen if the results obtained at the same time on successive days are plotted against the barometric curve. The curves thus obtained will present, on the whole, a similar appearance to the curves already described.

Results Obtained at Colliery B.—Encouraged somewhat by these results, we decided to continue them at the Colliery B, taking the samples at the same point as in the estimations given in the Table B, and shown in Plan B. The estimations here were continued up to the end of February, and the results obtained are shown in Table B_2. The results again are remarkably regular. It will be noticed, on reference to Plan B, that the methane curve takes a big leap upwards on the second day, rising to 1·96 per cent. This was due to a breakdown having occurred to the fan the preceding night. It had been stopped from 2 a.m. until 7 a.m., and the sample—taken a short time before the fan restarted—was a criterion of the amount of gas that had accumulated. The curve generally has the same character as the preceding one, the influence of the barometer and working the coal being both well marked. The effect of the stoppage on Sunday is shown in the curve between February 17 and February 19 (Saturday to Monday). There we have a very heavy fall in the barometer, which would normally have increased the methane percentage by a considerable amount; yet, owing to the fact that no coal was worked, the percentage only increased from 1·3 per cent. to 1·48 per cent. It will be noticed also in places that a rise in the barometer has nullified the effect of working the coal, the methane percentage in some cases even falling during the working shift. One or two discrepancies may perhaps be noticed, but on the whole the curve is extremely consistent.

The results obtained cannot be regarded in any way as being complete. A thorough research into this highly complicated subject would involve taking into consideration several factors that have in these short notes been left untouched. Observations made, say, every half-hour for an extended period, the speed of the fan, water gauge and barometer being continuously recorded, would no doubt give some data which would be of the greatest value in the increasingly complex subject of mine ventilation. Unfortunately the exigencies of a works laboratory, engaged to a great extent in routine determinations, have made such a research as yet impracticable, and we have had to content ourselves with such observations as are given in these notes.

THE "PROFILE" CONTROLLER AND OVERWIND PREVENTER.

Amongst the latest inventions for the prevention of overwinding at collieries, we notice the "Profile" controller and overwind preventer, manufactured by Messrs. Thornewill and Warham Limited, Burton-on-Trent, which contains several new features, and is exciting a good deal of attention amongst colliery managers. The ideal controller and overwind preventer must: (1) prevent an overwind due to starting the engines in the wrong direction; (2) shadow the engine driver's controlling power and be ready to come into action *immediately* should a speed be reached beyond the safe control of the driver. This does not mean that it will control at maximum speed only. It must control during the whole of the retardation period as well. This ideal condition necessitates only the minimum braking power which is conducive to the safety of the drum and ropes alike; (3) the apparatus must be simple and free from complications and take up as little room as possible. The inventors claim all these points for their apparatus, and owing to the special construction of the governor it will control down to creeping speeds; this cannot be said of any other governer on the market.

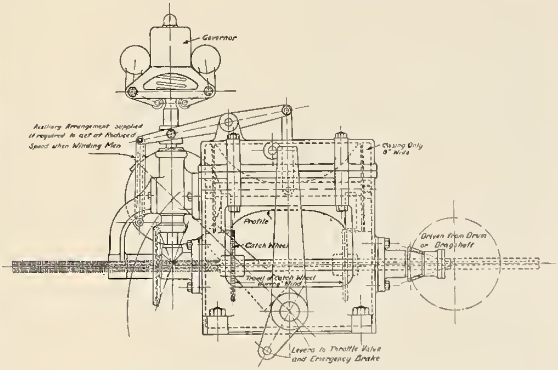

Governor
Auxiliary Arrangement supplied if required to act at Reduced Speed when Winding Men
Casing Only 8" Wide
Profile
Catch Wheel
Driven from Drum or Dragshaft
Travel of Catch Wheel during Wind
Levers to Throttle Valve and Emergency Brake

Fig. 1.—The "Profile" Controller and Overwind Preventer.

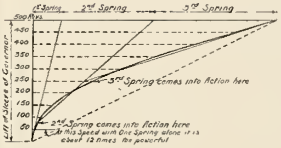


Fig. 2.

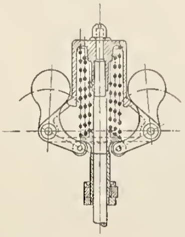


Fig. 3.

As seen from the figure, the apparatus consists of a spindle driven at one end by bevel wheels either direct from the dragshaft or through the intermediary of chain and sprocket wheels; the other end of the spindle drives the governer by bevel wheels. On the spindle is mounted a catch wheel which has a rotary as well as transverse motion, the distance moved by the periphery of the wheel representing the wind. Above the catch wheel is mounted a swivel plate on which is secured the profile, the shape of which represents the maximum safe speed and is cut from a diagram taken by the apparatus itself from the winding engine to which it is to be applied, under actual working conditions and while running at its greatest safe speed.

It is hardly necessary to state that the maximum safe speed is gradually decreasing towards the end of the wind; this is clearly shown by the shape of the profile in the figure. The profile is shaped from an actual safe maximum speed diagram taken from the engine while working; should this safe speed be exceeded the apparatus will at once shut off the steam supply, put on the brake or brakes, and bring the cage gently to rest. The profile is suspended by links mounted above the catch wheel, worked from a special governer which is described later.

As the engine is set in motion the catch wheel travels along, and at the same time the profile dips downwards, with the result that should the engine run at its maximum safe speed, the periphery of the wheel follows closely the profile during the maximum and retardation speeds. Should the speed exceed this safe limit at any time, the profile dips down still further and engages with the catch wheel, which swings the plate to one side, thereby releasing a catch, which shuts off the steam supply and puts on the brake. As the distance moved by the periphery of the catch wheel is greater than the travel of the corresponding catches of any other overwinder, the apparatus is so much quicker in getting into action.

Another improvement lies in the construction of the governor. The ordinary spring governor has one inherent defect, and has practically no control after the speed is reduced to one-fourth of its maximum. The reason is this: if the spring is made strong enough to control at the maximum speed, it is too strong at the lesser speeds; the result is the balls are practically closed when the speed is reduced to one-fourth. Therefore they have no longer control of the cages as they near the bottom of the shaft, which means the cages might run into the supports at the bottom and do considerable damage. This defect is got over by having three springs on the governor, the lightest one alone coming into action at the reduced speeds. The diagram (fig. 2) shows this clearly. The curve represents the force due to the centrifugal action of the balls and the dotted lines show the force exerted by the use of one spring only, clearly indicating that it is far too strong at the reduced speeds. Take any slow speed, *e.g.* one-tenth of maximum speed; a single spring at this speed is 12 times too powerful. The three other lines show that with three springs arranged to come into action at the points indicated (*see* action of governor) they follow the curve on the diagram close enough for all practical purposes and therefore still control at these reduced speeds.

The profile is formed by temporarily fixing on the spindle, in the place of the catch wheel, a scribing point, which marks off on the profile a speed diagram much the same as an engine indicator diagram is taken and the profile is cut out to the marks described. It is thus clear that the appliance constitutes a practical tool which shadows the engineman's control levers exactly.

The apparatus also prevents the engines from starting in the wrong direction, as the catch wheel, should this happen, would immediately continue its way to the profile, which is made to overlap at each end. The profile can be easily and cheaply altered to suit any increase in steam pressure, coal load, or alteration to type of drum.

Messrs. Thornewill and Warham have received large orders for the "Profile" controller, which is neat in appearance and occupies very little space.

"Yorkshire Blacks."—At York Assizes on the 12th inst., Mr. Justice Scrutton had before him an action brought by Mr. Robert Wilson, colliery agent, Post Office Chambers, Middlesbrough, to recover a sum of £268 9s. 2d., the price of a quantity of coal, known as West Riding blacks, sold to Mr. J. G. Chapman, coal merchant, Zetland-buildings, Middlesbrough, during the coal strike. There was a counter-claim for £54 5s. 8d. for loss of profit. The answer set up by the defendant was that there was an express warranty given that the coal was suitable for firing boilers. This was denied by the plaintiff. It was claimed that the warranty was not fulfilled, and the defendant claimed £54 5s. 8d. damages for loss of profit on the re-sale. The Yorkshire blacks were obtained from the Diamond seam of the West Riding Colliery of Messrs. Pope and Pearson. There was some foreign matter in it other than ordinary coal, but it had been sold before and since the strike. During the coal strike Messrs. Pope and Pearson sold 26,000 tons of the coal, and the Sheffield Gas Company, who had been supplied with one order, entered into negotiations to purchase the whole of the heap. The price of coal at the pit mouth during the strike was about £2 a ton. On March 23 Mr. Wilson called at the defendant's office and made a note on a pad to the effect that he had a quantity of Yorkshire blacks for sale at 12s. per ton at the pit. He called later at the office and saw Mr. Gibberson, the manager for the defendant, and the latter asked what the blacks consisted of, whereupon he was told that Pope and Pearson described them as drug dressings from the diamond mine—a mixture of coal and shale and small stuff—and that the Sheffield Gas Company had been supplied with one order and had repeated the order; 15s. a ton was the price asked. Three days later Gibberson gave an order for five trucks to be sent to Gray and Co.'s shipyard, West Hartlepool, and 50 tons to the Tees Bridge Ironworks, Stockton, and further orders followed. All the plaintiff represented was that the stuff would burn, and he said nothing about it being fit for steam boilers, although it was clear from the evidence he possessed that it could be used for that purpose if properly broken up. The chief witness for the defendant was Mr. George Gibberson, who stated that he had no recollection of a note being left in his pad at the office by the plaintiff, nor did he have a conversation with him as to a description of the material by Messrs. Pope and Pearson. He put the question as to whether it could be used for boilers, and, receiving a favourable reply, he rang his customers up and told them it was suitable for boilers. The first intimation he received that the coal was not satisfactory was on April 4, when on a visit to Gray's yard. It was stated that they were unable to burn it or to get up steam.—William Brown, foreman engineer to Messrs. Gray and Co., stated that they tried 7 or 8 tons of the material, and they could not get it to burn at all. They tried it with coal and wood, and it would not generate steam. The coal was of no value for steaming purposes.—Henry Smith, chief engineer for the Pulp and Paper Works, West Hartlepool, who also had a supply, expressed the opinion that it was not coal, but shale. They were in a desperate position, and decided to try it. They tried it for 10 hours to get up 160 lb. pressure, and only got 30 lb.—George Cardwell, general manager of the Hartlepool Electric Tramways, who had also tried the material, said it would require a stretch of imagination to call it coal.—Mr. Justice Scrutton, in giving judgment, said the transaction took place during the great coal strike, when many of the works were closed because they could not get coal, and many of the collieries were making quite unexpected and wholly undeserved profits by selling large heaps of stuff accumulated at the mouth of the colliery, but which at this time were saleable because people could not get ordinary coal. He substantially accepted the plaintiff's version of what took place, and it followed that he found that there was no express warranty that the coal was suitable for boilers, and it was not expressly made known to the plaintiff that the coal was for firing boilers. It might interest people in the coal trade that, when they sold under a trade name, in his view there was no implied condition that it was fit for any trade purpose. He had held this view in several cases, and it had not been appealed against. These goods were bought as "Yorkshire blacks," and were of a merchantable quality as such, but it did not mean that they were good steam coal. Defendant must therefore pay for what he bought as Yorkshire blacks. He gave judgment against the plaintiff, and dismissed the counter-claim.

GEOLOGICAL RESEARCH IN THE COALFIELDS

The *Summary of Progress* of the Geological Survey of Great Britain and the Museum of Practical Geology for 1911 has been issued.

In his introduction Dr. J. J. H. Teall, the director, states that the work during 1911 was continued on the same lines and in the same districts as in the previous year. These districts may be referred to as (1) the Denbighshire district, (2) the Warwickshire and South Staffordshire district, and (3) the London and South-eastern district. In the Denbighshire district the work is directed to the completion of the primary six-inch survey of the areas represented by the New Series one-inch Ordnance maps in which the coalfields occur.

In the Warwickshire and South Staffordshire district work is proceeding not only in the coalfields, but also in the intervening tracts, where the productive measures are covered by a variable thickness—sometimes very great—of unproductive coal measures and rocks which may be collectively referred to as belonging to the new red sandstone formation. The re-survey of this region, so far as it has gone, has not resulted in the separation from the coal measures on the one side, or the triassic rocks on the other, of any deposits to which the term permian can with confidence be applied, but the critical regions in which evidence on this important question may be expected to be found have not yet been resurveyed.

In Scotland the work of mapping for the first time the igneous and metamorphic rocks of the Highlands and Western Islands has been continued in the Island of Mull and in parts of Sutherlandshire, Perthshire, Inverness-shire and Argyllshire, while the revision of the carboniferous areas has been carried on in Lanarkshire and Ayrshire. The revision of the Lanarkshire coalfield is approaching completion. The preparation of a new edition of the memoir on the oil shales of the Lothians has necessitated a revision of the oil-shale fields. This revision, following on a period of extraordinary activity in boring, has proved of value in bringing forward new means of determining the positions of the said important shales in bores and shafts, and has indicated the existence of areas in which the search for oil shale is likely to prove successful in the immediate future.

Dealing with the carboniferous formation, the director states that productive coal measures have been surveyed in the neighbourhood of Ruabon and Chirk, in Denbighshire, and also near Mold and Holywell, in Flintshire. Further progress has also been made with the survey of the upper barren measures, which have now been separated into three groups—the Ruabon marls, the Coed-yr-Allt group and the Erbistock beds. The maximum thickness of these measures cannot at present be estimated, but it is certainly very great, and will probably be found to have an important effect in limiting the area over which coals can be worked towards the east under the triassic rocks.

The northern part of the South Staffordshire coalfield has been mapped on the 6 in. scale, and some additional information, involving a modification of the views expressed on the old map, as to the nature of the disturbances which bound the exposed portion of the coalfield on the east and on the west, has been obtained.

The survey on the northern part of the Warwickshire coalfield has been continued in the neighbourhood of Kingsbury, and a fairly complete sequence up to and including some of the rocks classed as permian on the Old Series map has been established. All the rocks examined up to the present belong to the coal measures, but a large tract of the so-called permian still remains to be surveyed.

In this connection reference may be made to the boring for coal at Ebbsfleet, in Kent. The boring ended in carboniferous limestone, at a depth of 1,389 ft.

In Scotland an area of carboniferous limestone on the south side of the great Lanarkshire coalfield has been revised, and evidence obtained that these strata were laid down on an extremely uneven floor of lower old red sandstone rocks. Work in coal measure areas has been carried on in the southern part of the Lanarkshire coalfield about Wishaw, Larkhall, and Stonehouse. The survey of the eastern part in the Shotts and Fauldhouse district was completed, and the field-unit employed in that district was transferred to Ayrshire, where work has been commenced in the carboniferous limestone area on the northern side of the coal basin.

In the palæontological section of the *Summary* some additional information is given as to the marine fauna of the upper carboniferous rocks of Scotland. The facies of this fauna is similar to that of the fauna described by Messrs. Hind and Stobbs from the coalfields of the Midland counties of England. It is now generally recognised in Scotland that these marine bands in the coal measures, and also in the carboniferous rocks with which the oil shales are associated, are persistent over extensive areas, and therefore of considerable value in fixing horizons and in interpreting the results obtained in boring for coal or shale.

In the *Summary* for 1910 reference was made under the heading "Permian" to certain red beds of doubtful age occurring near Hints, in East Staffordshire, and containing a peculiar limestone conglomerate. During last year considerable progress has been made in surveying the triassic rocks situated between the Warwickshire and South Staffordshire coalfields, and the Hints beds have been recognised at several places within the area mapped as bunter by the earlier surveyors. Their relations to the bunter have not, however, as yet been fully made out. So far as the re-survey of the Midland area is concerned, the permian question is still unsettled. Certain portions of the series formerly regarded as permian have been relegated to the coal measures, but the upper limit of the coal measures has not yet been fixed. In this connection reference may be made to the record of the important boring at Streetly or Little Aston, which, after passing through 77 ft. of bunter pebble beds, traversed 1,800 ft. of horizontally stratified marls, sandstones and conglomerates.

Denbighshire.

The outcrop of the lower and middle coal measures in the neighbourhood of Ruabon was mapped by Mr. Wedd, who reports that exposures of the lowest measures near Trevor show that the "Holywell shale" facies does not persist as far south as there. The productive measures attain a thickness of probably between 1,800 and 1,900 feet, including about 14 workable coalseams and several valuable fireclays. The more important coals are grouped in the middle portion of this thickness, with the Main coal, the principal seam of the district, in the lower part of their sequence. The fireclays and ganisters that are worked for the manufacture of drain-pipes, &c., and firebricks lie entirely below the Main coal, and are associated with the Chwarele, Llwyn-einion, Wall and Bench, Upper Half-yard, and Stone coals, in ascending order.

The measures consist essentially of shales with few beds of sandstone, and these of no great thickness, except in the upper part, where the massive Cefn sandstone, the chief building stone of the neighbourhood, makes a prominent landmark, and is repeated by strike-faults westward of Ruabon. On comparison of sections in neighbouring parts of this district, considerable variation of detail is observed; but in spite of this, such seams as the Llwyn-einion, Wall and Bench, Nant Yard, Main, New or Quaker and Cefn coals (in ascending order) can be traced throughout.

Except that some of the smaller coals are still raised in the mines that work the principal fireclays in the proximity of their outcrop, the more valuable coalseams have long since been worked out at shallow depths, and serious coalmining is now practically confined to the winning of the Wall and Bench, Main and Quaker coals, which are followed to considerable depth and distance eastward down the dip.

The rarity of fresh water or estuarine mollusca contrasts strangely with their abundance in the corresponding strata of the Midland coalfields.

South of Chirk, in the country surveyed by Mr. Wills, the coal measures are almost wholly concealed by drift and were only seen at the surface in some limited exposures in the banks of the Ceiriog.

In Flintshire, small areas of coal measures were mapped by Mr. Thomas in the neighbourhood of Mold and by Mr. Smith in the neighbourhood of Holywell, but in both districts the exposures were scanty, owing to the deep covering of drift. The coalfield is much faulted and the details of its structure can only be ascertained from underground workings.

The carboniferous strata in the neighbourhood of the River Dee examined by Mr. Wills and Mr. Wedd are characterised by a uniformity in direction and amount of dip. The former is about east 20 degs. south while the latter varies as a rule between 10 degs. and 20 degs. This uniformity is maintained despite the presence of numerous strike-faults, which in the Chirk district to a great extent counterbalance the dip. Near the River Dee the faults range about north 30 degs to 40 degs. east, but as traced south some of them seem to swing round to a nearly east-west direction. In this part of their course they are dip faults. Faults belonging to this north 40 degs. east series separate the carboniferous from the silurian outcrops from near Fron-Cysyllte to the southern side of the River Ceiriog, near Heunier House. The main fault probably cuts out the limestone and part of the sandy limestone series for about 1½ miles through Chirk Castle Park, but the junction is generally hidden by drift. Another large fault of this series passes just west of Chirk Castle, and throws down the millstone grit on the west against the sandy limestone series below the Castle. A master fault with a downthrow west of 300-400 feet ranges through the workings of Black Park and Brynkinallt collieries from north-east to south-west, but appears to be traceable into the east-west fault which throws the limestone outcrop to the west, near Henmer House. Other faults of the same series, some with large throws, have been met with in the colliery workings, but their surface outcrops are generally concealed by drift. As was suspected last year, there is no large fault along the face of the Coed-yr-Allt escarpment.

The surface position of the main Viaduct fault has been traced by Messrs. Wedd and Wills. The latter finds that it runs from about a mile east of Pen-y-lan Bridge to the bridge in almost an east-west direction. From thence it swings south-west and then north-west again, passing between Coedleoedd-uchaf and -isaf. It regains an east-west trend in Halton Woods, which it maintains to near Fron-Cysyllte. In its western continuation traced by Mr. Wedd the main fault crosses the river in a west-north-westerly direction at the bend north of Argoed Hall, where its position can be closely located; and, after throwing out several strong springs below the road to Llangollen, assumes a more westerly trend for a short distance, but soon returns to a west-north-westerly course along the foot of the Eglwseg rocks. The dislocation is seen in the stream valley above Ty-Canol. A southerly offshoot of the main fault, in the ground surveyed by Mr. Wills, has been encountered in some old workings near Pentre and Black Park. It too can be traced running almost due east-west to Fron-Cysyllte. Here other faults connected with the same disturbance but of less importance were mapped.

It is not easy to estimate the throw of the main Viaduct fault, because of the strike faulting which appears to repeat the outcrop of the Coed-yr-Allt series four times, and that of the Cefn rock three times, on its northern side. Similar though less well-displayed repetitions occur on the south side also. But at the bend of the Dee near Pentre an approximate throw of 1,200 ft. has been calculated.

North of the Dee fault, Mr. Wedd found that most of the dislocations that intersect the coal measures still follow the direction of strike, with which many of them swerve from a north-north-easterly to a northerly trend beyond Ruabon. As proved in the earlier workings of the Wynnstay and neighbouring collieries, these faults tend to run in small groups throwing alternately east and west, so as to produce submerged troughs and ridges in the measures, without, however, seriously affecting the position of seams as determined by the dip on either side of the disturbed area. Further east, as far as the colliery workings yet extend, the faults met with have a general easterly downthrow, which may be expected to give place to upthrows when the seams have been followed further.

Transverse faults are rarely found. Of these the most important is the Ty-Gwyn fault, with southerly downthrow, north of Rhos.

Warwickshire.

During 1911 the mapping of the area about Walsall, Lichfield and Tamworth contained in the 1 in. map 154 was nearly completed, but there remains a considerable amount of information from old mine plans and borings to be dealt with before any opinion can be formed of the exact limits of the concealed coal measures between the South Staffordshire and Warwickshire coalfields.

Cambrian rocks have been mapped by Mr. Burrow about Dosthill, 2½ miles south of Tamworth, where they form an inlier about 1½ miles long by about half a-mile broad. The junction of the Cambrian and coal measures on the east side of Dosthill has been complicated by considerable post-carboniferous movements. The dip of the coals rapidly increases to verticality as the Cambrian is approached, and there must be a break of some kind, yet in a small lane leading from the high road to the village of Dosthill the lowest coalseam has been cut open, standing on end, while all the others appear to come on in their natural order. The most likely explanation is that there is here some small and local overthrusting, though for the most part the coal measures rest naturally on an eroded surface of the Cambrian shales.

The silurian rocks, which occupy several square miles near Walsall, have been examined by Mr. Cantrill. He finds that they have a north-westerly dip at a low angle, and in this direction pass under the coal measures which rest unconformably upon them, all the lower carboniferous rocks being absent; but to the east they are cut off by the eastern boundary fault of the coalfield.

At Daffodilly, detailed mapping on the 6 in. scale has led to an interpretation of the structure differing from that adopted by Jukes. A part only of the Barr limestone comes to the surface, in a low anticline, its western margin falling into line with the general structure of the rest of the silurian tract, while to the east it turns over and dips towards the adjacent coal measures, from which it is separated by a fault. A sandstone which has hitherto been supposed to be of upper Llandovery age has now been found to contain traces of plants and to be one of the Halesowen sandstones (Newcastle series), with the so-called permian naturally superimposed upon it to the east.

At Shustoke Lodge, the rock, correctly identified as upper Llandovery, is abundantly fossiliferous, and is faulted on the east against the permian of the Old Series map; but instead of dipping westward or toward the silurian shales on its western margin, as it was presumed to do by Jukes, it dips away from them and toward the boundary fault on the east, as was pointed out by John Jones in 1866.*

The survey of the coalfield has been continued by Dr. Gibson and Mr. Cantrill. Mr. Cantrill notes that the gentle north-westerly rise of the coalseams observable in the northern end of this coalfield is replaced some distance to the south by a rise in the opposite direction. As a result, the principal seams crop out in the neighbourhood of Brownhills, and the silurian floor comes to the surface near Walsall, as described above.

In the Brownhills district the chief seams worked are the Yard, Bass, Cinder, Shallow and Deep coals. These crop out alongside the eastern boundary fault and range south-westward by Pelsall Common and Coal Pool to the Birchills, near Walsall. Below the Deep or Bottom coal, the blue flats, silver threads and diamond ironstones have been worked by both shafts and crop works—especially about Rushall Hall and church. These lowest coal measures rest upon various members of the silurian series, but the transgression is not very marked.

The eastern boundary-fault is shown on the old map as splitting into two branches at Chasetown. No serious modification has been found necessary in the position of the western branch, the Clayhanger fault, and Jukes's interpretation of the ground along its eastern margin has proved substantially correct. The eastern branch is, however, of a different nature, being a sharp easterly downfold rather than a clean break. It is within the tract between the two branches that the most important mining developments are taking place. At the surface there appear deep red marls containing occasional beds of angular breccia or "Espley rock." They are well exposed near Aldridge in a series of large openworks, excavated for the manufacture of blue bricks, and were correctly identified by Jukes as underlying the Halesowen sandstones. Farther east, at Stonnall Hill, these Aldridge marls are terminated by a fault which brings them in contact with the red marls and clays formerly classed as permian, the outcrop of the Halesowen sandstones being cut out. In a brook at King's Hayes Farm, Vigo, these so-called permian marls contain a lenticular bed of Spirorbis limestone, and southward of Great Barr include impersistent bands of conglomerate, characterised by pebbles of red and yellow carboniferous chert, with a small proportion of limestone, presumably carboniferous also. There is no reason to doubt that they rest conformably on the Halesowen sandstones, and are really of carboniferous age, corresponding approximately to the Keele series of North Staffordshire.

It may be noted that in the outcrop of Keele beds at Stonnall Hill, a steep dip to the east appears, marking the oncoming of the fold described above.

The area between Great Wyrley and Willenhall examined by Dr. Gibson during the year chiefly lies north of the well-known Bentley faults which separate the region of the Thick coal on the south from the region of the Pelsall, Wyrley and Essington coals on the north. He finds the chief interest lies in the western area situated between Holly Bank and Huntingdon, on the line of the so-called western boundary fault. The fault is not evidenced at the surface within the drift or trias covered area, but has been proved by mining to consist of a belt of disturbed ground from 1 to 2 miles in width, in which several faults trending north and south let down the coal measures in the form of wedges. Though the aggregate downthrow of the faults is to the west, this is partly counteracted by several considerable downthrows to the east and the increasing depths to the seams is largely due to their assuming a higher dip westwards.

In the area about Whateley, Wood End and Kingsbury, a fairly complete sequence has been determined by Mr. Burrow in the carboniferous rocks, the information derived from numerous excavations having been supplemented by that derived from underground workings, which has been kindly supplied by Mr. G. Hurst, of Kingsbury Colliery, and by Mr. Allen, of Hall End Colliery. The following divisions have thus been made out, in descending order.—

1 Upper red marls and sandstones. Permian on old map.

2 Upper grey measures. The Halesowen sandstone series.

3. The lower red marls and Espley rocks.

4. The lower grey measures in which alone workable coalseams occur.

Little new information has been obtained at the surface with respect to the last part of the series. The Lower red marls at Whateley have a total thickness of about 200 ft. The upper grey measures (Halesowen sandstone series), which are about 400 ft. thick, differ from the coal-bearing series in being paler in tint, and in containing a larger proportion of sandstone.

Groups 1 and 2 correspond approximately to the Keele and Newcastle groups of North Staffordshire, but it must be understood that this remark at present applies only to the lowest 200 or 300 feet of the so-called permian, the higher strata not having yet been examined.

The limestone conglomerate and associated breccias have been followed more or less continuously from Hopwas, almost to the eastern margin of the South Staffordshire coalfield. The group generally forms a marked feature, and has been recognised by Mr Dixon in the Hints area, by Mr. Cunnington about Four Oaks and Streetly, and by Mr. Cantrill about Barr Beacon. In North Staffordshire a limestone conglomerate, which is precisely similar to and may be the same as that of Hopwas, is exposed near the mouth of the Cheadle railway tunnel, here also immediately underlying the bunter pebble beds. But it is not known elsewhere in any part of the Cheadle district. Thus, while it seems to adhere to the base of the pebble beds, wherever it has been met with, yet in much of the area it appears to be overlapped. That there is a great unconformity at its base is well shown at Cheadle, where these breccia beds with abundant limestone pebbles rest directly on the lower part of the middle coal measures.

In the area south and south-west of Hints these breccia beds rest on the upper part of the permian. The detailed mapping of the rocks visible at the surface does not suggest any great discordance between the breccia beds and the permian, yet there must be one, if we are right in believing, that the breccia beds rest on a far higher horizon in the permian in the Hints area than at Barr Beacon. Further, the higher permian beds of Walsall Wood and Stonnall on the eastern margin of the South Staffordshire coalfield are affected by a steep and sudden easterly downfold, which has not involved some overlying breccias which we believe to be the quivalents of the breccia beds of Hints. Mr. Barrow finds a similar sudden downfold on the opposite margin of this area, that is on the north-west edge of the known Warwickshire coalfield. But in this case it takes place in at least two stages. The first stage has been proved in an adit by Mr. Grayston, at Amington Colliery, where by a combination of a fault and a high dip the coals are dropped to the north-west a distance of about 500 ft.; the second is constituted by a fault which is known to run at a distance of about 400 yards to the north-west. It is gradually becoming clear that at the north end of the Warwickshire coalfield there is a sagging down of the carboniferous rocks on a larger scale than in the ground a little further to the south.

The Streetly or Little Aston boring is situated in Roundabout Wood, close to the Midland Railway. It was put down to prove the depth to the workable coalseams, and was carried to a depth of 1,907 ft. but then abandoned.

After traversing pebble beds and a series of red sandstones with gravelly bands—possibly the equivalent of the Hopwas breccia beds—permian rocks were reached at a depth of 77 ft. from the surface. These comprise a series of marls, sandstones, and conglomerates, the general character of which did not vary much throughout the remaining 1,830 ft. No rocks resembling the Halesowen sandstones were met with, nor is there any record of a Spirorbis limestone having been penetrated. The majority of the pebbles are of foreign origin, even in the lowest bands reached, and it is possibly legitimate to infer that the sandstones, which in Warwickshire contain only pebbles of local origin, lie below any rock reached in this boring. If this is correct, the first workable coal would be nearly 3,000 ft. down or possibly more.

(To be continued.)

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* "Notes on the Geology of the Midland Counties," 8vo., Birm., p. 8.

HYDRAULIC STOWAGE AT DALZELL AND BROOMSIDE COLLIERY.

The following is extracted from Mr. W. Walker's annual report on Mines and Quarries in the Scotland Division for 1911:—A portion of the Wishaw Coal Company's leasehold at this colliery lies along the banks of the Clyde, and as the surface is the old course of the river, the greater part of the area is covered with a bed of water-bearing gravel.

The main seam, 25 fathoms below the surface at this point, has been worked out into stoops about 20 yards square. The management were faced with the necessity of abandoning the coal in the stoops (or fully 50 per cent. of the coal in the solid seam), or of working out these stoops, the effect of which, by ordinary methods, would be to cause a rapid subsidence with consequent breakage of the roof, and result in the flooding of the workings and create a constant menace to those in the deeper seams over the whole of the area of the company's property. This being so, the owners, advised by their mining engineer, Mr. R. W. Dron, decided to extract the stoops and fill the waste with redd from the refuse heaps on the surface, by means of the hydraulic stowage system. This method is practised in France and Germany, and its object is to prevent subsidences and breakage of the strata. By this means Mr. Dron was of opinion that the coal could be worked, and the quantity of water to be pumped with it would not exceed the capacity of the pumping plant which was already installed. The seam in question is 4 ft. thick, and has a strong post or rock roof and a blaes floor. The dip of the strata is 1 in 8 to the south-west, and fairly regular.

A large heap of washer *débris*, consisting of burnt shale and fireclay, was ready at hand on the surface, and this probably makes the best material possible for hydraulic stowing, as the absence of grit does not wear the iron carrying pipes, and it is not subject to spontaneous combustion. The clay and shale dirt of the heap is hand-filled into a canvas belt, and is carried by it to a cross conveyor, which delivers into a jigging screen with 1½ in. mesh set above the dirt heap. The material which does not go through the screen passes on to a crusher, in which it is reduced to the requisite size. The dirt passes from the screens into a large hopper 30 ft. square, tapering towards the bottom, into a shoot provided with a door to stop and regulate the flow of dirt. Perforated pipes are carried round this hopper, and a constant flow of water is kept playing on to the *débris* and the inside of the bin, and these keep the material moving down the receiver as it drains off through the shoot at the bottom. The dirt from the shoot then passes into a concrete mixing chamber 3 ft. in diameter, and provided on each side with a 6 in. perforated water pipe, so placed that two rows of water jets play on the dirt as it falls from the shoot, and so cause it to be carried into the pipes and to the working face underground. One man is employed at the shoot and mixing chamber regulating the flow of dirt and water; there is telephonic communication between this man and the working place underground. Two men are employed about the screens and bin, and four filling dirt on to the belt conveyor. A length of 6 in. diameter pipe, connected to the same supply as the mixing water pipes, enters the main pipe line at a point beyond the mixing chamber so as to provide an extra flushing supply of water if required. Some trouble is experienced owing to the pipes on the surface becoming choked, the reason being that the dip of the pipe line on the surface could not be made more than 1 in 40. The pipes carrying the material and water are cast iron, "spigot and faucet" jointed, but flanged pipes are used as every fifth pipe, in order to facilitate opening up the columns in the event of a stoppage.

The pipe line is carried down one of three boreholes to the workings of the main seam underground; one of the other two boreholes is used to carry the electric cables underground for the pump, and the other for the discharge column of pipes returning the used water to the surface. The water-carried dirt passes through similar pipes to those at the surface, until the actual working face is reached, where it enters a column of wrought iron pipes, $\frac{3}{16}$ in. thick, of the same diameter as the cast iron pipes. These pipes are the columns for the face and are screw-jointed, but the thread on the end of each thimble nearest to the face nozzle is turned off so that the upper end of each pipe fits easily into the lower end of each thimble, and the last pipe on the column can be easily detached by an upward and outward motion from below.

The working face consists of four stoops with the roads between them, amounting in all to a straight line of 260 ft. to the full dip of the strata. This face was prepared for the first stowing by a building 30 ft. wide being erected on the low side, but since work has been in progress it has been found that little or no pressure falls on the low side buildings, so these are now only built 6 ft. or so wide. Rails for tub roads are laid down the face, connecting the drawing road at the upper end to the drawing road at the lower end of the face as in the "Nottingham" system of working, and the tubs are brought down these rails to a point near the miner working the coal from the stoops. The miner fills them and they are taken down the face road to the lower drawing road and so out to the main haulage.

An ingenious method of letting the full tubs down the face is in operation. A single rope is laid down the face by means of which a bogie attached to the rope by a clip collects the tubs filled by the miners and lowers them to the drawing road. No trouble has, so far, been experienced from the miners in the upper part of the face having their tubs ready before those at the lower part, although each party of two miners work independently. The management wished the miners to work in parties of 12 or so at the commencement of the work. They refused to work together this way, but promised to keep the filling similar and regular.

The timbering at the face is done with half-round bars supported on two props set at right-angles to the face of the coal, but additional props are also set wherever required. The face pipe line is carried on pairs of props as near the roof as possible, supported by a wooden strap, nailed to each prop; the end of each pipe, up the hill, is fitted with a wide long pair of glands which allow the supporting props to hold the pipe close to the pipe above it. This pipe is carried about the centre of the width (here 14 ft.) which it is proposed to stow. After the face has advanced sufficiently to allow stowing 14 ft. in width to be put in, a line of props about 4 in. in diameter is set as near the face as is convenient, and on to these are nailed wooden laths 3½ in. by ¾ in. to hold the brattice cloth which is nailed over them from roof to floor. The object of this cloth is to hold the dirt or silt forced in to the waste, and also to allow the water which carries it to drain off as speedily and as completely as possible. Some difficulty was experienced in obtaining cloth of a suitable texture for this purpose, but eventually a cloth was procured somewhat more open than the cloth usually used for ventilation, and this gives excellent results.

The leading man of a gang of three stands at the top end of the last pipe, and directs the man at the dip heap on the surface when to allow dirt to flow and when to stop; he instructs the men with him when to withdraw timber and when to pull the pipe he has knocked out away from the filling waste. This man stands in water, and has altogether a very wet and dirty job, but the company provides him and his men with everything likely to improve matters, and they do not complain of the conditions. The force of the water carries the dirt 8 or 10 feet from the pipe ends, and packs it tightly into the waste. The water drains off through the cloth screen filter, and leaves the sediment almost a solid mass up to the roof of the place. As the stowing comes up to the pipe the man at the pipe withdraws the props under the last pipe and draws out the pipe, which is pulled away by the men behind by means of a rope previously attached. Three men can stow eight pipe lengths (24 yards) in eight hours, but three other men are required in the previous shift to brush and wall the roads (the walling on the lower side is essential) and to take out timber wherever possible, and also to move the line of rails nearer the coal face. Having given up its dirt, the water is carried by drains at the roadside back to a sump (which was made when the work commenced, and has not yet been changed) below the lower road, passing through several settling tanks before reaching it.

Clean water for the return pump is essential, but in spite of every precaution the water returned still carries a quantity of the finest silt. The pump in use is a five-stage Mather and Platt turbine pump, working with a head of 170 ft. at 145 revolutions, the motor, 86 ampères, three-phase current, at 400 volts. This pump has proved very successful, and if it does not draw air into the suction, works very well, even when pumping very dirty water. The return column is composed of wrought iron 6 in. diameter pipes, and is taken up the third borehole to a settling pond, 15 ft. above the mixing chambers. The head of 15 ft. is found to be sufficient, but it is absolutely essential to have a large quantity of water in the pond ready for use.

The distance that the strata has subsided, in the area worked during the year ending last January, measured underground, is 2½ in. An elaborate system of measurement of cross levels has also been organised on the surface, and these, Mr. Dron informs me, show a subsidence equal to about 20 per cent. of the thickness of the seam. From a mining point of view, the system appears most successful, as no work in it is very difficult or highly technical, and the cost in unworked areas where old roads have not to be stowed will compare very favourably with other methods.

These is little doubt that the regular and gradual subsidence which would take place over areas worked in this way does not cause the surface damage which takes place where other methods are employed, as the stowing is absolutely uniform and no coal or timber is left in the area from which the coal is extracted.

HAILWOOD'S PATENT COLLIER'S CHECK OR TALLY BOX.

In his report on the Whitehaven Colliery explosion, the Chief Inspector of Mines strongly advocates that records of the numbers employed below ground should be kept at the pithead. This view finds expression in the new Coal Mines Act, section 34 (1) requiring that a record shall be kept of the men to whom lamps are given out. Such a system of checking becomes most valuable in the hours following an explosion, enabling the manager to ascertain quickly the number and identity of men below ground.

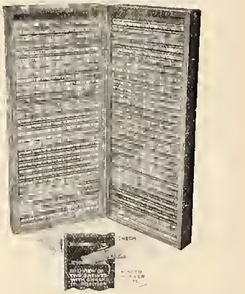


Fig. 1.

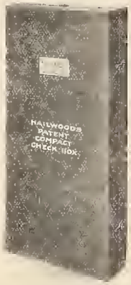


Fig. 2.

The cheapest and the best method of obtaining this information is, no doubt, by means of checks or tallies. But in the case of a large mine the storing and quick handling of these checks presents a serious problem. To overcome this, Messrs. Ackroyd and Best Limited, of Morley, near Leeds, have placed on the market the Hailwood's patent compact check-box, illustrated above. In this box the checks lie flat on slightly sloping thin metal shelves. The front of the shelves being provided with downwardly hanging hinged enamelled iron number plates, allows of the shelves being placed very close together; on inserting the finger to abstract a check from the shelf, the number plate moves clear.

The amount of space taken by checks under the Hailwood system is only about one-fourth or one-fifth of that needed when the checks are hung on nails on boards having the numbers painted above or below the checks. In the case of a colliery employing, say, 1,000 hands, this means that instead of having check-boards covering the greater portion of the lamp-room walls, it is possible, with two of the Hailwood boards, to have 500 checks in one comparatively small box—viz., 250 checks on each side of the box. It will be noted that the box is constructed in two halves hinged together, so that it may be placed very conveniently to the receiving or giving-out windows, and can be locked up at night.

There are many systems of checking employees. One that has been found to give satisfaction is where, on engaging the man, he is given a brass check to tally with his number. This check is handed to the lampman in exchange for a lamp, the check being temporarily placed on the lampstand in the position previously occupied by the lamp. When the men have all gone down the pit, the lampman can record the numbers of the checks on the stand, afterwards placing the checks in the check box. On the termination of the shift the men are handed back the checks in exchange for the lamps, therefore any remaining checks in the check box would indicate the number of employees remaining in the mine at any time.

If it be made a rule that when a man is finally "paid off" he must always hand in his check, the cost of replacing lost checks becomes a very small item.

The upper part of fig. 1 shows the check box open. The small side-sectional view at foot shows the method of abstracting the check. In this view will be seen the hinged enamelled iron number plate (immediately above the finger) tilted back. Fig. 2 shows the check box closed.

UNEMPLOYMENT INSURANCE.

The Position of Colliery Workers.

Pursuant to paragraph (5) of the Unemployment Insurance (Umpire) Regulations, issued under Part II. of the National Insurance Act, 1911, the Board of Trade gives notice of the following decisions (amongst others) by the umpire on questions whether contributions are payable:—

Contributions are Payable in respect of:—

Workmen employed by a firm of mining and tool engineers, and engaged in the work of a malleable iron and steel foundry.

Workmen engaged in the work of making underframes, trucks and steel wagons.

Workmen, their helpers and labourers, employed in steel foundries and described as follows:—Moulders, coremakers, dressers, annealers, including also workmen in machine shops in connection therewith.

Workmen described as mechanical engineers, fitters, turners, &c., and engaged in making boring machines, coal-washing machinery, disintegrators, &c.

Workmen engaged in the construction, reconstruction, or alteration of blastfurnaces, lime and brick kilns, gas retorts, chemical or electrolytic plant.

"Alteration," in the opinion of the umpire, refers to work which involves a substantial change or variation in the original design.

Workmen, their assistants and labourers, employed in mechanical engineering establishments (including boilermaking establishments), and described as follows:—Angle-iron smiths, platers, riveters, caulkers, holders-up, boilermakers, or ironworkers' machinemen.

Gaugers, markers-off, inspectors, examiners, viewers and checkers in mechanical engineering establishments who are employed wholly or mainly by way of manual labour, but *are not payable* in respect of gaugers, markers-off, inspectors, examiners, viewers and checkers in mechanical engineering establishments who are not so employed wholly or mainly by way of manual labour.

A workman employed at iron, steel and coke works, and described as a roll turner, who is engaged in machining rolls used in the manufacture of steel billets and sectional bars.

Workmen employed at an ironworks, and described as follows:—Fitters, fitters' labourers, riveters, blacksmiths, strikers if employed wholly or mainly in the maintenance and upkeep of machinery. Joiners, if employed wholly or mainly in the maintenance and upkeep of buildings or machinery, including fixed woodwork connected therewith. Moulders (iron or steel).

Workmen employed in a railway wagon or iron works, and described as follows:—(1) Wagon makers, builders and repairers of railway wagons; (2) blacksmiths and strikers (manufacturers and repairers of railway wagon ironwork); (3) painters and letterers of railway wagons; (4) labourers assisting above classes of workmen; (5) foremen if employed wholly or mainly by way of manual labour.

Workmen employed by a firm of brickmakers and described as:—(1) Bricklayers and labourers who are engaged wholly or mainly in the work of repairing and rebuilding brick kilns; (2) wheelwrights who are engaged wholly or mainly in repairing carts and wagons; (3) tile fixers who are engaged wholly or mainly in the work of fixing tiles to walls of new or existing buildings; (4) mechanics who are engaged wholly or mainly in the work of maintenance and upkeep of machinery; (5) carpenters and plumbers who are engaged wholly or mainly in the work of repairing buildings.

Workmen employed by a firm of wire rope manufacturers and described as fitters, and the labourers to assist them, who are engaged wholly or mainly in the work of maintenance and upkeep of machinery.

Workmen described as wheelwrights engaged at works forming part of a mechanical engineering establishment.

Workmen employed in a mechanical engineering establishment and described as follows:—Cranemen (hand or power), enginemen (stationary engines), firemen (stationary engines), boilermen.

Workmen (including helpers and labourers) employed in factories and workshops which are engaged wholly or mainly in the manufacture of steel castings for use as parts of the products of a mechanical engineering establishment, and in machine shops in connection with the manufacture of such steel castings.

Contributions are Not Payable in respect of:—

Workmen employed by a firm of coal merchants, and engaged wholly or mainly in the work of bunkering steamers—that is, putting coal on board by hydraulic crane, and trimming same into the bunkers.

Workmen employed by a firm of brickmakers, and engaged in the work of making plain stock bricks by hand burnt in open clamps.

Workmen (other than those who are engaged wholly or mainly in the maintenance and upkeep of buildings and machinery (who are engaged in work in rolling mills, bar mills, merchant mills and sheet mills, including rolling of tires and the rolling and treatment of armour plates.

Workmen engaged in the work of shale-getting; or making bricks by machinery and burning same.

Workmen employed by a steel company, and engaged wholly or mainly in the work of drawing and cold rolling black steel bars.

Workmen employed by a firm of mining and tool engineers, and described as warehousemen and warehousewomen.

Workmen engaged wholly or mainly in melting steel by the Siemens-Martin acid process.

Workmen employed by a firm of tube manufacturers and engaged wholly or mainly in the work of rolling, drawing, annealing and pickling seamless steel tubes.

Workmen engaged in the manufacture of explosives.

Workmen engaged wholly or mainly in the work of sand-screening in a sand quarry or pit.

(1) Rock drillers employed in slate quarries; (2) platelayers and labourers employed wholly or mainly in the upkeep and maintenance of railway lines in connection with slate quarries.

Workmen engaged in the work of smelting pig iron and molten metal from ironstone and iron ores.

Workmen engaged in the process of melting the mixtures in Siemens furnaces.

Sand pit workers who are engaged in digging sand, and are not engaged in any work of construction.

A workman employed by a firm of coal merchants, and engaged in work of crane-driving and stoking for the purpose of discharging coal.

Workmen employed by a firm of iron merchants, and engaged in work of cutting up boilers, shearing up plates into scrap, and loading into wagons for ironworks.

Workmen employed by a firm of manufacturers of miners' lamps, and engaged in brass founding, brass turning, screwing and drilling tin and sheet metal work in the course of manufacturing miners' lamps, not being in a mechanical engineering establishment.

Workmen employed by a granite company, and engaged wholly or mainly in the work of (1) dressing curbstones and channels for the edges of pavements in towns; (2) preparing timber for miscellaneous purposes in the quarries. The question of making and repairing trucks, wheelbarrows, &c., is reserved.

Workmen engaged in forging bar ends, under power hammer, pickling and cleaning, drawing steel from black bars in the drawbench and straightening bars by hand.

Workmen engaged in the work of repair of blast furnaces, lime and brick kilns, gas retorts and retort settings, chemical or electrolytic plant (not being machinery).

Workmen engaged in the work of washing and screening of small coal.

Workmen engaged in (1) making picks, hammers, wedges and other non-mechanical tools for use in quarries; (2) packing, parcelling blacking same.

(1) Workmen employed at collieries who are engaged wholly or mainly in the work of inspecting and adjusting the electrical installation. (2) Workmen employed at collieries who are engaged in sinking operations. (3) Sawyers employed at collieries who are engaged in sawing timber for colliery purposes. (4) Workmen described as colliery carpenters and colliery joiners, and their assistants, who are engaged in work at collieries and are not engaged wholly or mainly on buildings. (5) Workmen described as colliery fitters colliery blacksmiths, and their assistants, who are engaged wholly or mainly in maintaining colliery plant at the collieries and not in the engineering workshops (6) Colliery masons, bricklayers, painters, plumbers and their labourers, who are engaged wholly or mainly in maintaining at the collieries colliery plant and works (other than buildings). (7) Workmen engaged at collieries in the work of keeping in order pit tubs and trams at the collieries.

Workmen employed at iron, steel and coke works, and engaged in the work of inspection, adjustment (other than the repair of machinery).

Workmen engaged in the repair of blast furnace and steel works plant (other than machinery and buildings).

Workmen employed at a slate quarry, and engaged in the work of getting, making, inspecting slates.

A workman employed by a colliery company, and described as a colliery carpenter and joiner, who is engaged in making and repairing air doors, roller frames, &c., for underground use and doing other work at the colliery, and is not engaged wholly or mainly on buildings.

Workmen employed at collieries, and engaged in pit sinking.

Workmen employed as galvanisers.

Workmen employed as wire drawers, galvanisers, wire cleaners and testers, bar, strip, hoop and wire rod rollers.

Workmen engaged in the manufacture of:—(*a*) Steel ship and boiler plates, steel bars and sheets; (*b*) iron plates, bars, sheets and strips; (*c*) pig iron from the ore; (*d*) tubes from strips; (*e*) rivets, bolts and nuts from the steel and iron unless made in a mechanical engineering establishment.

Workmen engaged in the work of quarrying stone, including the process of scabbling or other rough dressing.

Workmen employed in a mechanical engineering establishment, and described as timekeepers, watchmen, storekeepers, draughtsmen, tracers, gatemen, weighmen, passenger hoist attendants, closet attendants, office attendants, commissionaires, clerks and typists (male and female), office errand boys.

A brickyard manager, engaged wholly or mainly in the work of overlooking workmen's books, attending to sale tickets, and generally supervising business.

Workmen employed by a firm of wire rope manufacturers, and described as cranemen and enginemen, who are engaged wholly or mainly in the work of driving, tenting, or minding machinery, nor in respect of workmen described as splicers.

Workmen employed by a firm of limeburners, and engaged in the work of excavating limestone from quarry, transporting same to open kilns, burning same therein, and transporting to railway, &c.

Workmen employed by a pick and tool manufacturer, and engaged in file-cutting by hand and making pliers by hand.

"Photos" Miners' Electric Lamp: Correction.—In our description of the above lamp, appearing in the last issue of the *C.G.*, it was stated erroneously that it is made at the "James" Works, Queen's-road, Battersea. This should have been "Janus."

South Staffordshire and Warwickshire Institute of Mining Engineers.—The general meeting, postponed from April 15 last, will be held at the University, Edmund-street, Birmingham, on Monday afternoon, July 22, at 3 p.m. A discussion will be taken upon the following papers: "The Loss of Mineral Areas in South Staffordshire," by Mr. I. Meachem; and "Notes on the Valuation of Mineral Properties," by Mr. T. A. O'Donahue.

Grimsby Coal Exports.—The following is the official return of the quantities of coal exported from Grimsby during the week ended July 12:—Foreign: To Gothenburg, 885 tons; Cronstadt, 2,160; Stege, 854; Malmo, 2,465; Gefle, 2,903; Esbjerg, 328; Hamburg, 921; Rotterdam, 241; Dieppe, 741; Landscrona, 3 662; Stockholm, 1,158; Videy, 516; Paimpol, 175; Treguier, 127; Ronne, 697; Antwerp, 296; Kolding, 801; Drammen, 739; Ahus, 106; total, 19,365 tons. Coastwise: To Lerwick, 1,107 tons. This compares with 36,784 foreign and 3,306 coastwise for the corresponding week of last year. The following is the official return of coal exported from the new port of Immingham during the week ended July 12:—To Fiume, 4 672 tons; Cronstadt, 8 565; Hamburg, 6 303; Malmo, 3,775; Halmstadt, 1,174; Oxelosund, 2,259; Rensburg, 1,305; Elsinore, 1,600; total, 29,673 tons.

NOTES FROM SOUTH WALES

[FROM OUR OWN CORRESPONDENT.]

Opinion upon the Award—New Rules to be Enforced Immediately—Renewed Agitation Threatened by Men's Leaders—Reorganising the Miners' Federation — Centralisation and Direct Control — The Ultimate Aim Indicated—Pecuniary Benefits of the Award Admitted by Men—Contrast of South Wales and German Wage Conditions—Another Important Coal Combine—Gwaun-cae-Gurwen Company Strikes "Big Vein"—Increased Payments to Newport Tippers.

The coalowners have discussed Lord St. Aldwyn's award, and they decided to put the new rules into force immediately. It is evident that the concessions to the men are important. Bearing in mind the outcry raised by the men against the original award concerning labourers, ostlers, &c., it is to be specially noted that the full award has not provoked anything like the same protest. Would it not be well if the provision of the Act for three chairmen were adopted generally, instead of depending upon only one? It is in the interests of the trade, and no less in the interest of individual chairmen, that the ultimate authority should be as strong as possible.

Mr. Gascoyne Dalziel is understood to have tendered his resignation as secretary to the Coalowners' Association, but was induced to reconsider his decision in this respect. Probably an assistant secretary will be appointed, thus relieving him of some of the burden of his increasing work.

Mr. Alfred Onions, treasurer of the South Wales Federation, describes the minimum award in several grades of labour as being lower than the average wage earned, and adds that "it cannot be considered satisfactory; it will be the duty of the miners and their representatives to take steps in the near future to get these defects remedied."

The new rules are not approved by the men, who object to them as complex and intricate. Mr. Onions thinks they are likely to lead to difficulties, and that the organisation must be made stronger, "in order to protect ourselves against harmful things that can be done under the rules"; and Mr. Hartshorn expresses the hope that the rules will not be made applicable at all to his district.

Mr. Albert Stanley, M.P., told the Forest of Dean miners that, as the principle of the minimum wage had been placed on the Statute Book it would be all the easier to put in their schedule. They would never be satisfied until their scheduled rates were put into the Act, and made compulsory from one end of the land to the other.

After several meetings of the sub-committee deputed to examine it, the scheme for reorganising the South Wales Miners' Federation came on Monday before the full executive was again gone through, and, after some minor amendments, was ordered to be printed and circulated amongst the men. On the 29th inst. it will come before a special conference of delegates.

Among the alterations which the scheme proposes is the abolition of present districts and the constitution of new districts covering the whole coalfield. Annual and quarterly conferences will determine policy and there will be an executive council composed of the officials and 24 elected members. The subscription will be 3d. per week and five-sixths of the income will go to the central funds, the remainder (with entrance fees) being utilised for local lodge purposes. Under this centralisation the effective power of the organisation will, it is expected, be materially enhanced. But it has to be regarded as only one stage in an evolution for which a determined and active minority are working, on lines previously described in this column, whereby the agents will become more and more the servants (rather than "leaders"), and the federation will place itself *vis-à-vis* to the employers' organisation by having its own statistical and record department, with such other agencies as will satisfy it in Parliamentary, local government, as well as industrial concerns. The present reorganisation may be regarded as only a single step in that direction—a step taken designedly, with clear view of the larger ultimate aim.

The executive on Monday dealt also with the award of Lord St. Aldwyn, and they discussed at length the new rules drafted under the Act, there being strongly adverse opinion upon the drastic nature of some of these. Pending the deputation of the Miners' Federation of Great Britain to the Prime Minister on the following day, an adjournment for a week was decided on.

That deputation was received by Mr. Asquith at the House of Commons on Tuesday, and put to the Premier their complaint as to men being desired to contract out because of alleged infirmity; as to the requirement in some cases that men must make 100 per cent. attendances before they are entitled to the minimum wage (80 per cent. is the South Wales figure); as to charging for explosives; as to the original demand for "5s. and 2s.," etc. Generally, the idea prevails that the men had comparatively little to find fault with. The Premier saw no ground for Government interference and expressed his opinion that the unions were strong enough to deal with certain matters.

Mr. R. Smillie, acting president of the Miners' Federation of Great Britain, informed the international conference of miners at Amsterdam that the award gained by the South Wales men would give advances to 50,000 employees varying from 1d. per day to as much as 2s. 6d. in some cases, and that the additional wage bill in South Wales was estimated at £400,000 per annum, which would go into the pockets of the workmen. He regarded the award in South Wales as typical of what had taken place all over the country. He also argued for legislative action in regulating the wage-rate, saying that the most important lesson to be learned from the strike was the necessity of having more Labour members in the House of Commons.

By way of contrast, and as showing how heavy is the wage handicap against British employers—especially those of South Wales, who are directly in competition and have been so seriously supplanted by German opponents—it is worth quoting a sentence or two from the speech of a German delegate who followed Mr. Smillie.—Herr Schmidt made manifest the much more favourable position of the German coalowner and merchant. The wages of the miners in Westphalia were, he said, lower now than in 1907, for the hewers were earning 5d. per day less and other grades of men among their 350,000 employees were getting 1d. to 2d. per day less, while the price of food had increased during recent years by 20 to 30 per cent. More than that, their men were overworked, for in the Ruhr Valley the miners worked on an average 73 shifts in nine weeks.

In face of such competitive conditions, the cry for more legislation with all its added costs of production gives food for serious thought. Mr. Brace, M.P., for example, speaking with all the weight of his position as president of the South Wales Federation, although recognising that the British system of eight hours was a great advance upon anything in operation in France or Germany, said that the British miner wanted still to have his eight hours calculated from bank to bank instead of from pit bottom to pit bottom.

Further, it may be noted in this connection that Mr. Hartshorn declares that neither South Wales nor any other part of the country can regard the present settlement as a final answer to the men's demands, and he hoped employers "would recognise this and try to meet the men."

In the opinion of Mr. Stanton, miners' agent, Aberdare, although the award does not come up to the desired schedule, there is sufficient in it to warrant the statement that, with the local organisation more perfect, the miner would be in an infinitely better position in the future than in the past, for the lower-waged hands, such as the ostlers, would benefit anything from 1d. to 6d. or 9d. per day. He now holds that it will be better to tackle matters in the House of Commons rather than by sectional or national strikes, which involved great suffering, not only to those directly concerned, but also to thousands of other persons.

This declared preference for Parliamentary action is to be noted as one of the more serious consequences of the passing of the Minimum Wage Act—the resort to legislation instead of leaving industry to be regulated upon an economic basis.

The men do not realise how very serious is the outlook. They do not understand that employment is being limited in a serious degree, and that, with fresh legislation and ever-growing costs, the investment of capital is discouraged and new enterprises stopped. Whereas the growth of South Wales coal exports was nearly 25 per cent. from 1904 to 1907—that is, from 20¼ millions of tons to over 25½ millions—there has been no such total as that of 1907 since that year. Prices have advanced, but the cost of production keeps pace and strikes create that feeling of uncertainty which drives away orders. It would be interesting to know exactly, from carefully compiled statistics, how far labour cost has increased during the past 20 or 25 years. Is it far short of double in this coalfield?

These are facts that have direct bearing upon the renewed declaration of miners' leaders, that the claims of surfacemen not having been met (because the Minimum Wage Act applies only to underground workers), "the Federation will not abandon the surfacemen's cause."

Without a doubt the men have gained considerably under Lord St. Aldwyn's award, and for 12 months there should now be peace. One distinguishing feature of that award is that his lordship—alone among the independent chairmen—has in some cases varied the standard upon which the percentages are based, and, in this way, the men have a double advantage.

In the new centralisation scheme which the Federation Conference will have under discussion, there are some drastic proposals for allowances to agents when engaged on Federation work outside their own area. Some of the men contend that the proposed amounts are "niggardly," and when the matter is discussed there is every probability that the expressions of opinion will be emphatic. Salaries of the agents will be £4 weekly, with third-class railway fares and quite moderate hotel allowances.

Agreement has at length been reached in the negotiations, previously alluded to in these columns, for the transfer of the Griffin-Nantyglo Collieries (Messrs. John Lancaster and Co.) to Furness, Withy and Co. and D. Davis and Sons (Ferndale). Each of the firms named as purchasers takes half the share capital. Mr. F. L. Davis, who is chairman of the Conciliation Board, becomes chairman of the new company, a similar position to that occupied by him in the Ferndale concern, and in the Welsh Navigation Company. Mr. T. Vivian Rees, at present general commercial manager and a director of Messrs. D. Davis and Sons, becomes joint managing director of the new undertaking with Mr. Beckingham, who for some time has been South Wales manager of the business of Messrs. Furness, Withy and Co. Mr. David Hannah, a director of D. Davis and Sons, will act as consulting engineer of the new acquisition. As the Griffin-Nantyglo properties have an output of about a million and a-quarter tons per annum, the total of the coal undertakings now controlled by Mr. F. L. Davis exceeds four millions of tons yearly. Lord Furness, who thus identifies himself more closely with South Wales, is well known for his vast interests in shipping, shipbuilding, ironworks and engineering, as well as in collieries in other parts.

At the East Pit, Gwaun-cae-Gurwen Colliery, the company have struck both the Big Vein and the Peacock, and in a few days sinking operations will be concluded. The Big Vein was won at a depth of 912 ft., and the Peacock at 1,000 ft. depth. The winding will be done by electricity. The shaft is 18 ft. in diameter, and when in full working it is estimated that 1,000 to 1,500 men will be employed.

Coal has been reached also by Mr. T. Taylor, at a depth of 420 yards, in his North Pit, Nantgarw, near Cardiff.

An arrangement has been made whereby the tippers in Newport Docks will receive extra payment for working on Saturday evenings, and also in respect of shifting tips, mixing coal, &c.

The Rhondda District Council has been formally notified by the Local Government Board that, under the new Mines Act, the duty of enforcing requirements as to fencing disused mines devolves partly upon them and partly upon colliery proprietors. It was reported to this Council that lads under 14 who had been four or five months at work were now withdrawn owing to the Act, and that not only was this a hardship upon parents, but that the lads could not go to school and had nothing to do.

The dispute at Messrs. Gilbertson's tin-plate works, Portardawe, which occurred on Wednesday of last week, and was briefly reported in our last issue, was settled by the Tin-plate Conciliation Board on Saturday. About 500 men were affected.

The coalowners of Carmarthenshire have written to the County Education Committee complaining of the dilatoriness of the committee in providing for the instruction of firemen under the new Mines Act. At a meeting of the committee last week, Mr. W. N. Jones was afraid the whole colliery district would get into chaos, but another member was of opinion that the ratepayers should not be saddled with the expense. The mining committee will discuss the question.

At Cardiff County Court, Thomas Williams, a collier, sued the Llanbraduch Colliery Company for payment for work done in what plaintiff said was a heading. It was stated that plaintiff was working a heading in which a fall took place, and he was then instructed to work a stall round the fall. For this he was paid stall rates. Plaintiff, however, claimed heading rates, and the point arose as to whether the place was a stall or a heading. Defendants said that rather than turn plaintiff off he was put on a stall at stall rates. Judge Kelly said that there was nothing to show that the stall had been driven as a heading, and gave judgment for defendants.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.—July 17.

Safety in Mines.

In discussion on the Home Office vote,

Mr. Neville called attention to the case of a miner named James Green, who, with another man named Mitchell, was recommended for the Edward VII. Medal, for trying to remove a fall of roof by which several men were entombed in the Bamfurlong Colliery, having to work for a number of hours in water breast high. He said that James Green died before the medals were actually bestowed by the King, and he wished to know whether the medal could be granted to his representatives. He added that there was a feeling among his constituents that the enquiries held before the distribution of rewards for heroism were made were not thorough, and this was rather borne out by the fact that there was a third man working with Mitchell and Green who had received no recognition.

Sir A. Markham said, in view of the statement of the Chancellor of the Exchequer that he desired to encourage research in agriculture, mining, and other industries, he wished to ask what sum had been set apart for research in connection with the mining industry. If such research were to be carried on in the interests of life it was necessary that the Home Secretary should have a larger establishment than he had at present. The managing director of the Cadeby mine a short time ago induced other colliery owners to join with him in undertaking research to find means for preventing such disasters as that which had occurred. They had had committee meetings and they had appointed an expert at every colliery, but no support from the Government had been forthcoming. They were anxious to place all the information they had at the service of the Government.

Mr. Ellis Griffith, who replied for the Government, said that with regard to the recent colliery disaster in Yorkshire, he understood that the widows of the inspectors who lost their lives received during their lives one-sixth of the salaries of their husbands. At the same time they felt that the circumstances were of so exceptional a character that they would be acting in accord with the general wish of the House if something were done on the lines suggested by the hon. baronet the member for Mansfield.

Mr. W. Harvey pressed the Home Secretary to at once appoint the Committee to enquire into the causes of the Cadeby mine explosion. It was of the utmost importance if a panic among the men working mines in the district was to be averted. If coal could not be got without this risk of loss of life, then coal-getting should cease. While quite agreeing with the appeal for the assistance of the families of the officials who had lost their lives, he earnestly appealed for help to the families of those who had perished like heroes in the attempts at rescue.

At a meeting of the Bolton Corporation Gas Committee, held on Friday morning, July 12, the subjoined offers for the purchase of coke were accepted:—J. Briggs and Sons or 1,500 tons; T. Brocklehurst Limited, 1,000 tons; A. Bromley and Sons, 1,000 tons; J. C. Newsome, 1,000 tons; W. Rawcliffe and Co., 1,000 tons; Hudson and Co., 1,500 tons; Thrutchley and Co., 1,000 tons; A. Bromley and Sons, 1,000 tons; G. Tunstall and Co., 1,000 tons; H. Baldwin and Co., 1,500 tons; Bold Venture Lime Company, 1,500 tons; Wigan Coal and Iron Company, 1,000 tons.

WORKMEN'S COMPENSATION.

(Specially Contributed.)

A Charge of Malingering

It is not often that we have to enter in this column particulars of a case which involves a charge of fraudulent malingering; one such instance has, however, recently come to light in relation to that curious miners' disease known as nystagmus. It appeared that in the case of *Moorhouse* v. *Lister Kaye* (Huddersfield, June 4), the workman had been in the employment of the Denby Grange Colliery, near Wakefield. In March 1909 he contracted the disease nystagmus as a result of his work in the mine. He sought and obtained compensation, which was paid from July 20, 1909, until the present time. The employers now applied to Judge Longstaff to diminish or stop the compensation altogether on the ground that the man was fit for work, or on the more serious ground that he was malingering. Two eminent surgeons gave evidence to the effect that the respondent could bring on nystagmus at will; while a doctor called on behalf of the workman appears to have admitted that it is possible for a man to control and also aggravate all the symptoms of nystagmus, and make the disease last longer than it otherwise would. In giving judgment, the judge said that the admission of the miner's medical man quite agreed with the employer's contention—that the man was malingering, or unduly and improperly prolonging the duration of the disease. "Such a practice," said the judge, "is grossly dishonest, and the sooner it is stopped the better. I am convinced that the respondent has been malingering in the sense that he has discovered and used means whereby he can produce within reasonable limits, for such period as he desires, all the symptoms of miners' nystagmus." In the event compensation was reduced to 1d. per week. This case should serve as a warning to colliery owners who are met with claims founded upon this obscure complaint. It is described in medical works as "a characteristic rolling movement of the eye, especially in extreme lateral positions which may be associated with general nervous disorders and visual defects." It is common in coal-miners, and is due to the cramped and oblique position in which the miners have to work, associated with very defective illumination. It may be cured by persistent abstention from the work which caused it. That it is possible to malinger in relation to a complaint of this character bodes ill for the future of the Insurance Act. If there can even be malingering in relation to certain well-known types of disease, the possibilities of fraud when mere inability to work through illness will confer the right to 10s. a week are too awful to contemplate.

The Waste of Compensation Money.

Prior to the Compensation Act, 1906, it had become apparent that the system of paying lump sums to workmen was inexpedient from the point of view of the workman. He receives an amount which, even if well invested, can only bring in a very small income; and he is therefore tempted either to live on his capital or to buy the goodwill of a business. Cases are frequently reported from which it appeared that the workman who proposes to set up in business is generally misled as to the purchase price and hopelessly fails to understand the business into which he is suddenly plunged. In a case recently heard at Sheffield, a workman, who had received a sum of £170 by way of compensation for an accident, purchased a greengrocer's round, including a horse and dray, for £35. This turned out to be nothing but a hawking business, which was a hopeless failure. His next venture was the purchase of a greengrocer's shop for £70, from which the vendor represented he was making a profit of £6 a week. He brought an action against this vendor for misrepresentation, but lost the action, and finally returned to work with his old employer! It was for the protection of workmen who squander their money in this fashion that the county court judges were authorised, by the Act of 1906, to retain a lump sum and pay it out by instalments; but it is surprising what pressure is brought to bear upon county court judges to make payment of a lump sum. The writer recalls one case where a workman, to whom an employer was under no legal obligation, had a choice of accepting £30 down or a pension of 25s. a week. He actually chose the lump sum, and spent it in about a month!

Workmen's Compensation and the Minimum Wage Act.

"Loyal" writes:—

1. I am a collier and have had one eye removed as the result of an accident whilst working. I am receiving 13s. a week compensation. Will you kindly tell me if I can claim a lump sum in settlement of my loss under the Employers' Liability Act or the Workmen's Compensation Act?

2. I had it done under the new Minimum Act. Will that make any difference to me if the new wages per day are higher than old wages before the strike?

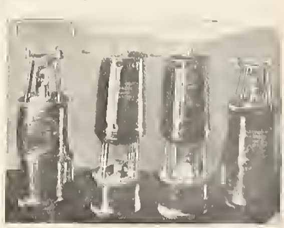
3. Do they only reckon the days I worked? During the last 12 months I was ill one month, and we had our strike and other strikes interfered with us.

*** As to (1) it is clear that our correspondent is entitled, if so minded, to enter into an agreement with the employers to accept a lump sum in commutation of the weekly payment of 13s. The agreement, however, will have to be sanctioned by the Court. The employers may, of their own motion, settle by payment of 75 per cent. of the capital value. Thus, by Schedule I (17) to the Workmen's Compensation Act, 1906, where any weekly payment has been continued for not less than six months the liability therefor may, on application by or on behalf of the employer, be redeemed by the payment of a lump sum of such an amount as, where the incapacity is permanent, would, if invested in the purchase of an immediate life annuity, purchase an annuity for the workman equal to 75 per cent. of the annual value of the weekly payment. As to (2) the amount of compensation is based upon the average weekly earnings during the *past* 12 months and the Minimum Wage Act would appear to have nothing to do with the matter; and as to (3) as average weekly earnings are to be computed in such manner as is best calculated to give the rate per week at which the workman was being remunerated, it is conceived that the week's illness would not be taken into account.

*** *We shall be pleased to answer in this column questions relating to Workmen's Compensation and Employers' Liability. All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.*

SAFETY LAMPS FOR THE KING.

In connection with the King's descent of the Elsecar Colliery last week, special electric and oil lamps were supplied for the occasion by Messrs. Ackroyd and Best Limited, of Morley, near Leeds, whose lamps are used throughout the pit. The accompanying photograph shows the set; the case of the electric lamps was made of aluminium carefully made up, and the oil lamps were constructed completely of the same metal, with solid silver pillars, handles, burners and other fittings.



Institution of Mechanical Engineers.—The Belfast meeting will be held Tuesday, July 30, and Wednesday July 31, in the hall of the Municipal Technical Institute, Belfast. The chair will be taken at 10 a.m. on each day. The following papers will be read:—"New Graving Dock, Belfast, Mechanical Plant and General Appliances, by Mr. W. Redfern Kelly, of Belfast; "Rolling Stock in use on the Principal Irish Narrow-gauge Railways," by Mr. R. M. Livesey, member, of Stranorlar; "The Evolution of the Flax Spinning Spindle," by Mr. John Horner, of Belfast; "Wire Ropes for Lifting Appliances, and the Conditions that Affect their Durability,", by Mr. Daniel Adamson, member, of Hyde; "Reciprocating Straight-blade Sawing Machines," by Mr. Charles Wickstead, member, of Kettering; "Commercial Utilisation of Peat for Power Purposes," by Mr. H. V. Pegg, of Belfast.

Visit of Scientific Men to Cornwall.—During the present week representatives of the leading scientific, mining and engineering societies of the British Empire have been on a visit to Cornwall, including representatives of the Royal Society, the Geological Society, Geologists' Association, Chemical Society, Faraday Society, Society of Chemical Industry, Institution of Mining and Metallurgy, Institution of Mining Engineers, Institution of Civil Engineers, Institution of Mechanical Engineers, Institution of Electrical Engineers, Institute of Metals, Institute of Chemistry, Iron and Steel Institute, Chemical, Metallurgical and Mining Society of South Africa, Mining and Geological Institute of India, Canadian Mining Institute, together with representatives of Birmingham, London and Sheffield Universities, the Imperial College of Science and Technology, and the Imperial Institute. An excellent programme has been arranged by a committee, of which Lord St. Levan is the chairman.

THE MINIMUM WAGE.

Deputation to the Prime Minister.

The leaders of the Miners' Federation of Great Britain were received by Mr. Asquith on Monday in the House of Commons to hear their views on the working of the Minimum Wage Act. The Prime Minister was accompanied by Sir George Askwith. The deputation consisted of about 20 representatives of the mining districts of Great Britain, and their complaints respecting the inadequacy of the minimum rates fixed by the Joint Boards under the Act were expressed by Mr. R. Smillie, president of the Federation, Mr. William Straker (Northumberland), and Mr. Vernon Hartshorn (South Wales).

Mr. Smillie said that during the discussion which preceded the introduction of the Minimum Wage Bill last spring the representatives of the miners held out strongly for the admission that no daily worker underground should be paid less than 5s. a day, and they certainly had the feeling, as a result of the negotiations, that a lower rate than 5s. would not be fixed by the independent chairmen of the Joint Boards. So far was that from being the case that nearly in every instance the chairman had fixed the minimum rate for daily wagemen at less than 5s. The rates ranged from 4s 2d. and 4s. 6d. up to 5s. He did not think that represented the intentions of the Government in passing the Act. The 2s. for boys had been recognised except in those districts where they did not expect it would be recognised, and therefore that was satisfactory.

Another cause of complaint was that while the Joint Boards, in fixing the rates for coal-getters, who were paid by piecework were required by the Act to have regard to "the average rate of wages" paid in the district, in nearly every case the chairman had declined to act upon that direction, and had fixed the minimum rates for the coal-getters considerably below the average wages. The miners' representatives had agreed to the safeguard that men who were old or infirm should not be entitled to the minimum wage. But instead of leaving this matter to the Joint Boards the managers of certain mines, especially in Scotland and West Yorkshire, were saying to their men that owing to infirmity or old age they were quite unfit to earn the minimum wage, and that unless they signed a declaration that they were not entitled to the minimum wage they would have to leave. That, in the opinion of the deputation, amounted to contracting out of the Act. They would give the Act a fair trial, but they thought its working required to be watched in the interests of the men.

Mr. Straker pointed out that the miners' representatives had agreed to the safeguard that men entitled to a minimum wage should do efficient work and attend with regularity. But it had been decided by some of the chairmen that a man should show 80 per cent. of attendances, and by other chairmen that a man should show 100 per cent. of attendances before he became entitled to the minimum rate.

Mr. Vernon Hartshorn criticised the award for South Wales. The whole award for South Wales in its entirety had added only 2d. per ton to the cost of production. Another ½d. per ton would give all the day men the minimum wage of 5s. a day that had been asked for.

Mr. Asquith said he thought it was satisfactory—for he gathered that on the whole such was the view of the deputation also—that the Minimum Wage Act, novel as it was in character, and passed as it had been in circumstances of great emergency, should have realised such gratifying results. There had been inevitably some misunderstandings, and some amount of friction, and possibly there was not complete logical harmony between all the awards; but no one could doubt that the claim of the men for a minimum wage was a reasonable claim; that it had been recognised as such by the Government and Parliament, and that a minimum wage had now been secured by Act of Parliament to the colliers, with enormous consequences for good to their great industry. He was glad to notice, looking at the awards, that the 2s. per day for boys had practically been universally conceded. With regard to the 5s. per day for day workers, as he had said in the spring, though sympathising with the claim, he did not feel justified, on account of the varying conditions in different districts, to include the figure in an Act of Parliament, but he gathered that if it had not been got in all cases, the amount fixed in most cases was about 4s. 6d. and that the average was something like 4s. 9d., and, of course, where there was but so slight a margin of difference, opportunities would recur for a revision of the figure. With respect to the scheduled rates for the coal-getters paid by piecework, he could not, in the absence of expert knowledge, criticise the awards of the independent chairmen, but looking through the rates that had actually been fixed, it did not seem to him that the miner had much ground for complaint. In saying that the chairman should have regard to the daily rate of wages paid to the workmen, what was meant was that he should take it into consideration as a relevant fact, but it was not intended to mean that the minimum should be fixed at that amount. As to the other grievances, he would be glad if specific particulars were sent to Sir George Askwith. They would understand generally that though the Government had made itself responsible for the passing of the Act, they must leave its interpretation to the statutory bodies which had been created for that purpose. They were not quite satisfied with the awards, and no doubt if the owners were present they also would say they were not quite satisfied, for, naturally, in a matter of this kind satisfaction all round was not to be expected. But he could not sit as a court of appeal from the statutory bodies. If a sufficiently strong case had been made out they might again go to Parliament and ask for amending legislation, but he did not think they had made out such a case as would justify Parliament in ripping up the Act at this stage. On the contrary, the Act had worked very well. The miners had obtained through it an enormous boon, and he would add that he did not believe either the owners or the consumers would suffer in consequence.

Mr. Smillie pointed out that the Prime Minister had said nothing in reference to the action of some of the coal-owners in trying to induce some of their men to contract themselves out of the Act.

Mr. Asquith thought the miners through their organisation could very well protect themselves in that respect without asking Parliament to come to their assistance.

The deputation thanked the Prime Minister for receiving them.

OBITUARY.

At Doncaster, on Saturday, the remains of Mr. W. H. Pickering, H.M. chief inspector of mines for the Yorkshire and North Midlands Division, who lost his life during the rescue operations following the explosion at the Cadeby Main Colliery, were laid to rest. Thousands, comprising colliery owners, managers, representatives of the Home Office and various institutions and universities, colliers and others, were present in the funeral *cortège*. There was a service at the parish church, which was conducted by the Archbishop of York. The coffin was placed in the chancel, and round it were masses of floral tributes. There was only one cross on the coffin—a fleuriated cross ("The Cross of Victory"). This came from the widow and family, and beside it lay the Edward VII. Medal, presented by the late King to Mr. Pickering, and also his safety lamp. The lamp was afterwards buried with him. The Archbishop, in his address in the Parish Church, said their hearts were full both of sorrow and praise. They bowed the head in silence before the mystery of this terrible disaster; they felt more than they could express sympathy for those from whom those they loved had been so suddenly snatched away, and they were also full of praise. They praised God that out of the fiery pit with its fatal fumes had risen the spirit of a noble life crowned by a noble death. They praised God not only for their brother whom they were laying in the grave that afternoon, but also for his brethren who shared with him the honour of this self-sacrifice. They praised God for all that patient nobility of toil in which the risks of danger and death were daily encountered, the nobility which came to the life of the miner and to the death of men who were overwhelmed standing at their daily task. He knew the thoughts of their Majesties were with them in that church that afternoon, for knowing that he (the Archbishop) would be there they asked him, on their behalf, to give expression not only to their sympathy with those who were mourning their beloved, but also their pride, their admiration, and their gratitude for the heroic self-sacrifice of their servant, William Henry Pickering, and his comrades. Only the hour before the swift tidings of Mr. Pickering's death reached his Grace he had read what he supposed was the last letter he wrote. With a simplicity characteristic of the man, he had written from the pit-mouth at Cadeby, "I am going here underground, as I think it is my duty to go If all is well I shall still hope to meet the King at Elsecar this afternoon." The late Mr. Pickering loved the miners. They were his friends. Often had he heard him say that the world had a great deal to say about miners, but to him they were always the men whom he could not keep back from facing danger if they could rescue their mates. He cared for these men. He cared for their bodies, and he cared, as many were less anxious to care, for their souls. There were upwards of 250 floral tributes, including one from the Home Secretary.

Mr. Douglas Chambers was buried in Denaby Churchyard on Friday, and on the same day the interment took place of Mr. Henry Richardson Hewitt in Ecclesall Churchyard. The wreaths were numerous. One from the National Association of Colliery Managers bore the following message: "In appreciation of services always willingly rendered in times of danger and difficulty."

Mr. Sidney Ellis, the chief surveyor to the Cadeby Main Colliery Company and one of the rescuers who lies buried in the mine, was a much valued official of the company and a popular man in the district; he was a son of the late Mr. Ellis, who was Mayor of Doncaster about three years ago.

The death-roll produced by the Cadeby disaster has been increased to 87, by the passing away on Monday morning of Mr. Charles Bury, manager of the Cadeby Pit. Mr. Bury was immensely popular with the miners. He was one of those who descended the mine after the early morning explosion to take part in the rescue work. Although missing the fate of those who were overwhelmed by the fall of roof which followed upon the heels of the second explosion, he was so badly "gassed" that at first his life was despaired of. He was at once removed to the Denaby Fullerton Hospital, where for some time he was reported to be making favourable progress towards recovery. On Monday, however, he suffered a relapse, and died without once recovering consciousness. He came to Denaby 20 years ago as a mining student, and about 12 years ago was appointed manager at Denaby Main, which pit he left for Cadeby last September. Simultaneously with Mr. Bury's promotion to Cadeby, Mr. Douglas Chambers was given the managership of Denaby. Mr. Bury's funeral took place on Tuesday at Denaby

Mr. Jabez Cole, senr., the founder of the firm of Jabez Cole and Co., coal merchants, of Bradford, died at his residence at Menston on Saturday. Mr. Cole, who was 81 years of age, commenced business in 1869, and retired in 1889.

The death took place on the 11th inst. of the Right. Hon. John Lloyd Wharton, chairman of the North-Eastern Railway Company.

The death has occurred of Mr. Frank Hill, managing director of the firm of Messrs. R. Hill and Co., of the Newport Wireworks, Middlesbrough.

Mr. Joseph Atkinson, a well-known Hull shipowner, of the firm of Brown, Atkinson and Co., died at his residence, Elloughton, near Hull, last week. Mr. Atkinson was the chairman of the Shipping Committee of the Hull Chamber of Commerce, a director of the London Joint Stock Bank, and of many Hull business concerns.

The death took place on Tuesday evening, July 9, at his residence, Elm House, Clifton, near Manchester, of Mr. James Lee Wood, one of the oldest officials connected with the Clifton and Kersley Coal Company, one of the best-known colliery firms in Lancashire. Mr. Wood, who was in his 73rd year, had been engaged as secretary for the company for the greater part of his life.

The death has occurred at Brighton of Mr. Edward Lowther. Mr. Lowther, who was 66 years of age, was born in Northumberland, the son of a coalminer. At the age of 10½ years he went down the pit at the West Cramlington Collieries, where his first work was that of a trapper. Afterwards he became a coal-getter, and after 17 years' work in the pit he was appointed secretary to a colliery company, which represented the first attempt at co-operative coalmines, and three years later he started business in London as a coal merchant. In 1877, in conjunction with the late Mr Andrew Cameron, he purchased a business at Brighton—Messrs. Lowther and Cameron. Mr. Lowther was first elected in 1884 to the Brighton Town Council.

The death occurred in London on the 8th inst. of Mr Thos. W. Benson, of Allerwash House, Fourstones. The deceased gentleman and his brother were largely interested in industrial pursuits. They owned Montague Colliery and Brickworks at Scotswood, quarries and lime-works at Fourstones, and limeworks at Alston, &c. Mr. Benson was a county alderman for Northumberland, a justice of the peace, and used to occasionally sit on the magisterial bench at Hexham. He was unmarried, and about 68 years of age.

GOVERNMENT PUBLICATIONS.

⁂ Any of the following publications may be obtained on application to this office at the price named post free.

Trade, Commerce and Conditions of People Return, 1d.

Statutory Rules and Orders, 1912: Unemployment Insurance, 1½d.; COALMINES *re* VIEWS OF WORKMEN, 1½d.

National Insurance: Draft Regulations under Section 4, 1½d.; ditto, Regulations under Section 66 (Irish), 1½d.; ditto, Orders (Various Counties and Boroughs), 1½d. each; Insurance Committee's Regulations: Report by Sir W. Plender *re* Medical Attendance in Certain Towns, 1½d.; Summary of Decisions by Umpire (Unemployment), up to and including July 4, 5½d.; Draft Regulations as to Employed Contributors, July 5, 1912, 1½d.; ditto, Benefits of Married Women (Scotland), July 14, 1912, 1½d.

MINES AND QUARRIES REPORTS, 1911: YORKSHIRE AND NORTH MIDLANDS, 1s. 7d.; NEWCASTLE, 5d; DURHAM, 6d.

Boiler Explosion Reports: No. 2139, 2½d.; No. 2140, 8½d.; No. 2142, 4½d.; No. 2143, 4½d.

Employment of Children Bill Report, 3d.

Consular Reports: Anticquita, 1d.; Colima, 3½d.; Philadelphia, 2½d.; Barcelona, 6d; Chicago, 6d.; Cuba, 6½d.; Coalmining in Hokkaido, 3d.

Labour Gazette for July, 2d.

During the recent visit of the King and Queen to Caerphilly, in Wales, Col. Pearson, H M. inspector of mines, the founder, and for several years the enthusiastic commander, of the Lowland Divisional Engineers, played a prominent part. Col. Pearson was in command of the 4,000 troops, of all arms of the service, who lined the streets and were posted in the castle grounds, and the display was remarkable, not only from the point of numbers, but for the efficiency and smoothness with which the various units performed their respective duties. Both their Majesties were deeply impressed, and made a special request to Lord Merthyr that their sense of appreciation should be communicated to Col. Pearson and the officers who assisted him.

THE COAL AND IRON TRADES.

THURSDAY, JULY 16.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week, 150,347 tons of coal and 2,358 tons of coke were despatched from Tyne Dock, an increase of 395 tons of coal and 1,383 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 67,542 tons of coal and 2,516 tons of coke, a decrease of 8,968 tons of coal and 62 tons of coke. The Blyth shipments totalled 97,708 tons of coal and coke, an increase of 17,540 tons. The principal interest in the week's coal market has been centred in the negotiations of the metropolitan gas companies for their annual requirements, which are usually arranged for much earlier in the year, but which, on this occasion, have been deferred owing to the high prices consequent on the miners' strike. The South Metropolitan Gas Company is stated to have closed contracts for about 1,000,000 tons of various grades of Durham gas coal for delivery from date until the end of next March. The London Gas Light and Coke Company Limited is stated to have purchased some 310,000 tons of Londonderry gas coal for delivery over 12 months, at 16s. c.i.f., which, on the basis of present freights, leaves about 12s. 6d. f.o.b. Details as to the prices paid by the South Metropolitan Company have not yet transpired, but it is believed that the business has been arranged at very little under current prices for the qualities taken. There is no news as yet as to the Commercial Gas Company's contracts. Other gas coal contracts are as follow:—Two or three "parcels" of Wear specials for shipment over 12 months, at 13s. f.o.b.; 40,000 tons New Pelton-Holmside, sold by second-hand holders, for delivery over 12 months, at 12s. 6d.; from 10,000 to 15,000 tons of best seconds for shipment to the end of the year, at 11s. 6d.; a quantity of Tyne primes, sold by second-hand holders, for shipment over 12 months, at 12s. 4½d.; the annual requirements of the South Shields Gasworks, delivery over 12 months, at from 11s. 3d. to 12s.; two considerable lots of gas seconds for shipment over 12 months, at 11s. 6d.; 25,000 tons New Pelton-Holmside for the annual requirements of the Palermo Gasworks, at 12s. 8d.; a considerable proportion of the annual requirements of the Thisted gasworks placed for Wear specials at about 13s. and 50,000 tons New Pelton-Holmside, delivery over 12 months, at 12s. 4½d. The following gas coal enquiries are in circulation.—Bremen Gasworks want 6,000 tons bests for delivery this year and 12,000 tons for delivery next year; the Magona Works, Porto Vecchio, want two cargoes—from 10,000 to 11,000 tons in all—of bests, one to be shipped early in August and the other 20 days later; the Norrkoping Gasworks want a supplementary quantity of 5,000 tons; the Aarhus Gasworks 20,000 tons of bests for August-April delivery; and the Aalborg Cement Works 30,000 tons for shipment over 12 months. The contract to supply the Rotterdam Gasworks with 240,000 tons of gas coal over the year appears to have gone wholly to Westphalia. In previous years an increasing proportion of this order went for German coal, and now Westphalia appears to have secured the whole of the business. The following enquiries for steam coals are circulating: Libau Wireworks want 10,000 tons, shipment to the end of the year; the Finnish State Railways want about 78,000 tons of steams for shipment to stipulated ports over the season the Gefle-Dala Railways require an additional supply of about 23,000 tons; and an enquiry for 40,000 tons of best Northumberland smalls is to hand from the Partington Works, Christiania, delivery over 12 months. The Marseilles Gasworks are stated to have postponed their contract purchases until September. Some 6,000 tons of good ordinary unscreened Durham bunkers have been sold for delivery up to the end of the year at 11s. 6d. About 50,000 tons of best Blyth steams, Tyne primes and unscreened have been sold for shipment over the rest of the year at about 13s. f.o.b. for Blyths, 12s. for Tynes, and 11s. for unscreened. The market is much improved this week. Supplies are scarce, and enquiries are numerous. Tonnage is to hand in fair quantities. Excepting that gas coals are easier, quotations are firmer all round. F.o.b. quotations for prompt shipment are as follow:—Best steams, Blyths (D.C.B.), 13s. 9d. to 14s. per ton f.o.b., an advance of from 9d. to 1s.; Tynes (Bowers, &c.), 13s. to 13s. 3d., 9d. up; seconds, Blyths, 12s., similarly increased; Tynes (Hastings or West Hartleys), 12s. 3d. to 12s. 6d., 9d. higher; unscreened, 11s. to 11s. 6d., from 6d. to 9d. more; smalls, Blyths, 10s. 6d., 1s. 6d. advanced; Tynes, 8s. 9d. to 9s. 6d., from 9d. to 1s. 3d. increased; specials, 10s. to 10s. 3d., similarly risen; smithies, 11s. 6d. to 12s., from 3d. to 6d. higher; gas bests (New Pelton or Holmside), 12s. 6d., a decline of 4½d.; seconds (Pelaw Main or similar), 11s. 6d., from 3d. to 6d. advanced; specials, 13s. to 13s. 6d., 6d. lower; unscreened bunkers, Durhams, 11s. to 11s. 6d., a rise of from 3d. to 6d.; Northumbrians, 11s. to 11s. 6d., from 6d. to 1s. dearer; coking coal, 11s. 3d. to 11s. 6d., from 6d. to 1s. up; smalls, 11s., from 9d. to 1s. more; households, 14s. 6d., steady; coke, foundry, 23s. 6d., 6d. higher; blast-furnace, 20s., similarly increased; and gas coke, 19s., 1s. dearer.

Later.—The contract to supply the Eastbourne Gasworks with their annual requirements is stated to have been placed for Durham seconds at 11s. 6d. f.o.b. The Helsingborg Gasworks want immediate offers of 5,000 tons of gas coal, and the Kalmar Gasworks 3,000 tons. Some 8,000 tons of ordinary unscreened Durham bunkers have been sold for shipment over this year at 11s. 6d. f.o.b.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 112,500 tons of coal and 90 tons of coke, as compared with 97,190 tons of coal and 50 tons of coke for the corresponding period of 1911, being an increase of 15,310 tons of coal and a decrease of 40 tons of coke. The coal market is stronger in every department; purchases for prompt shipment are not easy to negotiate, and in the forward market considerable activity prevails. There are more contracts coming into the market, and buyers seem to show a belief that the lowest range of prices is reached. There is a steady enquiry for bunker coal. In the gas coal trade the prices are firmer and the demand is stronger. Household coal is naturally quiet at this time of the year with weak prices. A very full demand continues for coke, the output being still barely sufficient for the wants of the smelters. It is reported that further contracts for gas coal over next year have been made at 12s. 6d. per ton f.o.b. It is also reported that the Palermo Gasworks have contracted for 25,000 tons of best Durham gas coals at 12s. 8d. per ton f.o.b. The London Gas Light and Coke Company is still negotiating, and is believed to have arranged for some Wear special qualities. General quotations are as follow:—Special Wear gas, 14s.; best gas, 13s.; seconds, 11s. 6d. for prompt, 12s. for later shipment; coking unscreened, 10s. 9d. to 11s.; smalls, 10s. 6d.; smithies, 13s. to 14s.; peas and nuts, 13s. to 14s.; households, 14s.; bests, 15s.; foundry coke, 22s. 6d. to 23s.; furnace coke, 20s. to 20s. 6d.; gas house coke, 18s. to 18s. 6d. Bunker prices are: Morrison's Marley Hill, 12s.; Priestman's, Burnhope, Consett, 11s. 6d.; Pease's, South Derwent, Framwellgate, 11s.; South Hetton, 11s.; Ryhope, 12s.; Londonderry, 12s.—all f.o.b. South Dock. Tonnage is still very scarce, and prompt loading turns are difficult to arrange. Freights are firm, and inclined to rise still further. Fixtures include the following.—Mediterranean: Genoa, 11s. 9d.; Naples, 11s. 6d.; Piræus, 11s.; Alexandria, 11s. 9d. Baltic: Cronstadt, 6s. 6d.; Fairwater, 6s. 3d. Bay: Bordeaux, 8s. Coasting: London, 3s. 9d.; Havre, 5s.; Calais, 4s. 6d.

Middlesbrough-on-Tees.

COAL.

Fuel is firm and the position generally is very satisfactory. Collieries have a good fortnight's to three weeks' turns booked, without taking into account the increasing demand. The fuel market is now more buoyant than it was previous to the disastrous strike. Notwithstanding high freights business is booming. There are good enquiries in the market, and difficulty may be experienced in fully meeting demand. The weakest spot just now appears to be the best gas department, but this is only so because good second-class Durhams at about 12s. are relatively a better bargain than bests at 13s. Many works and smaller gas companies are now understood to be badly in need of coal. Bunker coal is in good request, with an ample supply. Ordinary Durham bunkers are selling at 10s. 9d. f.o.b., and best kinds at 11s. 6d. Household coal is quiet at 14s. to 15s. Coking coal is a good deal asked after, and prices are stronger. Coking unscreened is 11s. 6d. and smalls 10s. 9d. to 11s. Coke is firm. There is a continued very large local consumption, and average blastfurnace quality is 19s. 6d. to 20s. delivered here, whilst foundry coke is 22s. and upward f.o.b. and gashouse coke 18s.

IRON.

The pig iron market is steady, and a good sound business is going on. Recently the market has not been disturbed by wild outside speculation in warrants, with the result that values of makers' iron have moved very little, and the absence of fluctuations in prices to any extent has brought forward genuine buyers. No. 3 g.m.b. Cleveland pig is firm at 57s. 3d. f.o.b., at which figure considerable sales have been recorded. No. 4 foundry is very scarce, and is about the same price as No. 3. No. 1 is also scarce, and is firm at 62s. 3d.; whilst No. 4 forge is 57s., and mottled and white iron each 56s. 6d.—all for early delivery. Producers of east coast hæmatite pig take a very firm stand. They report fairly good enquiries, and as this branch of the staple industry is not hampered by any stocks, outside speculators have little facility afforded for gambling in hæmatite to the detriment of legitimate trade. For either early or forward delivery of mixed numbers the general market quotation is 73s. 6d. Several substantial sales of foreign ore are reported at rates which many dealers regard as very low. Contracts for rubio of 50 per cent. quality, delivered over the first six months of next year, have been made at 21s. 6d. ex ship Tees, and other ores are quoted on that basis. Freights are very stiff, up to 6s. 10½d. Bilbao-Middlesbrough having been fixed. Great activity prevails in all branches of the manufactured iron and steel industries. Producers experience difficulty in coping with the orders in hand, and some firms are too busy to entertain further offers at present. Prices show a marked upward tendency, but are not quotably advanced.

South-West Lancashire.

COAL.

The summer weather keeps the inland household trade markedly quiet. There is no change in list prices. Full consignments of screened coal continue to go away for forges and for manufactories using round coal. As regards shipping, matters are much as they were. There is a good normal demand for bunkering the regular liners, and the excursion steamers are taking almost maximum quantities. Outside orders, however, are few, and as supplies of steam coal are fairly plentiful there is a tendency to ease prices a little for prompt delivery, and present quotations for screened Lancashire steam coals range from 11s. 3d. f.o.b. upwards. There is a full average summer shipment going on of household coals for the coastwise and cross-Channel trade, and best coals rule from 14s. 6d. to 15s., with good seconds at 13s. 6d. to 13s. 9d.—both f.o.b. Garston net. Slack continues scarce and prices firm, and open-sale quotations are about 9s. 9d. to 10s. for the best rough qualities, 9s. to 9s. 3d. for good medium grades, and 8s. 6d. or thereabouts for the commoner and smaller qualities—all per ton at the pit.

South Lancashire and Cheshire.

COAL.

There was a slightly better attendance on the Coal Exchange this week. The demand for household coal, however, is poor, and there are no changes to be noted in prices, which for best coal rule from 16s. to 16s. 9d., good medium qualities 14s. 6d. to 15s. 6d., and kitchen qualities 11s. 9d. to 12s. 9d., all at the pit. The steady demand for furnace coal is maintained, with prices up to 12s. 6d. per ton into trucks In shipping also there is increased enquiry with prices f.o.b. Partington at from 12s. to 14s. The active demand previously named continues for slack and for all grades of small fuel. Prices for best rough qualities are from 9s. to 9s. 9d., with seconds at 8s. to 8s. 6d., all at the pit.

IRON.

The pig iron market continues very firm, with little change to report in prices. Deliveries both in pig iron and finished iron are hard to obtain. The forges are extremely busy on finished crown iron at £8, with second quality at £7 10s., hoops £8 7s. 6d., sheets 9s., less 2½ per cent. The steelworks also are very full of work, and busily engaged on bars at £7 17s. 6d. to £8, with billets at £5 17s. 6d. to £6 net. Wagon builders continue fully occupied. Founders and engineers report more enquiries.

Yorkshire and Derbyshire.

Leeds.

COAL.

The spell of hot weather has reduced the demand for house coal to very small dimensions, and the pits have only averaged four days' work this week. Stocks in colliery sidings have been materially increased, and ground stocks are also bigger. In spite of these things, pit prices have varied very little, occasional offers to concede wagon hire being about the extent of the concessions. Business with London and the eastern and southern counties has kept up remarkably well considering the heat, but it is known that a large percentage of the deliveries is being put into stock at the depots, although a fair turnover is passing in the cheaper qualities. Pit prices for London are steady at about the following average figures:—Haigh Moor selected, 14s.; Wallsend and London best, 13s.; Silkstone best, 13s.; Silkstone house, 12s. to 12s. 6d.; house nuts, 10s. 6d. to 11s. 6d. Very few fresh house coal contracts have been made, but sellers are not anxious, preferring to take open market rates, which are expected to be high during the coming winter. The coastwise trade in house coal is quieter, the chief demand being for the lower-priced Silkstone varieties. Current f.o.b. Hull prices:—Haigh Moor house coal, 15s. 3d. to 16s.; Silkstone best, 14s. 6d. to 15s. 3d.; Silkstone house, 13s. 9d. to 14s. 3d.; house nuts, 12s. 6d. to 13s. 6d. West Riding merchants are doing a fair business in stocking the cellars of the larger residences, but the ordinary retail trade is very quiet. Current pit prices:—Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. to 16s.; ordinary house coal, 14s. to 15s.; secondary sorts, 12s. to 13s. 6d. The demand for washed nuts, slacks and coking smalls is exceptionally brisk, both for inland consumption and for shipment Nuts are scarce. Pit prices are firm. Current quotations:—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slacks, 8s. to 9s.; small slacks, 7s. to 7s. 6d.; coking smalls, 6s. 3d. to 6s. 9d. Washed furnace coke maintains its firmness, and there is considerable scarcity of supplies. For special spot lots up to 16s. per ton at the ovens has been paid this week, and 15s. 6d. is firmly quoted for ordinary samples. The demand is particularly brisk from the Frodingham district. The gas coal pits are able to work full time, surplus tonnage finding a ready outlet for export. New inland business still hangs fire to a large extent, buyers preferring to seek supplies for current needs in the open market. Prices are firm and particularly so for good quality nuts. Current quotations:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal 9s. to 10s. For prompt shipment at Hull the following f.o.b. figures are quoted:—Screened gas coal, 12s. 6d. to 13s. 3d.; gas nuts, 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d. to 12s. 6d. The market on Tuesday was exceptionally well attended and there were a good many enquiries for gas coals, nuts, second-class steam coals and slacks, but house coal was neglected. In all sections of the trade prices were firmly quoted.

Barnsley.

COAL.

The expected improved demand for steam coal on export account is becoming manifest, and already there is a difficulty of berthing vessels at Hull, where in the past month or so the trouble has been the lack of tonnage to maintain a steady and regular demand for the output. Shippers, with the season so well advanced, are now making vigorous efforts to arrange deliveries, and have to tackle a market which is remarkably firm and active on home account, with the consequence that values are advanced, with a strong upward tendency prevailing, and forward bookings are very difficult to negotiate. The output, too, can hardly be regarded as a full one, apart from the stoppage of such large producing concerns like Denaby and Cadeby, for the trouble regarding the minimum wage regulations is serious, and a lack of the more productive collier is becoming more marked. The tonnage required for Hull hereabouts is something approaching a record character, but relates chiefly to secondary grade fuel, which is more freely available. The best hards have gone up to 11s. 6d. per ton pit, with few offers for forward sale, whilst secondary brands are from 10s. 9d. to 11s. per ton, though the tone for supplies ahead is, perhaps, not so strong as is the case with the better class of fuel. The pressure for supplies is felt all the more keenly, owing to the strong demand on home account, particularly for the railway companies, who are now taking a full average delivery. In regard to all kinds of small steam fuel the same activity prevails and the demand is hardly met, whilst there is greater readiness to renew contracts at the advanced rates of 2s. to 2s. 6d. per ton than was the case recently. Best washed nuts are making from 10s. to 10s. 6d. per ton and secondary sorts from 6d. to 1s. per ton less. Best slacks are being sold at about 8s. per ton, with rougher kinds about 9d. per ton less. There has been little change with regard to the position of gas coal contracts, but slowly these are being renewed very much on the same terms which coalowners have pressed for, and current sales are very moderate. House coal is quieter under the influence of the present weather, but values are endeavoured to be held, though the quieter buying has led to stocks growing. So far, however, late quotations are repeated, the best Silkstone making up to 13s. 6d. per ton, best Barnsley softs, 12s. 6d. per ton; seconds, 10s. 6d. to 11s. 6d. per ton; nuts, 10s. per ton. Coke continues to be strong from the standpoint of makers, prices ruling at from 14s to 15s. per ton.

Chesterfield.

COAL.

The coal trade of North Derbyshire continues to display considerable activity, and despite the warm weather the amount of business passing in the house coal department is more than that usually done at this time of the year. Prices are now firm, and they will be advanced doubtless at the earliest opportunity. A large proportion of the contracts which expired at the end of June have been renewed at 2s. 6d. per ton advance. The demand for fuel for manufacturing purposes is on a large scale, and it is likely to remain strong for some time to come, seeing that the large iron and steel works of the district are working under boom conditions, and are now in need of larger supplies of coal than has ever previously been the case. Slack for steam-raising purposes is in brisk request, and the demand for this class of fuel will become acute before many weeks are over. Prices have substantially advanced, and many of the prime brands now stand at from 7s. 6d. to 8s. per ton at the pit. There are no stocks anywhere. Steam coal for locomotive purposes is in greater demand than it has been for many months past, and heavy deliveries are going forward daily. The past week has witnessed a marked improvement in the demand for steam coal for export, with a rise in prices on the week of fully 9d. per ton. A fuller supply of shipping tonnage has materially improved the position, and a brisk business will now be done until the end of October. Prices have a decidedly hardening tendency, and before the close of the present month it is believed that steam coal will be from 9d. to 1s. per ton dearer than it is now. A good demand is experienced for cobbles and nuts for near Continental ports, prices of which are improving. A good business is also passing in washed nuts and washed slack, and these classes of fuel are steadily appreciating in value. Coke continues in short supply, and is likely to remain below the requirements of the market for some time to come. Coking fuel is scarce and dear. Quoted prices are as follow:—Best 13s. 6d., seconds 12s. 6d., cobbles 10s. 6d., nuts 9s. 6d., slack 8s.

IRON.

A brisk demand continues for pig iron as well as for manufactured iron, and prices are strong. Buyers are eager to place orders for forward delivery, but this can only be done on sellers' own terms. The market is generally cheerful and hopeful. Engineers, ironfounders and wagon builders are extremely busy.

Nottingham.

COAL

The coal trade in this county is maintaining a very satisfactory position. With regard to household fuel, although there has been a falling off in the demand compared with two or three weeks ago, local merchants are doing a good business for the time of the year, many householders taking the opportunity of getting in stocks for the autumn and winter months. Nearly all classes of house coal are being asked for, and some merchants who have supplies due at the old contract rates are able to sell under the present list prices, but, generally speaking, in most cases the higher rates are being obtained. One indication of the activity which has recently been displayed is the comparative smallness of stocks at the collieries. Prices are practically unchanged, hand-picked brights making 12s. 6d. to 13s. 6d. per ton, good households 11s. to 12s., seconds 10s. to 11s., nuts from 8s. to 9s., cheap kitchens 7s. to 8s. 6d. Steam coal continues in brisk request, a good tonnage being sent away for shipment, whilst orders are coming to hand freely for the home market. Prices are firm, especially for best quality steams, which are making 10s. 9d. to 11s. 3d. per ton and seconds 9s. 6d. to 10s. 6d. Practically all kinds of slack are selling actively, and gascoal is going out of hand satisfactorily.

Leicestershire.

COAL.

The condition of business continues quite bright in this district, and there is but small cause, if any, for complaint. There is a general disposition on the part of buyers to place orders, and as a fact there is already a very fair amount of business placed for future delivery. Also there is a good amount of business on hand for prompt delivery. This is enabling the collieries to make practically a full week. With this there is no very notable accumulation of stock, some collieries are clear. The enquiry is generally distributed over all the various descriptions of coal produced. Household coal is in good demand, the smaller sorts being in better enquiry. There is, perhaps, if anything, a little better demand for steam coals, especially in special slacks for automatic stoking. The ordinary slacks also are wanted. Cobbles show no falling off. Local merchants are doing a fair amount of business, but they are not quite so busy as they have been in the past week or two. There is quite a cheerful aspect in business, and for some weeks a busy time will be the rule judging from present indications. The market fully upholds late prices. Business done for immediate delivery and for future is only at full rates.

South Staffordshire, North Worcestershire and Warwickshire.

Wolverhampton.

COAL.

The continuation of the prevailing heat wave the country over is, of course, a severe throw-back to the activity which previously marked the coal trade on the Cannock Chase coalfield. But there is abundant reason for believing that the slackness will be only temporary, and that things will soon again resume their normal busy condition. For manufacturing coal and slack the demand keeps very good, all the ironworks being fully engaged.

IRON.

The iron trade is this week congratulating itself upon having escaped satisfactorily from the serious trouble which threatened it from the ironworkers. Last month the puddlers gave three months' notice to the Midland Iron and Steel Trades Wages Board to terminate the existing sliding-scale, under which they are now receiving a wage of 9s. 3d. per ton for puddlers and millmen in proportion, and they demanded the fixing of a new minimum of 10s. per ton. The demand for so large an increase, with the additional proviso that 10s. was in future to be the minimum, occasioned a good deal of disaffection amongst the ironmasters, and the situation was the more serious since the Board covers not only Staffordshire, Shropshire and Worcestershire, but also Yorkshire, Lancashire and South Wales. This week, a happy issue out of the serious *impassé* which seemed to be impending for the market has been arrived at. After several previous informal conferences of the ironmasters, a full meeting of the joint masters' and men's board has now been held, and it is officially announced that "an amicable arrangement has been arrived at." The precise terms of the settlement have not at present been made public, but it is known that, amongst other matters, they involve certain amendments of the existing sliding scale agreement designed to give the men some substantial increase in wages at once. At present wages are regulated by an examination of the sales books of 17 different iron firms. Considerable curiosity exists concerning what changes are proposed, but it is stated that these will not be made known until the Yorkshire, Lancashire, and South Wales districts affiliated to the Midland Board have been communicated with. Business at the ironworks is better for the orders placed at last week's quarterly meeting. Marked bars furnish the chief surprise of the market. It had been generally expected that makers would declare an advance of 10s. per ton at the quarterly meeting, making the price £9 10s.; but they decided to make no alteration, and the basis therefore remains at £9, to which it was advanced in April last. There is little doubt but that the position warrants further rise. The usual margin between marked and unmarked bars is about 30s. per ton. The margin immediately after the last advance in marked iron was about 25s., but the present margin is only 15s.; merchant bars having moved up in the meantime. It is stated in some circles that makers have been influenced in their decision not to declare another advance by the fact that the wages question is just now uppermost. It must certainly not be assumed that marked bars will stand at £9 until next quarter-day. Makers of all classes of bars are very busy, and prices are firm. Merchant bars are quoted from £8 2s. 6d. to £8 5s., and there is a fair amount of enquiry on the market. Common sorts for nut and bolt making command up to £7 17s. 6d. Lancashire and North Staffordshire crown bars stand nominally at £8, but few makers will now do business at that price. Much satisfaction has been occasioned by the intelligence that the important Osier Bed Ironworks, Wolverhampton, formerly the property of Messrs. Lysaght Limited, the great sheet iron and galvanised iron making firm, and which have been standing for several years, are to be restarted. The site has been purchased by a new firm, and it is said that 16 puddling furnaces and several bar iron and strip rolling mills are to be laid down. Possibly steel rolling may also by-and-bye be added. It has been a long time since there was better news for the Black Country than this restart. Galvanised sheets continue a little on the weak side, being at from £11 17s. 6d. to £12 5s. This is in spite of a very heavy output. This district is increasingly leaving the foreign trade to the makers on the coast, who are in every way better situated for this work. Yet the mills have no lack of orders on home account, though it is admitted that the price is scarcely profitable. Black sheets are selling at: Singles £7 17s. 6d., doubles £8 2s. 6d. to £8 5s., and trebles £8 12s. 6d. per ton. Hard spelter for the galvanisers is quoted at £21 15s. per ton delivered here at stations. Virgin spelter is selling at £27 10s. delivered in this district. It is rumoured that the German Syndicate have just sold 2,000 tons of this expensive metal to American consumers in one line. There is an increasing outcry for raw material. Pig iron cannot be got in anything like sufficient quantity, and smelters complain of inability to get coke. Some furnaces have been actually temporarily damped down for this cause. Prices are not increasing just now, for the reason that new orders are not being placed in any quantity. Consumers mean to run out their contracts before renewing at present prices; but the signs are evident for a great demand for material shortly. It is only here and there that there is any quotable change in current values. South Staffordshire common forge, though in very brisk request, can be bought at 57s. 6d. Part-mine is 62s. to 63s., best all-mine 90s., and cold-blast 120s. Northamptonshire makers have stiffened their terms up. There is no material to be had at less than 60s., in the ordinary way, but for several good orders sellers are willing to consider 59s. Some makers decline to entertain offers under 62s., and Derbyshire is scarce at 62s. 6d. to 63s. 6d. The congestion in all branches of the manufactured steel trade continues. Some of the principal North-country houses decline business, being booked up in some departments for six or nine months. Values are hard all round, and special deliveries can only be obtained on conceding an advance on the association terms. The regular quotations for billets and bars are £6 and £6 2s. 6d. Some buyers who are in a position to place very valuable contracts are getting supplies at £5 17s. 6d., but these instances are exceptional. Raw steel bars are very scarce, largely owing to the small consignments coming from abroad. The Welsh mills are full of work, with prices firm, at about 1s. a ton above the quotation of three months ago. Makers, accordingly, are not wanting further business from this district. In hardly any case can makers accept the tonnage offered. Where they are willing to take orders and to guarantee delivery, prices are a secondary consideration, and substantial increases are in many cases obtained. German steel prices offered on the market are £5 5s. per ton, and billets £5. Rolled steel of native manufacture is quoted £7 10s. to £7 12s. 6d. for angles and £7 to £7 5s. for joists, the latter quotation being 5s. per ton in excess of the association basis.

Hednesford.

COAL.

There is a slight falling off noticeable this week in the condition of the coal trade of the Cannock Chase district, due in some measure to the warm weather experienced, but there will probably be an early recovery, as a brisk autumnal trade is generally expected. There is not likely to be any falling off in prices. The collieries are working much more regularly than is usual at this time of the year, some of them doing practically full time. For all descriptions of works fuel there is a satisfactory demand, but the sale of house coal is quieter this week. The sale of slack keeps up very well. There is not very much doing at the landsale depots.

Birmingham

COAL.

Sales of house coal have received a check by reason of the visitation of tropical weather, but in the manufacturing branches there is no falling off to be recorded in the demand. Some pits manage to keep going full time, others four and five days a week, which is well above the average for the time of the year. Slacks are a shade more plentiful at the moment, owing to the usual lull in the demand at the end of June, when stocktaking is in progress. Prices are quite firm at from 6s. 6d. to 9s. 6d. according to quality.

IRON.

Enquiries showed that the quarterly meeting had yielded a large volume of business, and in many cases it would have been heavier but for the inability of producers to book for delivery in reasonable time. The settlement of the wages question has given immense satisfaction. A large area was affected by the recent demand of the men for an increase of 9d. per ton in puddlers' wages, because the Midland Wages Board covers not only Staffordshire, Shropshire and Worcestershire, but employers in Lancashire, Yorkshire and South Wales are also affiliated. The agreement come to is that puddlers are to get a bonus of 6d. per ton, and that the hours of work for puddling furnaces are to be considered 11 for six heats and 9½ hours for Saturdays. Of course the notice given by the men to terminate the sliding-scale will be withdrawn. The new arrangement will cease to operate in August. Notification of the advance will probably in due course affect prices. Makers of standard bars, while unwilling at the moment to do anything to encourage speculative and irregular advances in pig iron — which is already sufficiently high—are covering themselves by stipulating for forward sales at the price current at time of delivery. Meanwhile, they hold a larger amount of business than for a number of years. Heavy sales of good second-class bars are recorded at £8 2s. 6d. to £8 5s. delivered, high prices which makers justify on the ground of dear pigs, the brands used having gone up about 2s. 6d. during the past few weeks, and the cost of fuel. Common bar iron commands £7 17s. 6d. and £8 per ton for reasonable quick delivery, Continental material being in small quantity and in arrear. For good orders of gas strip makers are getting £8 a ton. Demi-products are dear in proportion to the selling prices of sheets and hoops. Largets and billets of Bessemer qualities range from £6 to £6 5s., and in urgent cases 2s. 6d. more has been paid. Fine steel strip is consequently dearer, the latest quotation being £8 10s. a ton; stronger gauges are 2s. 9d. to 5s. below that figure according to the nature of order. Makers of galvanised sheets complain that present prices, which vary from £12 2s. 6d. to £12 7s. 6d., are unprofitable. Blacksheets for galvanising are £8 2s. 6d. to £8 5s. at makers' works. Prices of pig iron show no weakening, and makers are unable to meet all the requirements of consumers. The demand for boilers, tanks, roofing, colliery plant, &c., continues good, and makers in many cases are complaining of inadequate and irregular supplies of material. The high-class chain and anchor works in the Cradley district have sufficient on hand to keep them going full time up the middle of next quarter.

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Forest of Dean.

Lydney.

COAL.

The past week has provided nothing that is new to report in connection with either the house or steam coal trade. All the pits continue on short time—about three days in the week—and reports from all the collieries in the district agree as to the dulness at present prevailing. The great heat of the last few days will not help matters in the house coal department. Rail orders are still scarce, whilst shipments are very quiet. Quotations continue at block 15s. 6d., rubble 14s. 9d., nuts 13s., and rough slack 7s. 6d. at pit; these are the lowest summer prices. Steams are unchanged in price, and all the pits are making full time.

THE WELSH COAL AND IRON TRADES.

THURSDAY, JULY 18.

North Wales.

Ruabon.

COAL.

Generally speaking, the tone of the coal trade of this district during the past week has been fairly firm, and most of the collieries have been able to work full time throughout the week. With reference to the various classes of coal, the sales of household coal have been better, as merchants have been availing themselves of the summer prices to buy up spot lots, which they have been able to get at a fairly low price, owing to an accumulation during the past week or two in the various colliery sidings of this kind of fuel. The merchants, too, are now thinking of making their contracts, and several have fixed up for the coming year's supplies at 2s. advance. In regard to gas coal, these contracts are now being settled quickly. Gas companies, like the coal merchants, have been hanging back in the hopes that the advanced figures first quoted might possibly come to be reduced, but as the colliery companies have stood firm for the 2s. to 2s. 6d. advance they are now having to close; and in view of the actual operation of the three recent Acts of Parliament—the Minimum Wage, Coal Mines Regulation, and Insurance Acts—coming all together, each adding considerably to the cost of working of every colliery, they fear that if they do not close quickly they may have the present quotations withdrawn and higher ones substituted. The effect of the minimum wage is such that at one colliery, near Mold, it has been officially announced that if the minimum as applying to that colliery is not reduced there is no alternative but to close down, which would have a serious effect on that locality. Steam coal continues in good demand, and some of the largest contracts for this coal have now been settled at considerably higher prices than last year's contracts. Outside of contracts, ruling figures are at present as follow:—Best house coal 15s. to 16s. per ton, seconds 1s. per ton less, steam coal 12s. 6d. to 13s. 6d. per ton, and gas coal about the same figure; nuts 11s., slack up to 7s. 6d., and gas coke remains unchanged at from 15s. to £1 in different towns.

◆

Monmouthshire, South Wales, &c.

Newport.

COAL

The position in the local steam coal trade is still one of difficulty for colliery proprietors, the lack of sufficient suitable tonnage for loading still dominating the position. Arrivals for the last day or two have been disappointing, and until sufficient steamers come along to clear away a considerable portion of accumulated stocks it is unlikely that any improvement will be found. Quotations nominally show little alteration, and for forward delivery sellers continue to show a bold front, but for immediate shipment easier terms can be arranged without difficulty, as many collieries are hard put to for the want of empty wagons, and numerous stoppages have been reported. In the freight market there is a good enquiry for outward tonnage, rates quoted being higher, but a deficiency of handy steamers still exists. With a reduced output at so many collieries, values of small coals improve as the supply becomes less. Through coals, nuts, and house varieties show no alteration in quotations. Patent fuel likewise remains a steady trade, while pitwood, on account of a shortage of supplies, is quoted several shillings higher. Latest approximate ruling quotations may be taken as follow, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 3d. to 15s. 9d.; western-valleys, ordinaries, 14s. 6d. to 14s. 9d.; eastern-valleys, best, 14s. to 14s. 3d.; other sorts, 13s. 6d. to 13s. 9d.; colliery smalls, best, 9s. 3d. to 9s. 6d.; seconds, 8s. 6d. to 9s.; inferiors, 8s. to 8s. 3d.; screenings, 9s. 6d. to 9s. 9d.; through coals, 10s. 3d. to 10s. 9d.; nuts, best washed, 11s. to 11s. 3d.; house coals, best, 18s. to 18s. 6d.; seconds, 16s. 6d. to 17s. 6d.; patent fuel, 18s. to 18s. 6d. Pitwood: Best French fir, 27s. to 27s. 6d. ex-ship.

IRON.

The strong tone recently reported at the local iron and steel works is being well maintained, and from all branches good reports continue to come to hand. All departments are well employed, values are maintained—and, indeed, trend upwards. Continued activity is taking place at tin-plate bar and sheet bar mills, and, with plenty of work in hand, makers are quoting firm on the basis of £5 12s. 6d. to £5 15s. Bessemer and £5 15s. to £5 17s. 6d. Siemens for Welsh bars, while higher figures are being secured for prompt delivery. At the rail mills specifications are freely coming to hand, and last week's prices of £6 7s. 6d. to £6 10s. for heavy sections are easily maintained. A strong tone is apparent at the blastfurnaces, where prices have again increased, the official quotation for Welsh hæmatite to-day being 79s. to 80s. delivered to works in the district. The tin-plate market remains steady. Works being well booked for some time ahead are not anxious for further commitments, except at their own ideas of prices. Officially values remain unchanged, and are based upon the following:—Bessemer primes, 14 × 20, 14s. 9d. to 14s. 10½d.; Siemens ditto, 14s. 10½d. to 15s.; finished blackplate, £11 10s. per ton.

Cardiff.

COAL.

The coal market this week has been characterised by a considerable amount of lethargy. It was expected that the heavy chartering on Admiralty account, and the continued firmness of freights, would have brought more tonnage to the port, but these hopes were disappointed. Arrivals over the week end were much fewer than was anticipated, though they did not arise so much from any dilatoriness on the part of shipowners as from the dense fog which had prevailed in the Channel. Fog horns have been constantly hooting, and the movements of vessels greatly impeded. Most of the collieries are pretty well stemmed, but whilst some had ready tonnage available, others have experienced the utmost difficulty in carrying out their loading arrangements. Naturally this state of things has affected prices, which for best steam large have ranged from 17s. to 17s. 6d., according to the position of each individual colliery. Second Admiralties have ruled from 16s. 3d. to 16s. 6d., ordinary qualities from 15s. 6d. to 16s. Considerable optimism, however, prevails with regard to the future. Chartering transactions for the week were very heavy, the tonnage taken up amounting to 417,330 tons. Although, as compared with the previous six days, this represented a decline of over 66,000 tons, it is deemed very satisfactory, and is looked upon as an indication that buyers are preparing to take a considerable quantity of coal ere the August holidays commence. This optimism is further reflected in the higher prices asked by the best collieries, some of whom are indisposed to accept less than 17s. 9d. for loading in the last week of August, whilst for shipment after the holidays they are firmly demanding 18s. per ton. Proportionate advances are also asked by sellers of second-class Admiralties. Unfortunately, stocks of coal are just now very heavy. Last week it was expected there would have been a full average shipment of 400,000 tons, but as a matter of fact, it was nearly 100,000 tons below this quantity. There is no doubt that the continuance of high freights has no little to do with the present apathetic state of the market. Though it is difficult to see what relief can be expected for some time to come, buyers are placing their orders as sparingly as possible. This appplies more particularly to foreign depot owners. Some of the large home contractors appear to take a juster view of the situation and are showing some eagerness to cover, if not all, at least a considerable portion of their requirements. The Midland and Great Western Railway of Ireland, for instance, have come into the market for 210,000 tons of Welsh, Scotch and English coals for delivery over next year. Users of small coal, too, are evidently of opinion that nothing is to be gained by longer deferring their arrangements for supplies. Although no definite information is yet obtainable regarding the allotment of the French State Railways contract for large and small coal, there appears to be little doubt that a very considerable portion of the contract has been placed with Welsh collieries. Messrs. Pyman, Watson and Co. are stated to have received 44,000 tons, Messrs. Morgan, Wakley and Co. 24,000 tons, and Messrs. Moxey, Savon and Co. 10,000 tons. The prices for large coal are said to rule from 25·30 fr. to 25·90 fr., and for small from 17·70 fr. to 18 fr. Current values of small coal, owing to the scarcity of tonnage, are just now rather weak, bunkerings not realising more than from 10s. to 10s. 3d., best ordinaries 9s. 6d. to 9s. 9d., and cargo qualities 8s. 9d. to 9s. per ton. Best washed nuts are 14s. 6d., and washed peas 12s. 6d. per ton. Inferior peas are 11s 6d. There is not much change in Monmouthshire coals, Black Vein qualities are 15s. 3d. to 15s. 6d., western-valleys 14s. 9d. to 15s., best eastern-valleys 14s. 6d. and seconds 14s. to 14s. 3d., in each case f.o.b. Cardiff. According to the statistical tables issued by the Customs authorities, the exports of Welsh coal to foreign countries for the half year ending June 30 are much below those for the same period last year. The total for the last six months is 10,654,268 tons, and for January to June of last year 12,599,199 tons, or a decrease of 1,944,931 tons. The trade, however, seems to be slowly recovering. For June alone the exports from the Bristol Channel were 2 047,130 tons, an increase of 171,362 tons as compared with the corresponding month of last year. The whole of this increase may really be placed to the credit of Cardiff, for from that port alone the shipments amounted to 1,340,011 tons, or 172,623 tons in excess of the shipments for the same month last year. The only other port in the Channel which showed an increase was Swansea, whence were shipped 228,077 tons, or 19,068 tons increase. Newport, though it exported 329,176 tons, showed a decrease of 4,524 tons, whilst Port Talbot, with a shipment of 133,597 tons, exhibited a decrease of 14,234 tons. The demand for bituminous coals is very slow, but as supplies are short sellers have but little difficulty in maintaining prices. No. 3 Rhondda range is 17s. 4½d. to 17s. 6d., through-and-through 14s. 6d., and small 12s.; No 2 large 12s. to 12s. 3d., through-and-through 10s. 6d. to 10s. 9d., and small 8s. 6d. to 9s. Shipments of patent fuel for the week amounted to nearly 30,000 tons, the Crown and other local makers shipping 9,240 tons and Swansea 20,736 tons. Crown brands are still quoted at 19s. for shipment both this and next month. The coke manufacturers are very busy, and prices continue firm. North's special foundry is 27s. to 28s., ordinary foundry 25s. Furnace coke is 20s. Pitwood is scarce, and prices have gone up to 25s. per ton.

IRON.

Although the clearance of tin-plates last week amounted to 144,144 boxes, stocks still remain at over the half million. There is considerable congestion of traffic at the Swansea docks, and several of the railway companies have issued notices to the works that unless tin-plates are consigned for shipment by steamers actually in the dock they cannot convey tin-plate goods. A fair amount of business is doing in plates and prices are a little firmer. Some buyers complain of difficulty in obtaining delivery against specification, particularly of odd sizes. American competition is less severe, and not a few makers have now sufficient orders on their books to keep them occupied until the beginning of next year. Bessemer 14 × 20 cokes are 14s. 7½d., oil sizes 14s. 10½d. and 21s. 3d. There have been very heavy importations of foreign steel bars, but it has been mostly under old contracts. Including blooms and billets the total for the week is stated at something like 12,000 tons. Local steelworks, however, continue to be well employed, and prices are very firm, Siemens steel bars being £5 15s. to £5 17s. 6d., and Bessemer £5 12s. 9d. to £5 15s. per ton. In galvanised sheets there is practically no change. The demand is sluggish, and prices show a tendency in buyers' favour, most makers offering 24-gauge corrugateds at £11 17s. 6d. There is a much better enquiry for rails, and heavy sections are firmly quoted at £6 7s. 6d. to £6 10s., and light sections at £6 10s. to £6 15s. All the furnaces are in full blast, and Welsh pig iron has gone up to 77s. f.o.t. Best rubio iron ore is 21s., second qualities 19s. 6d. Scrap metals are firmer, now steel crop ends being 62s. to 62s. 6d., heavy wrought 50s. to 52s. 6d., heavy steel 55s. to 57s. 6d., cast 52s. 6d. to 55s., and double-headed iron and steel rails 65s. to 67s. 6d.

Swansea.

COAL

Last week the trade of the port was again very satisfactory. Briskness characterised the coal and patent fuel trades, the shipments together amounting to 110,404 tons. There was an average attendance on 'Change this morning and there was no material alteration to report in the general condition of the anthracite coal market, the undertone remaining from steady to firm. Swansea Valley large was in good request, but Red Vein large was weak. Machine-made nuts and cobbles were fully up to last week's level, and both beans and peas were very firm. Rubbly culm was barely holding its own, but duff continued in good demand. In the steam coal market there is a falling-off in the demand for large, but smalls are a shade firmer. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 16s. to 18s., less 2½ per cent.; Red Vein large, 12s. to 13s. 6d., less 2½ per cent.; machine-made cobbles, 22s. to 24s.; Paris, French, and German nuts, 23s. to 25s.; beans, 22s. to 23s. 6d.; machine-made large peas, 14s. 3d. to 15s.; ditto fine peas, 13s. 6d. to 14s. 3d., all net; rubbly culm, 7s. 3d. to 7s. 9d., less 2½ per cent.; duff, 4s. 6d. to 5s., net. Steam: Best large, 18s. 6d. to 18s. 9d.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s. 6d. to 11s. 6d.; small, 9s. 6d. to 10s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 18s. to 19s.; through-and-through, 15s. to 16s. 6d.; small, 10s. 6d. to 11s. 6d. Patent fuel, 16s. 6d. to 17s. 6d., less 2½ per cent Coal quotations are all f.o.b. cash in 30 days.

IRON.

The iron and steel trades were brisk during the past week. The blastfurnace yielded an average output of pig iron, and a large proportion of metal was conveyed directly to the steel-smelting furnaces adjacent. Satisfactory returns were made at all the steelworks. Continued activity in all branches was observable in the tinplate industry. Operations, after a week's stoppage for stocktaking, were resumed at the Mannesmann Tube Works. Briskness characterised the condition of things at all the engineering works in the district, and also the foundries. The shipments of tinplates last week were 144 boxes, receipts from works 140,480 boxes, and stocks in the dock warehouses and vans 518,342 boxes.

Llanelly.

COAL.

The coal market of the district is in a fair condition, and there is room for improvement. The great difficulty is still the shortage of tonnage. There is a tremendous quantity of coal lying in stock—not so much for want of orders, but cargoes waiting shipment. Pits are being considerably inconvenienced for want of empties, and some have been idle two or three days. Unfortunately there is no great improvement expected for the present. As a rule this time of the year is quiet; so many people are on holidays, and the works are now easing down deliveries owing to the stop week at the beginning of August. There is a very good demand for the smaller machine-made anthracite kinds, and prices are firm. Culm and duff are enjoying an unusual demand, and prices have never been so high as they are at present. This week's quotations are:—Best malting large, 21s. to 23s.; second malting large, 20s. to 22s.; Big Vein large, 16s. to 18s.; Red Vein large, 13s. to 14s.; machine-made large cobbles, 21s. to 23s.; German nuts, 22s. to 23s.; French nuts, 22s. to 24s.; Paris nuts, 22s. to 24s.; machine-made large beans, 22s. to 24s.; ditto second quality, 20s. to 22s.; machine-made peas, 14s. to 15s.; rubbly culm, 8s. 3d. to 8s. 9d.; duff, 5s. to 5s. 6d.; large steam, 13s. to 14s.; through-and-through, 10s. 6d. to 11s.; small steam, 8s. 6d. to 9s. 6d.; bituminous small, 10s. 6d. to 11s.—all f.o.b.

THE BY-PRODUCTS TRADE.

Tar products.—The market generally is steady. Benzols and pitch are both quieter, but on the other hand creosote is very firm, and crude carbolic is dearer; crystals unchanged. Naphthas steady. Toluol about the same as last reported. Nearest values are:—

Benzols, 90's, 11½d.; ditto 50's, 10½d.; toluol, 10½d.; carbolic acid, crude (60 per cent.), 2s. 6d. to 2s. 7d.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 10½d., as in quality and package; crude ditto, 4½d. in bulk; creosote, 3d. for ordinary qualities; pitch, 52s. 6d. to 53s. f.o.b. east coast; ditto, 51s. 6d. to 52s. 6d. f.a.s. west coast; ditto, 55s. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—Business is very quiet, and prices for the most part are nominal. For forward delivery there is a good enquiry and prices rule steady at substantial advances on the prompt prices of the moment, the nearest figures for which are:—

London (ordinary makes), £13 8s. 9d.; Beckton, £14; Liverpool, £14 9s. 3d. to £14 7s. 6d.; Hull, £14 5s.; Scotch ports, £14 7s. 6d.; nitrate of soda (ordinary), 11s. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

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THE UNIVERSITY OF SHEFFIELD.
MINING DEPARTMENT.

The Matriculation Examination for the Degree in Mining will be held on September 10th, 1912. For information apply to the Registrar before August 24th.

The MINING DIPLOMA (Day) COURSE commences on October 2nd, 1912.

The CERTIFICATE (Saturday afternoon) COURSE commences on September 21st, the Derby Mining Course on September 21st, and the Mining Teachers' Course on September 28th.

The COURSES in Electricity applied to Mining commence on September 28th.

For particulars, apply to **W. M. GIBBONS**, Registrar.

UNIVERSITY OF BIRMINGHAM.
SCHOOL OF MINING.

Professor ...	JOHN CADMAN, M.Sc., D.Sc. (Lond.), F.G.S.
Demonstrator in Coal Mining and Lecturer in Surveying	ALEXANDER CLUBE, B.Sc.
Demonstrator in Metal Mining & Lecturer in Economic Mineralogy	J. L. JEFFERY, A.R.S.M.
Lecturer in Mine Rescue Work	PERCY ORMAND, M.I.M.E.

THE SESSION COMMENCES ON OCTOBER 1st, 1912.

The School of Mining meets the requirements of those who intend to become Practising and Consultative Mining Engineers, Colliery Managers, Managers of Metal Mines, Teachers of Mining, Mine Surveyors, Land and Estate Agents, Land Owners, Owners of Collieries, and those generally interested in Mines and Quarries.

The Degree Course includes instruction in Mathematics, Physics, Chemistry, Geology and Mineralogy, Mechanical Engineering, Electrical Engineering, Civil Engineering, Mining (Coal, Metal, Surveying), and Metallurgy and Assaying.

In connection with the Mining Classes there will be frequent visits of inspection to mines in the neighbourhood of Birmingham, and a SUMMER MINING SCHOOL will also be held in the long vacation in some mining district either at home or abroad.

The Mining Courses are so arranged as to provide for
Degree Course—3 years.
Diploma in Coal or Metal Mining—2 years.
Occasional Mining Students—a complete course in 1 year.

Full particulars may be obtained from the **SECRETARY** of the **UNIVERSITY**.

Tenders are invited by the Athlone Urban District Council for 1,000 tons of GAS COAL delivered into the Council's Stores in good and dry condition as required over the ensuing twelve months. Analysis should accompany the tender.

Tenders must be placed in sealed envelopes marked "Tenders for Coal," and must be sent by registered post so as to reach the undersigned not later than 6 o'clock p.m. on Wednesday, the 31st July, 1912.

The lowest or any tender not necessarily accepted.

Town Hall,
Athlone.
By order,
P. V. C. MURTAGH,
Clerk.

Tenders Wanted for Sinking a Shaft in North Staffordshire.—Specification sent on application to **Box 4853**, *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

COUNTY BOROUGH OF BLACKBURN.
ELECTRICITY DEPARTMENT.

The Electricity Committee is prepared to receive TENDERS for the supply and delivery of STEAM COAL for the twelve months ending August 31st, 1913.

Specifications and forms of tender may be obtained on application at the Electricity Works, Jubilee-street, on and after Saturday, July 20th, 1912.

Sealed tenders endorsed "Steam Coal," and addressed to the Chairman of the Electricity Committee, will be received at the Town Hall up to midday Saturday, August 3rd, 1912.

The lowest or any tender will not necessarily be accepted.

Corporation Electricity Works,
Jubilee street,
16th July, 1912.
P. P. WHEELWRIGHT,
M.I.E.E.,
Engineer and Manager.

The Manchester and Salford Equitable Co-operative Society Ltd. invite TENDERS for the supply of HOUSE COALS as follows, during a period of 12 months commencing 1st August, 1912.

BEST COALS	4,000 tons.	SECONDS COALS	12,000 tons.
,, COBBLES	2,000 ,,	,, COBBLES	4,000 ,,
,, NUTS	2,000 ,,	,, NUTS	1,000 ,,

to be delivered to order at the various depots of the Society.

Tenders giving full particulars to be endorsed "Coal," and delivered at the Registered Office of the Society, Downing-street, Manchester, not later than Wednesday, 24th July, 1912.

FOR SALE BY TENDER
1 "Zoelly" Turbo Alternator, 850-kw., 3-phase, 640 volt 930 amp. 25 periods 1,500 r.p.m., built by Mather & Platt Ltd., Manchester, working at a steam pressure of 150 lb. per sq. inch.

The set may be seen running, by appointment, any week day after 3 o'clock p.m., at Risca Collieries, near Newport, Mon.

Tenders to be addressed to the **UNITED NATIONAL COLLIERIES LTD.**, Exchange, Cardiff, on or before the 31st instant.

TUBES & FITTINGS, IRON AND STEEL.
Tubes for Gas, Water, Steam, and Compressed Air.
Electric Tramway Poles, Pit Props, High Pressure Steam Mains, &c.
JOHN SPENCER LTD., Globe Tube Works, Wednesbury.

J. W. BAIRD AND COMPANY
PITWOOD IMPORTERS,
WEST HARTLEPOOL,
YEARLY CONTRACTS ENTERED INTO WITH COLLIERIES.

OSBECK & COMPANY LIMITED,
PIT-TIMBER MERCHANTS,
NEWCASTLE-ON-TYNE.
SUPPLY ALL KINDS OF COLLIERY TIMBER.
Telegrams—"Osbecks, Newcastle-on-Tyne."

*** *For other Miscellaneous Advertisements see Last White Page.*

Forthcoming Annual Meetings.

Institution of Mining Engineers—
Provincial Meeting (Birmingham) September 11, 12 & 13, 1912
North of England Institute of Mining and Mechanical Engineers ... August 3, 1912
Midland Counties Institution of Engineers Sept. 1912
Manchester Geological and Mining Society, Oct. 8, 1912
North Staffordshire Institute of Mining and Mechanical Engineers ... October 14, 1912
South Staffordshire and Warwickshire Institute of Mining Engineers ... October 1912 (2nd week)
Iron and Steel Institute—
Autumn Meeting ... September 1912
Association of Mining Electrical Engineers—
October 4 & 5, 1912 (Provis.)

The Colliery Guardian.

LONDON, FRIDAY, JULY 19, 1912.

On Monday Mr. Asquith received a deputation from the Miners' Federation of Great Britain in regard to certain points that have arisen under the Minimum Wage Act. Mr. Asquith said that although the men had not in every case got the 5s. minimum, still they had 4s. 6d. or 4s. 9d. That was a slight margin of difference that might be remedied by representation. The case put before him was hardly sufficient to justify Parliament in ripping up the Act and amending it at this stage. The Act had worked very well.

The executive of the Federation met on the following day to consider the reply of the Prime Minister, and it was decided to call a special conference, to be held in London on Tuesday, August 13, to consider and determine the policy to be followed by the Federation. The committee also decided to hold the annual conference of the Federation in Swansea on Tuesday, October 1, and following days. A sub-committee was appointed to prepare the miners' case for nationalisation of the mines, to arrange for meetings, and to draft a Bill.

Further consideration was given by the executive council of the South Wales Miners' Federation on Monday at Cardiff to the scheme prepared for the reorganisation of the Federation. The scheme was completed and will be submitted to a general conference. The main proposals for the scheme provide for the abolition of the present districts and their substitution by a central government system.

It is understood that another attempt will shortly be made to establish a mining college for South Wales in connection with the University College at Cardiff, and that Lord Merthyr, as president of the latter institution, will be actively associated with the movement.

The *Board of Trade Labour Gazette* publishes an article dealing with the first results of the enquiry into profit-sharing and co-partnership now being made by the Labour Department. It describes briefly the systems adopted in the first hundred schemes at present in operation, of which the investigation has been completed.

A meeting of the Coal Conciliation Board of the federated mining districts in England and North Wales was held at the Westminster Palace Hotel, London, on Wednesday afternoon, to consider an application from the miners' section for a 5 per cent. advance in the existing rate of wage. A resolution of condolence with the family of the late Mr. Enoch Edwards, M.P., was passed, and Mr. W. E. Harvey, M.P., was unanimously elected to the vacant office of vice-chairman of the Board. After discussion the meeting was adjourned until Thursday, August 1, at one o'clock.

A general meeting of the Monmouthshire and South Wales Coalowners' Association was held at Cardiff on Monday. It was decided to convene an early meeting of the Joint District Board for the consideration of certain matters arising under Lord St. Aldwyn's award. A communication was received from Mr. W. Gascoyne Dalziel, the secretary of the association, giving notice of the resignation of his appointment. Mr. Dalziel was asked to reconsider his decision, which he promised to do.

In the debate on the Home Office vote on Wednesday, Sir Arthur Markham appealed to the Home Office to give special consideration to the claims of the families of the inspectors who have lost their lives at Cadeby Main Colliery, and Mr. Ellis Griffiths gave the House to understand that the Government would do what was possible in the matter.

The name of Mr. Charles Bury, the manager of the Cadeby Colliery, has been added to the list of those killed in last week's disaster. The stoppages in the pit have been examined, and work has now been resumed in certain parts of the underground workings.

The meetings of the International Miners' Congress at Amsterdam were concluded on Friday.

The enquiry was concluded on Wednesday in regard to the deaths of three miners at the Barnsley Main Colliery on July 6, following an explosion. The manager expressed the opinion that the explosion was due to ignition of fire-damp by sparking, but this view was discarded by the jury, who accepted the opinion of the inspector that shotfiring was responsible.

It is stated that a Royal Commission, of which Admiral of the Fleet Lord Fisher is to be the chairman, will be appointed very shortly to investigate the subject of fuel for the Navy and other matters connected with warship propulsion. It is likely that the terms of reference to the Commission will be very wide.

The Half-Year's Coal Trade.

It may be fervently hoped that all the episodes of 1912 have been crowded into the first half-of the year, for it is doubtful if the coalmining industry can support any further adventures without a longer term for recuperation than is afforded by the closing months of the year.

January opened with apprehension, which was increased in February and justified in March. It is unnecessary to allude in detail here to the events of that and the following month, except as regards their bearing upon trade. A general strike of coalminers—a contingency long predestined—has come and gone, and all that can be said is that the community during its progress developed unexpected resources of endurance that must make the miners pause before they venture upon another conflict of similar dimensions. During the past few years the altered position of the house coal trade has become increasingly evident, but the considerations of economy and adaptability that have induced consumers to supplant the open grate by the gas fire were small matters compared with the added power of resistance derived from the secondary processes of heating, lighting and power during the time that the pits were closed. Those who were dependent upon gas undertakings and electric supply companies, with their greater capacity for storage, both in respect of raw material and energy, fared infinitely better than those who, of their own volition or by force of circumstances, were deprived of these facilities. Thus it happened that consumers in London never suffered from the stringency that prevailed on the Tyne and other coal-producing districts, and it is significant that the industries dependent more largely than others upon coal for heating purposes, such as the iron-smelting and pottery trades, were those in which the coal strike created the greatest amount of unemployment. The moral undoubtedly is that the collective production of the agents of heat and power has advantages altogether independent of economy.

What the ultimate effect may be on the coal trade it is difficult to say. It must tend to throw into the background some of the higher-priced grades of coal; but at the same time it will undoubtedly operate in the direction of making openings for large quantities of fuel that in the past have been a drug on the market, and inducing collieries, by the adoption of skilful methods of preparation, to increase the intrinsic value of their product. It need scarcely be said that the coal strike has only hastened an inevitable evolution, and that the gain to the community must be considerable from an abstract point of view.

Exports of Coal, Coke and Manufactured Fuel According to Description.

First six months.

	1912.			1911.		
	Quantity.	Average value per ton.		Quantity.	Average value per ton.	
Coal:—	Tons.	s.	d.	Tons.	s.	d.
Anthracite	974,193	15	10·7	1,169,675	14	10·5
Steam	18,720,167	12	11·1	22,985,294	11	7·1
Gas	4,487,837	10	5·8	5,074,073	9	8·8
Household	640,455	11	10·2	713,568	10	6 3
Other sorts	1,350,671	10	8·5	1,551,349	9	6·7
Total and average	26,173,323	12	5·7	31,493,959	11	3 5
Large	14,637,577	14	4 3	18,033,664	12	10·3
Thro'-and-thro'	5,636,455	10	6·2	6 397,378	9	7·3
Small	5,899,291	9	8·4	7,062,917	8	9 7
Coke	388,108	15	6·5	462,550	15	2·4
Manufactured fuel	635,283	15	4·7	851,867	13	9·0
Total fuel exported and average	27,196,714	12	8·7	32,808,385	11	4·9
Coal shipped in bunkers	8,125,897	—		9,558,647	—	

Exports of Coal, Coke and Patent Fuel, by Months.

	1912.			1911.		
	Quantity.	Average value.		Quantity.	Average value.	
	Tons.	s.	d.	Tons.	s.	d.
January	5,683,978	12	0·4	5,222,941	11	7·1
February	5,784,404	12	6·01	5 074,460	11	7·6
March	1,655,145	13	8 2	5,580,863	11	4·9
First quarter	**13,123,527**	**12**	**8 4**	**15,878,269**	**11**	**6·5**
April	1,527,508	13	1·9	5,030,570	11	3·6
May	6,629,247	13	1·4	6,456,771	11	4·3
June	5,916,432	12	2·1	5,442,775	11	2·3
Second quarter	**14,073,187**	**12**	**8·7**	**18 930.116**	**11**	**3·8**
First six months	**27,196,714**	**12**	**7·1**	**32,808,385**	**11**	**4·9**

Exports of Coal According to District.

First six months.

	1912. Tons.	1911. Tons.	1910. Tons.
Bristol Channel ports	10,654,268	12,590,190	12,681,116
North-western ports	259,300	326 586	304,915
North-eastern ports	8,781 526	10,594,696	8,610 597
Humber ports	2,320,738	2,951,397	3,087,806
Other east coast ports	118,554	146,418	158,617
Other English ports	47	126	46
East Scotland ports	3,256,087	3,832,419	3,946,201
West Scotland ports	752,803	1,043,118	978,187
Irish ports	—	—	1,922

Whether the coal trade will reap its fair measure of reward is more doubtful. The table of prices which we give on this page gives little clue to the high rates that prevailed during the strike period, but the export averages, which are considerably lower than the prices of £3 per ton which were obtained for rubbish in April, more nearly represent the actual increase, for the quantity of fuel sold at "fabulous" prices is always small and numbers of collieries failed to realise any additional profit that could compensate them for the decline in the volume of sales, to say nothing of the extra cost of working under the Minimum Wage Act.

Nevertheless, the condition of the country's industries is not unsatisfactory at the moment. A boom in trade had set in when the *fiat* of the Miners' Federation went forth, and it is fortunate that, with some exceptions, the staple trades of the country have been able to take up the threads very near the point at which they were dropped. This has helped the coal trade in no small measure. With the burdens of the Coal Mines Act, the Eight Hours Act, and the Minimum Wage Act, upon it, and with more than its share of the National Insurance Act and the Workmen's Compensation Act in addition, the industry has reached the definite stage at which it must call upon the consumer to pay more for his coal. Present indications are that the manufacturer, the gas company, and the householder are somewhat less repellent on this point than in former years, and in the contracts now being

Prices.

Description of fuel.	Per ton. July 1, 1911.	Per ton. January 1, 1912.	Per ton. July 1, 1912.
Best Northumbrian steam coals f.o.b. Tyne...	10s. 6d.	11s. 9d. to 12s.	12s. 3d.
" " steam smalls " ...	5s. 3d.	5s. 9d.	7s. 6d.
Best Durham gas coals " ...	10s. to 10s. 3d.	12s. 6d.	13s.
Durham coking coals " ...	9s. to 9s. 6d.	11s. 6d. to 12s.	10s. 3d. to 10s. 9d.
Best Durham blast-furnace coke del. Tees-side	14s. to 14s. 6d.	16s.	18s. 6d.
Durham bunkers f.o.b. Tyne	9s. to 10s.	11s. 6d. to 12s. 9d.	10s. 6d. to 11s.
Foundry coke f.o.b. Tyne ...	16s. to 16s. 6d.	16s. 6d. to 17s. 6d.	21s. 6d.
Best Lancashire house coals at pit	14s. to 14s. 6d.	15s. 6d.	16s. to 16s. 6d.
" " slacks "	8s.	8s. 6d.	9s. to 9s. 9d.
Best Yorkshire Silkstone "	11s. 6d.	13s. 6d.	13s. 6d.
Barnsley thick-seam house "	11s. to 11s. 6d.	12s. 6d.	12s. 6d.
Best Haigh Moor "	12s.	14s.	14s.
Yorkshire steam coals "	8s. 6d. to 8s. 9d.	10s. 3d.	10s. to 10s. 3d.
Best Derbyshire house coals "	11s.	11s. 6d.	13s. 6d.
Large " nuts "	7s. 6d.	8s. 6d.	10s.
Best Staffordshire house coals	14s.	15s. 6d.	16s. 6d.
" Welsh steam coals f.o.b. Cardiff...	18s. 6d.	17s. 6d.	17s. 6d.
" Welsh small steam coals " " ...	10s. 9d. to 11s.	9s. to 9s. 3d.	11s.
" Semi-bituminous " " ...	16s.	16s.	15s. 6d.
No. 3 Rhondda, large " " ...	17s. 6d.	17s. to 17s. 6d.	17s. 6d.
No. 2 " " " " ...	12s. 6d. to 13s.	13s. 6d. to 13s. 9d.	12s.
Patent fuel " " ...	17s. 6d.	17s. 6d.	19s.
Best Welsh malting anthracite f.o.b. Swansea	21s. to 23s.	21s. to 23s.	23s. to 25s.
Special foundry coke, Cardiff	25s.	24s. to 25s.	27s.
Scotch ell coals f.o.b. Glasgow	8s. 9d. to 9s. 3d.	11s. 6d. to 12s.	11s. 3d. to 11s. 6d.
" steam " "	9s. 6d.	10s. 6d. to 11s.	11s. to 11s. 6d.
" splint " "	9s. 9d.	12s. to 12s. 6d.	11s. 3d. to 11s. 9d.
Fife steam coals, f.o.b. Methil	9s. to 9s. 6d.	9s. 6d. to 10s. 9d.	10s. 6d. to 12s. 6d.
Fife treble nuts " "	8s. to 8s. 6d.	10s. 9d. to 11s. 6d.	12s. to 12s. 6d.
Hetton Wallsend, London	16s. 6d.	20s. 6d.	20s.

Freights.

——	July 1, 1911.	January 1, 1912.	July 1, 1912.
Tyne to—			
Hamburg	3s. 3d. to 3s. 4½d.	3s. 9d.	4s. to 4s. 3d.
Genoa	7s. 3d. to 7s. 6d.	10s. 3d.	10s. 6d.
Barcelona	7s.	10s.	11s. 3d.
Alexandria	7s. 3d.	10s. 6d.	11s. 6d.
Cronstadt	3s. 7½d. to 3s. 9d.	—	6s.
London	3s.	3s. 3d. to 3s. 6d.	3s. 9d.
Cardiff to—			
Genoa	7s. 9d.	10s. 9d.	11s. 6d.
Bordeaux	5s.	6s.	7s.
Marseilles	7s. 3d.	9s.	10s. 9d.
Havre	4s. 6d.	5s.	6s.
Barcelona	7s. 9d.	10s.	11s.
Las Palmas	7s. 6d.	10s. 3d.	11s.
Alexandria	7s. 3d.	10s. 6d.	12s.
River Plate	18s. 3d.	18s. 6d.	20s.

Wages.

District.	Percentage of wages above standards.		
	July 1, 1911.	Jan. 1, 1912.	July 1, 1912.
Northumberland	27¼*	27¼	32½
Durham	41¼	38¾	42½
Federated area	50	50	50
South Wales and Mon.	50	50	51¼
Scotland	50	50	62½

* Including an advance of 1¼ per cent. as from July 3.

ratified considerable advances in price are being obtained without excessive difficulty.

The position of the colliery that exports its coal is more difficult; but here again the vigour of the foreign demand, coupled with the activity of shipping, is proving some mitigation. During the first six months exports of fuel have declined by over 5½ million tons, or close upon 17 per cent. We have sent nearly a million tons less both to Germany and France, and three-quarters of a million tons less to Italy. At the same time, Germany has pushed her export trade in a phenomenal degree. Nevertheless, it is probable that the final figures for the year will not be far behind those of 1911. The main thing is that they should have been well ahead: the difference is all gain to our competitors. The "constitution" of industry and commerce is, indeed, wonderful, but every vital system has its limitations and its breaking point, and national improvidence may be carried to a climax. There is generally something to be said at all times for inhibitive legislation; the Coal Mines Act is excellent in parts, and the Minimum Wage Act does at least assist the manager in maintaining discipline; but these advantages scarcely discharge the bill, and fresh burdens, whether imposed directly by the Legislature or by labour, will render it increasingly difficult to carry on industries such as the coal trade.

Trade Summary.

The London coal trade for the past week continues very slow. The unusually hot weather has greatly checked the flow of public orders, and depots report very little delivery trade. Large coals, both for household and manufacturing qualities, are moving fairly freely, but nuts and cobbles are accumulating in stock very rapidly. Small nuts are also difficult to sell, except at lower prices, but slacks continue in good demand. Seaborne qualities are still suffering from the difficulties on the river, but cargoes are dealt with in increasing numbers.

The market at Newcastle has improved, supplies being scarce and enquiries numerous. All classes of fuel are dearer with the exception of gas coals, which, for prompt business, are somewhat variable.

The Durham coal trade is stronger in every department, the volume of business being heavy. House coal is quiet. Tonnage continues scarce.

The demand for Lancashire house coal is very dull, but list prices are unaltered. Works fuel of all classes is in strong request. There is also a better enquiry for shipping.

In West Yorkshire the poor demand for house coal has reduced the time at the pits, and stocks are growing. Prices, however, are well maintained. The demand for manufacturing fuel is exceptionally brisk.

In South Yorkshire the demand for steam coal is steadily expanding, and prices are firm and rising. Small industrial grades are especially sought after. House coal is quiet. Coke is strong.

The call for Derbyshire house coal is fair, considering the season, and prices are firm. Manufacturing fuel finds ready purchasers, and supplies are becoming scarcer, whilst prices continue to move upwards. There is also a marked improvement in the export demand for steam coal.

In South Staffs and Warwickshire the hot weather has adversely affected the house coal trade. The needs of manufacturers continue heavy.

The market at Cardiff is rather dull, and tonnage has been unexpectedly scarce. There is, however, considerable optimism in regard to the future, notwithstanding the high range of freights. Small coals are rather weak.

The annual holidays have interrupted the course of the Scottish coal trade, but the undercurrent is very strong.

LABOUR AND WAGES.

North of England.

No further difficulty is anticipated in the way of establishing a Conciliation Board for the settlement of wages questions in connection with the Northumberland Colliery Enginemen and Firemen's Association. Some time ago the men submitted a proposal for the formation of a Board to the Coalowners' Association. The coalowners, however, deferred their final sanction pending the decision of the men in regard to the appointment of an independent chairman. The men having decided that an independent chairman was necessary and desirable, the Board will be formed in due course.

At a meeting of the Cleveland ironstone mineowners' and miners' representatives, held at the mineowners' offices, Middlesbrough, this week, the question of wages to be paid during the next three months was considered. Mr. Stephens, on behalf of the miners, said that the present state of the iron trade was good, prices were improving, and prospects were regarded as bright. The workmen would therefore expect a satisfactory advance in wages for the current quarter. Mr. Arthur Francis Pease, who presided, pointed out that according to the formula that had been adopted for many years past, the recent ascertainment entitled the men to an advance of 1·50 (1½) per cent. The improvement in the iron trade would be reflected in the next quarter's ascertainment, when the men would, as usual, get the benefit of the better prices. The owners reminded the men's representatives that they had contracts to fulfil, which they had made when prices were low, and that the employers themselves would not benefit by the increase in prices until some months hence. The men's representatives said they had no power to settle at that meeting. They would have to report to the miners and meet the owners again. The meeting was adjourned until the 29th inst.

At a meeting of the Cleveland ironstone mine owners and miners' representatives held at Middlesbrough this week, the new Explosives Order was considered. Both the employers and mine representatives agreed that some of the provisions of the Order were altogether unsuitable for Cleveland ironstone mining operations, and it was decided that the secretaries of the mineowners and the Miners' Association make a joint communication to the Home Secretary on the subject.

Federated Area

At a meeting of the Wigan Enginemen's and Boilermen's Provident Society recently, Mr. T. Watson, the agent, said amongst enginemen and boilermen the demand for increased wages was becoming more intensified, and unless something was done in the near future by the employers to meet this demand, he was of the opinion that it would be difficult to restrain the men any longer from taking drastic action. However, he had hopes from the negotiations now taking place between Sir Thomas Ratcliffe-Ellis and himself (Mr. Watson), that a joint meeting would shortly be arranged, when the whole affair would be discussed on its merits.

At the Staffordshire Assizes, as briefly recorded last week, Mr. Justice Phillimore delivered his reserved judgment in the case of the prisoners concerned in the Talke intimidation charges. Some of his lordship's remarks are worthy of reproduction. He said that from what one of them said, some of them seemed to think there was no harm, in the time of a strike, in preventing other workmen, who wished to work, from following their employment. This prosecution had been undertaken in order to teach them that such a course was harmful, and was wicked and sinful. It was a crime punishable by the law of the land. Everybody had the right to strike, but so also had everyone the right to go to work who wished to do so, and the prisoners were not justified in their conduct to prevent them. If the prisoners did not choose to work they must understand that they had no right to prevent others from working who wished to do so. The prisoners had no justification for their conduct either in morals or in law. His lordship had had a longer experience than the prisoners, and he would say that if there were such a right, England would soon fall to pieces, and everyone would be in poverty and distress. Similarly strong language was used by Mr. Justice Horridge, in sentencing to various terms of imprisonment a number of miners concerned in disorders at the Littleton Collieries, on March 27.

Speaking recently at Ripley, Derbyshire, Mr. Thomas Spencer said his Honour Judge Lindley, in making the award, had held that the minimum wage must be paid irrespective of tools and ammunition. There were some managers, Mr. Spencer said, who had shown a disposition to make that clause ineffective, but they could not do it. As to the award being retrospective, he pointed out that the average of holers throughout the county was 5s. 8½d. per day, but 48 per cent. had been working below that, and some as low as 3s. 4d. per day.

Their wages would now have to be made up to 5s. 8d. per day for every day since the strike. The fitters and jobbers on night work averaged 4s. 9½d. per shift, but 53 per cent. had been working for less, some as low as 3s. 8d. per day. His Honour held that no fitter must have less than 4s. 9d. per shift, so that to some fitters there would be due 11d. for every day since the strike. The fact that the award was retrospective was causing friction with some of the managements.

The Coal Conciliation Board for the Federated Districts of England and Wales met at the Westminster Palace Hotel on Wednesday (Mr. Alfred Hewlett presiding) in order to consider an application from the miners for an advance of 5 per cent. in the rate of wages paid. The proceedings were private, and ultimately the conference adjourned till August 1 without having arrived at a decision. The board passed a resolution expressing grief at the death of their vice-president, Mr. Enoch Edwards, "who acted in that capacity for eight years, during the whole of which period he discharged the onerous duties pertaining to his office with conspicuous ability and with great acceptance to the members of the board. On behalf of the owners and workmen represented by the board and on their own behalf, the members desire to place on record their sense of the loss which they and those they represent have sustained by his death, and to convey to the members of his family an assurance of their very earnest and sincere sympathy and condolence with them in their great bereavement." The board appointed Mr. W. E. Harvey, M.P., vice-chairman.

At a meeting of the executive of the Yorkshire Miners' Association, held at Barnsley on Saturday, reports were considered regarding the stoppage of parts of seams in the West of Yorkshire, but considering that a meeting had been arranged to consider the whole question with the coalowners and the Minimum Wage Board on July 23 for West Yorkshire, and July 19 for South Yorkshire, no resolution was passed on the matter, except to support men thrown out of work. The association were considering what course to take with regard to the non-associated collieries, where the minimum wage, in many instances, had not been paid. Unless a prompt settlement was arrived at, the association would have to consider whether the whole of the cases should not be entered into the County Court. Out-of-work pay was granted to financial members at the Old Silkstone, West Silkstone, New Hall and Middleton, and Lepton collieries.

Scotland.

Representatives from 18 colliery districts in Midlothian and Haddingtonshire attended a conference at the Miners' Federation Offices, Dalkeith, last week. Mr. Robert Brown, Scottish miners' secretary, intimated that various claims had been lodged for balances of wages under the Minimum Wage Act, and stated that in some instances, upon workmen making their claims, the colliery managers had dismissed the miners from their employment. This was, consequently, causing much irritation. The matter would accordingly have to be brought before Sheriff Mackenzie, chairman of the Joint Board for Scotland, as to whether clause (b) of Rule 19 was to be interpreted that any official at the mines was to hold a pistol at the men's heads, asking them to sign a certificate, otherwise there was to be no more work for them at the collieries.

At a meeting of the executive board of the Fife and Kinross Miners' Association several complaints were made regarding men in some collieries not being paid the full advance to which they were entitled under the award of the neutral chairman of the Conciliation Board. Arrangements were made for full particulars in regard to the alleged grievances being sent to the secretaries, who were instructed to deal with the companies concerned. Mr. Wm. Adamson, M.P., the general secretary, was authorised to get into communication with the secretary of the Coalowners' Association in order to arrange for the payment of wages weekly, instead of fortnightly as at present, at all the collieries in the county.

Miners' Federation of Great Britain.

The executive of the Miners' Federation of Great Britain met at the Westminster Palace Hotel, London, on the 16th inst., to consider the reply of the Prime Minister to the deputation on the previous day respecting the Minimum Wage Act. The executive passed a resolution of sympathy and condolence with the relatives of the miners who lost their lives in the disaster at the Cadeby Main Pit, and appointed Mr. R. Smillie and Mr. Vernon Hartshorn as the representatives of the federation to attend the enquiry. The executive then considered the reply of the Prime Minister to the deputation which waited upon him on the previous day with reference to the working of the Minimum Wage Act, and it was decided to call a special conference to be held in London on Tuesday, August 13, to consider and determine the policy to be followed by the Federation. The committee also decided to hold the annual conference of the Federation in Swansea on Tuesday, October 1, and following days. A month is to be allowed to the districts to send in resolutions for discussion. A sub-committee was appointed, consisting of Messrs. R. Smillie (Scotland), Vernon Hartshorn South Wales), and W. Straker (Northumberland), with the secretary, Mr. T. Ashton, to prepare the miners' case for nationalisation of mines, to arrange for meetings, and to draft a Bill.

International Miners' Congress.

At the International Miners' Congress, which met at Amsterdam last week, Mr. Thomas Ashton (Manchester), general secretary, stated the International Committee decided that he should submit the following:—"This congress resolves that the national secretaries send to the general secretary not later than the end of 1912 a report on the output of coal, the exports, the imports, and the consumption of coal in each country, as well as the proposal of suitable measures to be taken to regulate the output of coal in the interest of the community." When those reports had been received a special meeting of the International Committee would be called to deal with the regulation of output and submit a suitable resolution to the next International Committee. If they accepted this, there would be no discussion at this congress, but the International Committee would have to prepare a report to be submitted to the next congress.—M. Jean Calaweart (Belgium) said that for 21 years this question of the limitation of output had occupied the attention of miners; but, nevertheless, the countries continued to compete more or less disastrously one against the other without any regulation of output.—M. Lemoudin (France) asked whether the countries which overproduced coal were prepared to discuss this question. Belgium and France produced less coal than they consumed. But there were other countries in that congress who produced more coal than they consumed. Were they prepared to discuss this question or not?—Mr. Ashton remarked that both of the speakers were members of the committee who had agreed to this resolution.—The resolution was carried.

Mr. W. Straker (Northumberland) moved a resolution in favour of a uniform working policy of not more than five days per week at all collieries in the districts represented at this congress. That this question be relegated to the International Committee to formulate a scheme and fix upon a date when in their judgment the five days' week should commence. He explained that the British miners did not seek a restriction of output of coal or any other commodity necessary for human needs. If under any system there was surplus production of commodities necessary for human life, it was because the system was wrong. They believed that five days a week were sufficient for any man to be confined working within the bowels of the earth.—The resolution was carried.

On the 10th inst., the congress discussed proposals from France and Holland asking for legislation to secure a fixed minimum wage. Mr. Robert Smillie, acting president of the British Federation, said he would like to emphasise some of the lessons which the recent movement in Great Britain had taught the miners. The first of these was that the national stoppage would not have been possible had it not been that the British miners were practically universally organised in one common organisation. Another lesson was that Parliament did not pay any attention to the voice of labour unless labour was sufficiently well-organised to cause a stoppage which would threaten the nation either with a universal want of fuel or want of food. He sincerely hoped that the miners represented in that congress would take advantage of their experience, and endeavour to secure for every person employed underground not only the principle of a minimum wage, but a real minimum wage. They had only just begun their struggle in Britain. They must go on until they had obtained for every person a real living wage. While they organised solidly in order to be able to fight if fighting was necessary, they ought to organise politically so as to make all Parliaments carry out the will of the people on this and every other question. Mr. Walker (American Union of Mine Workers) said the American miners would not object to the fixing of a minimum wage for aged and infirm workmen, and for men working in abnormal places, if they were assured that the fixing of such a minimum would not jeopardise the higher wages of the general body of mine workers. Herr Schmidt (Germany) said that the wages of the miners in that country were lower now than they were in 1907. In the great coalfield of Westphalia, where 350,000 men were employed, the coalhewers were earning 5d. per day less, and other grades of workmen 1d. and 2d. per day less, while the price of food had increased in recent years by 20 per cent. to 30 per cent. One of the greatest evils in Germany was over-work and over-exertion by the miner to earn sufficient to live. The resolution was carried.

The French delegation proposed a resolution in favour of an eight-hour day or a 48-hour week. Mr. W. Brace, M.P. (South Wales), said the congress would be well aware that in Britain they had an eight-hour day, not from bank to bank, but from pit bottom to pit bottom. He must say that the British delegates could be no party to any system of a 48-hour week. They wanted eight hours from bank to bank, and they could be no parties to any deviation from that proposal. He thought they would make a mistake in linking up the surface worker with the underground worker in the demand for a shorter day. He stood square with the British delegates in their effort to get a shorter day for the surface worker, but there was a clear and distinct difference between the man underground and the man on the surface, and while they had an unanswerable case for the underground worker, they would weaken their case if they linked it up with a demand for an eight-hour day for the surface worker. The resolution was adopted.

At Thursday's meeting of the congress, Germany opposed the French resolution recommending the hastening of the introduction of an eight hours day from bank to bank for all mineworkers, with a maximum working week of 48 hours, on the ground that it clashed with the British resolution favouring a uniform working policy of five days a week for all collieries. The executive committee will endeavour to find a formula which will reconcile these two points. A motion presented by Holland for referring to the International Committee the Belgian and French resolutions relating to a possible international strike and strikes in neighbouring countries in sympathy with a general strike in any other country, such committee to consider the resolutions and report on them, owing to their purport being unsuitable for public discussion, was unanimously adopted, as also was a British resolution recommending legislation dealing with the housing accommodation of miners.

Friday's sitting was devoted to the discussion of old-age pensions and insurance.

Mr. J. G. Hancock, M.P. (Nottingham), said that so far as the principle of old-age pensions was concerned there was no longer any difference of opinion. Existing differences of opinion on matters of detail were disappearing very fast; he believed they would succeed in getting the pension age lowered to 60 years. On the motion of Herr Hue (Germany), it was decided to hold a congress in Austria in 1913, and that in future the congresses should meet every two years, with power to the International Committee to call an emergency congress at any time.

The Iron, Steel, and Engineering Trades.

A conference between the employers' and operatives' sections of the Midland Iron and Steel Wages Board, which controls ironworkers' wages in the Midlands, South Wales, and Lancashire and Yorkshire, took place at Birmingham on the 15th inst. The men have given three months' notice to terminate the sliding scale by which wages are regulated and applied for a rate of not less than 10s. per ton and a working day of not more than ten hours. The present rate of pay is 9s. 3d. per ton. The decision will not be published until it has been made known to the whole of the employers, but it is understood that the men have agreed to a compromise. The Wages Board has been in existence for 44 years, and during that time no open rupture has taken place.

THE IRISH COAL TRADE.

Thursday, July 18.

Dublin.

The trade is now very dull generally, the tendering for contracts being about the only feature of note. There is no change in prices of any class of fuel, and as very large quantities continue to come into the port, stocks are accumulating considerably. City prices are as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 21s.; best Orrell slack, 21s.; "bell" coal, 1s. 5d. per sack; best coke, 23s. per ton. The coaling vessels arriving during the week totalled 54, as compared with 49 the week previously, chiefly from Garston, Point of Aire, Troon, Ayr, Glasgow, Cardiff, Irvine, Neath Abbey, Partington, Preston, Girvan, West Bank, Maryport, Swansea, Newport and Liverpool. At the recent monthly meeting of the committee of the Maryborough Lunatic Asylum it was decided to accept the tender of the new Irish Mining Company, Queen's County, for 600 tons of coal at 17s. 3d. per ton. This company have also been declared contractors to the Government for the supply of coal to the Army Service Corps at the Curragh Camp for the machinery generating the electric light and controlling the waterworks. The demand for the coal from these mines has assumed very large proportions during the past few months, and it is now being sent to places as far away as Cork, Sligo and Limerick, as well as to the principal centres in Leinster and the vicinity of the collieries.

Belfast.

There is an active demand for the various qualities of steam coal, and prices have advanced slightly during the week. The house coal trade continues to be very quiet owing to the warm weather, city prices standing as follow:—Best Arley coal, 25s. per ton; best Wigan, 24s.; Orrell nuts, 24s.; Scotch, 21s.; Orrell slack, 21s. Quotations ex quay are about:—21s. 4d. per ton for Arley house coal; Scotch house, 18s.; Scotch steam, 15s. to 16s. per ton; navigation steam, 15s. 6d. to 16s. 6d.; Welsh steam coal, 16s. 6d. to 17s 6d. There is a good import trade, cargoes arriving during the week being chiefly from Maryport, Garston, Girvan, Glasgow, Preston, Sharpness, Troon, Ayr, Saundersfoot, Neath Abbey, Port Talbot, Lydney, Workington and Ardrossan.

THE SCOTCH COAL AND IRON TRADES.

Thursday, July 18.

Glasgow and Lanarkshire.

COAL.

The returns of coal shipments available this week are unusually large, as they include extra cargoes hurriedly sent away before the pits closed down for the holidays. Aggregate clearances at the Scotch ports reached 373,741 tons, being 12,483 more than in the preceding week, and an increase of 34,279 over the quantity despatched in the corresponding week of last year. The Glasgow shipments amounted to 50,895 tons foreign and 35,689 coastwise, the total of 86,584 tons comparing with 88,059 in the preceding week and 88,411 in the corresponding week of last year. The coastwise business was necessarily curtailed by the holidays. Over a very large proportion of the mining districts work is entirely suspended this week. This is so throughout Lanarkshire, the miners being all on holiday. As the works of manufacturing consumers are closed, and household consumption of coal is reduced to a minimum owing to excessive heat, there has been very little doing in the coal markets. Nevertheless, prices of all sorts of coal are firm. Steam coal is quoted f.o.b. at Glasgow 11s. to 11s. 6d., ell 11s. 6d. to 11s. 9d., splint 12s. to 12s. 6d., treble nuts 12s. 3d. to 12s. 6d., doubles 12s. to 12s. 3d., and singles 11s. 6d. to 12s. per ton.

IRON.

The Glasgow iron market was closed after the forenoon meeting last Friday until Tuesday this week. The amount of business doing has necessarily been reduced by the absence of dealers on holiday, and as the southern markets have lately been weaker, the interest in warrant business has not been so keen as of late. Since last report Cleveland warrants have sold from 56s. 10d. to 57s. cash, 56s. 9d. to 57s. 3d. one month, and at 57s. 6d. and 57s. 9d. three months. Transactions have also been recorded at 56s. 10d. and 56s. 11d. for delivery in 13 days, 56s. 10½d. 14 days, and 57s. 25 days. Cumberland hæmatite warrants are firm, with buyers at 74s. 6d. to 74s. 9d. cash and three months respectively. There has been an increasing demand for hæmatite ore. Merchants quote Scotch hæmatite 78s. to 78s. 6d., but some makers do not name less than 79s. for west of Scotland delivery. Prices of ordinary and special brands of Scotch pig iron are steady. Govan and Monkland Nos. 1 are quoted f.o.b. at Glasgow, 66s. 6d., Nos. 3, 65s.; Carnbroe, No. 1. 70s., No. 3, 66s.; Clyde and Calder, Nos. 1, 74s., Nos. 3, 69s.; Gartsherrie and Summerlee, Nos. 1, 74s. 6d., Nos. 3, 69s. 6d.; Langloan, No. 1, 75s., No. 3, 70s.; Coltness, No. 1, 90s. 6d., No. 3. 70s. 6d.; Eglinton at Ardrossan or Troon, No. 1, 66s., No. 3, 65s; Glengarnock, at Ardrossan, No. 1, 74s., No. 3, 69s.; Dalmellington, at Ayr, No. 1, 67s., No. 3, 65s.; Shotts, at Leith, No. 1, 74s. 6d., No. 3, 69s. 6d.; Carron, at Grangemouth, No. 1, 75s., No. 3, 70s. per ton. There are 85 furnaces in blast in Scotland, compared with 75 at this time last year, but it is understood that the output is practically all going into consumption. The shipments of Scotch pig iron in the past week were 2,913 tons foreign and 1,635 coastwise, the total of 4,548 tons being 2138 tons more than in the corresponding week. The arrivals at Grangemouth of pig iron from Middlesbrough and district amounted to 8,522 tons, being 497 tons less than in the corresponding week of last year. The amount of raw iron being melted at present is, of course, much reduced, owing to the holidays.

Renfrew, Ayr and Dumbarton.

COAL.

There has been a quiet business this week in the coal trade in some parts of the district, while in others, where holidays are at an end or have not yet commenced, the trade has been in a normal condition. The coal shipments reported this week bulked very well. At Greenock 2,368 tons were despatched, Ardrossan 2,295, Irvine 1,551, Troon 7,694, Ayr 23,337—total 37,245 tons, compared with 36,169 in the preceding week and 30,160 in the corresponding week of last year. The foreign shipments amounted to only 1,875 tons, while 35,370 tons were despatched coastwise to Scotch and Irish ports. In the districts of Greenock and Port Glasgow, where the holidays are now finished, there has been a brisk demand for coal for manufacturing purposes, and prices are well maintained. House coal for home use is very little wanted owing to extremely warm weather.

Stirling, the Lothians and Fife.

COAL.

There has been a fair business doing in coal in the Lothians, and the shipments are good though not so large as in the previous week. The quantity sent abroad from Firth of Forth ports amounted to 90,478 tons and the coastwise shipments 26,089 tons. The clearances were, at Granton 9,510 tons, Bo'ness 15,564, Leith 43,401, Grangemouth 48,092—total 116,567 tons, compared with 131,151 in the preceding week, and 87,204 in the corresponding week of last year. Best screened steam coal is quoted at Leith 12s. to 12s. 6d., secondary qualities 11s. to 11s. 6d., treble nuts 12s. 6d. to 13s., and doubles and singles 12s. to 12s. 6d. per ton. There were very heavy shipments at Fife ports in the past week in anticipation of this week's holidays at the collieries. At Burntisland 65,929 tons were despatched (of which 42,496 tons went abroad and 12,010 coastwise), Methil 59,983 tons, Alloa 3,545, Dysart 1,298, Charleston 1,070, Wemyss 915, and Tayport 605—total 133,345 tons, compared with 105,879 in the preceding week, and 133,687 in the corresponding week of last year. First-class screened navigation coal is quoted at Methil and Burntisland 15s. to 16s., unscreened 13s., first-class steam coal 12s. 6d. to 13s., third qualities 10s. 6d to 11s., treble nuts 12s. 6d. to 13s. 6d., doubles 11s. 6d. to 12s., and singles 11s. 6d. per ton.

THE LONDON COAL TRADE.

Thursday, July 18.

The London coal trade has suffered exceedingly from the sparse numbers of orders obtainable on the market during the past week, and the heat wave has considerably checked the flow of public orders, so that all the metropolitan depots are complaining of the smallness of the delivery trade. The bulk of the collieries report a fair demand for large coal, but ordinary nuts and cobbles are rapidly accumulating in stock. In the seaborne market the difficulty of river transport is still blocking the way to a good deal of business, but gradually both steamers and barges are moving, and cargoes are being dealt with in increasing numbers. The attendance on market lately has been quite up to the average, notwithstanding the great heat and the absolute stagnation of orders. Prices remain unaltered, and collieries are still maintaining a determined front in their endeavour to secure the 2s. 6d. advance; on the other hand merchants are refraining from buying, and consequently stocks are accumulating very rapidly at the various collieries. The present hot weather is helping the merchants, as, of course, the consumption of house coal is down to its lowest possible limit. The wharves and depots in the metropolis are being congested, and stocks on the ground are rapidly increasing. Many of the London merchants report that they have on the ground as much coal as they can conveniently take, so that the outlook for the remaining summer months is exceedingly gloomy. Seaborne house coals are not offering, and the prices for Durham Wallsend continue merely nominal. Fourteen cargoes entered the River Thames as reported Monday last The dock strike appears to be in a fair way to settlement, and hopes are fully entertained of the full resumption of work this week. Nothing can undo the dire calamity of this terrible strike. Many of the most industrious working men who have had no quarrel or disagreement with their employers have been kept, week after week, out of work, for a cause which some of them are anxious to trace. The strike arose first because the lightermen, against their leaders, demanded the dismissal of a watchmen named Thomas, who refused to join their union. Large coals continue to sell fairly freely, but nuts and cobbles are rapidly accumulating at the colliery end. Small nuts have not been in so good demand lately, but slacks are eagerly bought up. At a further meeting of colliery owners, held on Tuesday, it was again decided to firmly adhere to the prices agreed upon, and in view of a meeting held in London on Wednesday, at which the demand of the miners for a 5 per cent. advance in wages was considered, but adjourned until August 1, it is not likely that any material reduction will be made in the contract scale of prices, although the merchants still refuse to consider the advance as justified. The congestion at the various Thames side barging wharves is causing considerable trouble to wagon owners, as so many wagons are now hung up waiting to be tipped, and this, coupled with the increasing stock of loaded wagons at the colliery end, is causing a shortage of empty wagons.

COLLIERY ACCIDENTS.

Cadeby Main.

Mr. W. H. Chambers, the managing director of the Denaby and Cadeby Colliery Company, made an important statement on Friday last, to the effect that the colliery was then absolutely safe, and there was no further risk of explosions. He had had analyses made of the air in the colliery—both of the little that was escaping from the affected working behind the stoppings, and also of that on the outside of the brickwork. These analyses showed that the air behind the stoppings was a non-explosive mixture and absolutely safe. The stoppings would have to be kept intact for some time, however, he said. The whole of the pit had been examined and was perfectly right.

On Sunday morning Mr. Herbert Smith (president). Mr. Sam Roebuck (assistant general secretary). and local branch officials of the Yorkshire Miners' Association, were given facilities by the colliery management to descend and inspect the Cadeby mine. They were below ground for over three hours and subsequently had a consultation with Mr. W. H. Chambers (managing director), who agreed to their request for a further and more extended inspection, which took place on Monday.

Mr. Chambers was down the pit on Saturday and found all the seals on the wall intact. Very little air had escaped, and what had come out was non-explosive. All through the night men were working at the huge fall of roof beneath which most of the rescue party lie, but only one more body was recovered. It was that of Charles Prince, assistant deputy. The miners held a meeting on Tuesday to receive the report of their officials who had enquired into the condition of the mine. It was decided to resume at once in all parts except the south district, which is adjacent to the portion where the explosion took place.

With the exception of the south district of the mine, work was resumed in all parts of the colliery on Wednesday.

To alleviate the distress caused by the disaster a relief fund has been opened at the Sheffield Banking Company Mexborough, and already a considerable sum has been collected.

Lord Harewood, Lord Lieutenant of the West Riding, has forwarded a cheque for £150 as a donation from the King and Queen to the relief fund for the sufferers by the Cadeby explosion. Of this sum £100 is from the King and £50 from the Queen.

The trustees of the Micklefield Colliery Disaster Fund will contribute £1,000. Mr. F. J. G. Montegn, of Mundford, who is a large royalty owner in the district, has subscribed £500.

CONTINENTAL MINING NOTES.

Germany.

Ruhr Coal Market.—Although the Syndicate has not altered the restriction of output for the current month, this is not a sign that the situation remains unchanged; for, as a matter of fact, the sales of gas and open-burning gas coal are suffering from the resumption of English competition and from the overbuying at the time of the strike. On the other hand, business in industrial coals displays undiminished activity, and would be still better were it not that the mixed works cover their own requirements direct. In South Germany things are much quieter, the waterborne supplies of Ruhr and English coals being ample and enabling considerable reserves to be accumulated. In northern Germany English competition is being felt keenly once more, though the Syndicate is still able to hold its own in certain districts, Holland and Belgium being large buyers, though the former country is getting large supplies from England again. There is nothing very favourable to report about the coke market, the output being out of all proportion to the consumption, so that stocks are becoming very large, and it is doubtful whether the present restriction on the output will not have to be increased before long.

Official Coal Prices, Düsseldorf Exchange.—Gas and open-burning coals: Gas coal 12 to 13 marks per ton for the summer months, 13 to 14 marks for winter; producer coal 12·50 to 13·50 marks; open-burning gas coal, through-and-through, 11·50 to 12·50 marks. Bituminous coals: Through-and-through 11·25 to 12 marks, best mixed 12·50 to 13 marks, coking coal 12·25 to 13 marks. Lean coals: Through-and-through 10·50 to 12 marks, best mixed 12·75 to 14·25 marks, anthracite nuts II. 21·50 to 25·50 marks. Coke: Foundry coke 18 to 20 marks, blast-furnace coke 15·50 to 17·50 marks, broken coke I. and II. 20 to 23 marks. Briquettes 11 to 14·25 marks.

Miners' Wages in Prussia, First Quarter, 1912.—In Upper Silesia the average earnings per hewer (50 per cent. of the total workers employed) were 4·03 marks per shift; other underground workers (16·9 per cent.), 3·85 marks; surface men (23·8 per cent.), 3·18 marks; youths under 16 (4·4 per cent.), 1·20 marks; women (4·9 per cent.), 1·24 marks. In Lower Silesia the hewers (49·1 per cent.) earned 3·63 marks per shift; other underground workers (20 per cent.), 3·45 marks; surface men (26·9 per cent.), 3·10 marks; youths (2·7 per cent.), 1·28 marks; women (1·3 per cent.), 1·59 marks. In the Dortmund district, the wages of hewers (50·5 per cent.) were 5·74 marks per shift; other underground workers 26·8 per cent.), 4·18 marks; surface men (19·5 per cent.), 4·04 marks; youths (3·2 per cent.), 1·40 marks. In Saarbrücken, hewers (49·3 per cent.) earned 4·73 marks per shift; other underground workers (28·3 per cent.), 3·86 marks; surface men (19·9 per cent.), 3·59 marks; youths (2·5 per cent.), 1·44 marks; and in Aachen. hewers (58·3 per cent.), 5·35 marks; other underground workers (15 per cent.), 4·22 marks; surface men (23·1 per cent.), 3·91 marks; youths (3·6 per cent.), 1·51 marks.

Coal Market in South Germany.—The improvement in the demand for house fuel continues, especially in respect of anthracite nuts and broken coke—in fact, so much so that it is hardly possible to satisfy all requirements even by drawing on stocks. Retailers put off placing their orders, and then come in with a rush which the wholesale merchants have difficulty in satisfying. Industrial consumers are still taking deliveries in a satisfactory manner. Current sales are very small, and generally confined to slight purchases in excess of contract quantities. The river is going down a little, but is still deep enough to enable fully-laden craft to reach the highest ports.

Coal Market in Upper Silesia.—In industrial coals the entire output finds ready absorption, and recourse is even had to stocks, which are smaller than this time last year. Gas coal goes off in a satisfactory manner, but there is less demand for house coal, which will not begin to revive until next month. The export trade is considerable, Russian Poland taking large consignments and Austria-Hungary doing the same, notwithstanding the known difficulties existing in that market. The coke market is also in good form, the pig iron industry being particularly busy, and taking blastfurnace coke as fast as it can be turned out. Foundry coke also goes off well, and the demand for smaller kinds is sufficiently active to keep stocks from growing. Large coke is being despatched to Austria-Hungary and Russian Poland in considerable quantities.

Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

THE CADEBY MAIN COLLIERY DISASTER.

Sir,—With reference to the lamentable disaster at the Cadeby Main Colliery, and particularly to the catastrophe by which the valuable lives of so many of the brave members of the rescue party were lost, it seems to me that this accident might properly cause one to ponder as to whether it is not necessary to study the question of rescue parties.

Of course, until the proposed enquiries have been made and the whole evidence is available, it is difficult to form a correct idea as to what the overwhelmed rescue party really did; but, judging by experience at previous accidents, it seems to me that after disasters there is need for caution lest rescue parties should be imbued with a very enthusiastic eagerness to penetrate the dangerous parts of the mine. One can understand that in the hope and eagerness of saving life, it may from some points of view seem a cruel thing to suggest that a rescue party should hold back for any reason, but we must face the fact that Nature is no respecter of persons, and that the capability of man in fighting Nature is very small, and therefore that great care should be exercised to avoid unnecessary loss of life by a futile fight against Nature.

In one personal experience of the writer's he was particularly struck by the almost unnatural enthusiasm of a party in entering the pit after an explosion, and although there was not the remotest possibility of saving any life, yet the party continued advancing up rising ground for a considerable distance after having left the oil safety lamps at a point where more than ½ in. cap was visible on the oil safety lamp flame, the advance being made with electric lamps and without any possible means of ascertaining the nature of the atmosphere we were entering; and, as a matter of fact, on several occasions the members of the party were severely tried by the gases encountered, and had anyone been overcome, we were so far from the pit-bottom and the condition of the road was so bad, that there would have been little or no chance of saving his life, as there were no rescue apparatus carried by the party, and it would have taken two to three hours by the quickest possible means to have got to the pit bottom and back again with any rescue appliances.

On one occasion whilst in this unknown atmosphere one of the electric lamps suddenly went out. On another occasion it was found that the wooden case of the electric lamp carried by one of the party had been so loosely put together that the sneck was unfastened, a slight jerk might have caused the lamp to open, and of course the breaking of the circuit might have caused the lot of us to have been blown to pieces. In any case had the party not been provided with electric lamps explorations would have had to be delayed a few days longer until ventilation had been restored, but the writer at the time could not help but think that a few days' delay would have been preferable to risking further disaster, merely for the purpose of fetching out dead bodies.

Experience has shown that after one explosion the pit is always ripe for another, as no doubt the movement of the atmosphere by the first explosion will cause not only gas from the goaf to come out, but also the explosion vacuum will allow a good quantity of gas to come out from the coal face, and immediately the gases formed by the first explosion (and which gases after the explosion would not support combustion) have cleared away, and fresh air commences to come back again into the workings, an explosive mixture may soon be formed, and immediately this is ripe it may be fired off by any smouldering flame left by the first explosion; if, therefore, the members of the overwhelmed rescue party had had safety pit lamps with them and tested for gas, and seen that an explosive mixture of gas was forming, one feels inclined to think that they would, with their existing knowledge of previous explosions and gob fires, have retreated from the pit, especially seeing that apparently the bulk of the bodies had been got out, and there was evidently no hope of saving further life.

According to the newspaper reports of the one survivor of the ill-fated party, who was wearing a respirator at the time, the air in the vicinity of the party appeared to be clear only a moment before the explosion. By this he may, of course, mean that he felt no ill effects, and yet, as is well known, he and the party may have been breathing from 6 to 9 per cent. of marsh gas and not been aware of the fact, as an electric lamp would not show it, but an oil safety lamp would have done so.

Whilst the writer does not for one moment dispute the great utility of an electric lamp to a rescue or exploration party, he is of opinion that it is a subject worthy of consideration as to the advisability of advancing in the pit beyond a point where the oil safety lamp clearly points to danger, especially where the possibility of saving life is very doubtful.

E. A. Hailwood,
Manager and Secretary,
Ackroyd and Best Limited.

Morley, near Leeds,
July 17, 1912.

TO CORRESPONDENTS.

The Provision of Keps.

R. H. V.—The proviso to subsection (4) of section 40 of the Coal Mines Act, exempting from the requirement as to the provision of keps "a system of winding by means of a single rope where the cages are held by the friction of the rope on the winding sheave," refers to the Koepe system of winding and analogous systems. In the Koepe system only one winding rope is used, which passes round the winding pulley and over the two pulleys at the top of the pit frame, a cage being attached to each end. To counterbalance the weight of the winding rope a tail rope runs round a return pulley at the bottom of the shaft, one end being attached to the underside of each cage. This gives a type of endless rope, the necessary energy for the purpose of raising the load being communicated from the winding engine to the rope through the medium of the friction generated between the rope and the groove of the winding pulley. In this system no keps are required.—Ed. C G.

LAW INTELLIGENCE.

SUPREME COURT OF JUDICATURE.

COURT OF APPEAL.—July 5

Before the Master of the Rolls, Lord Justice Farwell, and Lord Justice Kennedy.

Gaskell and Others v Lancashire and Cheshire Miners' Federation and Others.—This was an appeal by the plaintiffs from a decision of the Deputy of the Chancellor of the County Palatine dismissing an action brought by Robert Gaskell and two other persons who had been in the employment of Messrs. Cross, Tetley, and Co. Limited at the Bamfurlong Collieries against the above-mentioned federation and Mr Ashton and Mr. Twist, the general secretary and miners' agent of the Federation. The action against Mr. Ashton had been subsequently abandoned. The plaintiffs alleged that the defendants had maliciously and wrongfully and with intent to injure the plaintiffs procured or induced the plaintiffs' employers to break their contracts with the plaintiffs and to cease to employ them; and they claimed an injunction. They also claimed damages for loss occasioned to the plaintiffs by the defendants wrongfully causing these employers to cease to employ the plaintiffs. The Deputy of the Chancellor considered that the defendants came within the protection of the Trade Disputes Act, 1906, and dismissed the action. The plaintiffs appealed.

The Court dismissed the appeal.

The Master of the Rolls, in the course of his judgment, said two points had been raised which presented no difficulty whatever, and there was a third point which was more deserving of consideration. The plaintiffs were non-union men engaged at the Bamfurlong Collieries, which employed a considerable number of men, the majority of whom were union men. They were anxious to get all the men engaged at the collieries into the union. A ballot was taken and there was a large majority in favour of a strike unless the non-union men either came into the union or were got rid of. The Bamfurlong union was a branch of the Federation, and in accordance with the rules the men would not get strike pay unless they got the sanction of the Federation to the action which the branch proposed to take. The first point that had been taken was that there was no trade dispute, but his lordship thought this came as plainly as possible within the definition of trade dispute contained in the Trade Disputes Act, 1906, and he felt not the slightest doubt that there was in this case a trade dispute and that the Act applied. The next point, which seemed to create no difficulty, was this—it was said that because the rules of the Federation included a rule which under the decision in the Osborne case (1910, A C., 87) was *ultra vires* the union, the union was not a union within the meaning of the Trade Disputes Act. That proposition was one which only needed to be stated to be rejected. Then it was said that the Court must consider the position, first, of the Federation, and next of the defendant Twist. Since the passing of section 4 of the Trade Union Act, 1906, if there was a trade dispute, it was too plain for argument that no action would lie against the Federation. His lordship had heard no argument addressed to that point and none could have been urged having regard to the decisions of the Court of Appeal as to the extent of the Act of 1906. As regards the defendant Twist, it was said that he was liable because it was due to the threats that he had uttered that the employers were induced to refuse to continue to employ non-union men. His lordship would mention in passing that there was no breach of contract in the present case. Fourteen days' notice had been duly given and that branch of the case came to nothing. Were any threats used as distinct from information or warnings as to what might be the consequences in the temper of the men if non-union men continued to work? These were the critical words:—"It was a choice of two evils. We were to give them an opportunity to get the names, or they would stop the pits." It was not "we will stop the pits," but having regard to the state of feeling among the men, who had balloted in favour of a strike by a large majority, the employers were informed that things had got to such a pass that unless the employers enabled the union agents to approach the non-union men at their own houses, the pits would be stopped, which did not mean more than that they would leave work after having given due notice. The learned deputy-judge had found that there were no threats, and that what was done was done in furtherance of a trade dispute and was therefore not actionable. Sections 1 and 3 of the Trade Disputes Act, 1906, both had a bearing on the case. Having regard to the findings of fact by the deputy-judge and having regard to those sections, his lordship had come to the conclusion that it was not possible to interfere with the judgment of the Court below, and that the appeal must be dismissed with costs. In the view taken it was not necessary or right to discuss some of the questions raised in the argument. They were questions which might have to be raised some day, but they did not affect the present case.

The other lords issued judgments also dismissing the appeal.

JUSTICIARY APPEAL COURT (SCOTLAND).—June 21.

Before the Lord Justice-General and Lords Kinnear and Mackenzie.

The Comforts of Checkweighmen.

King v. Dalmellington Iron Company Limited.—In the Sheriff Court, Ayr, the Dalmellington Iron Company Limited, Dunaskin, were convicted on evidence of having failed to afford Michael Colrain, checkweigher at No. 3 Pit, Sundrum Colliery, belonging to them, proper facilities for enabling him to fulfil the duties for which he was stationed there, in respect that they did not provide for him a shelter from the weather, contrary to the Coal Mines Regulation Act, 1887, section 13 (2) and the Coal Mines (Weighing of Minerals) Act, 1905, section 1 (4) whereby they are liable to a penalty not exceeding £20. Sheriff-substitute Shairp, who tried the case and imposed a fine of £1, stated that the question for the Court was whether, in respect that the weigh-house where Colrain did his work was not artificially heated, he was right in convicting of a contravention of the statutes quoted. Among the facts which he found proved were that the weather between January 4 and February 15 last, the period covered by the complaint, was very cold, that no artificial heating was provided in the weigh-house, that an open fire or stove would have involved danger, that the weigh-house might have been heated with exhaust steam, that Colrain did not wear an overcoat while performing his duties, that during the period in question he had to stop work for the cold as his fingers became numbed, and that the cold in the weigh-house was excessive and detrimental and dangerous to Colrain's health.

In the course of the discussion the Solicitor-General, who supported the conviction, said he did not submit that each colliery owner must provide artificial heating for the place where the checkweigher worked, but he contended that a "shelter from the weather" implied that the checkweigher was intended to be afforded conditions while he worked which were fairly comfortable, and which would not endanger his health. He submitted that it was unsuitable for anyone discharging clerking duties to wear an overcoat.

The court quashed the conviction, and found the appellants entitled to 7 guineas of expenses. Their lordships held that the statute of 1905, being a penal one, its requirements must be interpreted strictly, that its provisions did not require the provision of artificial heating for the checkweigher's office, and that they could only uphold the conviction and refuse the appeal by finding that the accommodation provided for the man was in no way a shelter from the weather.

SCOTTISH COURT OF SESSION.

FIRST DIVISION.—June 11.

Before the Lord President and Lords Johnston and Mackenzie.

Is Oil Shale a Mineral?

Marquis of Linlithgow and Others v. North British Railway Company.—In this case the Marquis of Linlithgow and his mineral tenants, Young's Paraffin Light and Mineral Oil Company Limited, sued the North British Railway Company for declarator of their right to statutory compensation in respect of their being compelled to leave unworked a seam of oil shale lying under and adjacent to the Union Canal in Hopetoun estate. The pursuers said that to proceed with the workings would endanger the canal. In the Outer House, Lord Skerrington negatived the pursuers' claim, and found the defenders entitled to expenses. His lordship held that the seams of shale underlying the canal were the property of the defenders, the pursuers having failed to prove that oil shale was known and regarded by business men in Scotland as a mineral until many years after 1818, the year in which the land was conveyed.

The First Division, Lord Johnston dissenting, adhered to the judgment of the Lord Ordinary, and allowed expenses modified to two-thirds.

The Lord President said that although the defenders had won their case before the Lord Ordinary, they took advantage of the reclaiming note to raise the question which naturally came first in the case, and they asked the Court to pronounce judgment upon the statute in question that the effect of the provisions of the statute were that on a transference or sale effected under them an absolute right of support was given which would make it unnecessary to consider whether shale was a mineral or not. The case on that branch was not altogether easy, for the statute was one of the comparatively early instances of that class of legislation. With a much larger canal system in England, there were more English cases on the subject than in Scotland; and while it was proper that those cases should be brought before them, he did not think it would do any good to examine them, because, after all, each case came to be decided upon its own statute. His lordship therefore went straight to the Act of 1817. It was not out of place to remember that the predecessor of the defenders was a small company, and that the construction of the canal was not a work of extraordinary magnitude, or a work that could have gone on at all if a very extravagant price had been paid for the facilities bearing to be given by the landowners. The Act was doubtfully expressed even upon the question of acquiring land. The Legislature had not settled down to the forms with which they were now so familiar in the long train of decisions under the Railways Clauses Act and the Lands Clauses Act. His lordship confessed that if the Act had stopped at sections 60 and 61 he thought there would have been no doubt that it was the intention to allow lands to be taken for the purposes of the canal, and obligation to support must be supposed to have been given also, because without that the allowance to take lands would have been useless. But the statute did not stop there, and under sections 112 and 113 the concession was made subject to the conditions contained in the Act. The general result of section 113, to his lordship's mind, was that it meant to make the canal company pay for the minerals which were not otherwise available, and that the obligation to support, which but for these words was absolute, was here taken away in this sense; and if it was necessary in order to maintain support of the minerals, then there should be a claim for damages. On that point, therefore, he was against the contention of the railway company, and agreed with the Lord Ordinary. With regard to the question whether shale was a mineral or not, he thought the criterion they had to apply was in the words used by Lord Halsbury as to what the word connoted in the vernacular of commercial and mining men and among landowners. But the matter must be judged of when the thing passed, because then was the time when something was given and something was reserved. It seemed to him that that happened in 1817, and the mere fact that the actual written conveyance was not executed until 1867, did not seem to matter. Taking the question at 1817, his lordship came to the same decision as the Lord Ordinary. He did not think that, in the view of the mining world, the commercial world and among landowners, shale, as it was now called, was a mineral. If it was removed from the earth at all, it was removed to get it out of the way to get at better stuff. There was another question in the case which did not need to be decided, but his lordship's view on it was in accordance with that of the Lord Ordinary in favour of the railway company. It had been shown that the canal was laid through a seam of shale, and to hold as the pursuers contended would be to hold that by their conveyance the Canal Company got nothing. If the value of the shale had been realised as it was now, no canal would ever have been constructed, because it would have been too costly, and that showed also what people thought at one time when they were talking about minerals.

Lord Johnston, in the course of a long opinion, said he was unable to accept the conclusions of the Lord Ordinary.

Lord Mackenzie agreed with the opinion of the Lord President.

Recent developments at the Yorkshire Main Colliery at Edlington have been very satisfactory. The management have had great difficulties to contend with in unexpected faults in getting through the shaft pillar, but these troubles have now been entirely overcome. The coal is of excellent quality. On the west side the difficulties were much greater than on the east, on account of the very faulty ground. The cages have been fixed, and the screens and other plant, capable of dealing with 5,000 to 6,000 tons per day, are now in working order. The houses already built at New Edlington are rapidly filling and it is clear that, to keep pace with the developments of the colliery, some hundreds of houses will be required. Quite a town is springing up and already there is a population of about 600.

LONDON COAL CONTRACTS.

The following tenders have been accepted by the Metropolitan Water Board for the undermentioned supplies of coal:—Bradbury Son and Co. Limited: 700 tons Wollaton H.P. hards to Lea Bridge Station, 17s. 9d. per ton; 10 trucks Digby (Gelding) locomotive to Lea Bridge Station, 17s. 9d.; 200 tons Digby locomotive hards to Waltham Abbey Station, £1 0s. 3d. (stacked if required); 50 tons Shirebrook screened cobbles to Southfleet Station, £1 2s. 11d. (stacked if required); 120 tons new Gored large to New River Yard, £1 3s. 9d.; 20 tons Bwllfa large to New River Yard, £1 5s. 9d.; 200 tons West Cannock deep hards to Green Lanes, £1 0s. 3d.; 30 tons ditto to Hornsey-lane Station, £1 0s. 9d.; 50 tons ditto to Park Station, 19s.; 90 tons Nailstone to Hornsey-lane, 17s. 10d; 50 tons ditto to Campsbourne Station, 17s. 9d.; 500 tons Digby (Gedling) hard locomotive to Hornsey Station, 17s. 5d; 250 tons Digby (Gedling) hard cobbles to Cricklewood Station, 15s. 6d.; 40 tons Clifton H.P. hards to Park Station, 19s. 5d.; 20 tons West Cannock deep hards to Amwell End Station, £1 0s. 6d; 200 tons Shirebrook best hards to Darenth Station, £1 3s. 3d. (stacked if required); 100 tons Shirebrook screened cobbles to Plumstead Station, £1 1s. 3d.; 150 tons ditto to West Wickham Station £1 2s. 9d. (stacked if required); 30 tons new Gored large to Nunhead Station, £1 4s. 11d. (stacking 3d. extra); four trucks Glasbrook, Merthyr through-and-through to Willesden Station, £1 0s. 9d.; 500 tons Glasbrook large to Hampton Station, £1 8s. 9d.; 400 tons ditto to Surbiton Station, £1 6s. 11d.; 300 tons Glasbrook unscreened to Surbiton Station, 18s. f.a.s.; 350 tons Glasbrook Merthyr 40 per cent. large to Surbiton Station, 17s. 9d. f.a.s.; 150 tons Dowlais large to Surbiton Station, £1 7s. 4d. f.a.s.; 500 tons new Gored large to Surbiton Station, £1 4s.; 100 tons Shirebrook washed nuts to Kempton Park Station, 19s. 11d.; 80 to 70 tons Glasbrook 40 per cent. large to Sunbury Station, 19s. 1d.; 100 tons Nuneaton screened large to Kempton Park Station, 18s. 9d. Harrison, Tidswell and Co. Limited: 1,000 tons Copper pit large to Lea Bridge Station, £1 3s. 7d.; 45 tons ditto to Deptford Station, £1 9s. 4d.; 10 tons ditto to Shooters Hill Station, £1 9s. 4d.; 140 tons Durham unscreened to Turnford Station, 19s. 8½d.; 500 tons Copper pit large to Hammersmith Station, £1 4s. 1d.; 500 tons Llanbradach screened large to Hammersmith, £1 4s. 6d.; 500 tons Copper pit large to Hampton Station, £1 5s. 7d.; 500 tons Llanbradach screened large to Kew Bridge, £1 5s.; 400 tons Copper pit large to Surbiton Station, £1 5s. 10d.; 2,000 tons Llanbradach screened large to Surbiton Station, £1 6s. 9d.; 250 tons Durham unscreened to Surbiton, 17s. 6d. f.a.s.; 500 tons Copper pit through to Kempton Park Station, £1 1s. 4d. Coote and Warren Limited: 60 tons Nailstone steam cobbles to Haggar-lane Station, 16s. 2d. per ton (stacking 3d. per ton extra); 175 tons ditto to Copper Mills Station, 17s. (stacking 3d. per ton extra); 100 tons ditto to Waltham Abbey Station, 17s. 2d.; 90 tons Clifton deep hard cobbles to Broxbourne Station, 17s. 6d. per ton; 60 tons ditto to Hoddesdon Station, 17s. 6d.; 50 tons ditto to Amwell March Station, 17s. 6d. G. Hinchliffe and Co.: 175 tons Ellistown main nuts to Ferry-lane Station, 15s. 3d.; 625 tons Nailstone to Green Lanes Station, 17s. 4d.; 30 tons ditto to Alma-road Station, 18s.; 80 tons ditto to Hoe-lane Station, 18s.; 140 tons ditto to Hadley-road Station, 18s.; 25 tons Ferndale through to Nunhead Station, £1 3s. 3d.; 100 tons ditto to Kempton Park Station, £1 1s. 9d.; 200 tons Moody's smokeless Merthyrs to Campden Hill Station, £1 4s. 8d.; 200 tons Clifton deep hard No. 17 to Kempton Park Station, 17s. 10d. Dinham, Fawcus and Co. Limited: 170 tons Clifton deep hard cobbles to Deptford Station, 17s. 11d. (including stacking); 100 tons ditto to Old Ford Station, 17s. 2d. (including stacking); 200 tons Northumberland washed nuts to Walton Station, 18s. 6d. per ton f.a.s.; 300 tons Watson's washed nuts to Walton Station, 16s. 6d. f.a.s. Beadle Brothers Limited: 305 tons Nailstone deep engine steam to Crayford Station, 17s. 11d. (including stacking); 300 tons ditto to Shortlands Station, 18s. 1d. (including stacking); 300 tons ditto to Orpington Station, at 18s. (including stacking); 125 tons ditto to Southfleet Station, £1 0s. 3d. (including stacking); 300 tons Shirebrook best locomotive hards to Shortlands Station, £1 3s. 6d. (stacked if required). J. Waddell and Sons: 70 tons Allerton Bywater washed (singles and doubles) to Crayford Station, 19s. 9d. per ton; 70 tons ditto to Wilmington Station, 19s.; 130 tons Fryston rough slack to Wansunt Station, 17s. 3d.; 70 tons Allerton Bywater washed (singles and doubles) to Wansunt Station, £1. J. Hudson and Co. Limited: 100 tons South Hilton rough small to Orpington Station, £1; 70 tons Wemyss large steam (in barge f.a.s.) to Wandsworth Station, 16s. 6d.; 150 tons ditto to Honor Oak Station, 19s 2d. (stacking 3d extra); 630 tons Polmaise smokeless washed nuts to Staines Station, £1 1s. 6d.; 100 tons Londonderry unscreened to Kempton Park Station, £1 1s. 8d.; 100 tons Glass Houghton rough small to Kempton Park Station, 17s 9d. Cory Brothers and Co. Limited: 830 tons Nailstone steam cobbles to Wilmington Station, 18s. 4d. (including stacking); 400 tons Duffryn Aberdare large to Hammersmith Station, £1 3s. (in barge f.a.s.); 500 tons ditto to Hampton Station, £1 5s. 2d. f.a.s.; 400 tons ditto to Surbiton Station, £1 3s 6d. f.a.s. Phillips and Co. Limited: 50 tons Bwllfa large to Campden Hill, £1 4s. 9d. (stacking 3d. extra). Gardner, Locket and Hinton: 300 tons Mardy Tredegar or Ocean washed nuts to Hammersmith, £1 3s. Wm. Cory and Son Limited: 150 tons Bwllfa large to Barrow Hill Station, £1 5s. 7d. (stacking 3d. per ton extra); 800 tons Scotch washed nuts to Walton Station 17s. f.a.s.; 630 tons Powell Duffryn washed peas to Staines Station, £1 2s. 11d. Steamship Owners' Coal Association Limited: 500 tons Aitken Navigation to Hampton Station £1 0s. 3d.; 400 tons Glencraig Navigation to Surbiton Station, 18s. 1d. f.a.s.; 500 tons ditto to Kempton Park Station, £1 0s. 4d.; 200 tons ditto to Kempton Park Station, £1 0s. 4d. Redgrave and Co.: 3,000 tons Cymmer Graigola through to Hampton Station, £1 1s. 3d. Rickett, Smith and Co. Limited: 250 tons Cwmaman beans to Staines Station, £1 5s. G. J Evoson Coal and Coke Company Limited: 100 tons Desford hard steam to Kempton Park Station, 18s. The Ynisawed Colliery Company Limited: 170 tons Glyn Merthyr through coal to Kempton Park Station, £1 0s. 4d. Swansea Navigation Collieries Limited: 200 tons Mountain through to Kempton Park Station, £1 1s. 6d.

The tenders of W. Cory and Son Limited have been accepted by Yarmouth Town Council for supplies of 3,000 tons of Nixon's small washed nut coal at 14s. 6d. per ton f.o.b. Penarth, and 1,000 tons of Derbyshire best nutty slack at 13s. 10d. per ton f.o.r.

The following tenders have been accepted by Fulham Borough Council:—T. A. King: 500 tons Clifton large steam coal, at 18s. 6d per ton; 500 tons Glyncoed Welsh coal, at 23s. 6d. per ton. Thorpe, Head and Co.: 120 tons best house coal, from Bestwood Colliery, 20s. 3d. per ton. J. H. Beattie and Co.: 20 tons Hollybush Tanfield coal, at £1 2s. 8d. per ton.

The London County Council have accepted the following tenders for annual supplies of coal, the estimated quantity is put in parentheses:—Bradbury, Son and Co. Limited: Dowlais Merthyr best smokeless large (75 tons), 26s. 4d. per ton. Charrington, Sells, Dale and Co.: Ackton Hall Main (90 tons), 22s. 5d. per ton; ditto (200 tons), 19s. 7d.: ditto (6,000 tons), 20s. 5d. Wm. Cory and Son Limited: Nixon's Navigation and or Hill's Plymouth washed nuts (8,500 tons), 21s. per ton; ditto (2,900 tons), 22s.; ditto (170 tons), 21s. 6d. Wm. Dowell and Co. Limited: Nixon's Navigation large washed nuts (4,785 tons), 24s. 3d. per ton; (400 tons), 25s. Allerton Bywater: Bright Hartley (2,200 tons), 21s. 6d. John Hudson and Co. Limited: North's Navigation washed nuts (20 tons), 26s. per ton; Hudson's Navigation large (6,000 tons), 20s. 3d.; South Hetton (13,000 tons), 15s. 5d.; ditto (12,000 tons), 15s. 3d.; ditto (4,500 tons), 15s. 8d. Sergeant, Longstaff and Co.: East Hartlepool Wallsend (60 tons), 22s. per ton; Joicey's Tanfield (10 tons), 21s. The Steamship Owners' Coal Association Limited: Aitken screened navigation (11,500 tons), 20s. 6d. per ton. F. B. Cameron and Co. Limited: Mapperley second (700 tons), 18s. 7d. per ton. James Edge: Duffryn Rhondda (450 tons), 28s. 3d. per ton. Chas. Franklin: Graigola large smokeless (450), 23s. per ton; Griff large hard (1,700 tons), 18s. 9d.; Graigola nuts (10 tons), 24s 2d.; Graigola beans (10 tons), 23s 11d. Gardner, Locket and Hinton Limited: Bwllfa marine Merthyr large smokeless (240 tons), 25s. 4d. per ton. G. Hinchliffe and Co.: Bwllfa (250 tons), 23s. 11d. per ton; Cadley Hill nutty slack (40 tons), 16s. 5d.; Wollaton No. 4 (920 tons), 17s. 6d.; Apedale Wallsend (2,900 tons), 22s. 5d. C. Miller and Co.: Griff large (2,000 tons), 18s. 9d. per ton. Newton, Chambers and Co. Limited Mapperley second (2,500 tons), 18s. 10d. per ton; Apedale Wallsend (4,000 tons), 23s. 8d. M. A. Ray and Sons: Flockton best or Fryston Diamond Silkstone (at firm's option) (3,800 tons), 20s. 4d. per ton; ditto (1,000 tons), 20s. 6d. Rickett, Cockerell and Co. Limited: Joicey's Tanfield (25 tons), 25s. 10d. per ton; ditto (115 tons), 24s 10d.; Griff cobbles (300 tons), 20s. Rippon, Plews and Co.: Rheola Merthyr (440 tons), 23s. 11d. per ton; Tanfield (70 tons), 22s. 6d. Spenser Whatley Limited: Hollybush Tanfield (90 tons), 23s. 11d. per ton; Wollaton cobbles (700 tons), 18s. 11d. J. R. Wood and Co. Limited: Graigola Merthyr large smokeless (250 tons), 24s. per ton.

The tenders of E. and A. Shadrack have been accepted by West Ham Education Committee for annual supplies of Clifton best hand-picked hards at 22s. 3d. per ton, and Bolsover best hand-picked hard steam at 21s. per ton.

Messrs. Bradbury, Son and Co. have successfully tendered to the Southampton Town Council for an annual supply of Bwllfa steam coal at 22s. 3d. per ton.

Richmond Town Council has accepted the tender of Bradbury, Son and Co. Limited for an annual supply of Glasbrook Merthyr smokeless Admiralty unscreened steam coal at 19s. 6d. per ton; also the tender of Charrington, Sells, Dale and Co. for annual supplies of best Silkstone coal at 21s. 5d. per ton, Derby brights at 20s. 9d. per ton, and household coal at 19s. 4d. per ton.

The tender of Hinchliffe and Co. has been accepted by Shoreditch Borough Council for an annual supply of Silkstone coal, from the Mapperley Colliery, at 22s. 8d. per ton.

Hemel Hempstead Town Council has accepted the tender of Balderson and Sons for supplies of Moira steam coal to March 31 next at 18s. per ton; also the tender of Brentnall and Cleland for a similar supply of coal at 17s. 9d. per ton, and that of Nunn and Co. for slack coal at 12s. per ton.

The following tenders have been accepted by the London County Council for annual supplies of coal to the undermentioned asylums:—House coal: The Clay Cross Company, Clay Cross best cobbles (railborne), to Banstead and Cane Hill, 20s. 4d. per ton; Colney Hatch, 17s. 11d.; Horton, Long Grove, The Manor and Epileptic Colony, 20s. 6d. R. C. A. Palmer-Morewood (Swanwick Colliery): Swanwick Mainbrights (railborne), to Bexley, 19s. 6d. per ton. Annesley Colliery Company Limited: Annesley bright cobbles (railborne), to Claybury 18s. 5d., Hanwell 18s. 2d. Steam coal: Tredegar Iron and Coal Company Limited: Tredegar washed nuts (railborne), to Banstead and Cane Hill, 22s. 5d. per ton; Claybury, 21s. 9d.; Colney Hatch, 21s. 2d; Horton and the Epileptic Colony and Long Grove, 22s. 8d.; Tredegar washed peas (railborne) to Banstead and Cane Hill, 20s. 11d.; Claybury, 20s. 3d.; Colney Hatch, 19s. 11d.; Central Station, 21s. 2d. Powell Duffryn Steam Coal Company Limited (per Wm. Cory and Son Limited): Powell Duffryn New Tredegar washed nuts (railborne) to Hanwell: 21s. 9d. Wm. Cory and Son Limited: Nixon's Navigation washed nuts (seaborne) to Bexley, 22s. 7d.; The Manor, 23s. 3d.; Nixon's Navigation washed peas (seaborne), Bexley, 21s. 1d. Gas coal: Wm. Cory and Son Limited: Holmside unscreened (seaborne) to Banstead, 19s. 6d.; Hanwell, 20s. Old Silkstone Collieries Limited: Old Silkstone unscreened (railborne) to Colney Hatch, 18s. 4d.

MINING AND OTHER NOTES.

At a memorial service held in the Denahy Parish Church on Sunday the Archbishop of York, in the course of an address, said it was wonderful to think that on the very day of the disaster their King descended a pit, and no one knew better than he did, who had to discuss with the King whether it was a danger he ought to undergo, the motives that led his Majesty to do it. What the King said he (the Archbishop) would surely be forgiven for repeating. His Majesty said:—"Whatever happens, I have got to show I want to do all I can at this time to see for myself, as far as I can, the risks to which my miners are exposed."

The Barrow Hæmatite Iron and Steel Company have just put into operation a new big blast furnace. The new installation is on the same modern lines as another furnace which was built and put into blast last year, and is now giving good results. There are now six furnaces in blast at the Barrow works.

An important scheme for an extension of the Great Central Railway is being taken up at Coventry, the project being to connect up that city by means of a line from the Great Central main line at Lutterworth to the Great Western near Birmingham. A conference has been arranged, and will shortly be held at Coventry, between representatives of the municipal and commercial bodies interested in reference to the financial side of the question.

At Cardiff County Court on the 10th inst., Edward W. Rodden, mining engineer, Cardiff, claimed £36 balance of wages under a verbal agreement from Edward Wiley, commission agent, Liverpool. It was stated that Mr. Rodden had been engaged by defendant as manager of a mine in Lancashire, at a salary of £3 a week, from August 1907. The salary was paid up to the end of that year, when operations were suspended. In January 1908, an agreement was made, under which plaintiff was to receive £1 a week as a retaining fee, but no retaining fees had been paid. His Honour entered judgment for plaintiff for the amount claimed.

The Solway Ironworks at Maryport, owned by the Workington Iron and Steel Company, re-started last week after being idle since last August. They employ 250 hands.

The annual meeting of the British Association will be held on September 4, at Dundee, and an unusually large number of foreign guests, especially physiologists and geologists, are expected to attend the meeting. The new president is Prof. E. A. Schäfer, F.R.S., Professor of Physiology in Edinburgh University, and the originator of the resuscitation system that bears his name. The president of Section A (Mathematical and Physical Science), Prof. H. L. Callendar, will probably devote his address to a consideration of the relations of heat and electricity, and to a review of modern theories of radiation and specific heat. In the same section Dr. F. A. Lindemann will introduce a discussion on the atomic heat of solids. The president of Section B (chemistry) is Prof. A. Senier, of Galway, and Dr. B. N. Peach, F.R.S., will preside over Section C (geology); the latter will take as the subject of his address the relation between the Cambrian faunas of Scotland and North America. Sir Henry H. Cunynghame is the president of Section F (economic science and statistics), and will urge the necessity of treating political economy from the point of view of an exact science, concluding with a few remarks on the present relations of political economy to legislation and politics. In this section a discussion on labour disputes will call forth papers by (*inter alias*) Sir Charles Macara, Mr. Ramsay MacDonald, M.P., Prof. Chapman, and Mr. C. R. Fay. Dumping in the tin-plate industry will be dealt with by Mr. J. H. Jones. Prof. A. Barr, of Glasgow, will preside over Section G (engineering), and his address will deal with the conversion of natural sources of power to the service of man. Mr. Leonard Hill, F.R.S., is the president of Section I (physiology), and will give the results of experiments on the effect of confined atmospheres on various occupations.

A large party of members of the North of England Institute of Mining and Mechanical Engineers left Newcastle on Friday on an excursion to Easington Colliery, which was placed at the disposal of the visitors by the Easington Coal Company Limited. On arrival the members were received on behalf of the colliery company, and made an inspection of the surface and other arrangements at the pit.

Nobel's Explosives Company Limited have prepared a leaflet giving a summary of the new regulations for the supply, use, and storage of explosives, which came into force at the beginning of this month, in accordance with the Explosives in Coal Mines Order of May 21.

Mr. George Young, of the Londonderry Offices, Seaham Harbour, who has been secretary of the Londonderry Collieries Limited since the several pits were converted into a private company, and who for many years prior to that was cashier to the Londonderry Collieries, is retiring shortly. Mr. Young has held a responsible position under the Londonderry family for nearly half a century. Mr. Thomas Brough, manager of Seaham Colliery, of the Londonderry Collieries Limited, is also retiring shortly, owing to the state of his health.

In view of the development of the petroleum industry in various parts of the world, including the British colonies, the University of Birmingham, which already has provided special courses in petroleum mining, has prepared a syllabus to cover the course for the degree of B.Sc. (in petroleum mining) and the diploma in petroleum mining.

Sir Thomas Ratcliffe-Ellis has been appointed independent chairman of the seven Conciliation Boards recently elected on the Caledonian Railway system for the purpose of dealing with disputes which may arise between the company and its employees.

In Stirling Sheriff Court on the 15th inst., Mr. Wallace Thorneycroft, managing director of the Plean Colliery Company, and Mr. Peter Inglis, manager at No. 4 Pit, were charged with a contravention of the Mining Regulation Act of 1908. The allegation was that, on May 5 and 6, seven men were at work, through their connivance, for a longer period than eight out of twenty-four hours. Several objections were made as to the competency and relevancy of the complaint. Sheriff Mitchell repelled the objections, and the trial of the case was fixed for October 7.

The case of Cooper *v.* the Micklefield Coal Company Limited was heard last week in the King's Bench Division, before Mr. Justice Hamilton. The plaintiff was Mr. Andrew Cooper, of Beaconsfield, Scalby, near Scarborough, who sued the defendant company on a contract by which defendants undertook to deliver 10,000 tons of cobbles coal to a Mr. Ben. Houlden, which contract, plaintiff said, had been assigned to him with Houlden's coal business at Leeds. Defendants said the contract was not assignable. His lordship, in giving judgment, said the whole question was whether there was in this case that personal element which had been repeatedly made the ground for refusing to recognise the assignability of a contract. He held that the contract was unassignable, and that the action failed. Judgment would be for the defendants, with costs.

A general committee, representing the engineering societies of the British empire and of the United States of America, has been formed to carry into effect a proposal for the erection in Westminster Abbey of a memorial window to the late Lord Kelvin. It is desired that contributions to the fund should be sent either to Dr. J. H. T. Tudsbery, honorary treasurer, 12, Dartmouth-street, Westminster, S.W.; or to Messrs. Coutts and Co., bankers, at 440, Strand, W.C., the treasurers to the fund.

The directors of the Bristol and South Wales Railway Wagon Company Limited have elected Mr. John Bicknell to a seat on the board to fill the vacancy caused by the death of Mr. Robert Hall Warren.

At the monthly meeting of the Hamilton Town Council it was reported that rapid progress was not being made with the scheme whereby the corporation should extract the remainder of the coal in the Townsland Pit. It was explained that the adjoining proprietors had been approached as to the terms in which they were prepared to join in the working of the coal with the burgh as a united subject but so far no reply had been received. With regard to the coal underneath the barracks it was pointed out that the Crown authorities would only accept the terms given to the other proprietors in the burgh. The council authorised the committee to continue the negotiations.

Sinking operations have been commenced at Easter Dullatur, in the Cumbernauld district of Dumbartonshire. It is understood that the boring operations revealed the presence of three seams of coal.

The United States Metallic Packing Company Limited have removed to new and extensive premises at the Soho Works, Allerton-road, Bradford.

The assistant manager at the Tinsley Park Collieries, Mr. Douglas Hay, B.Sc., attained the distinction of first place in the recent examination for assistant inspectorships of mines. Mr. Hay obtained his mining experience at Shirebrook Colliery—of which his father, Mr. William Hay, J.P., is general manager—and Stanton Colliery, near Burton-on-Trent, before going to Tinsley.

Mr. James Watson, a well-known iron merchant and owner of sea-going lighters, is retiring from business after some 40 years' association with trade on the Tyne.

During the visit of the King and Queen to the Lewis-Merthyr Collieries recently, their Majesties showed great interest in the coal washing plant. The operation of this fine automatic plant was explained to them by Mr. Oliver Sheppard, J.P., of Messrs. Sheppard and Sons Limited, of Bridgend, who supplied the installation. It represents their latest pattern and samples of coal before and after washing were shown, which showed the ash to have been reduced from 15·5 to 4·25 per cent. Both the King and Queen asked a number of questions as to the process.

Mr. G. B. Gregory has resigned his position as managing director of Messrs. G. B. Gregory Limited, railway wagon owners and contractors, Manchester, and has also retired from the active management.

The Secrétariat International du Carbure de Calcium has offered a prize of 5,000 fr. for the best acetylene safety lamp for use in fiery mines. Competitors must send in their designs to the Secrétariat, 5, Rue des Granges, Geneva before March 31, 1913.

The late Mr. G. H. Randall, of Pontlottyn, who was manager of the Rhymney Iron and Coal Company's colliery at Rhymney, and who died on March 12, left estate of the gross value of £2,396, of which £2,304 is net personalty.

By permission of Major W. E. Walker, general manager a visit was paid on Wednesday, July 10, to Clifton Colliery by members of the Midland branch of the National Association of Colliery Managers, the monthly meeting being also held at the colliery offices. Mr. H. R. Watson, of Codnor, president of the branch, was in the chair, and before the ordinary business was commenced he feelingly referred to the disaster at Cadeby Main Colliery. The meeting passed a vote of condolence with the relatives and friends of those who had perished, of sympathy with the owners and management of the colliery, and of admiration at the heroic conduct of the rescue parties. After the business had been transacted the visitors made an inspection of the surface machinery, and also descended the pit, where they witnessed the haulage arrangements. At the conclusion of the visit Mr. Watson expressed thanks to the management for giving them an opportunity of viewing the plant, adding that it had been somewhat of a surprise to find that a comparatively old colliery like Clifton had been brought up to date in regard to mechanical and electrical appliances

Mr. G. A. Lewis, Derby, general manager of the National Association of Colliery Managers, Mr. R. Laverick, Nottingham, secretary of the Midland branch, Mr. Percy W. Lewis, Derby, and Mr. G. S. Bragge, of the Granville Colliery, Swadlincote, have been appointed under the Coal Mines Act, 1911, as examiners for Derbyshire of candidates for qualification as colliery deputies in gas testing, hearing, and measuring ventilation.

Mr. John Varley has been elected chairman of the board of directors of the Scottish Australian Mining Company Limited, in the place of the late Mr. George Rait. Mr. Frederick William Turner retires from the secretaryship, and has been elected a director of the company. Mr. Thomas Glover Park has been appointed to succeed Mr. Turner as secretary from and after the 20th instant.

A meeting of the Advisory Committee for the Imperial Institute was held at 7, Whitehall-gardens, on July 11, when there were present Lord Emmott, Sir A. E. Bateman, Sir Cecil Clementi-Smith, Captain Muirhead Collins, Mr. C. A. Harris, Sir T. W. Holderness, Sir T. H. Holland, F.R.S., Mr. George Miller, Col. D. G. Pitcher, Prof. Wyndham Dunstan, F.R.S. (director), and Mr. Percy Ashley (secretary). Lord Emmott was elected chairman of the committee, in place of the late Lord Northcote; and the committee subsequently considered a number of question relating to the work of the institute.

The session of the mining classes for 1911-12, promoted by the Gloucestershire County Council, closed with the annual examination on the 9th ult., upon which the examiner has reported that the high standard of capability mentioned in previous reports had been more than sustained; that the elementary class had produced a contingent of capable men for the advanced class, and the students in both classes who secured highest places in the examination had rendered papers of high merit and sound judgment. As a result of the examination the 20 best men were selected to compete for the principal scholarship of £100 per year for two years, and nine travelling scholarships, and the examination for this competition was conducted by Mr. Stuart on Saturday. The winner of the principal scholarship will go direct to the Lancashire collieries to complete his education in mining, and the winners of the travelling scholarships will, under the guidance of Mr. Joynes, visit other mines in the country to gain insight and experience not obtainable in the mines of the Forest of Dean.

University of Sheffield.—The matriculation examination for the degree in mining will be held on September 10, 1912. Intending candidates should apply to Mr. W. M. Gibbons, the registrar, before August 24. The mining diploma (day) course commences on October 2, 1912. The certificate (Saturday afternoon) course commences on September 21, the Derby mining course on September 21 and the mining teachers' course on September 28. The course in electricity applied to mining commence on September 28.

AWARDS UNDER THE MINIMUM WAGE ACT.

(Continued from page 70.)

Shropshire.

The following is the text of Mr. B. Francis-Williams' award for the Shropshire district:—

Whereas a Joint District Board for the district of Shropshire has been formed under the above Act, and duly recognised by the Board of Trade, and whereas I, Benjamin Francis-Williams, one of His Majesty's counsel, have been appointed by the Board of Trade to act as chairman of the id Joint District Board, and whereas the members of the Joint District Board representing the workmen and the members representing the employers, agreed that a specified period longer than three weeks, that is to say, a period of six weeks, should be for the purposes of subsection 2 of section 4 of the said Act, substituted for three weeks. Now the said Joint District Board have agreed that the following shall be the district rules for the said district:—

District Rules.

1. For the purposes of subsection 2 of section 1 of the Act, there shall be local joint committees for each complete colliery firm, consisting of two representatives of the employers and two representatives of the workmen (one representative of the employer and one representative of the workmen at least shall be selected from the Joint District Board) who, in case they disagree, shall call in a chairman, whose decision shall be final. Such chairman shall be selected by the local joint committee from a panel of persons chosen by the Joint District Board, and may, if he thinks fit, submit any question of construction or application of the rules to the chairman of the Joint District Board, whose decision shall be final.

2. No question shall be submitted to the local joint committee unless the workman and an authorised official of the mine have discussed and have endeavoured to settle the point in dispute; and in the event of their having failed to agree, the manager of the mine and the district miners' agent (or other person nominated by the workmen and approved by the employer) have also discussed and endeavoured to agree thereon. When an agreement is come to, a certificate to that effect shall be forthwith signed by the workman and authorised official, or by the manager and district agent, as the case may be.

3. The expenses and charges of the chairman of such local joint committee shall be paid by the local joint committee, and apportioned in the same manner as the expenses of the Joint District Board.

4. A local joint committee shall, when reference is made to it, decide (*a*) whether a workman for the district is one to whom the minimum rate is applicable; (*b*) whether the workman has complied with the conditions laid down by the rules; and (*c*) whether he has or has not forfeited his right to wages at the minimum rate.

5. Such local joint committee, or, if it fails to agree, its chairman, shall give a certificate of every decision. Any decision of a local joint committee may be varied by that committee on the application of either party after the expiration of three months from the date of the certificate. A certificate of forfeiture of the minimum wage rate under this Act, if signed by an authorised official of the colliery and the workman, or alternatively by the manager and the district miners' agent, shall be valid, and shall be substituted for a reference to the local joint committee, and such certificate shall be conclusive.

6. (1) The question as to whether an aged, infirm, or inefficient workman has the right to wages at the minimum rate shall be left to the local joint committee to decide; (2) the wages rate of a workman who is temporarily partially disabled by illness or accident shall, before he resumes work, be fixed by the local joint committee.

7. A workman who fails in any week to duly attend 80 per cent. of his available working days shall forfeit the right to wages at the minimum rate (unless his attendance is prevented by illness or accident or other justifiable cause), and be paid at his existing contract rates. Any difference which may arise as to the cause of such absence shall be decided by the local joint committee, and the minimum wage shall not be payable to such workman until it has been decided that the attendance was prevented by illness or accident, or other justifiable cause. If any workman voluntarily ceases work, or leaves his working place before the proper time at the end of his shift, the proportion of the payment for the time so lost shall be deducted from the amount of his minimum wage for that shift.

8. If a workman, in consequence of his own disregard of proper instructions, breach of colliery rules, or through any other wilful act or default, fails to earn the minimum wage to which he may be entitled, he shall forfeit his right to such minimum wage.

9. (*a*) If a workman, when he presents himself for work at the pit bottom, or at a station within 300 yards therefrom, is informed that something has happened in or about the mine to prevent his working, he shall return to the surface (reasonable facilities being given) and not be entitled to claim any wage in respect to that shift; (*b*) in the event of any interruption of work due to an emergency—for example, if tubs cannot be supplied to him—he shall only be entitled to that proportion of the minimum wage up to the time at which he was informed, but in such case he shall be entitled to leave his working face; (*c*) if from any cause—*e.g.*, shortness of wagons on the surface—it should become necessary to "knock off" the whole or a portion of the mine at an earlier hour than that at which the shift would ordinarily terminate, a workman shall only be entitled to such proportion of the minimum wage as the time worked bears to the full shift.

10. Whenever a contractor or a pieceworker does not perform the amount of work which, calculated at the agreed rates, would produce the minimum, he shall not receive the minimum unless the deficiency is due to any cause for which he is not responsible—for example, faults, bad roof, falls, water, or other unusual conditions.

11. The fact that the minimum wage has been paid to a workman shall not be considered to be a proof of efficiency.

12. A period of not less than two weeks shall be taken for the purpose of ascertaining the earnings of a contractor or pieceworker.

13. Overmen, firemen and others having statutory duties under the Coal Mines Regulation Act, 1911, are not workmen to whom this Act applies; such latter persons shall from time to time be defined by the Joint District Board.

Wage Rates.

And whereas the said Joint District Board, within six weeks after the time at which it was recognised as aforesaid has failed to settle the first minimum rates of wages in that district, now I, the said chairman, in pursuance of the terms of the said Act, and after having heard the parties, do hereby settle the said minimum rates to apply to all coal-mines in the district, and all the workmen employed therein, other than the mines to which and workmen to whom special minimum rates are applied as hereinafter provided.

Boys are those workers who have not reached the age of 21 years:—

Boys.	Per day. s.	d.	Boys.	Per day. s.	d.
13-14 years of age	2	0	18 years of age	3	0
15 " " "	2	2	19 " " "	3	6
16 " " "	2	4	20 " " "	4	0
17 " " "	2	6			

At 21 to be regarded as adult workmen.

	s.	d.
Stallmen in charge of stalls and other practical workmen working in stalls	6	0
Practical timberers and skilled road repairers	5	9
Ordinary datallers unskilled, such as dirt fillers, and emptiers	4	9
Loaders	5	6
Onsetters	5	3
All other adult workmen not less than	4	6

The following special minimum rates shall apply to all collieries in the Hanwood district:—

	s.	d.
Stallmen in charge of stalls and other practical workmen working in stalls	5	0
Practical timberers and skilled road repairers	4	9
Ordinary datallers unskilled, such as dirt fillers and emptiers	4	6
Loaders	4	6
Onsetters	4	6
All other adult workmen not less than	4	6

Forest of Dean.

The agreed figures come to at a meeting of the Forest of Dean District Board, on May 8, 1912, are as follows, the existing standard rates of the district being taken as a basis, plus 30 per cent. on that standard:—

			Percentage (30 per cent.).		Total.	
	s.	d.	s.	d.	s.	d.
Those paid on a basis of	4	0	1	2½	5	2½
" " "	3	10	1	2	5	0
" " "	3	8	1	1	4	9
" " "	3	7	1	0¾	4	8
" " "	3	6	1	0¼	4	6½
" " "	3	4	1	0	4	4
" " "	3	2	0	11	4	1
" " "	3	0	0	10¾	3	11
" " "	2	11	0	10½	3	9½
" " "	2	10	0	10¼	3	8
" " "	2	9	0	10	3	7
" " "	2	8	0	9	3	5¼
" " "	2	6	0	9	3	3
" " "	2	4	0	8	3	0
" " "	2	3	0	8	2	11
" " "	2	0	0	7	2	7
" " "	1	9	0	6	2	3
" " "	1	6	0	5½	1	11½
" " "	1	3	0	4½	1	7½
" " "	1	0	0	3½	1	3½

District Rules.

The following district rules were adopted at a joint conference of owners and workmen held at the Speech House, May 14, 1912.

1. In the event of any difficulty arising in any place, which in the opinion of the workman has prevented him earning the minimum wage, it shall be obligatory upon him to inform the manager, under-manager or overman as soon as practicable, and in any case before leaving the colliery premises.

2. No workman shall be entitled to the minimum wage where the difficulty is caused by his own negligence or inefficiency.

3. Where any difficulty arises which renders it impossible for the workman to earn a day's wage, he shall, subject to the provisions of these rules, be entitled to the minimum wage.

4. No wages shall be required to be made up to the minimum unless the average earnings per day worked for the period of two weeks last preceding fall below the minimum wage

5 A workman who from physical causes, arising either from age or infirmity, or who, being partially disabled by illness or accident, is unable to do the work ordinarily done by a man in his position in the mine, shall be regarded either as an aged or an infirm workman within the meaning of the Act, and shall be excluded from the right to the minimum rates.

6. A workman who is inefficient or irregular by reason of not attending 80 per cent. of the time the pit works for the period in respect of which the claim is made, shall not be entitled to be paid the minimum wage unless he satisfies the management that such irregularity is attributable to illness, accident, or other justifiable cause. No workman shall be entitled to the minimum wage if he has not proceeded promptly to his working place and commenced work, nor if he has ceased work before the time necessary to enable him to reach the shaft for his time to ascend (according to the custom of the colliery), nor if he has been suspended during the shift for any breach of the various Acts, regulations and rules governing his work.

7. In the case of any accident, breakdown, or other interruption over which the management has no control, the workman, on being informed of it, shall be entitled only to such proportion of the daily minimum wage as the period up to the time he was so informed bears to the total period of the shift. The workman shall have the right to ascend the shaft on his return to the pit bottom as soon as is reasonably practicable, the period of waiting not to exceed 30 minutes.

8. If the workman is informed during any part of the shift that for any cause he cannot continue his work, he shall only be entitled to the proportion of the minimum wage which the time he was at work bears to the total period of the full time of the shift. The workman shall have the right to ascend the shaft on his return to the pit bottom as soon as is reasonably practicable, the period of waiting not to exceed 30 minutes.

9. In the case of men driving hard headings the average earnings over the period of each contract shall not be less than the minimum wage.

10. If any dispute shall arise as to whether any underground workman in the district is a workman to whom the minimum rate of wages is applicable, or whether a workman has failed to comply with any of the conditions contained in these rules, or whether by non-compliance with any of these rules such workman has forfeited his right to the minimum rate, it shall be decided in the following manner:—

(*a*) An endeavour shall be made between the manager and workman to settle the difference.

(*b*) Failing that, it shall be considered by the manager and the member of the Minimum Wage Board for that colliery.

(*c*) Failing a settlement by them it shall be referred to a joint committee consisting of three representatives of the officials, and three representatives of the workmen in the colliery where the dispute arose. In case of their disagreement the matter in dispute shall go before the District Board, and if the Board fail to agree, the chairman shall be called in to decide it.

11. A certificate in writing of any decision by any person or persons under the last preceding rule shall be given by such person or persons to both or either of the parties when requested, and such certificate shall be conclusive evidence of the decision.

12. Any workman incapacitated by age or infirmity, or who is partially disabled by illness or accident, who desires to be included in the class that shall not be entitled to the minimum wage shall, with the consent of the owners, be so included.

THE TIN-PLATE TRADE

Liverpool.

The tone of the market is firmer on the week. The enquiry is very fair, and buyers are more inclined to cover their forward requirements. Works are all very busy, and many of them are much behind in their deliveries. A continuance of the present hot weather will not improve matters in this respect, owing to the reduced output. Current quotations are firm as follow:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 14s. 9d. per box; I C 28 × 20 (112 sh. 216 lb.), 29s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 1½d. to 15s. 3d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s per box; I C 14 × 19½ (120 sh. 110 lb.), 15s. per box; I C 20 × 10 (225 sh 156 lb.), 21s. 6d. per box; I C squares and odd sizes, 15s. to 15s. 3d. basis. Ternes are steady at 26s. to 26s. 6d. for I C 28 × 20 unassorted. Charcoal tins run 17s. basis and upwards according to tinning, and are in moderate request. Black-plate is firm at £10 17s. 6d. to £11 per ton basis for finished quality in 30-gauge. Coke wasters meet with a steady demand, and quotations are firm as follow:—C W 14 × 20, 13s. 9d. per box; C W 28 × 20, 28s. 3d. per box; C W 14 × 18¾, 13s. 9d per box; C W 20 × 10, 19s. 9d. per box—all f.o.b. Wales, less 4 per cent.

Stepney Borough Council have accepted the tender of A. Blackmore and Co., for an annual supply of 5,000 tons of Wemyss washed peas at 14s. 7½d. per ton; also the tender of William Cory and Son Limited, for a similar supply of 5,000 tons of Cowdenbeath, Muirfield, and/or Hillhouse washed peas at 14s. 11d. per ton.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Athlone, July 31.—Tenders are invited by the Athlone Urban District Council for 1,000 tons of gas coal, delivered into the Council stores in good and dry condition, as required over the ensuing twelve months. Analysis should accompany the tender. Tenders must be placed in sealed envelopes marked "Tenders for coal," and must be sent by registered post so as to reach the undersigned not later than 6 p.m. on Wednesday, July 31, 1912. The lowest or any tender not necessarily accepted. By order, P. V. C. Murtagh, clerk, Town Hall, Athlone.

Blackburn, August 3.—The Electricity Committee is prepared to receive tenders for the supply and delivery of steam coal for the 12 months ending August 31, 1913. Specifications and forms of tender may be obtained on application at the Electricity Works, Jubilee-street, on and after Saturday, July 20, 1912. Sealed tenders endorsed "Steam coal," and addressed to the Chairman of the Electricity Committee, will be received at the Town Hall up to midday, Saturday, August 3, 1912. The lowest or any tender will not necessarily be accepted. P. P. Wheelwright, M.I.E.E., engineer and manager, Corporation Electricity Works, Jubilee-street.

Abstracts of Contracts Open.

Antrim, July 25.—For 270 tons of best screened coal (150 tons of hard Ayr and 120 tons of Brayton Domain), for the Guardians.

Barnsley, July 22.—For seconds house coal, for the Lady Harriet Wentworth and Barnsley Charity.

Barry, July 26.—For gas coal, for the Urban District Council.

Belfast, July 22.—For 250 tons best steam coal and 150 tons best house coal, for the Belfast Charitable Society.

Bishop Auckland, July 24.—For best household and steam coal, for the Auckland, Shildon, and Willington Joint Hospital Board.

Bridlington, July 22.—For 500 tons of best South Yorkshire screened hard steam coal, for the Waterworks Committee of the Corporation.

Bristol, July 26.—For semi-anthracite or bituminous coal (unwashed small coal), for the Corporation.

Bromley, July 30.—For coal and coke, for the Corporation.

Christiania (Norway), July 13-August 2.—Tenders are invited by the Norwegian State Railway Authorities for the supply of (1) 39,650 tons of best quality locomotive coal (Shireoaks, Langwith, Kiveton Park, Hetton, Sherwood, &c.), and, for supply in Bergen, 1,200 tons of smokeless double-screened Cardiff coal; (2) 672,700 kilogs. of petroleum. Conditions of tender for both (1) and (2) can be seen by British firms at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Clacton-on-Sea, July 22.—For house and steam coal and coke, for the Middlesex Hospital Board.

Darlington, July 25.—For screened household coal (cobbles and double nuts), for the Corporation.

Darlington, July 31.—For approximately 60 tons per week of best steam coal, for the Tees Valley Water Board.

Darwen, July 24.—For rough gas slack and nuts, for the Corporation.

Dewsbury (Yorks), July 25.—For coals, for the Guardians.

Drogheda (Ireland), July 25.—For 400 tons of coal of the following description:—Best Whitehaven, Orrell, screened Workington, Wigan or Maryport coal, for the Guardians.

Dublin, July 22.—For best quality locomotive steam coal in the following quantities:—English coal, 70,000 tons, more or less; or Scotch coal, 80,000 tons, more or less; or Welsh coal, 60,000 tons, more or less, for the directors of the Midland Great Western Railway of Ireland Company.

Dublin, July 27.—For house coal, for St. Patrick's Hospital, James's-street, Dublin.

Dublin, July 29.—For 200 tons of house, 60 tons of Welsh steam coal and 200 tons of coke, for the Board of Governors.

Evesham, July 30.—For from 500 to 3,500 tons (or less if required) of best screened gas coal, for the Corporation.

Exmouth, July 26.—For about 7,000 tons of best gas coal (screened or unscreened), for the directors of the Exmouth Gas Company.

Great Yarmouth, July 26.—For house and steam coal, for the Corporation:—Requirements approximate to 620 tons of house coal and 200 tons of steam coal, and 200 tons of coke.

Harrington, July 23.—For best steam washed nuts, for the Harrington and Distington Joint Water Committee.

Hastings, July 24.—For fuel, for the Education Committee; about 330 tons machine-broken coke (from local tradesmen), about 230 tons (from local tradesmen), about 44,000 bavins.

Hastings, July 30.—For 500 tons of best Welsh anthracite gas peas, for the Corporation.

Hastings, July 30.—For 1,400 tons of Welsh steam coal, for the Corporation.

Haworth, July 23.—For 3,250 tons of gas coal (screened, unscreened, and gas nuts), for the Urban District Council.

Hereford, August 10.—For 12,000 tons of gas coal, for the Corporation.

Hove, July 24.—For supplying such quantities as may be required, not exceeding 60 tons of anthracite coal, 15 tons of hard steam coal, 215 tons of best household coal, and 25 tons of unbroken coke, for the Corporation.

Jarrow-on-Tyne, July 23.—For coal and coke, for the Education Committee of the Corporation.

Keighley, August 5.—For coal, for the Keighley and Bingley Joint Hospital Board.

Kendal, July 22.—For 8,500 tons of screened or unscreened gas coals and nuts, for the Corporation.

Leith, July 22.—For 6,500 tons of washed shingles, for the Corporation.

Limerick, July 23.—For 300 tons either of best 4 ft. Wigan, Whitehaven, Garston, Orrell coal, for the Guardians.

Littlehampton, July 31.—For Nixon's steam Navigation coals, for the Urban District Council.

London, July 22.—For coal and coke, for the Metropolitan Water Board.

London, July 25.—For 450 tons of coal; also for the supply of steam and other coal, for the Stepney Guardians.

Maidstone, July 26.—For 200 tons of coal, for the trustees of the Edmett charity.

Malton, July 27.—For gas coal, for the directors of the Malton Gas Company. Quantity required about 5,000 tons.

Mansfield, July 20.—For house coal, for the Board of Management of the Mansfield and Mansfield Woodhouse District Hospital.

March, July 23.—For coal and coke, for the Isle of Ely Education Committee.

Market Harborough, July 27.—For about 4,500 tons of best screened gas coal and nuts, for the Urban District Council.

Mirfield, July 23.—For 11,000 tons of best screened gas coal, for the directors of the Gas Company.

Nottingham, July 25.—For screened slack and screened nuts, for the Public Baths Committee of the Corporation.

Oakham, July 22.—For coal and coke, for the Rutland Education Committee.

Oldham.—For the supply of coal, for the Markets and Baths Committee of the Corporation, to the various baths. Particulars can be obtained from the Superintendent at the Central Baths, Union-street.

Oldham, August 6.—For gas coals, for the Gasworks Committee of the Corporation.

Oxford, July 22.—For Warwickshire or Leicestershire hand-picked cobbles, for the Education Committee.

Penrith, July 23.—For gas coal and cannel, for the Urban District Council.

Portsmouth, July 24.—For coal (other than Welsh coal), for the Corporation.

Ramsbottom, July 29.—For coal, for the Bury and District Joint Hospital.

Rawmarsh, July 22.—For 3,000 or 5,000 tons of screened gas coal or nuts, for the Urban District Council.

Rochester, July 24.—For 34,000 tons of gas coal, for the directors of the Rochester, Chatham, and Gillingham Gas Company.

Rochester, September 3.—For coal, for the Corporation.

Skipton, July 25.—For about 8,000 tons of best gas coal (screened, unscreened and nuts), for the Urban District Council.

Stirling, July 24.—For coal, for the Governor of the Poorhouse.

Stockport, July 22.—For best engine slack and house coal, for the Sewage Outfall Committee.

Sunbury, July 25.—For 2,000 tons of gas coal, for the directors of the Sunbury Gas Consumers' Company Limited.

Torquay, July 22.—For 3,000 tons of approved gas coal, for the Corporation.

Watford, July 22.—For coals and coke, for the Watford Urban and Bushey Urban School Managers.

West Ham, July 25.—For coal and coke, for the Corporation.

Widnes, August 2.—For coal, for the Corporation.

Winchester.—For 150 tons double-screened household coal. Mr. A. E. Russell, West Downs, Winchester.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Aberdare, July 29.—*Electricity Plant.*—For plant, &c., for the Urban District Council (Electricity Supply Works), (*a*) machinery foundations, trenches, &c.; (*b*) engines, dynamos, static balancer, booster, switchboard and connections, piping, &c.

Bristol, July 22.—*Coal Elevating Plant.*—For coal-elevating and coal-conveying plant, for the Corporation.

Melbourne (Australia), July 31.—*Steel Rails.*—For the following rails and/or fishplates, for the Agent-General for Victoria, Australia (Victorian State Railways):—Contract 22,918: Approximately 2,100 tons of 60 lb. steel rails, and approximately 144 tons of steel fishplates, for 60 lb. rails. Contract 23,038: Approximately 13,146 tons of 80 lb. steel rails, and approximately 1,174 tons of steel fishplates, for 80 lb. rails. Forms obtainable at the office of the Agent-General for Victoria, Melbourne-place, Strand, London, W.C.

Moose Jaw (Sask., Canada), August 1.—*Steam Electric Machinery.*—For one 500-kw. steam-driven generating set, for the City Commissioners.

Newport (I.W.), July 24.—*Boiler, &c.*—For a boiler, for the Isle of Wight Guardians.

Russia.—*Motor Engines, &c.*—The Board of Trade is notified that the municipal authorities of a city in Russia are about to invite tenders for the supply of motor engines, pumps, &c., for installation in the central water-distributing station. Further particulars can be obtained by British firms on application to the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Stourbridge, July 25.—*Cast Iron Pipes.*—For about 857 tons of cast iron pipes, varying in size from 12 in. to 5 in. in diameter, for the Stourbridge and District Water Board.

Valetta (Malta), August 1.—*Cast Iron Pipes, &c.*—For cast iron pipes and irregular castings, for H.M. Government (No. 204). Particulars, &c., can be obtained on application at the Valetta office, or to the Crown Agents for the Colonies, Whitehall-gardens, London.

Walsall, July 30.—*High- and Low-tension Switchgear.*—For high- and low-tension switchgear, for the Corporation.

COAL, IRON AND ENGINEERING COMPANIES.

Argentine Iron and Steel (Pedro Vasena e Hijos) Company Limited.—The statutory meeting was held on the 12th inst., Baron Emile B. d'Erlanger presiding. The chairman said the total increase in the sales since they took over the business—that is to say, since March 1, 1912—has amounted to 578,000 dols. The immediate prospects of the company were eminently satisfactory, and he had confidence also in the more distant future.

Bessemer (Henry) and Co. Limited.—The directors have declared an interim dividend of 6d. per share (free of tax) on the ordinary shares.

Brush Electrical Engineering Company Limited.—The report for 1911 states that the company's manufacturing output for 1911, both from the electrical engineering and from the rolling stock departments, showed a marked improvement over the results for the previous three years. Although the net result of the year's working is a loss of £5,688, after paying interest on all the debenture stocks, this loss is less than in preceding years and compares with a loss of £10,780 for 1910, and with a loss of £21,230 for 1909. The directors have prepared a scheme for reduction of capital and for raising fresh capital required to pay off existing loans and to enable the company to carry on its business with greater advantage. They propose that a small representative committee be appointed. The contracts undertaken by the company are mainly of a class which involve a large lock-up of money while in progress, and shortage of liquid capital has made it necessary to arrange for temporary loans. To secure part of these loans bonds for £50,000 of a new issue of second prior lien debenture stock have been deposited. Any scheme that may be decided upon for the introduction of fresh capital will include provision for redemption of this stock. In the opinion of the directors a special effort is necessary to strengthen the company's finances in order that full advantage may be taken of the improved conditions.

Carlton Iron Company Limited.—The accounts for the year ended April 30, 1912, show a profit of £11,369 (as against £3,641 for previous year), of which £10,363 is appropriated for interest on debenture bonds and loans, leaving £1,006, which reduces the debit balance of profit and loss account to £150,215.

Emerson, Crice Limited.—This private company has been registered, with a capital of £500 in £1 shares, to carry on the business of dealers in steel files, electrical and general engineers, &c. First directors: A. G. Holmes and T. H. Jackson (provisional directors). Qualification, one share.

Gibbons (H.) and Co. Limited.—This private company has been registered, with a capital of £6,000 in £1 shares, to take over the business of an engineer, founder and smith carried on by H. W. Gibbons at Hungerford, Berks., as Gibbons and Son. First directors: H. W. Gibbons, G. C. Goodhart, Mrs. A. M. Goodhart and E. S. Brereton.

Harvey United Steel Company Limited.—At the twelfth ordinary general meeting held on the 15th inst. in London, Mr. Albert Vickers, the chairman, said the directors had considered it advisable that the company should go into voluntary liquidation, in order that so much of the assets as were available at the present time should be distributed without further delay. If the shareholders approved of that course, the liquidators would be in a position to distribute about 5s. per share within a few weeks of the company going into liquidation. It was anticipated that later there would be a second distribution of about 1s. 6d. per share, and if the litigation was concluded successfully an additional sum of 1s. 6d. per share would be available for distribution, making the second and final distribution up to about 3s. per share. The resolution to wind up the company voluntarily was carried without discussion.

Henderson (David and William) and Co. Limited.—The directors report that the result of the year's work has been unsatisfactory. The year's working shows a loss of £15,970, to which is added the usual provision for depreciation (£4,500), making £20,470, which has to be added to the sum already at debit of profit and loss account. The interim dividend on the preference shares was duly paid, leaving a balance of £12,500. The directors are advised that in view of the amount at debit of profit and loss account the final dividend should not be paid meantime.

Lancashire and Yorkshire Wagon Company Limited.—The report for the year ended 30th ult. states that, after deducting what is required for the replacement of capital invested in wagons, depreciation of fixed plant, tools, &c., and the interim dividend for the half-year ended December 31, 1911, there remains a balance of £9,092, which the directors recommend be appropriated as follows, namely: £5,000 to payment of a dividend at the rate of 10s. per share and £2,000 to payment of a bonus of 4s. per share, free from income-tax, for the half-year ended June 30, 1912; and the balance of £2,092 to be carried forward. The total written off for depreciation to date is £37,033, and the reserve account now amounts to £10,000.

Kyshtim Corporation Limited.—The accounts for 1911 show that the interest and commission receipts, including those due from the Russian company, amounted to £65,657, a large part of which has been applied to debenture interest, standing charges, general expenses, and to writing off the balance of preliminary expenses, amounting to £11,333. After allowing for these items there remains £17,734, which is reserved to meet income-tax and expenses connected with the new debenture issue. The Corporation holds the total share capital of the Kyshtim Mining Works (a Russian company), and has made loans to that company amounting at the close of 1911 to £761,152.

Lochgelly Iron and Coal Company Limited.—The profits for the year ended May 31, after deducting expenses and depreciation on works and plant, amounted to £32,471, to which has to be added £5,417 brought forward. The directors recommend a final dividend of 15s. per share, less tax, on the ordinary shares, leaving £9,966 to be carried forward. The dividend for the year is thus 10 per cent., as compared with 5 per cent. in the previous year.

Maesycwmmer Brick, Stone and Coal Company Limited.—This company has been registered, with a capital of £15,000 in £1 shares, to carry on the business of colliery proprietors, coalowners, coke manufacturers and dealers, patent fuel makers, &c., to acquire the business carried on at Maesycwmmer, Mon., as the Maesycwmmer Brick, Stone and Coal Company. The subscribers are:—E. Harvey, Glyncoed, Maesycwmmer, colliery manager; J. L. Herbert, Glyndwr, Tredegar, estate agent; T. Reynolds, Vale Cottage, Tredegar, mining engineer; M. H. Hughes, Anwyl-Fan, Tredegar, merchant; B. Nicholas, Glencoed, Maesycwmmer, manager; W. J. Jones, Beacons View House, Brecon, manager; W. L. Jones, Beech House, Maesycwmmer, clerk of the works. Minimum cash subscription, £7. The number of directors is not to be less than three nor more than seven; the first are E. Harvey, J. L. Herbert, T. Reynolds, and M. H. Hughes. Remuneration, £100 per annum divisible. Solicitor, W. D. Lewis, 28, High-street, Bargoed, Glam.

Mitford (Calgary) Colliery Company Limited.—The directors have invited subscriptions at par for 500 6 per cent. first mortgage participating debentures of £100 each (part of a series of 650 like debentures, of which 150 will be issued fully paid to the vendors in part payment of the purchase consideration). The subscribers to this issue will be entitled, when the debentures have been paid in full, to receive from the vendor syndicate for each debenture subscribed a bonus of 30 per cent. in fully paid ordinary shares of 5 dols. each. In addition to the fixed 6 per cent interest the debentures will also be entitled to participate in profits to the extent of a further 6 per cent. per annum (making 12 per cent. in all) after the issued share capital for the time being has received 6 per cent. per annum. A 3½ per cent. cumulative sinking fund will commence in October 1915. The company, which is situated at Mitford, near Cochrane, Alberta, has a share capital of 1,000,000 dols. The property is held under Crown grants and leases and approximates 5,120 acres in extent. Three experts (Messrs. John Cadman, F. C. Greene, and Cunningham Craig) have reported on the coal measures, and the estimated amount of coal is given as 19,000,000 tons. Development work has apparently not been carried on for more than six months, but two slopes have been driven 605 ft. and 330 ft. respectively, and merchantable coal has been produced in small quantities. The vendor concern is the Calgary Coal Syndicate Limited, which sells its interest in the property for £78,000, payable as to £15,000 in debentures, £60,000 in shares, and £3,000 in cash; the company, however, has also to indemnify the syndicate against all the outstanding liabilities it has incurred, and as these amount to about £22,700, the total purchase price is really £100,700, of which £25,700 is payable in cash. The directors are Messrs. R. B. Bennett, K.C., M.P., of Calgary; C. H. Pollen, M.I.A.C.E., F.R.S., of Cranbrook; B. C. and N. E. Brooks, of Calgary. The English advisory board consists of Messrs. Thomas Ritchie, of Overstrand; John Wood, of Coxhoe (managing director of the Trimdon Coal Company); and Major R. G. T. Baker-Carr, of London.

Pollard Engine Syndicate Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of engine and machinery, &c., manufacturers and dealers. First directors, J. L. Elliot and A. Bonnin. Qualification, one share. Registered office, Capel House, New Broad-street, E.C.

Scholes (J. S.) and Son Limited.—This private company has been registered, with a capital of £10,000 in £5 shares, to take over the business of coal, &c., merchants, dealers, agents and factors, carried on by C. Scholes and J. H. Scholes as J. B. Scholes and Sons. First directors, C. Scholes and J. H. Scholes. Qualification, £2,000. Registered office, Astley Bridge Sidings, Blackburn-road, Bolton.

Scottish Wagon Company Limited.—An interim dividend has been declared of 3½ per cent., less tax.

Steel Company of Canada Limited.—The report for the year ended December 31, 1911, shows a net profit, after allowing 404,500 dols. for repairs, maintenance and improvement of plant and machinery, of 1,373,500 dols. Of this sum, interest on bonds and mortgage, cost of underwriting and stamping bonds, have absorbed 484,100 dols., the preference dividend requires 454,700 dols., and there has been credited to depreciation fund, renewals and improvements of plant account 100,000 dols., leaving to be carried to credit of profit and loss account, 337,700 dols. The amount now at credit of the depreciation and renewal of plant fund is 204,100 dols., and at credit of profit and loss account 553,600 dols. The 650,000 dols. of bonds set aside to provide further working capital were sold during the year, the total bond issue being now 7,500,000 dols., as compared with 6,850,000 dols. at the end of 1910.

Stewart (John) and Son (1912) Limited.—This private company has been registered, with a capital of £15,000 in £1 shares, to carry on the business of manufacturing engineers, boiler makers, brass and iron founders, &c. First directors: C. V. Faviell and R. M. Hudson. Qualification, 250 shares. Registered office, 22, Billiter-street, E.C.

Wales (Thos.) and Sons Limited.—This private company has been registered, with a capital of £5,000 in £1 shares (1,500 6 per cent. cumulative preference), to carry on the business of manufacturers of steel and iron goods, &c. First directors: A. Wales, J. Wales and W. Barlow. Qualification, £250.

Willow Bridge Engineering Company Limited.—This private company has been registered, with a capital of £500 in £1 shares, to carry on the business of engineers, founders, manufacturers of agricultural implements and other machinery, &c., and to acquire the goodwill and assets of the Precision Tool Company of Leicester. First directors: J. Green and H. Collins. Qualification, £50. Registered office, 172, Willow-street, Leicester.

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, July 9, 1912, is as follows:—Antwerp, 315 tons; Amsterdam, 633; Alexandria, 4,899; Assens, 1,997; Buenos Ayres, 3,382; Bremen, 2,271; Cronstadt, 14,000; Constantinople, 1,700; Christiania, 211; Copenhagen, 3,902; Drontheim, 172; Ghent, 348; Gothenburg, 908; Harlingen, 2,206; Hamburg, 8,175; Landscrona, 1,753; Leghorn, 856; Libau, 355; Malmo, 3,844; Marseilles, 803; Naples, 3,607; Nakskov, 1,286; Oxelosund, 2,732; Pernau, 1,576; Riga, 3,110; Rotterdam, 10,132; Reval, 2,198; Rouen, 6,100; Stettin, 2,588; Stockholm, 1,890; St. Petersburg, 3,309; Skutskar, 2,042; Trieste, 361; Venice, 1,022; Wyborg, 1,088; Wasa, 296; Wilhelmshaven, 2,868; Wyk, 91; total, 98,026 tons. Corresponding period, July 1911, total, 46,541 tons; corresponding period July 1910, total, 54,848 tons.

THE FREIGHT MARKET.

Outward chartering from the north-east coast has been rather light in volume this week, and rates—excepting the Mediterranean and Bay ports—are generally easier. At South Wales a large amount of business has been done, and rates in most directions are stronger, there being a good enquiry and some shortage of tonnage. Practically nothing has been done at the Clyde. The Humber is quiet, with tonnage fairly plentiful and rates unaltered. Homewards, Odessa advices report that the surplus of tonnage at the Black Sea has been cleared off, and that vessels are now limited in number. Owners are holding out for higher rates, and, with harvesting progressing rapidly and considerable quantities of new crop expected at the seaboard by the end of the month, their position would appear to be fairly strong. The Danube and Azof are also firmer. There is a good enquiry from the East, and the tone is firm. The Mediterranean and ore trades are strong, with tonnage scarce. The Baltic is steady. America is unaltered. The River Plate is unchanged.

Tyne to Aalborg, 1,850, 6s., 350; 1,800, 6s.; Antwerp, 2,500, 4s. 4½d.; Alexandria, 6,000, 11s. 9d.; Brunsbruttel, 1,500, 5s. 6d.; Barcelona, 2,100, 12s. 3d.; Bas Indre, 2,000, 7s.; Calais, 1,900, 4s. 6d.; Catania, 3,000, 12s. 4½d., 600; Carthagena, 3,000, 11s.; 2,000, 11s. coal, 13s. 6d. coke; Finland, 1,400, 8s. 3d., end August, six ports discharge; Genoa, 4,300, 11s. 9d.; 3,200, 11s. 9d.; 3,600, 11s. 9d.; Gefle, 1,800, 7s. 3d.; Lisbon, 10s., 250; London, 1,800, 3s. 9d.; 2,000, 3s. 6d.; 1,800, 3s. 5d.; Malaga, 2,000, 11s., 350, from Dunston; Nice, 2,000, 13s. 6d., 400; Port Kunda, 2,200, 7s.; Palermo, 4,000, 12s. 6d.; Savona, 11s. 3d.; 3,600, 11s. 9d.

Cardiff to Aden, 12s. 6d., July; 5,500, 12s. 6d., August 10 cancelling; Algiers, 3,700, 13 fr., 1,000, ppt.; 5,600, 12½ fr., July; 3,900, 12¾ fr.; Brindisi, 4,000, 12s., 500, ppt.; Bona, 1,600, 16½ fr., ppt.; 1,600, 16¾ and 17¼ francs; Campana, 4,200, 21s. 6d., end July; 23s.; Chantenay, 2,500, 9 fr.; Colombo, 13s., August 15; Caen, 1,600, 6s. 4½d., spot; Calais, 1,250, 5s. 9d., ppt.; 1,400, 5s. 7½d.; Cronstadt, 4,300, 7s. 1½d., 4,600, 7s.; Dieppe, 1,500, 5s. 9d.; Dartmouth, 800, 4s. 3d., spot; Dover, 175, 4s. 6d.; Galatz and or Braila, 3,700, 13s., 200 coke 18s., 400 10d., July 22-31; Genoa, 4,000, 11s. 3d.; 4,800, 11s. 6d., July 18; 3,800, 11s. 6d., July 18; 5,500, 11s. 6d., end July-August 10; Gibraltar, 1,800, 9s. 9d., spot, 7s.; Haiffa, 4,500, 14s. 6d., July 20; Havre, 740, 6s.; 1,500, 5s. 6d.; 1,300, 5s. 9d., ppt.; Honfleur, 6s. 1½d.; Leghorn, 3,800, 11s.; 4,800, 11s., 800, August 5; 4,800, 11s. 6d., 800, spot; Lisbon, 1,950, 9s., 350, July 19; Messina, 11s., net, July; Naples, 3,800, 11s.; 4,800, 11s., 800, August 5; 5,300-5,900, 10s. 9d., 1,000, with options, ppt.; 4,800, 11s. 6d., 800, spot; 5,500, 10s. 9d., 1,000, end July-August 10; Nantes, 1,900, 9 fr.; Port Said, 4,000, 11s. 3d.; 4,500, 11s., July 17; 4,200, 11s., July 22; Pernambuco, 4,000, 19s., July; Palma, 1,900, 12s. 6d.; Pembroke, 250, 3s. 9d.; Rosario, 4,200, 22s., end July; 23s., August 19; River Plate, 5,000, 22s., ppt.; 6,000, 22s. 6d.; 5,500, 21s. 10½d., end July; Rosyth, 1,700, 5s. 6d., with options; Rochefort, 1,400, 8¼ fr., ppt.; St. Malo, 500, 5s. 3d.; St. Nazaire, 1,250, 9 fr.; Teneriffe, 2,700, 12s.; Ville Constitucion, 23s.; 4,200, 21s. 6d., end July; Venice, 5,500, 12s., 500, end July-August 10.

Wear to Piræus, 11s.; Naples, 11s. 6d.; Torre Annunziata, 11s. 6d.

Blyth to Helsingfors, 7s. 6d.; 1,700, 7s. 9d.; Havre, 1,000, 5s.

New Holland to Oldenburgh, 300, 7s., ppt.

Hull to Trelleborg, 1,450, 7s.; Malmo, 1,000, 7s. 9d.; Cronstadt, 3,100, 6s., ppt.; 1,200, 6s. 3d., ppt.; Inverness, 820, 4s. 3d.; Pernau, 2,000, 6s. 6d., July 22.

Goole to Aarhuus, sail, 200, £100; Southampton, 480, 5s. 9d.; Ghent, 800, 4s. 9d., ppt.

Newport to Nantes, 1,850, 9 fr.; 1,000, 9 fr.; River Plate, 6,000, 21s. 9d., July; Bilbao, 1,000, 7s., ppt.; Algiers, 5,600, 12½ fr.; Bona, 1,600, 16¾ and 17¼ francs; Brest, 5s. 6d. coal, 6s. 3d. fuel; Bordeaux, 2,200, 9 fr.; St. Malo, 1,200, 5s. 9d.

Swansea to Bougie, 2,300, 15½ fr.; Genoa, 3,100, 12s., ppt.; 2,300, 12s. and 12s. 9d.; 1,500, 12s. 3d.; 2,400, 12s., July 20; Savona, 2,400, 12s., July 20; 2,300, 12s. and 12s. 9d., coal and fuel respectively; 1,500, 12s. 3d.; Honfleur, 900, 6s. 3½d.; Tunis, 17 fr. coal, 18 fr. fuel; 1,900, 17¼ fr., July 19; Havre, 850, 6s. 3d.; 930, 5s. 9d.; Leghorn, 2,300, 12s. coal, 12s. 9d. fuel; St. Nazaire, 2,200, 8.85 fr., ppt.; Fecamp, 900, 6s., ppt.; Rouen, 1,180, 6s. 9d.; 1,700, 6s. 6d.; 750, 6s. 6d.; Sundsvall, 2,000, 7s. 9d., ppt.; La Rochelle, 1,300, 8.87½ fr.

Glasgow to Buenos Ayres, 5,000, 22s., July; Alexandria, 11s. 3d.

Rotterdam to La Rochelle, 2,300, 6s. 10½d., July 15; 1,550, 6s. 10½d., July 18; Rochefort, 1,550, 7s., July 18; 2,300, 7s., July 15; Barcelona, 3,700, 11s. 6d., July 17; Marseilles, 5,400, 13¾ fr. steam coals, 14¾ fr. fuel, July 15; Malta, 3,000, 10s. 6d., July 25.

Wales to Monte Video, sail, 16s.

Grimsby to Wasa, 800, 7s. 6d.

Seaham to Fairwater, 1,500, 6s. 3d.; Bordeaux, 1,900, 8s.

Hartlepool to Antwerp, 1,500, 4s. 3d.; Memel, 1,700, 6s. 9d.; Venice, 4,500, 13s. 6d.

Liverpool to Alexandria, 10s. 6d.

Hudikswall to Sydney, N.S.W. (sail), 65s., July.

Newport River to Brest, 830, 5s. 6d. coal, 6s. 3d. fuel, ppt.

Port Talbot to Genoa, 12s. 3d.

Garston to Genoa, 11s. 6d., July; Gibraltar, 1,250, 10s. 9d., July.

Partington to Buenos Ayres, 21s. 6d., 200, July 29-August 15.

Manchester Ship Canal to Genoa, 4,000, 11s. 3d., July.

Burntisland to Sundswall, 2,500, 6s. 6d.

Methil to Sundswell, 2,500, 6s. 6d.

Homeward charters:—Tampa, sail, 18½ dols., Rosario; San Francisco, sail, 35s., United Kingdom-Continent, September-October; time charter, States and West Indies, £1,015, 12 months, delivery September-October; San Lorenzo, 18s. 9d. o.c., United Kingdom-Continent, August-September; 4,000, 10 per cent., 19s. 3d. o.c., less 6d., August 20-September 20; 4,000, 10 per cent., 18s. 9d., o.c.; 5,000, 10 per cent., 16s. 3d. o.c., less 6d., ppt.; 4,500, 10 per cent., 17s. 6d. o.c., less 6d., ppt.; Danube, 4,600 max., Antwerp or Rotterdam, 11s. 6d., July 23; 4,400, 11s. 6d., end July; Azof, 3,000, 13s., n.c., ppt.; 7,500, Rotterdam 13s. 3d., Emden 13s. 6d., Hamburg 13s. 9d. on d.w., grain only, August 1; 5,200, Rotterdam 12s., Hamburg 12s. 6d., July 25; 4,200, Rotterdam 13s., Antwerp 13s. 3d., Hamburg or Weser 13s. 6d., August 5; 3,800, Northern ports, 14s. 6d., ppt.; 5,200, Weser, 13s. 6d., ppt.; 4,200, Rotterdam 12s. 6d., Antwerp, Emden or Weser 12s. 9d., Hamburg 13s., ppt.; Port Pirie, 5,401 net, Antwerp, about 32s. 6d., July; Bombay or Kurrachee, 2,893 net, Rs. 9, end July; Kurrachee, 6,200, United Kingdom-Continent, p.p., basis 20s. 6d., July-August; 3,116 net, about 20s., July 20-August 10; 20s. one port, 20s. 6d. two ports, July-August; 7,600, Antwerp, 19s. 6d., August 1-15; Miramichi, 1,100 stds., 10 per cent., Bristol Channel, Sharpness, 56s. 3d., July-August; Gulf timber port, 1,000 stds., 10 per cent., River Plate 157s. 6d., August; Buenos Ayres, 2,833 net, Marseilles, 16s. 3d., ppt.; 5,500, 10 per cent., United Kingdom-Cont., 16s. 6d., spot; 2,183 net, 16s. 6d. o.c., less 6d., ppt.; Bilbao, 2,200, Middlesbrough, 6s. 10½d., ppt.; 3,200, Rotterdam, 6s. 9d., ppt.; 3,000, Cardiff, 5s. 6d., August 10-20; Larnes, 3,300, Rotterdam, 8s., f.d., ppt.; Carthagena, 4,200, Middlesbrough, 8s., ppt.; 4,000, Glasgow, 7s. 7½d., July-August; 7,100, Rotterdam, 6s. 9d., July; Santander, 2,100, Rotterdam, 7s., ppt.; 2,600, 7s., complement loading, ppt.; Iquique, sail, 26s. 9d., United Kingdom-Continent, September-October; Kherson, Nicolaieff or Odessa, 6,100, Rotterdam, 10s. 9d., July 25; Buenos Ayres-La Plata, 7,800, 10 per cent., United Kingdom-Continent, 16s. o.c., less 6d., option two ports East Coast United Kingdom 6d. more, ppt.; 6,000, Venice, 18s. 6d., ppt.; Port Pirie, 4,230 net, Antwerp, 31s., September-October; Durban, 5,000, Bombay, 8s. 3d., August; Calcutta, 2,722 net, Bombay and or Kurrachee, Rs. 9, end July; Nicolaieff, 6,000, Rotterdam, 9s. 9d. one port, 3,000-3,000, ppt.; Agua Amarga, 2,100, Newport, 6s. 9d., July; Saigon, 5,500 max., United Kingdom, 36s. 9d. one port, 37s. 6d. two ports, rice meal, August; Bombay, 2,900, Antwerp, 24s. 6d., ore, September; Pensacola, 1,200 stds., 10 per cent., West Italy, Sicily, 120s. one port, 122s. 6d. two ports, 125s. three, August; Huelva, 6,000, Rotterdam, 6s. 4½d., Tinto terms, ppt.

THE HULL COAL TRADE.

According to the return made by the Hull Corporation's coal inspector, Mr. W. Herbert Truman, 629,808 tons of coal were imported into Hull during June—586,566 tons by rail, and 43,242 tons by river—as compared with 552,496 tons in June 1911. This brings the total for the half-year to 2,997,821 tons, as compared with 3,088,032 tons in the first half of last year. The following shows the quantities consigned in that period from the principal shipping collieries:—

Name of colliery.	January to June 1912. Tons.	January to June 1911. Tons.
Allerton Bywater	31,550	45,096
Allerton Main (Bowers)	22,204	22,992
Aldwarke Main	94,880	70,096
Ackton Hall	28,085	21,088
Barnsley Main	18,417	7,480
Birley	27,265	19,776
Brodsworth	80,005	91,864
Barrow	15,202	20,008
Bentinck	11,912	18,032
Bentley	143,010	91,328
Cortonwood	42,396	15,480
Carlton Main, Grimthorpe and Frickley	270,312	183,320
Dalton Main	128,623	136,056
Dearne Valley	10,330	5,184
Denaby and Cadeby Main	298,971	440,440
Darfield Main	12,584	14,064
Dinnington	104,869	80,536
Elsecar	68,803	61,672
Glapwell	34,237	32,512
Garforth	44,348	55,616
Glass Houghton	87,172	105,000
Houghton Main	22,957	15,584
Hoyland Silkstone	18,486	22,216
Hardwick	16,537	26,152
Hickleton	76,861	101,536
Kilnhurst and Thrybergh	45,722	42,728
Kiveton Park	16,452	34,072
Lofthouse	14,027	9,272
Low Laithe	26,409	19,128
Langwith	17,071	13,632
Manvers Main	113,982	149,736
Mitchell Main	39,752	25,584
Monkton Main	27,246	27,048
Monk Bretton	44,159	41,960
Maltby	19,373	—
Mansfield	58,560	61,840
New Sharlston	18,057	21,976
Old Silkstone	9,896	11,760
Prince of Wales' Castle	25,448	50,584
Peckfield	45,557	73,344
Rothervale	22,405	46,712
South Hiendley	13,922	14,752
Staveley	37,786	54,288
Shireoaks	21,957	19,568
Strafford	4,154	15,264
South Kirkby, Featherstone and Hemsworth	70,618	56,896
Shirebrook	9,932	14,520
Sherwood	39,246	24,840
Thorncliffe	52,197	78,968
Tinsley	11,350	22,048
Wharncliffe Silkstone	40,109	33,352
West Riding and Silkstone	32,101	31,352
Wombwell Main	76,052	76,832
Whitwood	48,188	43,128
Wheldale and Fryston	65,241	72,560
Wath Main	64,621	59,744

Coastwise shipments from Hull in June amounted to 69,331 tons, and exports to 433,642 tons, as against 246,788 tons; and in the six months 423,762 tons were despatched coastwise, as against 483,508 tons, whilst 1,304,747 tons were exported as against 1,562,617 tons.

During June the Denaby and Cadeby Main Co. sent 69,009 tons to Hull, as against 73,408 tons in June 1911, other collieries sending quantities exceeding 10,000 tons being the following (arranged in order of aggregate tonnage):—Grimthorpe and Frickley, Dalton Main, Bentley, Glasshoughton, Aldwarke Main, Manvers Main, Carlton Main, Dinnington, South Kirkby, Featherstone and Hemsworth, Wombwell Main, Elsecar, Brodsworth, Peckfield, Whitwood, Hickleton, Wheldale and Fryston, Mitchell Main, Kilnhurst and Thrybergh, Wath Main.

BOOK NOTICES.

Das Rettungswesen im Bergbau, Seine Technik und Gesetzliche Regelung im In- und Auslande. Von Dr. Ingenieur O. PÜTZ. Freiberg in Sachsen: Verlag von Craz und Gerlach (Joh. Stettner). Price 4 marks.

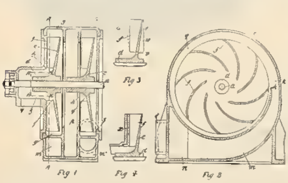
Rescue work in mines is the subject of this pamphlet. It deals with the technology of rescue work, and with its regulation by law both at home (viz., in Germany) and abroad. It is, in fact, an extended form of the author's paper read at the Hygiene Exhibition in Dresden, embellished with sketches and illustrations, 150 in number, including various types of rescue apparatus, the arrangement of rescue stations, and ambulance equipment. In an appendix is given parts of the Austrian Coal Mines Order, dealing with coaldust explosions and rescue work in mines, while other appendices deal with similar regulations in the Saarbrück and Dortmund districts. It is a useful summary of the position on the Continent with respect to this important subject. Reference is made to several British equipments, but the spelling of the place names requires revision.

Modern Practice in Fuel Contracts and Useful Data for Coal Buyers. By MYLES BROWN. Office of *The Science and Art of Mining*, Wigan, England. Price 4s.

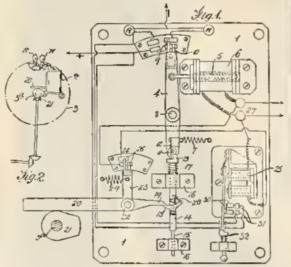
This work is designed as a handbook for those concerned in the sale, purchase, or handling of coal. It is intended mainly for the use of contractors, and gives information respecting the best modern practice in fuel contract notes. The first 50 pages or so are occupied by specifications and model coal contracts of various kinds. These will be found useful by those who are engaged in framing new contract forms. These are followed by chapters on the comparative values of various coals, on the storage of coal and the effect of weathering, and on the classification of coal and coke with local names and terms for various sizes. This latter chapter might have been amplified with advantage, and space might have been given for the various terms used to denote the different sizes of Belgian, French and German coals. The subject of briquettes is dealt with, and some useful foreign specifications for briquetted fuel are given. There is a mass of "useful notes" and "cullings" of very unequal value, and other data which will be found useful for reference. The last two chapters of the book are mainly taken up with analyses and heat values of typical coals from various quarters of the globe.

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

7149 (1912). *Improvements in Centrifugal Fans or Blowers.* W. J. Frame, 13, Royal-terrace, Queen's-drive, Crosshill, Glasgow.—This invention relates to compound or multi-stage centrifugal fans or blowers. It consists in improvements whereby the cross-sectional areas of the volute and discharge passages are continually increased, and the discharge passages from one wheel to the next are, moreover, conveniently arranged and of a design tending to promote efficiency and reduce the cost of construction. The invention further consists in constructing the fan wheels as cones with main vanes on the inlet and outer side of the cone and auxiliary vanes on the other side of the cone, the cone being perforated. Fig. 1 is an axial-section of a two-stage fan constructed according to the invention. Fig. 2 is a cross-section on the line A A A of fig. 1. Figs. 3 and 4 illustrate alternative constructions of wheel. (Four claims.)

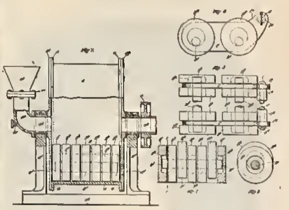


17430 (1911). *Improvements in Visible Electrical Signals in connection with Colliery Winding Engines.* T. Charlton, 6, Bradley Carr-terrace, South Elmsall, S.O., Yorkshire, and P. F. Smith, formerly of 27, Northumberland-road, now of 71, Southgrove-road, Sheffield.—This invention relates to visible electrical signals in connection with colliery winding engines used in conjunction and operating with the audible signals and indicator in ordinary use. The object is the combination, arrangement and working of the automatic switch as hereinafter set forth to provide a proof of individual neglect in case of accident, and to prevent such accidents as may result from the engine being started to wind before the "hanger on" or signaller at the bottom of the pit shaft has so signalled. In fig. 1 the switch is shown in working position during winding and diagrammatically in fig. 2 the apparatus fixed to the back of an indicator. On the "hanger on" giving a "clear" signal to engine room by bell signals 27, which are connected to the coil of the solenoid magnet 6 closing its circuit, thus causing plunger 5 to be drawn into coil 6 which action breaks the red-lamp circuit and closes the visible white electric circuit which remain, the arm 4 being switched over against the action of spring 7 and locked by catch as in fig. 1, the white light being maintained independently of the number of audible signals transmitted by the "hanger on". The wind begins and lever 20 returns to the normal, passing pawl 18, tilting same, said pawl 18 being returned by spring 28 connected to rod 14, at the same time the relay switch 24 is again under action of the spring 29, making contact. Spring 29 serves the purpose of returning the lever 20, and as 23 is keyed to this lever it returns it also. In the event of the winding engine being started at full winding power without a signal, the red light would remain showing. Further, should a signal be given both lamps would then show:—

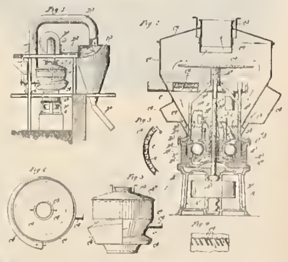


(1) By reason of the action of the solenoid; (2) by reason of the relay switch making contact, which would cause the red lamp to show as well as the white, as before set forth, the above action establishing an emergency call. At the end of the wind up the cam 21 raises the tappet lever 20, depressing spindle 14 and with it the catch 13 against the action of the spring 17 by the engagement of the nose 19 of lever 20 with the pawl 18 thus releasing the switch arm 4, breaking the "clear" or white signal and establishing the red or "danger" circuit. In this case the arm 4 would be in the off position—i.e., red lamp would be alight. Arranged in parallel circuit with the solenoid aforesaid is an emergency relay which only operates when relay switch 24 is closed. This emergency relay puts the red lamp in action in the following manner. Two contact pieces 30 fixed to the armature of relay 25 aforesaid but insulated therefrom connects two other contacts 31 when the armature has moved a certain distance, putting the red lamp in circuit. The object of this is in case of the engine being started full, and afterwards the "hanger on" has reason to stop the winding. He gives the "emergency" signal which closes the relay circuit and puts the red lamp in action, as well as the white, a clear visible indication of an emergency, as well as the audible "stop" signal on the bell. The relay is retained by a catch 32 which can be released only by the electrician in charge. At the end of a wind, arm 4 is thrown clear of catch 13 and contacts 26 clear of relay switch 24, but as soon as a wind commences, indicator shaft 3ᵃ revolves and with it cam 21, allowing lever 20 to return to its normal position. It will be seen from an inspection of the drawings that as soon as 20 is at normal, 26 will make contact with 24 and so close the relay circuit so that, should a signal be given, both solenoid and relay would act, in which case the arm 4 would operate the white light and relay armature the red light. If no signal be given, then the red light remains in by reason of the arm 4 not having moved. Cam 21 is keyed on the existing shaft of the indicator, which by reason of worm or bevel gear off the crank shaft of the engine rotates in such a ratio that for a given number of revolutions of the winding drum the indicator pointer moves through a certain angle denoting the distance to which the cage has ascended or descended the shaft, the cam 21 only operating 20 at the extreme end of the wind—i.e., when the pointer of the indicator has reached its limiting positions both ways. (Two claims.)

18978 (1911). *Pulverising Mill for Coal and the like.* C. J. A. Robinson, 27, Argyle-road, Custom House, Victoria Docks, London, E.—This invention relates to pulverising mills for coal and the like, in which the material to be pulverised is placed in a rotary drum and subjected to the action of composite rollers comprising a number of rings or annular discs arranged side by side in close contiguity to each other and free to travel on the lower portion of the inside of the drum as the latter revolves. It is the chief object of the invention to provide the composite rollers with means whereby the component parts thereof are prevented from leaving their proper position relatively to each other without relying upon the drum for that purpose, so that the diameter of the drum is independent of that of the rollers and can consequently be made much greater than heretofore, with the result that the grinding operation is improved, so that an impalpable powder can be produced in an expeditious and efficient manner. According to the invention, the composite roller is built up from a number of annular discs or rings, which are arranged side by side upon a loose rigid bar or rod disposed parallel to the axis of the said drum, the length of the composite roller being the same or approximately the same as the width of the drum. The openings in the said annular discs for the reception of the cylindrical bars are of much larger diameter than that of the bar, so that the said discs can participate in a large amount of independent movement in planes transverse to the said bar without becoming separated one from the other owing to the limiting effect the said bar has on their transverse movements. If desired, more than one of the aforesaid composite rollers may be provided, in which case it is preferable to connect their cylindrical bars together by distance pieces or other suitable means which will permit of free rotation of the composite rollers but keep them at a constant distance apart so that they cannot become injured by collision with each other. Fig. 1 is a sectional elevation of a pulverising mill provided with the improvements; fig. 2 is a sectional elevation of one of the composite pulverising rollers; fig. 3 is a vertical section on the line 1—1 of fig. 2; fig. 4 is an end view and fig 5 a part plan showing a manner of connecting the composite rollers together when two of such rollers are employed. (Four claims.)



19850 (1911). *Improvements in Pulverising Machinery.* E. J. Steckle, of Dixon, Lee county, Illinois, U.S.A.—This invention has reference to a pulverising or crushing machine of the kind comprising a crushing ring or zone fitted with crushing balls, and a separating chamber located above the crushing zone provided with a stirring fan, the finely-divided crushed material being carried out of the machine by a current of air and a baffle, causing the larger particles which may by chance have been caught up by the air-current to pass back again into the crushing zone of the machine. According to the invention the air is forced by a fan into the lower part of the separating chamber immediately above the crushing zone, the air preferably entering at all points about the circumference of the said chamber. Fig. 1 of the accompanying illustrative drawings is an elevation of a crushing mill installation according to the invention; fig. 2 is a section through the pulverising machine; fig. 3 a section along the line 3—3 of fig. 2; fig. 4 a section along the line 4—4 of fig. 3; fig. 5 a detail elevation of the hood; fig. 6 a detail plan view of the hood. (Five claims.)



21161 (1911). *Improvements in Cranes.* W. Pitt, of Newarke Foundry, Bath.—In cranes having a luffing jib arm, various means have been adopted for keeping the load that is being lifted always at the same horizontal level when the jig arm is being luffed. According to the invention this is effected by the employment of epicyclic gear, coupling the luffing or derricking gear with the hoisting gear in such manner that when the luffing gear has motion given to it the hoisting barrel has also the requisite amount of motion

(*Continued on page 144.*)

THE RECORD

840

square feet in one shift with

one "Siskol" Coal-Cutter.

INTERNATIONAL CHANNELLING MACHINES LD.,

SHEFFIELD.

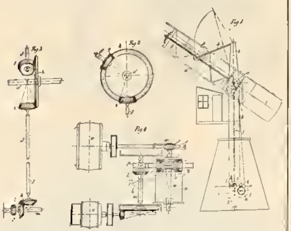
The OFFICIAL figures recently published by H.M. Home Office show that in the Manchester District, for 1910, there were 152 Coal Cutters, of eleven different types, in use, of which 81, or more than half of the total number, were "SISKOL" machines.

Is any further proof needed as to which is the best Coal Cutter?

INTERNATIONAL CHANNELLING MACHINES LD.,

SHEFFIELD.

given to it to cause it to wind up or pay out the requisite amount of rope to compensate for the raising or lowering of the upper end of the jib arm. Fig. 1 is a side elevation of a crane; figs. 2 and 3 show parts of the gearing to a larger scale; fig. 4 is a plan view of the epicyclic gear and the luffing and hoisting motors; fig. 5 is an end view of fig. 4 with some of the parts removed. (Two claims.)



22696 (1911). *Improved Method of Coking Coal and the like.* Dr. E. Enke, of 38, Kirschenallee, Breslau 18, Germany.—This invention relates to a method of coking coal of inferior quality, peat, lignite, wood-waste and the like. According to it, the coking materials, such as coal, lignite and younger fossil fuel, are compressed to a high degree by means of briquette or like pressing machines into small briquettes, cakes or any other shape to which a great density can be imparted. Previous to the compression a binding agent such as pitch, tar or the like is added to the materials, the adhesiveness of the latter and the density of the carbonised coke being thereby greatly enhanced. The compressed materials are finally fed continuously through the coking chambers or passages by suitable transporting elements—for instance, mechanical gratings, refractory conveying bands, racks, or the like. For the purpose of protecting the distillate as far as possible against decomposition, the materials are, at least partly, heated by means of steam which is superheated to coking temperature and introduced directly into the coking chambers through the walls of the latter. The method allows of complete carbonisation in about three hours, a fact which considerably increases the density of the resultant coke. (One claim.)

PUBLICATIONS RECEIVED.

Proceedings of the Institution of Mechanical Engineers, 1911. Parts 3–4. London: The Institution.

Summary of Progress of the Geological Survey of Great Britain and the Museum of Practical Geology for 1911. London: Board of Agriculture and Fisheries. Price 1s.

[This volume gives an account of the work of the Geological Survey for the past year. Extracts are given elsewhere in this issue, and will be continued. Copies may be obtained from any agents for the sale of Ordnance Survey maps, or through any bookseller, from Mr. T. Fisher Unwin, 1, Adelphi-terrace, London, W.C., who is the wholesale agent for the sale of Geological Survey memoirs in the United Kingdom (except in the county of London.)]

Nigeria and its Tin Fields. By Albert F. Calvert. Second edition. London: Edward Stanford. Price 4s. 2d. post free.

[This is a larger and more leisurely compiled volume, which gives information in regard to a territory of which, perhaps, too little is known. There are no less than 250 excellent illustrations, and the text is both racy and informative.]

Northern Coal, Iron and Steel Companies, 1912. Third edition. Cardiff: Business Statistics Company Limited. Price 1s. net.

[This is the third annual issue of this useful little compilation. Every company is treated separately, the boards, capital and Stock Exchange prices being given, as well as summaries of the last issued balance-sheets and profit and loss accounts, dividends paid, and sums placed to reserve, &c.]

Explosives and their Storage under the Explosives Act, 1875. London: Curtis's and Harvey Limited. Price 6d.

[There are few concerns that deservedly enjoy a higher reputation than Messrs. Curtis's and Harvey Limited, and anything they have to say on the subject of explosives has the *cachet* of authority. Users will find this little pamphlet characterised by a clarity and directness which may be looked for in vain in the official guide to the Explosives Act. Parts 1 and 2 deal respectively with storage for "private use" and on registered premises. Under the latter heading illustrated specifications are given of two recommended buildings for explosives (Mode "A"), following which there are short descriptions of the various explosives manufactured by the company. Part 3 deals with "stores," and here again is given a useful design and specification. Part 4 is devoted to "magazines" for the storage of large quantities of explosives.]

The Isolation of Vibration and Noise. Glasgow: British Anti-vibration and Noise Company Limited.

Report on Coalmining in West Virginia: Mining Methods, Mining Costs, Quality. By Ernest M. Merrill, C.E.

[An epitome of mining conditions in this important coalmining state. There are useful tables of analyses and costs, covering a wide extent of date. Some of the coals have much interest to European readers, as they include the famous New River Pocahontas seams, which have been largely exported and possess high steaming properties. An average of 38 samples in the Pocahontas field gives the following:—Moisture, 0·23 per cent.; volatile matter, 17·43 per cent.; fixed carbon, 77·71 per cent.; ash, 4·63 per cent.; sulphur, 0·62; phosphorus, 0·0057; B.T.U., 15,073. The average mining costs are about 65 c. per gross ton, including 10 c. per ton royalty. Similar data in regard to the New River field are (the analysis being based on samples taken from 42 mines):—Moisture, 0·85; volatile matter, 19·82; fixed carbon, 75·44; ash, 3·89; sulphur, 0·77; phosphorus, 0·020; B.T.U., 15,139. Mining costs 1 dol. per ton. Both coals are soft and do not stand handling well.]

First Annual Report of the Director of the United States Bureau of Mines for the Fiscal Year ended June 30, 1911. Washington: Government Printing Office.

[The United States Bureau of Mines was formally established in 1910, but the present is the first annual report. It, nevertheless, shows that a vast amount of work has been done during the past two years; indeed, the funds have apparently proved inadequate to answer the varied demands made upon them. Thus the director appeals for larger buildings and better equipment, and points out that there is need of sufficient funds for the continuous operation of the seven mine safety cars now in service and for the supply of two additional cars. For 1913 he recommends the appropriation of 360,000 dols. for mine accidents and technologic work. So far, the former branch of investigation has been largely restricted to colliery explosions. It is now intended to extend the work to other classes of accidents and to include investigations into health and sanitation. One subject that is now inviting enquiry is the prevalence of hookworm (or ankylostomiasis), introduced by emigrants. Dr. Holmes also advocates the collection of more accurate and comprehensive statistical information, and points to the need of investigations with a view to the prevention of mineral waste. The existing annual loss, he estimates, of soft coal is no less than 200 million tons, whilst 80 million tons of anthracite and 480,000,000,000 cubic feet of natural gas are yearly wasted. There is also serious need of enlarging the fuel investigations to meet the demands of the various branches of the Government service. Over 8,000 samples of coal, lignite, and fuel oil, intended for the use of the Government, were analysed in the past fiscal year, representing over a million tons of coal. Other problems awaiting further examination are the practicability of increasing the fuel value of lignites and low-grade coals by briquetting, the suitability of different coals for the manufacture of coke, the processes by which the highest yield of coke and by-products can be obtained from these coals, the relative value of the cokes for different metallurgical purposes, the steaming value of coals from different fields, and the possibility of utilising the same coals and lignites to greater advantage in gas-producers. On several of these subjects valuable results have already been obtained. In connection with the mine accidents branch it is recorded that the preliminary recommendation of the Bureau in regard to regulations concerning the use of electricity in mines have been generally accepted by mining engineers, and have been incorporated in the mining law of the largest mining State. Up to July 1, 1911, 88 explosives had passed the tests required by the Bureau and placed on the list; the testing work is now nearly a year in arrear. It is interesting to note that investigations have been made into the influence of carbon dioxide on the explosibility of mine gases for the purpose of determining the practicability of introducing carbon dioxide into mine workings to extinguish fires and prevent explosions, and the range of explosibility of mixtures of methane, air, and carbon dioxide. The results lead to the conclusions that (1) CO_2 is more effective than nitrogen in preventing gas explosions, owing to its higher specific heat; (2) the addition of 25 parts (by volume) of CO_2 to 75 parts of the most explosive mixture of methane and air renders the mixture non-explosive; and (3) when CO is introduced in place of oxygen, 7 per cent. of CO_2 is sufficient to prevent explosion. In the anthracite region the system of mine filling or flushing has been investigated, this being but an instance of many similar, though diversified, enquiries now being carried on. The entire force of the Bureau at the close of the fiscal year consisted of 298 employees.]

"Proceedings of the South Wales Institute of Engineers" (Vol. 25, No. 2), 1912, price 5s.; "The Journal of the West of Scotland Iron and Steel Institute" (Vol. 19, No. 7), April; "List of Members, 1911-12, of the West of Scotland Iron and Steel Institute"; "Book Catalogue of Mr. James Wilson, Birmingham"; "Mines Department, Union of South Africa (Statistics for the month of May)"; "The Journal of the Western Society of Engineers" (Vol. 17, No. 5), May, price 50 cents; "The I.C.S. Student" (Vol. 4, No. 7, July, price 2d.; "Bulletin et Comptes Rendus Mensuels de la Société de l'Industrie Minérale," Juin, (Tome 1, No. 6); "Le Mois Scientifique et Industriel (No. 154), Juin, price 2 fr.; "Annales des Mines" (Tome 1, No. 6); "Peru To-day" (Vol. 4, No. 1), April, price 5d.; "The British Chamber of Commerce of Turkey" (Quarterly Trade Journal No. 18), June, price 2s. 6d.; "Revue Universelle des Mines de la Métallurgie" (Tome 38, No. 3), Juin; "Transactions of the North-East Coast Institution of Engineers and Shipbuilders" (Vol. 28, Part 7); "Quarterly Bulletin of the Canadian Mining Institute" (No. 19, May 1912); "Transactions of the Canadian Mining Institute" (Vol. 15, Part 1, 1912); "Quarterly Journal of the Geological Society" (Vol. 68, Part 2, June 1912, No. 270).

NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

15891. Water-tube steam generators. A. W. Cooper.
15905. Electric lift or hoist starting-rod or rope-locking apparatus. M. T. Medway.
15906. Apparatus for uniformly heating granular or pulverised materials. T. L. G. Bell.
15914. Method for burning, incinerating, and consuming dynamite, powder and other fumes and dust, and other particles and the like in the atmosphere caused by blasting, drilling or the like. W. Alderson.
15919. Process of precipitating and separating thorium from other rare earths. Deutsche Gasglühlicht Akt.-Ges. (Auerges).
15920. Electric aerial rail or rope ways. Elektromotoren-Werke Hermann Gradenwitz.
15940. Alloy. G. T. P. Tatham.
15963. Free-piston compressors or pumps. Akt. Ges. Brown, Boveri et Cie.
16058. Water-tube steam generators. L. and C. Steinmüller.
16092. Process of briquetting flue-dust, and product of said process. R. Hubner.
16093. Method of treating metal ingots. G. H. Benjamin.
16159. Furnace. E. L. Pamart.
16193. Mixture for use as fuel. A. Arnold.
16196. Apparatus and appliances for controlling winding engines. J. W. Rose and E. B. Whalley.
16197. Flues and dash-walls for vertical steam boilers. J. W. Nicholson.
16215. Combined gas and coal fire. F. C. Batten.
16218. Removal of zinc from the ore, particularly zinc-lead ore. H. C. Woltereck and J. Moeller.
16220. Removing tin or zinc from scrap. H. C. Woltereck and J. Moeller.
16225. Coking or gas ovens and the like. Société Anonyme Burkheiser-Eloy.
16226. Regenerative coking ovens and the like. Société Anonyme Burkheiser-Eloy.
16227. Air supply for regenerative coking and gas ovens and the like. Société Anonyme Burkheiser-Eloy.
16283. Colliery or pit corves or tubs. R. Sandham.
16340. Compressed-air hauling winches. Rud. Meyer Akt.-Ges. für Maschinen und Bergbau.
16346. Mechanical roasting furnaces. G. G. M. Hardingham.
16385. Method of and apparatus for washing coal tar, mineral or other oils. H. P. Hird, E. V. Chambers, and T. C. Hammond.
16397. Pedestal bearings for axles of vehicles, more particularly for mining corves and wagons. J. H. Potter, F. C. Moorwood, and J. A. Potter.
16404. Miners' and like lamps. G. B. Hillman.
16440. Method of and apparatus for preventing the spreading and effect of coaldust and firedamp explosions. G. Kahler and F. Junker.
16441. Method of and apparatus for preventing the spreading and reducing the effect of coaldust and firedamp explosions. G. Kahler and F. Junker.
16453. Method for preventing dust particles escaping from boreholes. W. Alderson.

Complete Specifications Accepted.

To be published on August 1.

1911.

18777. Explosives. Flürscheim.
19921. Rope belts, rope bands, and the like. Luckweil.
21447. Treatment of tin, tin-containing minerals, and other products. Elektrochemische Fabrik Kempen-Rhein Dr. Brandenburg and Weyland.
21552. Means for preventing overspeed and overwind in winding or like engines. Grant, Ritchie and Co., McAlister.
21651. Coalminers' picks. Williams.
24906. Chocks for colliery tubs and the like. Stone.
26704 Manufacture of light slabs, bricks, and the like from blastfurnace slag. Schol.
27516. Trough conveyors. G. Eickhoff.

1912.

2857. Separation of tar and ammonium chloride contained in gases produced by distilling coal. Brougham.
4662. Steam-generator and like furnaces. Whitteker.
5235. Apparatus for classifying ores. Compagnie D'Entreprises de Lavage de Minerais.

Complete Specifications open to Public Inspection before Acceptance.

1911.

25332. U-bends suitable for superheaters. Cole.

1912.

10688. Trucks. Taylor.
14848. Rotary engines, compressors, and the like. Carrel.
15642. Method of and a machine for ramming in moulding sand. Keller.

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NOTICE is hereby given, that in an action for Infringement of Blackett's Patent No. 14,053, of 1904, raised in the Court of Session, Edinburgh, at the instance of the Patentee, William Cuthbert Blackett, Mining Engineer, of Acorn Close, Sacriston, in the County of Durham, Complainer, against Dickson & Mann Limited, Engineers and Steel Founders, Incorporated under the Companies' Acts, and having their registered office at Bathville Steel Works, Armadale, in the County of Linlithgow, Respondents, the Lord Ordinary (Lord Guthrie) by his Interlocutor or Order dated 17th November, 1908 inter alia certified the validity of the said Patent, in terms of section 35 of the Patents and Designs Act, 1907.

The Patentee hereby WARNS the trade and the public generally against making, selling, buying, dealing in or using Conveyors made in infringement of the said patent, which it is his intention to support and vindicate by all necessary means including legal proceedings. And further CAUTIONS infringers that they render themselves liable to an injunction or interdict with costs or expenses as well as to damages and delivery up of all infringing apparatus.

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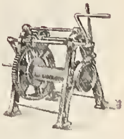

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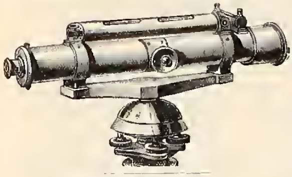

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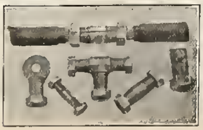

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Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, R., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Conveyors and Elevators
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Chain Belt Engineering Co., Derby, England
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Diamond Coal-Cutter Co. Stennard Wks. Wakefield
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Improved Coal Mining Co., Sacriston, nr. Durham
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Mather and Platt Ld., Manchester
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Pratchitt Bros., Carlisle
Primus Patents Co., Falcon-street, Oldham
Reddaway, F., & Co. Ld., Pendleton, Manchester
Sheppard and Sons Ld., Bridgend, South Wales
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts.
Sutcliffe, R., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Yorkshire Engine Co. Ld., Sheffield
Wright, Joseph, and Co., Tipton

Corner Plates
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

Couplings
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Crab Winches
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

Crane Makers
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Middleton, Robert, Sheepscar Foundry, Leeds
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Cranes
Appleby, E. O., and Co., 10, Victoria-street, Westminster
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Gt. Central Railway, 216, Marylebone-rd., London
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Ryland-street Works, Birmingham

Creepers

Cut-off Gear
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Thornewill and Warham Ld., Burton-on-Trent
Wood, John, and Sons Ld., Wigan

Detonators
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Disintegrators
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Middleton, Robert, Sheepscar Foundry, Leeds
Simon-Carves Ld., 20, Mount-street, Manchester
Yeadon, Son and Co., Albion-place, Leeds

Diving Apparatus
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Pulsometer Engineering Co. Ld., Reading
Siebe, Gorman and Co. Ld., Westminster S.W.

Docks
Gt. Central Railway, 216, Marylebone-road, N.W.

Dog Spikes
Frost, Albert, and Co., Sheffield
Renton, B. M., & Co., Midland Works, Sheffield

Double Helical Gear (Machine Cut)
Brown, David, and Sons (H'f'd) Ld., Huddersfield
Citroen, Andre, and Co., 27 Queen Victoria-street, London
Deutsche Maschinenfabrik A.G., Duisburg, Germany

Drain Cocks
Appleton and Howard, St. Helens, Lancs.
Hopkinson, J., and Co. Ld., Huddersfield

Drawing Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drawing Office Stationery
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drills (Electric)
United States Metallic Packing Co. Ld., Soho Works, Bradford

Driving Pulleys
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Duplex Pumping Engines
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Evans, Joseph, and Sons Ld., Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Pearn, F., and Co. Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Dustbins (Sanitary)
Baker, John, and Son, Bilston, Staffs
Harvey, G. A., and Co., Lewisham, London, S.E.
Lewis, Wm., and Son, Bilston
Theedam, E. C., Ld., Dudley

Dynamite, &c.
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Nobel's Explosives Co. Ld., Glasgow

Dynamos
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Sutcliffe, Richard, Horbury, near Wakefield

Ebonite and Vulcanite
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Electric Detonators and Fuses
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Electrical Engineers
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mather and Platt Ld., Manchester
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne
Theedam, E. C., Ld., Dudley

Electrical Fault Indicators
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne

Electric Haulages
Avonside Engine Co. Ld., Bristol
Bridge, David, & Co. Ld., Castleton, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davis John, and Son (Derby) Ld., Derby
Deutsche Maschinenfabrik A.G., Duisburg Germany
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, B. H., and Co. Ld., Wakefield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Electric Meters
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Electrical Plant
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Gt. Central Railway, 216, Marylebone-rd., London
Jones, Geo. H., 74, Blackfriars-road, Salford
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne
Ward, Thos. W., Limited, Albion Works, Sheffield

Electrical Pumps
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
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Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Electrical Stores
Cort, Arthur, & Co., 303½, Camberwell-rd., London
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Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C., Ld., Dudley

Emery Wheels
Rook, G. T., 19, Bridge-street Manchester

Enamelled Plates for Notices for Mines
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Theedam, E.C., Ld., Dudley

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Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalbitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Engineers (Consulting)
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Radford, R. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

Engines (Blowing)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Gas-Compressing)
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Hauling and Winding)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Jones, G. H., 74, Blackfriars-road, Salford
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, B. H., and Co. Ld., Wakefield

Engines (Hauling and Winding)—continued.
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, R., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

Engines (Locomotive)
Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Jones, G. H., 74, Blackfriars-road, Salford
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)
Mather and Platt Ld., Manchester

Engine Merchants
Jones, Geo. H., 74, Blackfriars-road, Salford
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

Engines (Oil)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping) (See Pumps)

Engines (Rolling Mill)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany

Engines (Steam)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Jones, G. H., 74, Blackfriars-road, Salford
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Exhaust Turbine Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Jones, G. H., 74, Blackfriars road, Salford

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Jones, G. H., 74, Blackfriars-road, Salford
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Jones, Geo. H., 74, Blackfriars-road, Salford
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Jones, Geo. H., 74, Blackfriars-road, Salford
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Files
Hardy Patent Pick Co. Ld., Sheffield
Spencer, Matthias, and Sons, Sheffield
Waterfall, H. & R., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

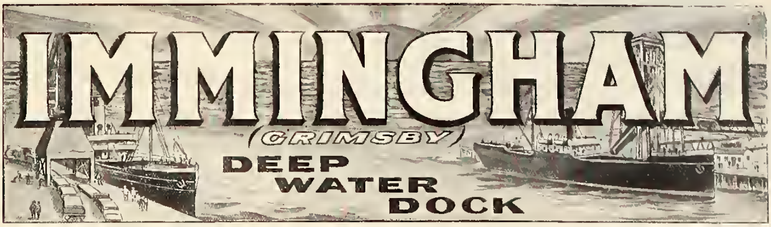
Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

Fire Appliances
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods
Wirton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

The NEW COAL PORT



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SAM FAY, General Manager.

Purchasers' Guide to Advertisers' Specialities.—(continued).

Firelighter Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Fishplates
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

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Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

Forced Draught
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

Forges
Hardy Patent Pick Co. Ld., Sheffield

Forgings
Bagnall, W. G., Ld., Stafford
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld., Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, H. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Fuel Economisers
Jones, Geo. H., 74, Blackfriars-road, Salford
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld., Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Hammerton-st., Burnley
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall

Fuses (Safety)
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Bricks

Gas Engines
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Glover, M., and Co., Holbeck-lane, Leeds
Jones, Geo. H., 74, Blackfriars-road, Salford
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

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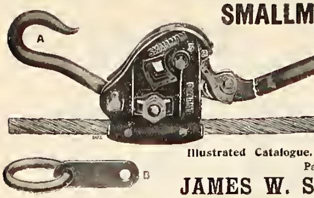

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Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham

Perforated Plates
Barns, W., & Son, Queensland-rd., Holloway, N.
Firth, William, Ld., Leeds
Harvey, G. A., & Co., Lampit Vale, Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Norton's (Tividale) Ld., Tipton
Theedam, E. C., Ld., Dudley

Picks and Shovels
Baker, John, and Son, Bilston, Staffs
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Spencer, Matthias, and Sons, Sheffield
Theedam, E. C., Ld., Dudley

Pinions
Cort, Arthur & Co., 303½, Camberwell-rd., London

Pinions (Raw Hide and Paper)
Bridge, David, & Co. Ld., Castleton, Manchester
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan

Pipe Joint Paste
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Pipes (Steam and Water)
British Mannesmann Tube Co. Ld., London Wall
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Isca Foundry Co., Newport, Mon.
Lewis, Edwin, and Sons, Wolverhampton
Pulsometer Engineering Co. Ld., Reading
Russell, John, & Co. Ld., Alma Tube Wks., Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Nile-st., Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

Pistons
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Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

Piston Springs
Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

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Bute Works Supply Co. Ld., Bute Docks, Cardiff
Firth, William, Ld., Leeds
Heenan & Froude Ld., Worcester
Henderson and Glass, Liverpool
Lewis, Edwin, and Sons, Wolverhampton
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Spencer, John, Ld., Globe Tube Works, Wednesbury
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton

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British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Osbeck and Co., Newcastle-on-Tyne

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Spencer, Matthias, and Sons, Sheffield

Pit Water Gauges.
John Davis & Son (Derby) Ld., Derby

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Railway and General Engineering Co. Ld., Notts
Theedam, E. C., Ld., Dudley

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Firth, Wm., Ld., Water-lane, Leeds
Jones, G. H., 74, Blackfriars-road, Salford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Stewarts & Lloyds Ld., Birmingham & Glasgow
Stringer, John, and Son, Dept. 11, Blackburn

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Heenan & Froude Ld., Worcester
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Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Ld., Albion Works, Sheffield

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Bagnall, W. G., Ld., Stafford
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington

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Thomas, Wm., Mining School, Porth, Glam.

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Kalbitum Paint Co. Ld., Belvedere Works, Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Publications
Colliery Guardian Co. Ld., 30 & 31, Furnival-st., Holborn, London, E.C.
Griffin, Charles, and Co. Ld., London, W.C.
Southern, T. A., Universal Mining School, Cardiff

Pulley Blocks
Deutsche Maschinenfabrik A.G., Duisburg Germany
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Byland-street Works, Birmingham

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Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Frost, Albert, and Co., Sheffield
Humble, Stephen, 9, Victoria-st., London, S.W.
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Jones, G. H., 74, Blackfriars-road, Salford
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Spencer and Co. Ld., Melksham, Wilts
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Thornewill and Warham Ld., Burton-on-Trent
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Spencer and Co. Ld., Melksham, Wilts
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Wood, John, & Sons Ld., Brook Foundry, Wigan

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United States Metallic Packing Co. Ld., Soho Works, Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

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Bever, Dorling and Co. Ld., Bradford, Yorks.
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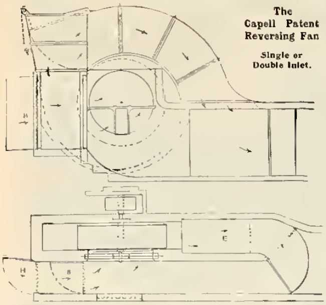

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Date, Oct. 5th, 1907.	Direct Driven.	16 ft. 0 in. × 5 ft. 6 in.
	Date, October 6th, 1907.	
Revols. 265	Revols. . 158	Revols. 170
W.G. ... 8 inches	Cubic ft. 431,700	Cubic ft. .. 298,000
Cubic ft. per min. 376,000	W.G. .. ... 4·3 inches	W.G. .. .. 5½ inches
H.P. in av. . . 472	Useful Effect 81%	Useful Effect 74%
H.P. indicated .. 579		
Useful Effect 81·5%		

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Edited by ALLAN GREENWELL, F.G.S., Assoc.M.Inst.C.E., M.Inst.M.E.

(Editor of the "Colliery Guardian.")

THE COLLIERY GUARDIAN CO. LTD., 30 & 31, Furnival St., Holborn, London, E.C.

Purchasers' Guide to Advertisers' Specialities—(continued).

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Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
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Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co. Ld., West Gorton, Manchester
Phillips, C. D., Newport, Mon.
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham
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Uskside Engineering Co. Ld., Newport
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Thedam, E. C., Ld., Dudley

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Mather and Platt Ld., Manchester

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Chorley Railway Wagon Co. Ld., Chorley, Lancs.

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Lincoln Wagon and Engine Co. Ld., Lincoln

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Heenan & Froude Ld., Worcester
Lancashire and Yorkshire Wagon Co. Ld., Heywood, near Manchester
Lincoln Wagon and Engine Co. Ld., 11, St. Mary-street, Lincoln
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Rigley, Wm., Forest Wagon Works, Bulwell, Nottingham

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Hopkinson, J., and Co. Ld., Huddersfield

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Knowles Oxygen Co. Ld., Wolverhampton
Mining Engineering Co. Ld. (The), Sheffield
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Thedam, E. C., Ld., Dudley
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Diamond Coal-Cutter Co., Wakefield
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Spencer, Matthias, and Sons, Sheffield
Stephens, R., and Son, Carn Brea, Cornwall

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Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Renton, B. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

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Heenan & Froude Ld., Newton Heath, Manchester
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Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton

ROPES (COTTON DRIVING)

Kenyon, Wm., & Sons Ld., Dukinfield
Wright, J. and E., Ld., Birmingham

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Latch and Batchelor Ld., Hay Mills, Birmingham
Thompson and Co., Wigan
Wright, John & Edwin, Ld., Garrison st., B'ham

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Wright, Joseph, and Co., Tipton

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Wright, Joseph, and Co., Tipton

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Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

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British Insulated and Helsby Cables Ld., Lancs.
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Hustam and Schonthal Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

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Baker, John, and Son, Bilston, Staffs
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Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Sheffield
Thedam, E. C., Ld., Dudley

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Summerson, Thomas, & Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

Purchasers' Guide to Advertisers' Specialities.—(continued).

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Bute Works Supply Co. Ld., Cardiff
Firth, Wm., Ld., Water-lane, Leeds
Renton, B. M., and Co., Midland Works, Sheffield

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Heenan and Froude Ld., Worcester
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Wright, Joseph, and Co., Tipton

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Siebe, Gorman and Co. Ld., Westminster, S.E.

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Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Sphincter Grip Armoured Hose
Reddaway, F., & Co. Ld., Pendleton, Manchester

Springs
British Wagon Co. Ld., Rotherham
Lancaster and Tonge Ld., Pendleton, Manchester
Skinner, J. P. and Co. Ld., Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Stampings
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Steam Experts
Tickle Brothers, Vulcan Ironworks, Wigan

Steam Fittings
British Mannesmann Tube Co. Ld., London Wall
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Russell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staffs.

Steam Mains and Pipe Installations
Stewarts and Lloyds Ld., Birmingham & Glasgow
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

Steam-Saving Appliances
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Burnley
Yorkshire Boiler Co. Ld., Bradford

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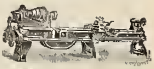
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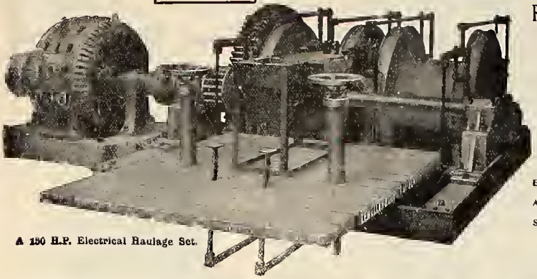

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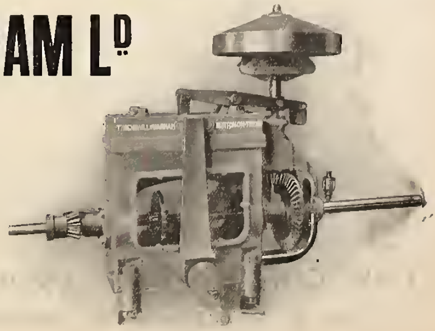

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Continued on Page 155.

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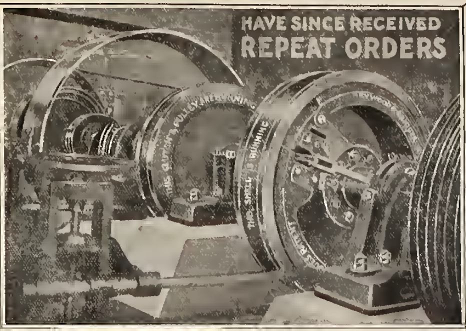

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New Forms, &c., recently issued under the Coal Mines Acts.

This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c.

Continued from Page 154.

Registered No. Please quote when ordering.	NEW FORMS, &c., RECENTLY ISSUED.		
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For Sale, New Steel Lancashire Boilers, ready for immediate delivery:— Other sizes in progress.
30 ft. long by 8 ft. diameter, for 100 lb. working pressure.
30 ft. " 8 ft. " 160 lb. " "
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SPURR, INMAN & CO. LTD., Calder Vale Boiler Works, Wakefield.

Locomotives of every description, Colliery or main lines; COAL-CUTTER MACHINES to undercut up to 6 ft.—**YORKSHIRE ENGINE CO. LTD.,** Meadow Hall Works, Sheffield.

Boilers and Machinery (good Second-hand) for sale; if you are requiring Boilers, Engines, or other plant, please send us particulars as we shall probably have something suitable to offer you.—**JOHN STRINGER & SON,** Dept. 11, Blackburn.

Locomotives, two 10 in., 4-wheel coupled, by Pecketts, suitable for sidings; quantity 20, 24, 56, 70 lb. per yard good relayable Flange Rails; 300 tons good relayable Bull Head Rails, suitable for sidings, with Points and Crossings, Chairs, second-hand or new Sleepers, Crossing Timbers, and Turntables; twenty 24 in. gauge Tip Wagons and Portable Railway for sale at low figure to clear.—**B. M. BENTON & CO.,** Midland Works, Sheffield.

For Sale, 750 ten-ton Spring-buffer WAGONS in first-class condition; will be split up to suit requirements.—Full particulars, apply **BRITISH WAGON CO.,** Rotherham.

Four Dry Back Marine Type Boilers, by Frasers, 11 ft. 2 in. diameter by 13 ft. long, suitable for 180 lb. steam, 1,000 gallons per hour evaporated each, heating surface 2,000 square feet; will be sold cheap before removal; seen London.—Apply, **HARRY B GARHAM,** Staines.

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Electric Plant, comprising 400-H.P. Belliss Engine, and 225-kw. Generator, 460 volts; 150-kw. 2-cylinder Compound Belliss-Morcom ENGINE, cylinders 14 in. and 19 in. by 10 in.; two Sunderland Forge Triple-expansion High-speed ENGINES and D.C. DYNAMOS, cylinders 9 in., 14½ in., 23½ in. by 10 in. stroke, 380 r.p.m., dynamos 168-kw. each, 220 volts; Electric GENERATING PLANT, comprising pair 16½ in. by 11 in. "Robey" Vertical Engines, and B.T.H. Generator, 125 k.v.a., 40 cycle, and exciter; one ditto, comprising 21 in. by 21 in. Vertical Engine and two-pole Dynamo, 500 volts 158 amps. 500 revs.; ditto, comprising 80-kw. 3-phase B T H Alternator, 40 cycles, 440 volts, and Exciter, with Westinghouse Engine, cylinders 10 by 18 by 10.
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For Sale, 5-ton Loco. Steam Crane, jib 26 ft. long, 4 ft. 8½ in. gauge, in good working order.—**Box 4819,** *Colliery Guardian* Office, 30 & 31, Furnival street, Holborn, London, E.C.

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For Sale, Air Compressor, Semi-portable, Schram's patent, 8 in. by 8 in. by 12 in. stroke, on steel receiver 10 ft. by 2 ft. 6 in. diameter; little used, low price.—**WILLIAMS & SONS,** South Bermondsey Station, London.

For Sale, two 225-kw. Generating Sets, 440 volts, Siemens dynamos; now fixed, low price to save second removal.—**WILLIAMS & SONS,** 73, Queen Victoria-street, London.

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Fifty ¾-yard Steel Side-tipping Wagons, 24 in. gauge.
20 capital second-hand Crane Skeps, cheap.
500 tons specially selected hard Steel B.H. Rails, about 80 lb. per yard, with all accessories.
4/500 tons of splendid second-hand 50/56 lb. Flange Rails, with Fishplates, Points and Crossings, &c., to match.
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120 b.h.p. Cundall GAS ENGINE and SUCTION PLANT.
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40-ton Hydraulic FORGING PRESS, 14 in. ram.
No. 3 West's Hydraulic TYRE SETTING MACHINE, with three-throw Pumps.
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40 h.p. Semi portable ENGINE, by Fowler, for 150 lb. steam.
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Horizontal ENGINE, 16 in. cylinders, with 10 ft. flywheel, cheap.
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Nearly new Self-contained GUIBAL FAN, capacity 40,000 cubic feet, with 14 in. duplicate Engines.
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Baker's Patent PRESSURE BLOWER, size No. 17.
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Portable ENGINE, 10-h.p., by Ruston Proctor.
MORTAR MILL, 8 ft. pan, underdriven.
DYNAMO, 4-pole, 440 volts.
100 ft. of 3 in. and 3½ in. shafting, with plummer blocks and pulleys.
SHAPING MACHINE, 12 in. stroke.
Plate Edge PLANING MACHINE up to 4 ft. 3 in.
STEAM HAMMER, 5 cwt.
DYEWORKS PUMP, 6 in. cylinder, 10 in. stroke.
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150 tons of FLANGE RAILS, 16/18 lb. per yard, also other Colliery and Ironworks Plant.
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A large manufacturing firm employing several thousand hands is willing to pay a liberal salary to an energetic man to control their PURCHASING DEPARTMENT; qualifications required, wide knowledge of markets, including all classes of general stores; organising ability; experience in similar position of trust; state age, experience, and present salary.—Reply, **Box 4852,** *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

Required for a Colliery in India, Assistant MINING ENGINEER of good education, age under 30; first-class certificate and qualifications, and experience of thick coal would be an advantage; three years' engagement at Rs 400/-, 425/-, and 450/- per month with free bungalow, &c., renewable.—Write, "**J. M. B.,**" care of J. W. Vickers & Co. Ltd., 5, Nicholas-lane, London, E.C.

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David Roberts, F.A.I., will Offer for Sale by PUBLIC AUCTION at the Hotel Metropole, Swansea, on TUESDAY, JULY 30th, 1912, at 3.30 o'clock, in one lot, the valuable Leasehold Manufactory known as the

WELSH FUEL WORKS,

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Together with the goodwill and valuable PATENTS subsisting in England, France, Belgium, and Italy, comprising large Factory, Engine Room, Boiler Shed, Laboratory Offices, Workshop and Yards, fitted with substantial modern MACHINERY and PLANT put in at great cost and capable of turning out over 500 tons of fuel per week, fitted with electric light and hydraulic power, the whole having an area of

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Provided with excellent transport facilities by road, rail and water, held on lease from the Harbour Trustees for 42 years, from December 31st, 1910, at the low rent of £242 per annum with valuable wharfage rights and use of electric cranes.

The Works are ready for immediate occupation, the BUILDINGS in good condition, and although adapted for the Welsh fuel patent, the machinery can be used for the manufacture of other fuels.

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Telephone 233 Docks.

⁂ *For* **later Advertisements** *and* **Scale of Charges,** see **Page 130 (Leader Page).**

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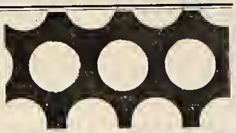

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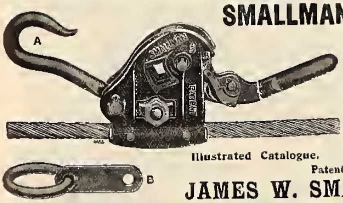

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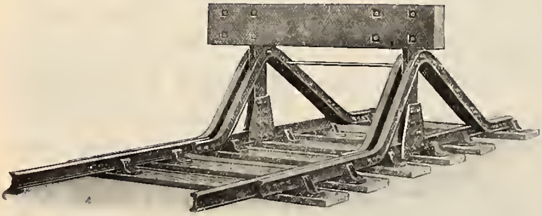

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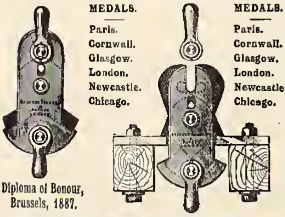

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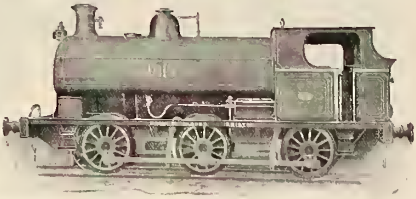

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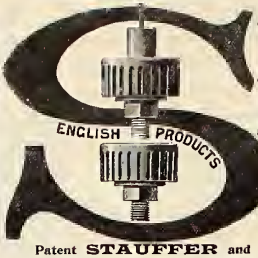

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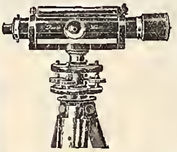

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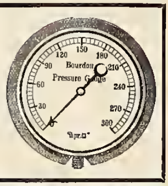

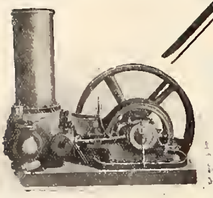

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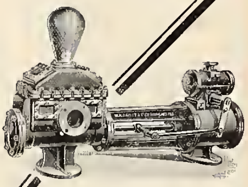

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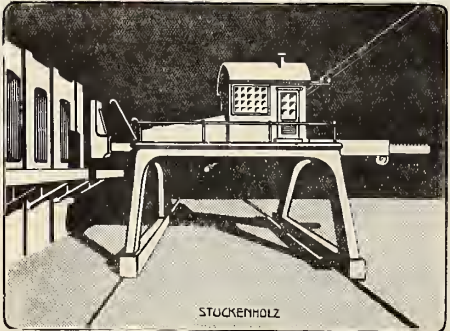

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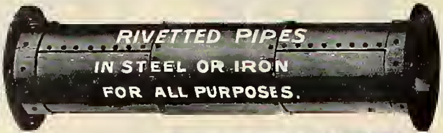

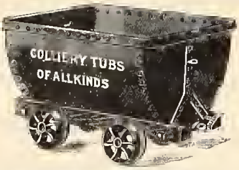

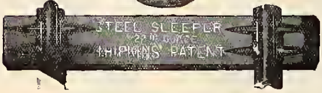

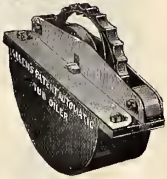

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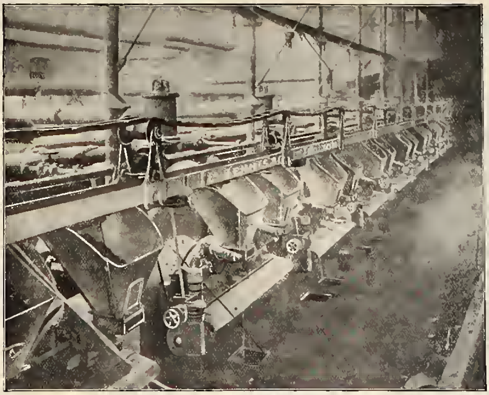

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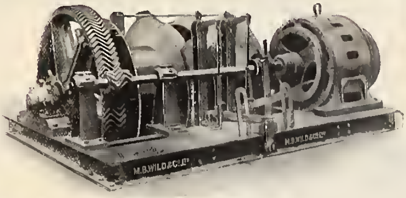

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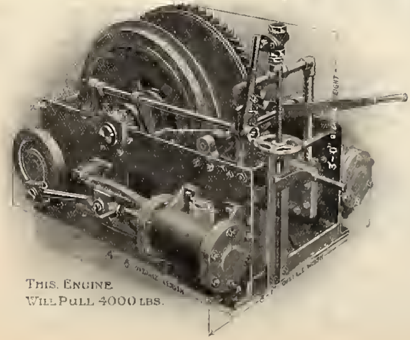

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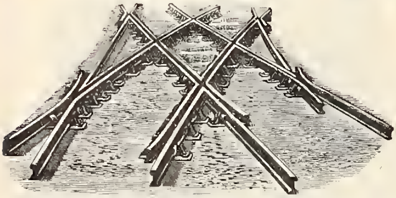

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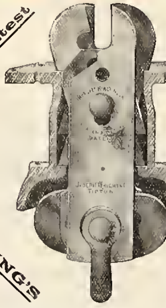

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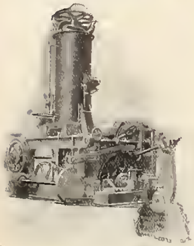

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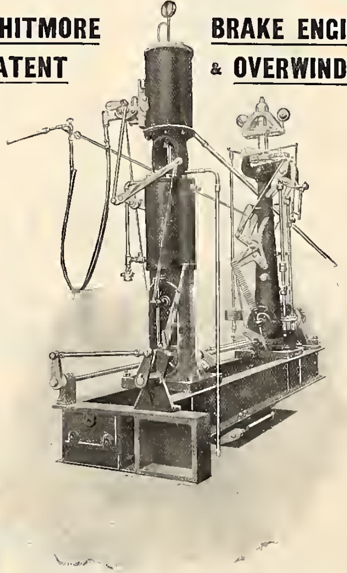

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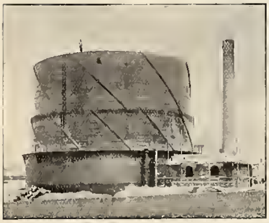

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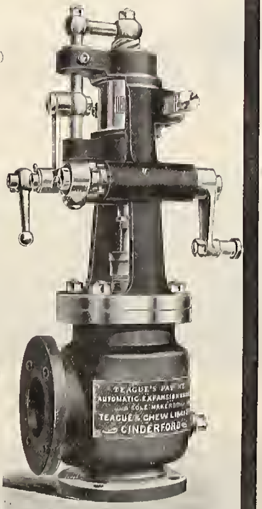

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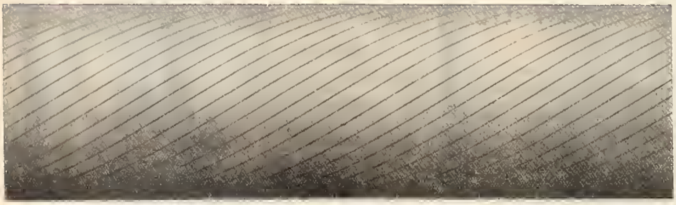

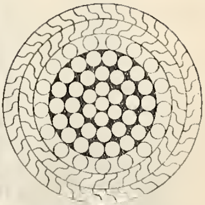

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WHY LEAVE SHAFT PILLARS?

Authors' Reply to Discussion.

At the recent London meeting of the Institution of Mining Engineers, a paper entitled, "Why Leave Shaft Pillars?" was read by the late Mr. W. H. Pickering and Mr. Basil H. Pickering. The paper was reprinted in the *Colliery Guardian* of June 7, 1912, p. 1133, and the following issue (p. 1191) contains a report of the discussion, to which Mr. W. H. Pickering briefly replied at the meeting. The authors have since prepared a more extended reply for publication in the *Transactions*, which, by the kind permission of the institution, we are enabled to publish in advance. In view of the importance of the subject and the unfortunate death of Mr. Pickering, it cannot fail to be of interest to our readers.

The authors say:—

Responsibility.

It was pointed out, particularly by Mr. C. E. Rhodes, that very great responsibility would rest upon a mining engineer who advocated the removal of coal round a pit shaft. He would be blamed in case of failure, and success would bring him little credit. No doubt he would be blamed for failure, but the writers agreed with Prof. Lupton that the experiment was well worth a trial. Pioneers were bound to take greater risk than the more timid men who followed in their tracks; but, as a rule, they received credit if they earned it. It was quite probable that there were colliery owners who would consider favourably a detailed scheme for removing shaft pillars, and who would absolve the mining engineer from all blame in case of failure, provided that he made clear the advantages and the risks involved in the undertaking.

Subsidence.

The writers, as stated in the paper, did not deal at length with facts and problems in connection with subsidence, a list of papers upon this important subject having been given at the end of the paper. Several points were, however, raised in discussion which required comment. Mr. C. E. Rhodes had mentioned a case in which the pull from workings 800 yards deep was some 200 yards in advance of the face. This supported the writers' plan of extracting the shaft-pillar by working outwards from the shaft. Mr. W. B. Wilson considered that irregularities in the strata would probably allow breaks to run into the shaft, and Mr. Hugh Johnstone was of opinion that the pressure would come upon two points in the shaft nearest the longwall face. The writers thought that as the main weight breaks would be inclined from the shaft, no serious damage would be caused by the back-breaks from the settlement. The settlement would be vertical, and there would be little lateral pressure on the shafts. All strata were more or less elastic; and although the first layers were broken by these subsidiary back-breaks, the layers above, being cushioned, were only bent. To allow for the first settlement, the writers suggested that the bottom part of the shaft should be supported temporarily. Mr. Wilson was of opinion that much of the stuff produced in the sinking, being soft shale, would not be of any value in packing. The writers held the contrary opinion. To make an effective uniform tight pack, small stuff was absolutely necessary. The building stones should be set in it, and it should be rammed into all spaces. It was a mistake to suppose that sand or fine dirt would not support great pressure even when occupying a greater space than when first extracted from the earth. Sir Benjamin Baker had made an experiment proving this fact, which had been observed in practical work by mining engineers who had used fine material for the internal construction of packs. Sir Benjamin filled a vertical box 20 ft. long and 2 ft. square with sand. He loaded the sand with 20 tons to the square foot, and there was no settlement. He then hammered the load to imitate the vibration of a girder carrying a railway train, and still there was no settlement. He then removed the load and gave the box three taps with a hammer, with the result that the surface of the sand fell 2 ft.* It was really remarkable that sand which occupied at least 10 per cent. more than its proper space should have supported so heavy a load. It was this property which, amongst others, made sand and other fine material so valuable in packs. It was probable that the movement of the strata in settling would eventually cause the particles to adjust themselves so as to occupy the smallest space, but the adjustment would be very slow and the settlement uniform. Speed in forming a large area of uniform tight packing was one of the essentials of the suggested plan of extraction. This would, to a great extent, prevent the shear which caused distinct and definite advance breaks to be formed at each holing when a longwall face was not advanced rapidly and the packing was not tight. Mr. H. W. G. Halbaum had clearly shown that damage at shaft bottoms and elsewhere was largely due to the shearing forces caused by unequal support of the strata.

The important questions of the rate and duration of settlement of strata after the extraction of coal had received too little attention from mining engineers. Careful observations, extended over a number of years, of the effects above and below ground would be of the greatest practical value. The best record of surface depression that the writers had been able to find was by Mr. Tylden Wright. During the discussion of a paper read by Mr. S. R. Kay before the Institution of Civil Engineers, Mr. Tylden Wright made the following statement:—

> But he did not agree that the wave of subsidence followed the excavation of the coal. He had found from most careful experiments extending over 7 years, month by month, that the subsidence began considerably in advance of the working of the coal. An instance he might refer to was Newstead Abbey, in Nottinghamshire, one of the finest historical mansions in the country. It was his lot to advise the owner whether the pillar of coal that had been planned to protect it should be left, or whether the whole of the coal should be swept out by longwall work. He found that the pillar required to protect it would be at least 40 acres in extent, and about £4,000 in value; and even if the pillar were left, then the lakes which were close to the Abbey would be thrown out of level, and a great deal of trouble would be caused. He therefore recommended that the pillar be entirely swept out by longwall work. The workings were 560 yards from the surface, and the seam of coal was 3 ft. thick, but the material removed was 3 ft. 8 in. in thickness. Observations had been kept by Mr. Bagnold Smith, the managing director of the Newstead Colliery Company, for seven years. Fortunately they began before the coal was worked, and it was found that nine months before the coal was excavated under any portion of the Abbey, it began to move and to fall at one end at the rate of ¼ in. per month. The face of the work was then 90 yards distant from the Abbey. As the work advanced the wave of depression increased from ¼ in. a month until it ultimately reached 1¼ in. per month, or a total depression of 15 in. in the year. At one time, a year or two ago, one end of the Abbey was 10 in. lower than the other. But to show how smoothly and steadily the fall took place, he might mention that in the west window of Newstead Abbey, which was one of the finest architectural possessions of the country, with the loose tracery of the window, which was there 800 years ago, not a single stone had dropped out, and it was all just as it was, although it had subsided no less than 23 in. He cited that instance as, in his opinion, confirming the modern view, that the best plan to deal with such questions, where there was a deep seam and the strata were moderately favourable, was to sweep the whole seam out by longwall work as rapidly as possible. There was no question that if the pillar had been left, grinding would have been going on for years, the level of the lakes would have been disturbed, and it would be impossible to surmise the fate of the Abbey. The working face was now 500 yards past the Abbey, and although there was still movement of ¼ in. per month, practically it had come to a state of rest again.†

This was a striking example of the successful extraction of a pillar under a valuable building. If it had been possible to begin in the middle of this pillar and work two parallel faces outwards, as suggested by the writers, for the extraction of shaft pillars, it appeared to be certain that the Abbey would have settled on an even keel from the first. As it was, the subsidence was so gradual and regular that, at the worst, the Abbey was only 10 in. out of level, and it eventually settled without damage.

Mr. Tylden Wright, however, gave an instance where in similar circumstances the surface subsidence was sudden, the floor of a house having risen whilst the family were at dinner; but it was not recorded that in this case the question of working the coal had been so carefully considered as in the Newstead case. Judging from the amount of subsidence, the goaf had not been tightly packed in either case.

Mr. J. J. Prest wished to know in what circumstances the surface subsidence would be greater than might be expected from the thickness of the coal extracted. This occurred when quicksand was drained by the workings, or when the surface rock was full of fissures. Mr. Prest gave an instance of the surface subsidence being only 2 in., when a seam of 3½ ft. thick was worked under the magnesian limestone. Further details of that interesting instance were desirable.

The magnesian limestone in some parts of the Doncaster district was water-logged and full of fissures. In some places the ground gave forth a hollow sound when struck. About 20 years ago, and long before there was any mining in the district, a gamekeeper, when going his rounds, found a large deep pool where there had been a dry field the previous day. It had been formed by the caving-in of a large area of limestone. Similar pools, some of them 20 ft. deep, had probably been formed in the same way. It was found that the surface subsidence, when coal was worked 600 yards under this limestone, was very serious, and greater than the underground settlement of the strata following the extraction of the coal. This striking difference of behaviour of geologically similar strata was another good illustration of the impossibility of expressing the effect of subsidence in formulæ which would agree with practical experience. In considering the probable effect of extracting the coal, the principles which governed subsidence must be kept in mind, but the conclusions must be tempered by a practical view of the various overlying strata. Each case must be judged on its merits.

Difficulties which might Prevent the Extraction of Shaft Pillars.

The writers had chosen, as an example to illustrate the principles of the method which they suggested, a very simple and straightforward case; but had pointed out that they did not advocate the extraction of shaft pillars in all circumstances. Several practical difficulties had been mentioned during the discussion.

Mr. Rhodes, Mr. Wilson, and Mr. T. H. Bailey had drawn attention to shafts in which there was tubbing holding back water at a high pressure. No doubt the responsibility of extracting the shaft pillar in such circumstances would be very great, but the writers were of opinion that it could be done without damage to the tubbing, provided that there was a considerable thickness of strata between the seam and the bottom of the tubbing, the thickness required depending upon the character of the strata. The writers would deal with the concrete example given during the discussion, namely, a pit 900 yards deep, where the strata were of a running character and enormous quantities of water had to be dealt with and tubbed back. If the tubbing were to be carried well into solid strata, an extra wide crib-bed prepared, and the bottom lengths of tubbing backed by cement, the writers believed that it would be undamaged. At 500 yards above the seam the subsidence would be slow, uniform and vertical, and would probably be measured by inches only. A length of 300 or 400 yards of tubbing with its numerous joints was comparatively elastic, and would follow the vertical settlement without damage. The only serious danger point would be the seat crib. In this connection Mr. Halbaum had cited an interesting case where running sand flowed from behind the tubbing into the workings without serious mischief resulting.

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* *Minutes of Proceedings* of the Institution of Civil Engineers, 1898, vol. cxxxv., p. 145.

† *Minutes of Proceedings* of the Institution of Civil Engineers, 1898, vol. cxxxv., pages 126-127.

In considering the possible damage to the lining of shafts, the flexibility of apparently rigid structures, if high or long enough, must not be forgotten. How great was this flexibility would be realised by one who ventured on to the top of a high chimney-stack during a heavy gale. The force of the wind bent the chimney out of the perpendicular without any damage, but the sensation of rocking was most disagreeable. The lining of a shaft was a specially high chimney surrounded by strata. Such a structure would bend or yield to a uniform movement or pressure, and would right itself without damage. A shearing force was the danger.

Mr. Bailey had given an example of the disturbance of tubbing where coal pillars only 40 to 60 yards in diameter had been left. In most cases, such small pillars would be certain to cause a shearing weight, and the result would be serious damage to the shaft.

Mr. Bailey also raised the question of extracting the pillars where more than one seam was worked, and Mr. Prest asked what the writers would do if six seams were worked simultaneously. The writers assumed that this was an actual and not a hypothetical case. It would be impossible to give even a guarded answer, unless more data were supplied, such as the thickness of the seams, the depth of each from the surface, the character of the strata, &c. If, however, it was in the same district where the example of a surface subsidence from the working of a 3½ ft. seam—described by Mr. Prest—was only 2 in., there appeared to be a *primâ facie* case for the extraction of the shaft pillar coal from the various seams amounting to, say, 7 ft.; for the surface subsidence would be only 4 in., or much less where tight packing was put in. A paper by Mr. Prest on the simultaneous working of these six seams and the underground effects would be most interesting. It seemed to be a unique case. Evidence had been given before Royal Commissions, and papers had been written upon the proper order of working contiguous or nearly contiguous seams; but in practical life commercial and not engineering reasons determined the order of working. The most profitable seam would be worked first. The shaft pillar of this should be extracted. It would be possible in many cases to extract the pillars of other seams, but it must not be forgotten that, when ground had once been disturbed, further disturbance had a greater effect than the first breaking of the virgin strata. Where the strata were weak or unsound, brickwork was really unsuitable for lining large shafts and for supporting the insets, as bricks offered a very poor resistance to pressure. Even to withstand the very slight lateral pressure in shafts, the brickwork had to be of considerable thickness. It was a question of cost, but probably convention and custom were responsible for the almost universal use of bricks for the lining of shafts and insets. Reinforced concrete would certainly be much better for lining the bottom length of shafts and for the insets. It would take far less room, with the result that excavation would be saved. If the excavation of a shaft to have a finished diameter of 20 ft. was reduced by only 6 in. all round, the raising in the "bowk" of some 500 tons of rock per 100 yards, as well as the labour of excavation, was saved. It would not be difficult to arrange the skeleton rings and hangers, commonly used for the temporary support of the sides of sinking shafts, so that they might remain and form the reinforcement of the concrete. A shaft lined with reinforced concrete at the bottom and bonded to similar material supporting the insets would behave better under stress than if brickwork had been used.

Faults and Dislocation of the Strata.

The president and Mr. Bailey had drawn attention to faults as a disturbing factor, and Mr. C. C. Leach had asked how the existence of serious faults could be discovered before they were reached. Serious downthrows from the shaft would be cut in the sinking. These would be far more disturbing than upthrows, for they would have the effect of directing weight breaks into the shaft. Other faults would be struck by the preliminary heading, and if the engineer were not satisfied that the ground was unbroken by faults, he could drive a proving heading at right angles to the preliminary heading. Faults might be disregarded, unless they were in the area of the tight packing, or were considerable downthrows. The writers did not think that the fault with a throw of 416 yards and 500 yards from the pit, mentioned by the president, would cause the slightest mischief if the pillar were extracted.

Inclined Seams.

Mr. Prest, Mr. Bailey, and Mr. John Gerrard had mentioned inclined seams. Coal pillars might be extracted with success where the strata were highly inclined. Such circumstances were favourable for hydraulic stowing. This method of stowage reduced subsidence to a minimum, and was so effective that in Germany special railways were laid to bring the fine material to the mines. The writers were informed by Dr. Friedensburg, an eminent German mining engineer, that the cost varied from 6d. to 1s. per ton raised. This method was now being tried at a Scottish mine.

Commercial Reasons for Extracting the Coal from Round the Shafts in the First Instance.

Mr. Rhodes, Mr. J. H. Merivale, and Mr. Wilson considered that leaving in the shaft pillar was only a temporary loss, as the coal would be won at the end of the life of the colliery. The writers submitted that the extraction of coal from the shaft pillars in such circumstances was not satisfactory. The seam was crushed and broken. Arches, girder-work, and other permanent structures in the main roads interfered with the work, and the working face had to be advanced in the wrong direction. If the coal were extracted in the beginning, the haulage arrangements would be temporary, and would not interfere with a very liberal ripping of the roads and the burying of the packs. The coal could be cheaply worked. The writers, as an example, had estimated the profit by taking the present figure of the working costs of a particular seam and deducting this from the published value of the coal at the pit mouth. A kindly and able critic had pointed out in a private letter that costs and prices were so variable that the figures given might be misleading. The writers accepted the suggestion that the profit on the sale of the coal from the shaft pillar might be estimated at 1s. a ton. Taking this figure, the profit would be £25,000 for the 500,000 tons which Mr. Arnold Lupton suggested might be extracted—surely a very satisfactory nest-egg for the beginning of a colliery. The life of a modern colliery would not be less than 50 years, and, even assuming that the shaft pillar was successfully extracted at the end of that period, the interest on £25,000 would have been suspended.

No instances of crush when shaft pillars had been left were given in the discussion. The writers hoped that some of the members would describe difficulties from this cause at mines under their charge. Engineers, however, were naturally shy of giving instances of difficulties which had not been overcome, or of unsolved problems. Mr. Halbaum, who had given close attention to the problems connected with crush, pointed out that, even if the authors' expectations were not fulfilled when the pillar was extracted by the method which they had suggested, the mischief could hardly be greater than that which had resulted in many cases from leaving pillars. The authors had in mind an instance where in a 3½ ft. seam, worked at a depth of 760 yards, and a pillar 500 by 450 yards left, there has been no rest from shearing crush and side weight. Girders of 12 in. section were twisted, bent, and broken. The road supports, consisting of girders and heavy timbers, had to be renewed in places 20 times during the last seven years. Taking all the roads, the average renewal required had been 12 times in the same period. The brickwork side walls in the inset had been pushed gradually into the road by side weight, and the inset, which originally was 21 ft. wide, was now reduced to 17 ft. 4 in. Serious damage to the shaft had been one of the results.

Grimsby Coal Exports.—The following is the official return of the quantities of coal exported from Grimsby during the week ended July 19:—To foreign destinations (tons): Wyborg, 1,292; Gothenburg, 945; Dieppe, 1,769; Trelleborg, 1,616; Slite, 626; Halmstad, 1,243; Cronstadt, 5,722; Assens, 2,508; Stockholm, 1,619; Esbjerg, 311; Nexo, 776; Antwerp, 383; Hamburg, 912; Gefle, 4,163; Bremen, 356; Rotterdam, 514; Riga, 2,014; Wasa, 837; Bandholm, 1,463; and Christiania, 653 tons; total, 29,746 tons. To coastwise destinations (tons): Lerwick, 1,706; Folkestone, 320; and Hayle, 650 tons; total, 2,676 tons. The export for the corresponding week of last year was: Foreign, 28,879; coastwise, 986 tons.

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, July 16, 1912, is as follows:—Amsterdam, 2,386 tons; Aalborg, 286; Assens, 2,067; Alexandria, 10,204; Antwerp, 115; Abo, 1,000; Bremen, 1,845; Bruges, 692; Buenos Ayres, 5,225; Bombay, 1,229; Copenhagen, 450; Christiansand, 406; Cronstadt, 21,336; Drontheim, 116; Danzig, 435; Gefle, 5,644; Ghent, 500; Gothenburg, 3,916; Harlingen, 1,421; Hamburg, 4,240; Heligoland, 185; Husum, 501; Kolding, 326; Libau, 405; Oporto, 1,254; Oran, 506; Oxelosund, 4,978; Oscarshamn, 1,092; Port Said, 4,295; Rotterdam, 7,338; Rouen, 776; Riga, 4,846; Reval, 2,216; Stettin, 199; Stockholm, 300; Sodertelje, 942; St. Petersburg, 2,949; Trelleborg, 3,829; Videy, 908; Ystad, 4,163; total, 112,531 tons. Corresponding period, July 1911, total, 56,557 tons; corresponding period July 1910, total, 100,460 tons.

THE BRITISH COALDUST EXPERIMENTS.

Scheme of Investigation.

On July 18, a meeting took place at the Home Office, Whitehall, of the Committee appointed to carry out the coaldust experiments at Eskmeals and the Advisory Committee. A programme was submitted to and approved by the meeting, and the experiments are already in progress. A date was fixed for a visit by the Advisory Committee to inspect the works.

The following is the text of the programme:—

The following general scheme has been prepared with a view of giving an idea of the scope and nature of the investigation which the Committee has begun.

It is not, of course, to be assumed that the order here adopted will be that followed in experimenting. On the contrary, several questions, notably those concerning the use of inert dusts, will be investigated at once with a view of arriving as speedily as possible, if not at a definite conclusion, at all events at a basis for practical action.

The work before the Committee can conveniently be divided into two main branches:—

1. Problems affecting the initial ignition of coaldust and the prevention of that ignition.
2. The experimental study of the nature of explosions resulting from such ignitions.

The Committee propose to conduct their investigations in such a manner that, as far as possible, progress in these two branches may proceed *pari passu*, since they regard knowledge concerning each as of equal importance. For although the prevention of the initial ignition of coaldust may largely limit disastrous explosions, an ignition of firedamp may cause a coaldust explosion, and it is essential that the conditions necessary for the development of such explosion and the maximum force that can be generated thereby, should be known before true remedial measures can be laid down.

Whilst, therefore, experiments are being conducted, both in the laboratory and on a large scale, regarding the conditions necessary for the ignition of coaldust—according to the scheme outlined below—it is desirable to come to a decision, as soon as possible, as to what extension, if any, of the existing gallery is required in order to render it suitable for the study of the development of explosions and the means of arresting them after full development.

For this purpose a gallery of sufficient diameter and length will be required, and the Committee's first duty will be to compare explosions traversing the two existing galleries (7 ft. 6 in. and 3 ft. 2 in. in diameter respectively) in order to determine whether it will be necessary to add to the present gallery, and with what diameter it will be necessary to experiment.

I. The three main factors involved in a dust ignition are:—
  i. The nature and condition of the coaldust.
  ii. The amount and purity of the oxygen supply.
  iii. The character of the source of heat.

It being understood that each of these factors may be modified by the surrounding conditions.

The Coaldust.

As a first step, a series of comparative experiments with different samples of coaldust is necessary in order to determine the most sensitive dust, it being wisest, in order to secure a factor of safety, that all preventive measures should be pitted against the greatest certainty of ignition.

It would appear that the inflammability of coaldust is dependent on its chemical composition, on the size (and shape?) of the particles, and also on its physical character (*i.e.*, density, power of occluding or condensing gases).

For this investigation each district inspector has, according to instructions received, forwarded to the experimental station samples of nut coal and "upper dust" from two or three tyical seams in his district. Altogether samples from 54 different seams have been sent.

At the outset an investigator is faced with a difficulty in that the true nature of coal is not yet properly understood. The Committee have continued the investigations undertaken by the Coaldust Committee of the Mining Association directed towards obtaining definite information regarding the composition and chemical constitution of coal, and although they have not as yet attained this ultimate object, some insight has been acquired into the general character of the compounds that form the "coal substance," and a relationship has been traced between the proportions in which these compounds exist in any particular sample of coal and the inflammability of its dust.

So far as the work has progressed, it appears that, for dusts of the same degree of fineness, the relative inflammability (as indicated by experiments on the lines of Prof. Bedson's well-known work) can be measured according to the percentage extractable from the coal by the solvent action of pyridine. The Committee hope shortly to publish a preliminary account of this investigation, which involves also experiments as to (*a*) the solvent action on coal of various organic liquids, (*b*) the effect of low temperature distillation of coal and of the bodies extracted therefrom by the solvents, (*c*) the determination of the relative ignition temperatures of the dusts, and (*d*) the determination of the relative ease of propagation of flame over a short distance in a tube of small (1 ft.) diameter.

At the same time, since the physical properties of the coaldust come into play, it is proposed to determine the relative friabilities of the different coals, whereby their liability to form fine dust can be judged.

Further, the influence of different densities of dust cloud must be ascertained in order that it may be understood under what conditions a cloud of sufficient density can be produced from coaldust lying at rest by, say (*a*) a fall of roof or timber, (*b*) a reversal of the air-current, (*c*) the firing of a shot, or (*d*) an inflammation of gas, with or without much violence.

Finally, the effect of additions to the coaldust must be ascertained. In one direction there is the effect of the addition of a small percentage of firedamp; in the other direction the quenching effect of (*a*) water in different quantities, (*b*) inert dust in different quantities, and (*c*) chemicals such as, for example, an alkaline bicarbonate.

The Oxygen Supply.

The question has been raised whether a current of air is one of the conditions necessary for obtaining an inflammation of dust. Preliminary experiments have shown that the velocity of such current varies with the character of the source of inflammation, the requisite velocity being greatest with a small source of heat unaccompanied by concussion, and least with a large source of heat accompanied by concussion (such as is obtained by firing a charge of dynamite unstemmed from a cannon).

This question must be studied.

Among other conditions, we have to consider :—

Barometric pressure.

The initial temperature of the air.

Varying tension of aqueous vapour.

The reduction of the oxygen-content of the air.

The addition of a small percentage of carbon dioxide to the air.

The Source of Heat.

With the most sensitive dust it is required to know the limiting size, volume and intensity, and duration of flame (from whatever source) that can cause ignition under the most favourable conditions as regards purity, fineness and quantity of coaldust present, with and without a small percentage of firedamp, and with or without a ventilating current.

The conditions necessary for ignition must be studied with—

Blown-out shots with various explosives;

Overcharged shots with various explosives.

(These two involve an experimental study of high explosives as regards their speed of detonation, length and volume of flame, and duration of flame. The necessary apparatus for carrying out this work has been obtained.)

Gaseous explosions ;

Inflammation of gas, such as may arise from a feeder of gas issuing on to a naked light ;

Naked lights, smouldering dust, &c.

Electric arcs (direct and alternating current).

Further, it requires to be known whether ignition can be caused by the heat due to friction from brakes, falling stones, or ropes and sheaves, and whether a dangerous degree of heat may be generated either by such a sudden compression of air as may occur naturally in a mine, or by any failure of compressed air pipes.

Experiments will be made to discover in what way coaldust and air mixtures, or coaldust gas and air mixtures can be treated in order to prevent an ignition taking place. Such experiments include (among others) :—

a. The testing of the value of water screens, brattice screens, or water bags in front of the shot-hole ; water tamping and watering or stonedusting round the shot-hole ; chemical tamping.

b. The determination of the quantity of moisture or of incombustible dust that must be present with the coaldust in order to render it incapable of ignition, either in pure air or in an air-current containing a small percentage of firedamp.

II. It would be premature to attempt to outline any complete scheme of investigation of the propagation of explosions and their arrestment until definite information is obtained as to what a coaldust explosion that has attained its maximum violence is capable of doing, and until the conditions necessary for the attainment of this maximum violence have been ascertained.

There are, however, certain lines of work that have been indicated by the unpublished experiments of the Mining Association. These show that one or more constrictions have the effect of causing explosive violence to be obtained at an earlier period in the gallery than when such constrictions do not exist.

The effect will therefore be studied of—

Restrictions of different degrees ;

Changes of direction of the gallery ;

Changes in the size of the gallery.

Firedamp Explosions.

Inasmuch as any methods that may be proposed for the prevention (or the quenching when started) of coaldust explosions must not render greater the danger of gaseous explosions, it will be necessary to study, both on the large scale and in the laboratory, the propagation of explosion under various conditions in mixtures of firedamp and air.

We have in mind, in particular, the objection that has been raised to the use of incombustible dusts that, according to some experiments of Sir Frederick Abel, the presence of such dusts in the air of the mine would render explosion possible with a smaller percentage of firedamp than is ordinarily the case.

HAILWOOD'S PATENT ELECTRIC MINERS' LAMP.

Through the courtesy of Messrs. Ackroyd and Best Limited, of Morley, near Leeds, we are enabled to give the following particulars of an electric miner's lamp which has recently been placed on the market by them.

The lamp primarily consists of two main portions of cylindrical form. The bottom cup-like portion contains a circular accumulator having flat plates, the paste of which has been inserted under great pressure. The lamp bottom is provided with a solid cast ledge R having two slots L G formed therein.

The upper part of the lamp is passed down and over the bottom, lock catches L,C on the upper part entering the slots L G, a slight rotation (bayonet joint-wise) to the left causes these catches to pass under solid rim R, the lock bolt L B engaging in teeth on the underside of one of the catches L, C, suitable guards being provided on the plate L C to screen the lock and prevent the same being tampered with. The catches L C are formed so as to anchor behind another solid rim on the lamp top, so that there is no fear of the top and bottom severing and the formation of a spark by the breaking of the electric contact, as may so easily happen with lamps which have hinged or similar joints.

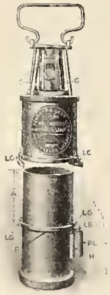

FIG. 1.

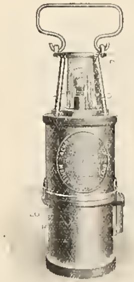

FIG. 2.

Particular attention is drawn to the fact that the upper part of the lamp overlaps the bottom part at the part marked A (fig. 1) to the extent of $2\frac{5}{8}$ in., and a clearance of $\frac{1}{32}$ in. is left between the walls of the upper and lower case, which, while allowing acid fumes to ventilate and get clear of the lamp, *will not allow flame to pass out alive*, as the flame in passing over $2\frac{5}{8}$ in. of cold metal has the heat abstracted from it and cannot possibly ignite gas on the outside of the lamp. This is an important feature of the Hailwood lamp, seeing that it has been demonstrated that a spark given by portable batteries can ignite coal gas, and also the fact that the hydrogen gas given off by accumulators, or the spilling of the sulphuric acid on iron and the formation of hydrogen may generate a very explosive gas, which may be ignited at the terminals of the battery.

It should be noted that there are no rubber washers employed to make a joint between the upper and lower part of the lamp.

The electric bulb is contained in a glass G, which is of exceedingly small outer diameter and has very thick walls, and has the unique formation of a top $\frac{1}{4}$ in. thick at the part D (fig. 2), the top of the glass being flat, forming a strong bed against the crown plate of the lamp, an aperture U (fig. 3) being formed in the crown plate to allow rays of light to pass through the thick upper end of the glass. This glass is also a very important factor in the Hailwood lamp in tending to reduce the possibility of explosions from the shattering of the electric bulb, seeing that such a breakage in an explosive mixture of gas has been proved capable of igniting gas. The small diameter of the glass G reduces the chances of being damaged by blows from a pick, and the solid top D makes the glass, at this point, really stronger than the frame of the lamp, and there is, therefore, not the same liability of the glass being cracked through pieces of coal or stone falling thereon from the roof.

It should be noted that with this outer glass G there is only one joint to make, viz., at the bottom of the glass, and there is not, therefore, the same risk of lighting the outside gas by the breakage of the electric bulb as would be the case where there is a joint to make both at the top and the bottom of the glass.

The accumulator is fitted with a special arrangement of vents, which, whilst permitting the escape of the fumes from the interior of the accumulator, will not allow sulphuric acid to run out.

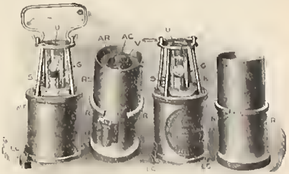

FIG. 3.

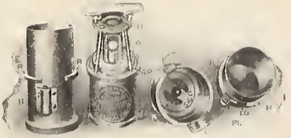

FIG. 4.

For use in cases where quantities are required, the lock P L is provided, this being of the pneumatic type, and formed of brass and aluminium, and therefore not subject to corrosion from the sulphuric acid or acid fumes, as would be the case with the iron or magnetic lock. The pneumatic lock can be arranged to open with an air pressure of from 100 lb. to 250 lb. per square inch. The makers offer a special plant for doing this work, the idea being to construct the lock to only open at a higher pressure than the normal pressure of the compressed air service in the pit. The compressed air enters the lock through an aperture H, passes along a tortuous channel, and depresses the lock bolt L B, freeing it from the lock catch L C, when the top may be rotated until the catches L C are in line with slots L G, and the top then lifted off. Where only two or three lamps are wanted, the lock may be fitted with a special screwed key so that it may be opened without the pneumatic opening device, but where desired it may be fitted with a lead plug lock, or with the Hailwood patent impregnable magnetic lock, as now so largely in use on oil lamps.

After the lamp has been closed, the light may be turned on by the screwing down of the screwed switch S, the lower part of the switch pressing on to accumulator contact ring A R (fig. 3), the screwing down of the switch tending to clean the contact.

Owing to the difficulty in obtaining electric bulbs with interchangeably threaded necks, the lamps are fitted with a patent lock nut which gets a firm grip of the bulb neck and does away with the unexpected falling out of the bulb, as is so common with other makes of lamps. The glass G sits on a plate K, which is screwed into the upper part of the lamp, and the operation of the changing of the electric bulb can be done in a moment.

The whole of the case is made of aluminium or brass and is machined up accurately.

For officials' use or for exploration purposes the lamp may be fitted with a lens for throwing forward a powerful ray of light. Where requested, the makers also provide a small reflector inside the glass G and behind the electric bulb, so as to cast forward the rays of light. The handle may be either square or round and provided with spike point.

Fig. 1 shows the lamp top in position ready to be passed over the lamp bottom. Fig. 2 shows the lamp closed and ready to hand out. Fig. 3 shows the back and front of two lamps, bringing the various interior and exterior portions into prominent view. Fig. 4 is a further view of parts of the lamp.

Where desired, Messrs. Ackroyd and Best can supply a 4-volt lamp of larger dimensions, or of rectangular shape and embodying the main principles of the above-mentioned lamp—the weight, of course, being greater according to the voltage, candle-power and number of hours the lamp is required to burn.

GEOLOGICAL RESEARCH IN THE COALFIELDS.

(Continued from page 121.)

Scotland.

The ground surveyed in the Highlands was arranged in two districts as follows:—

1. West Highland District, including Mull and South Morvern, under Mr. C. T. Clough, M.A.
2. North and Central Highland District, comprising parts of the counties of Sutherland, Perth, and Inverness, under Mr. L. W. Hinxman, B.A.

The coalfield areas were grouped in two districts:—

Carluke, East Kilbride and Douglas District, with a small part of Fifeshire, under Mr. L. W. Hinxman, B.A.

Shotts and Fauldhouse District, comprising also part of Ayrshire, under Mr. C. T. Clough, M.A.

Carluke, East Kilbride and Douglas District (with a part of Fife).—Revision of the coalfields in the Wishaw district was continued by Mr. Macgregor, and in that of Larkhall and Stonehouse by Mr. Dinham. The examination of the Auchenheath area was commenced by Mr. Hinxman.

In the Fife coast area, Dr. Crampton had opportunities of examining good natural sections of parts of the upper limestone group and millstone grit; he also obtained many bore sections, some of which show the strata to a depth below the Dunfermline Splint coal. These bores indicate that the thickness of the carboniferous limestone series in this part of Fife is greater than in any part of the Lothians or of the Lanarkshire basin, the beds thinning to the west in the direction of Bannockburn, Plean and Denny, and to the south towards the Lothians. The Edge coals are wrought in deep pits at Valleyfield, on the coast east of Culross, and further inland at Blairhall. A thick mass of black blaes with ironstone bands that occurs about 150 fathoms below the Index limestone and 80 fathoms above the Dunfermline Splint coal in all probability represents the important horizon of the "Black Metals" of the Denny, Kilsyth and Glasgow districts. If this assumption is correct, the Lochgelly Splint is on the same horizon as the Bannockburn Main coal and the Oloven coal of Kilsyth.

In the stata below the "Black Metals" there is a much greater development of coals in the Fife area than in Stirlingshire. The Kilsyth coking coal probably lies at a horizon considerably higher than that of the Dunfermline Splint, since the latter is within a comparatively short distance of the Top Hosie limestone, whereas the Kilsyth coking coal lies more than 60 fathoms above that limestone and comparatively close to the "Black Metals."

The limestones of the upper limestone group are easily recognisable in this part of Fife. The Calmy limestone is well developed and is underlain by a thick coal, the "Janet Peat"; the Index limestone is usually 4 to 5 ft. thick. One or two thin marine limestones are also met with between the Calmy and Castlecary positions. The cement limestone occupies the same horizon as the oil-shale which overlies the Castlecary seam in the north-west of Fife, at Levenseat and elsewhere, and thus indicates a wide-spread change from marine to land or brackish-water conditions at the commencement of the millstone grit period. Further sections show a calcareous band higher in the sequence, followed by a thick fireclay which may possibly represent the lower fireclay of the Glenboig district.

The sandstones and fireclays are remarkably lenticular in character, and the former often show current bedding and crumpling of the original planes of deposit. The crumpled beds frequently include thin lenticular layers of bright coal formed from the bark of tree-trunks lying in a more or less horizontal position, and with the external ornament still preserved. The sections suggest that the deposits were disturbed by the decay of the wood and consequent collapse of the buried tree trunks. The bright and highly inflammable coal of these layers contrast strongly with the papery coals interleaved with shales which often underlie the lower limestones of the Douglas district in Lanarkshire, and consist chiefly of fragments of carbonised wood, being evidently formed from drifted material. This difference tends to support Mr. Pringle's* views as to the origin of the bright and dull layers in coalseams, since the bright coal is found under conditions that suggest its formation by the removal of the woody material from tree trunks already deposited; whereas the dull layers occur in a manner that points to their being entirely made up of material transported from a distance.

The area revised by Mr. Hinxman between the Clyde at Crossford and the Nethan north of Lesmahagow forms a part of the most southerly extension of the Lanarkshire basin, in which the carboniferous limestone and calciferous sandstone rocks appear from beneath the coalfields of Stonehouse and Dalserf. Along the southern boundary these strata have been laid down upon an extremely uneven surface of the older rocks, the amount of overlap being indicated by the fact that between the Nethan and Hallhill, a distance of 1½ miles, beds from a short distance below the main limestone up to those about the horizon of the gas coal are found resting in turn upon sedimentary and igneous rocks of lower old red sandstone age. Three main faults cross the area from north-west to south-east, with the effect that immediately south of Craignethan Castle a raised fault-block of the lower limestone group of the carboniferous limestone series is in contact to the north with the middle coal and ironstone group of the same series, and to the south with beds ranging from the base of the coal measures to the upper limestones. The course of these faults, and of the many minor dislocations with which the field is troubled can be followed in the workings of the gas coals, which were at one time extensively wrought in the country between Lesmahagow and Crossford, while the gorges of the River Nethan afford good natural sections of the strata below the Gair limestone.

The principal horizons in the carboniferous limestone series, from the Gair or Calmy down to the main limestone, are clearly recognisable in the Auchenheath district, though the Gair and Gillfoot seams of the upper limestone group have to a large degree lost their normal "calmy" or argillaceous character. The thickness of the intervening strata has, however, diminished considerably from that found to the east and north-east, on the other side of the Clyde valley. This is particularly the case with the upper limestone group, the distance between the Gair and the Index limestones decreasing from 65 to 70 fathoms at Wilsontown and Carluke to 34 fathoms at Auchenheath.

The base lines of the millstone grit and coal measures have yet to be determined. From the evidence already obtained, it seems probable that the millstone grit is also much attenuated in this region.

The examination of the excellent section of the coal-measures displayed in the Garrion Burn, near Law Junction, has now been completed by Mr. Macgregor. With the exception of portions of the strata between the splint and Virtuewell coals, a fairly continuous section is exposed from the Kiltongue coal to a position about 53 fathoms above the Ell coal. The chief horizons actually seen are—the Kiltongue coal, the Kiltongue Musselband, the Ladygrange and Virtuewell coals, the Musselband coal position, the Humph position, Main and Pyotshaw coals, and the probable equivalents of the upper coal and Palacecraig ironstone. The positions of the Splint and Ell seams are given by day-levels; some of the crop workings along this stream go back for more than 100 years. The Ell, Main and Splint were thick and very valuable seams, but are now almost exhausted. The Main can, however, still be seen in two natural sections. The Pyotshaw, 5 to 5½ fathoms above the Main, is about 13 in. in thickness, the probable representative of the Humph only 2 in.; but both these seams thicken towards the east, and the former is wrought at Straven Colliery.

A noteworthy point in this section is the occurrence of "mussels" (*Carbonicola*, &c.) at eight different horizons, as indicated in the table given below. The horizon beneath the Ell coal occurs also in the Rutherglen district and many other places; that below the main has not been recorded so often, but is known at Bellshill and Rawyards. Except in the case of the Kiltongue Musselband and the 11 inch "mussel-ironstone" 29 fathoms above the Ell coal, "mussels" are not abundant at any of the horizons mentioned. The section of the Kiltongue Musselband in the Garrion Burn is as follows:—

	Ft.	in.
Sandstone, thick.		
Blaes	1	4
Parrotty oil shale	0	4
Musselband	0	8
Ironstone, clayband	0	2
Fireclay.		

At two points in the section a few inches of white clay, overlying thin seams of burnt coal, represent the dolerite intrusions that are found in the Law and Shawfield coalfield. These intrusions take the form of thin "whin floats" and occur at different levels, generally overlying coalseams, and are connected by nearly vertical dykes. In Straven Colliery the Pyotshaw coal has a roof of "white trap," and in the Brownlee workings the Kiltongue is locally covered by an 8 to 12 inch sill, by which the coal is burnt for about 6 inches.

In the area between Stonehouse and Larkhall, examined by Mr. Dinham, the principal coalseams of economic value are the Virtuewell, Kiltongue, and Upper and Lower Drumgray. The Kiltongue coal is often in two leaves, separated by 6 in. of fakes or fireclay. Between the Kiltongue and the Upper Drumgray there occurs a thin seam, locally known as the Jewel, which in a very few places reaches a workable thickness of 2 ft. The Upper and Lower Drumgray in this district are usually close together, and rarely more than 10 fathoms below the Kiltongue. From 4 to 8 fathoms below the Lower Drumgray lies the Watstone Musselband ironstone, associated with a thin parrot coal. Below this horizon the strata are variable and but imperfectly known; in the eastern part of the area a few thin coals occur here and there within a considerable thickness of sandstone and fakes; in the western portion one or more ironstones, locally known as slaty bands, have been wrought to a small extent in former times.

The base line of the coal measures in this district is as yet undefined.

The well-known Lesmahagow gas coal, which lies at an average depth of 33 fathoms below the Index limestone, and the "Wee" gas or Auchenheath oil coal, 15 to 19 fathoms higher in the series, were extensively wrought during the last century in the Auchenheath district. Over the greater part of the field these seams are practically exhausted, and as there is now no demand for cannel coal for gasmaking, the gas coal industry in this part of the country may be regarded as extinct. The only coals now wrought in the Auchenheath area are the smithy, a 17 in. seam 14 to 16 fathoms below the Index limestone, and the dross (locally known as the "lime") coal, 6 to 7 fathoms lower down. The smithy coal, which is locally burnt by a thin "whin float," is raised as a house and steam coal from a mine on the Nethan, near Auchenheath Station. The dross coal is mined and used for burning the limestone at the Netherton Lime Works, south of Auchenheath.

At the Valleyfield pits, Culross, Fife, the Five-feet and Dunfermline Splint coals are now being raised. The former is often as much as 6 ft. thick; the latter, which is worked at a depth of 210 fathoms, is 3 to 4 feet in thickness. Both are used as steam navigation coals.

Mr. Macgregor reports that in the Wishaw and Morningside district mining is now practically confined to the Virtuewell, Kiltongue and Lower Drumgray seams—all house coals. The thick upper seams are practically exhausted, though the ell and splint coals are still worked to a very small extent respectively at Woodhall Colliery, Cambusnethan, and at Shawfield. The Pyotshaw—a furnace coal—is wrought by coal-cutters at Straven; the Virtuewell and Kiltongue are largely raised at Garriongill and Brownlee; the Lower Drumgray at Herdshill, and all three seams, together with the Upper Drumgray, are or have lately been worked at Chapel Colliery. Of the seams below the Lower Drumgray, the Mill coal is probably the only one of much value, and may average 1 ft. 10 in. in thickness; the other Armadale coals are thin. No ironstones are now worked in this area, but the fireclay beneath the Lower Drumgray coal is locally mined.

In the Stonehouse and Larkhall area Mr. Dinham finds that the Virtuewell, Kiltongue, and Upper and Lower Drumgray are raised as house coals of varying quality. In the neighbourhood of Swinhill all these seams with the exception of the Upper Drumgray have at different times been coked, but the coking character is only local. The Watstone Musselband ironstone was at one time wrought at Watstone and elsewhere in the parish of Stonehouse.

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* "On the Origin of Bright Laminæ in Coal, and a Suggestion arising out of their Distribution." Read before the Edin. Geol. Soc., January 1911, but not yet published.

(To be continued.)

THE NEW FRENCH COAL MINES REGULATIONS.

In a circular dated February 22, 1912, from the Minister of Public Works, instructions are given for bringing into force the New Coal Mines Regulations of August 13, 1911, which were to become operative on February 25, 1912. These instructions are intended to be of an explanatory nature, and to indicate where and to what extent the new regulations have modified previous conditions. It may be mentioned that the decree contains 233 clauses, arranged under the general heads of *Surface Installations*: Section 1, General; Section 2, Electric Plant. *Shafts and Adits*: Section I, General; Section 2, Haulage. *Inclines. Haulage Roads. Machinery and Ropes. Working Places. Ventilation*: Section 1, General; Section 2, Fiery Mines. *Special Precautions against Dust. Lighting*: Section 1, General; Section 2, Safety Lamps; Section 3, Special Precautions as to Use of Spirit Lamps. *Explosives*: Section 1, General; Section 2, Use of Explosives in Fiery and Dusty Mines. *Gob Fires and Outbursts of Gas. Use of Electricity Underground*: Section 1, General; Section 2, Permanent Electric Cables; Section 3, Temporary Cables; Section 4, Machine Chambers, Sub-stations and Transformers; Section 5, Switchboards; Section 6, Electric Haulage; Section 7, Electric Shotfiring; Section 8, Special Application to Fiery Mines; Section 9, Insulation. *Sanitation in Working Places. Plans and Forms. Various.*

With regard to the surface regulations, the Minister of Public Works states that there is no reason why the surface arrangements of collieries should not be subject to the same rules as regards hygiene and safety as are applicable to other industries. Hence the requirements under this heading are mainly those already embodied in the Law of June 12, 1893, and subsequent decrees for regulating work in factories. There are, however, some clauses which are specially applicable to coalmines—such, for example, as boundary walls and provision of baths. With respect to the latter, the details have, in fact, been left for further consideration, but it is stated that this does not imply that the Government will tolerate any undue delay in bringing the clause into effective operation, believing that it will prove to be a real social advance. The Minister calls attention to the fact that the new Act includes a number of the type-regulations previously announced in the circular of July 25, 1895. It is not to be concluded, however, that the omission of any of these is in consequence of their being thought either excessively severe or useless. Some of these provisions will be dealt with in special rules, while others do not lend themselves to hard and fast regulations. The circular then proceeds to review certain clauses which might give rise to some doubt as to their interpretation. Some of these have been purposely left in a vague form in consequence of differences in local conditions.

The new shaft regulations require that there shall be a second mode of egress, either by means of ladders, or a second winding apparatus with an independent cable. Special exemption from this regulation can be granted by the Minister, and it does not apply to mines worked by adits, as is often the case in the Gard and Loire districts. Ascending cages carrying men may carry loaded tracks on any floors not occupied by men. Regulation 59 respecting lowering men in shafts is extended to sinking pit operations. Cages are to be furnished with proper railings to prevent men from falling out. Article 78 makes it obligatory to supply refuges in the haulage ways, even when there is a double track; and, in winding, a speed indicator is required for velocities exceeding 12 m. per second. Safety catches are required to be attached to cages. The rigorous requirements respecting winding ropes, embodied in Article 87, are not intended to apply to their full extent to ropes on inclined planes, or secondary haulage. Daily inspection of the winding appliances, cages, brakes and safety catches is required to be made. In the testing of winding ropes a distinction is drawn in the case of ropes used for winding more than four persons at a time.

In this case the ratio between the resistance to rupture by tension, determined beforehand, and the total load must at least correspond to the factor of safety. Subsequent tests are carried out on portions of the rope periodically cut off, and if there is a loss of resistance of more than 30 per cent. of its original value, the rope must be no longer used. Also no winding rope may be used for a load greater than one-sixth of its breaking strain if it is made of wire, or one-fourth of its breaking strain if made of hemp. In the case of winding ropes used for lighter loads, viz., less than four persons, the periodical tests on portions cut from the end are not obligatory, and ropes not used for winding men need only conform to conditions respecting the maximum load. Winding ropes used in the Koepe system are exempt from the conditions laid down in articles 90 and 91, but may not be used for a maximum load exceeding one-seventh of their breaking strain when new, and may not be kept in use longer than two years for winding men.

Article 104 deals with timbering, which is to be carried out in accordance with the general rules fixed by the colliery managers, with due regard to local geological conditions, and is not to be left to the individual judgment of subordinates.

Article 105 deals with packing, which is to be done consistently with a good ventilation system. Regard is to be paid to avoiding gob fires by using incombustible material for packing. In the case of hydraulic packing it is permissible to use the refuse from the washers and the screens. It is not, however, to be assumed that this refuse cannot also be utilised for hand packing in cases where they are not liable to give rise to spontaneous ignition.

In Article 107 it is laid down that waterproof clothing must be supplied to men exposed to wet, and this is to be interpreted as gratuitous.

With regard to temperature, the Minister of Public Works thinks that Dr. Haldane's suggestion that the wet bulb temperature should alone be considered would be excessively severe, although it must be acknowledged that the wet bulb readings are a better indication of the whole of the conditions likely to affect the miner than are those of the dry thermometer. By Article 108, except in cases of absolute necessity, work is prohibited in places where the temperature reaches 35 degs. Cent. on the dry thermometer, or 30 degs. Cent. wet bulb reading. But the Minister states that any temperature exceeding 25 degs. Cent. wet bulb must be considered high, and continuous work would at this temperature be arduous when the air is very damp, *i.e.*, when the difference between wet and dry bulb readings does not exceed 2 or 3 degrees at least. Thus, although by the Act it is not required that the inspector should actually intervene when the temperature reaches 25 degs. Cent., the attention of colliery managers is directed to this lower temperature and to the hygrometric state of the air. One of the most important clauses of the new Act is Article 110 dealing with ventilation, which is to be sufficient to maintain a healthy atmosphere, to prevent any great elevation of temperature and to overcome any danger from accumulation of gas. Save in special local circumstances the velocity of the air in the galleries may not exceed 8 m. per second, except in shafts and cross roads or return airways not serving normally as travelling roads. The Minister explains that in the first draft of this rule the quantity of air circulating in the pit was not to be less than 50 litres per second per man as represented by the biggest working shift. Further consideration, however, showed that this standard was too absolute and would prove to be sometimes excessive, and at other times insufficient. It behoves engineers, however, to take special note of mines or parts of the mine where the supply of air in the downcast is less than 50 litres per man per second. They should in all mines see that the air circulates properly throughout, and that a sufficient quantity of air reaches the face in each working place to render the atmosphere wholesome.

In regard to the classification of fiery mines, inspectors will have to take into consideration, not only the quantity of gas set free and the method of its liberation, as natural stratigraphical phenomena, but also the ventilation. The chief inspector of mines has large powers in the matter of ventilation, and he will be able to refuse his sanction to any scheme of ventilation by descending currents, which by Article 121 must be submitted to him by the management before being carried out. A percentage of more than 2 per cent. of gas is to be considered dangerous in any part of a working place, and when this limit is exceeded the men must be withdrawn, and the above percentage is not to be taken as the average gas content of the working place. The permissible limit in the case of headings is 1·5 per cent. of gas in the return from the heading, and 1 per cent. in the return from other working places. This means that an air current with 1 to 1·5 per cent. of gas cannot be employed without previous dilution with fresh air, for the ventilation of other working places. It is not forbidden to use a ventilation current drawn from a particular part of the mine so long as the above percentage limits in the returns are not overstepped. The determination of the firedamp percentage is to be made by approved indicators of a type specified by Ministerial decree.

Under Article 139 of the Regulations it is provided that the percentage of firedamp in the return airway shall be ascertained daily in freely gaseous mines and at least once a week in mines giving off feeble quantities of firedamp, by means of an indicator giving immediate results. These are to be verified by monthly analyses. The indicators are to be of a type approved by the Minister of Public Works. The Commission of Scientific Research has now decided that such indicators shall conform to the type known under the name of the Chesneau lamp.

The classification of dusty mines is based upon the degree of danger which they possess, having regard to the proportion of volatile matter in the dust, its ash content and fineness, which factors are held to have a preponderating influence upon dust explosions, and at the same time are the least variable in every mine or part of the same. It is not found possible to lay down precisely the limits of each of the three categories under which mines are placed in this respect. In the first category are all mines in which the dust is capable of ignition, under conditions resembling the Liévin tests, by an unstemmed shot. In the third category are placed those mines with dust practically non-explosive, and the second category includes all mines falling between these extremes. These three classes of mines with regard to dust resemble the firedamp classification into distinctly fiery, feebly fiery and not classed, and inspectors are enjoined, in making this classification, to take into consideration not only the principal factors enumerated above, but also other points such as the thickness of the dust deposits, the size of the galleries, their dampness and the proportion of firedamp present in the main air currents.

In case of objection by the colliery manager to any particular classification, samples of the dust are to be taken by the inspector and transmitted to Liévin for the determination of its degree of inflammability.

Articles 144 and 145 deal with safety lamps, and define the conditions of their compulsory employment in the place of "lamps with a protected flame." The latter are defined as lamps protected by glass and gauze in such a way that the flame is practically safe from risk of fire. These "protected flame" lamps are, therefore, a kind of compromise between safety lamps and naked lights. Thus, although naked lights are no longer permitted even in non-fiery mines, the French law has not gone so far as to make safety lamps compulsory in every mine.

According to Article 146 of the Regulations, safety lamps are to conform to one of the types approved by the Minister of Public Works. The following lamps have been approved for use in fiery or dusty mines:—

A. Oil and spirit lamps.—(1) Oil: Marsaut; Fumat (1895 model); ditto (G. C. model); ditto (1903 model); Thomas-Grey. (2) Spirit: Marsaut; Fumat (1895 model); ditto (1906 model); Wolf (lower feed); Arras; Muller.

B. Electric Lamps.—Cotté; Lux; Universelle; Trin; Joris.

The spirit lamps may be furnished with internal igniters of approved design; the trigger of the relighter must be of metal, and enter the reservoir through a hole in the walls in which the trigger fits tightly without play. The igniting bands must be disposed so that only one relight can be made at a single time, and must be composed of substances that are inflammable but not explosive.

The use of exploders is governed by Article 217, which provides that they shall be also of an approved type. The following have now been admitted for use in fiery mines:—

1. Exploders made by the Société Anonyme d'Explosifs et de Produits Chimiques—No. 1; No. 3; *boute-feu* (large, medium and small models).

2. Exploders made by the Société Générale pour la Fabrication de la Dynamite—Types BD, BDK (metal, cylindrical, with oval section), N, D, NF, and DF (ash, parallelopipedic form).

3. Rousselle and Tournaire exploders (Siemens and Halske types, (dynamo and magneto forms).

4. Virieux exploder.

5. Davey-Bickford exploder (dynamo, metal box of rectangular section).

It is provided that the exploders used in fiery mines should only produce low-tension currents, and the fuses employed should be incandescent fuses of metallic filament. Fuses of standard resistance should be employed to prevent miss-fires. The boxes should be strong and tight and leave as little free space inside as possible. The triggers should be metallic and work smoothly and enter the box through a suitable metallic gland. The apparatus should be provided with an automatic device to prevent the passage of the current, except for a brief interval at the moment of maximum voltage. The terminals should be sufficiently far apart to obviate any danger of contact between the bare parts of the live wires. Approved types of exploders include both magneto and dynamo machines. Three exploders of the Société Anonyme d'Explosifs et de Produits Chimiques are described and figured. The magneto exploders comprise voltages from 20 to 50 and weigh from 7·5 to 15 kilogrammes (16½ to 33 pounds). The dynamo exploders are in three dimensions, with 18, 20 and 45 maximum voltages, and weighing respectively 1·5, 3·5 and 4·2 kilogrammes (3·3, 7·7 and 9 pounds). The exploders of the Société Générale pour la Fabrication de la Dynamite are of various strengths and weigh from 1·4 to 5·8 kilogrammes (3·2 to 12·6 pounds). The exploders of Ronesselle and Tournaire are of the Siemens and Halske type and comprise both dynamo and magneto machines. The former have a maximum voltage of 70 and the latter 12, the weight being nearly the same in each case—viz., about 7 lb. The Virieux exploder is a dynamo machine, 17 volts, and weighing about 3 lb. The Davey-Bickford exploder is a dynamo machine, 20 volts, and weighing about 6 lb.

North Staffordshire Institute of Mining and Mechanical Engineers.—Through the kindness of Mr. G. H. Greatbatch, of Berryhill Collieries, there will be a demonstration of work at the rescue brigade station at Berryhill Colliery, situated near the Railway pit, on Monday, July 29 next, at 1.45 p.m., for the benefit of the members of the institute.

Fillers and the Minimum Wage Act: Important Test Case.—His Honour Judge Moss has given judgment at the Wrexham County Court in two test cases arising out of the Mines Minimum Wage Act. The plaintiffs were Edward Richards and James Davies, fillers, employed at the Wrexham and Acton Colliery, and they claimed from the colliery company four days' wages at 1s. 1d. per day, being the difference between 5s. 11d. per day, the rate at which they were paid up to the time when the new rules under the Minimum Wage Act came into operation, and 4s. 10d., the amount now paid under the award of Mr. B. Francis Williams, K.C., the independent chairman of the North Wales District Board. The case was adjourned from the previous court, and in the meantime the judge decided that he had jurisdiction. The case for plaintiffs was that they worked as coal-fillers in a set of contractors or chartermasters, one of whom drew from the colliery company all the money earned by them collectively at tonnage rates and paid the fillers not less than 5s. 11d. per day. The chairman's award under the Minimum Wage Act reduced the minimum for fillers to 4s. 10d., and plaintiffs were therefore paid the reduced figure. On behalf of plaintiffs it was submitted by Mr. Caradoc Rees, barrister, that for all intents and purposes they were employees of the company, which was not absolved from liability merely because the fillers, as a matter of convenience to all concerned, received their money from the hand of the contractors.—Mr. Allen, of Wigan, for the defendants, called witnesses to prove the almost universal custom by which colliery companies, being unconcerned, ignored the filler from the point of view of remuneration, leaving this as a question to be mutually agreed upon as between the contractor and the filler. In support of this he pointed out that when the agitation took place four years ago about "hard and difficult places," one of the most prominent arguments of the colliers was that after paying their fillers, which by custom was regarded as an obligation, they sometimes had little, if any, money left for themselves. Counsel contended that the Minimum Wage Act had not altered the circumstances one tittle.—Judge Moss, in giving judgment for the colliery company with costs, said the award of the chairman of the Wages Board in respect to fillers was 4s. 10d. as a minimum, and by that award the fillers were bound. In his opinion there was a custom at the Wrexham and Acton Colliery to pay fillers 5s. 9d. a day, and the question was who was the party liable to pay—the company or the contractors. He had heard nothing in the evidence to justify him in saying that the colliery company had ever been liable, or that the fillers had ever made a claim against them directly for any money at all beyond the actual amount earned by the collier based upon the tonnage rate at so much per ton. Once having discharged that obligation to the collier of paying him the whole of the field rate, plus the percentages, for the amount of coal gotten by his set, the colliery company had been relieved from all liability, unless the question of a "hard and difficult place" was involved. The present case was not one in which this exception arose. His Honour added that he found, as a fact, that there had been a custom to pay the fillers 5s. 9d. a day, and that the filler had been paid by the contractor and not by the company, the contractor—or chartermaster—having made a contract with the company to win the coal at so much per ton. Therefore, he would give judgment for the defendant company, with costs.—Mr. Caradoc Rees asked for and obtained leave to appeal.

SOUTH WALES INSTITUTE OF ENGINEERS.

The quarterly meeting of the South Wales Institute of Engineers was held at Cardiff on Thursday, July 18, Prof. W. GALLOWAY, F.G.S., the president, in the chair.

The PRESIDENT announced that the council had decided to hold two meetings of the institute in the year at Swansea, these being supplemental to the quarterly meetings. This step had been prompted by the fact that new works were being established at a rapid rate in the western district, and that Swansea was the centre of a metallurgical area of the highest importance. The general meetings of the institute would be now as follow:—

January at Cardiff.
March at Swansea.
May at Cardiff.
July at Cardiff.
September at Swansea.
November at Cardiff.

The opening Swansea meeting would be held on Tuesday, September 17 next, at 2.30 p.m., when Mr. A. O. Schenk and Mr. David E. Roberts would read papers on subjects identified with the industries of the district. There would be an adjournment for tea, and the meeting would be resumed afterwards and invitations would be issued to the proprietors, managers and chief officials of engineering works in West Glamorgan and Carmarthenshire.

Discussions were closed on Dr. J. T. NICHOLSON'S paper treating of heat transmission and boiler design, and on Mr. EDWIN KENYON'S paper on the insulation of heated surfaces, and these gentlemen, on the motion of the PRESIDENT, were thanked.

The Analysis of Mine Air.

In discussion on "The Analyses of Mine Air conducted at the Lewis Merthyr Collieries Limited, Trehafod," by J. W. HUTCHINSON, M.I.M.E., and E. C. EVANS, B.Sc., A.I.C. (published in last week's *Colliery Guardian*),

The PRESIDENT said the subject of the paper was of pressing importance, more especially at the present moment, when the provisions of the new Mines Act were coming into force. The paper resolved itself into four distinct parts or subjects, and he should like the discussion to proceed on those lines. There was one point which he did not think was mentioned, and this was that the quality of the oil or other combustible used in the safety lamp had a good deal to do with the size of the "cap." The authors of the paper had been able to detect as low as 1 per cent. of firedamp, but with pure colza oil it was practically impossible to detect anything under about 1·6 per cent. At least that was his experience, using pure colza oil. With regard to the barometric influence on the actual firedamp, he recalled that as far back, he believed, as 1872, he had the honour of reading a paper, jointly with the then director of the Meteorological Society, before the Royal Society on the barometric influence on the outflow of gases. Mr. Alexander Brogden, a gentleman who loomed large in the middle of the South Wales coalfield 30 or 40 years ago, got hold of the paper just after it was read, and put a question in Parliament whether it was not desirable to have a barometer and thermometer put at the entrance of every mine. Parliament immediately adopted the suggestion, and the thing became law. Subsequently he (the president) had occasion to investigate the same problem in the Scottish coalfield, and this raised a point which had been the subject of much controversy—namely, that the variations in pressure of the air had an immensely greater effect in some mines than in others. For instance, in many Scottish mines, where fissures in the rocks were open, falls of the barometer immediately brought out the gas, or within a few minutes, whereas in mines in which the strata were very close, and there were no fissures, the barometric drop made scarcely any difference. The consequence was that men who were accustomed to mines where the strata were open were all advocates of the use of the barometer, while those who worked in mines with very close strata pooh-poohed the barometric influence on gas outflow. He was particularly pleased that Messrs. Hutchinson and Evans had obtained the results set out in the paper, because they corroborated what had been denied by so many people.

Mr. HUTCHINSON said he proposed to embody in a supplementary paper the results of further experiments that Mr. Evans and he had conducted. In this supplement, too, would be an explanation of certain contradictions apparent in Tables A_1 and A_2 and the chart, due to the varying speed of the fan.

Dr. J. S. HALDANE, F.R.S., wrote explaining that an engagement at the Home Office prevented his attendance at the institute's meeting. With regard to the paper of Messrs. Hutchinson and Evans, the plan of occasionally checking by analysis the lamp estimations made by firemen underground was evidently very valuable. The check analyses indicated that after suitable instructions, a capable fireman could estimate with his lamp the firedamp percentages ordinarily present within an error of about ½ per cent. A specially-skilled observer could doubtless get a little closer than this, but not very much. Dr. Haldane proceeds to say: "In spite of what the authors say, I am inclined to think that the Cadman-Cunynghame device, or the still simpler wire loop of Mr. Briggs, will prove useful in enabling a fireman to ascertain very quickly, and without lowering his lamp flame, whether any serious proportion of firedamp is present, and whether it is desirable to make a more careful test with the flame lowered. The authors show (for the first time, so far as I am aware) that even in a Welsh steam coal pit, with firedamp issuing directly from the face in large quantities, changes in barometric pressure, as well as work at the face, have a distinct effect on the issue of firedamp. The pressure immediately behind the issuing firedamp is so very large in relation to the barometric changes that a negative result as regards the influence of change in barometric pressure would not have been surprising. Further observations on this point at different pits would be of interest. Another point on which information is needed is the influence of stopping the fan, and particularly of reversing the ventilation, on the issue of firedamp. When the fan is stopped, the barometrical pressure is suddenly raised throughout the mine; and when the ventilation is reversed by driving air from the fan down the normal upcast shaft, there is a much greater increase of pressure. The effect of this must be in the direction of checking for the time the issue of firedamp. The observations of Mr. Bain and the writer showed that, in a colliery where but little firedamp was given off, the issue of gas into the airways was for the time reduced to a mere fraction of its former amount by reversing the ventilation. The effect of reversal on the issue of firedamp might be very important in case of reversal, on account of a fire in a main intake; and reversal by the method of connecting the fan with the downcast shaft may be less safe than by the more usual method of directing the air from the fan down the normal upcast. In the former method there is no general increase of barometric pressure throughout the mine on reversing the current, and the air returning on the fire might at first be more heavily charged with firedamp than the normal return air unless extensive short-circuiting occurred on reversing. Observations in a fiery mine on this point and on the effects on issuing firedamp of re-establishing the normal air-current, would be of much value. It was, perhaps, owing to the increased barometric pressure in the mine that stoppage of the fan for five hours did not cause a greater increase in the percentage of firedamp (chart B_3); but a sample taken just after restarting the fan and thus suddenly diminishing the air-pressure in the mine, might possibly have shown a greater increase."

Mr. D. E. THOMAS said the authors of the paper under consideration had demonstrated that variations in the composition of mine air took place due to coal working. Theoretically it had long been accepted that the working of coal caused a rise in the methane content. The evidence submitted by Messrs. Hutchinson and Evans confirmed the theory and made it an incontrovertible fact. The authors had carried out their observations for atmospheric pressure by means of a barometer placed at the surface of the mine. In doing this they had followed the same course as Koehler, Morin and others. It was a moot point whether this was justifiable. In the mine the atmospheric pressure at any point was different from the surface atmospheric pressure, as was immediately evident from the consideration of the depth of shaft and the water-gauge due to ventilation. Working, as they were, under varying factors, due to speed of fan, &c., local variations would of necessity occur. Again, the quantity of air passing at the point of observation might have been noted at the same time as the sample was being taken and the atmospheric pressure being recorded. He would suggest that it would be at least worth taking the atmospheric pressure not only at the surface, but also underground at the point of observation.

The PRESIDENT said Mr. Thomas might take it for granted that any change in atmospheric pressure on the surface would effect exactly the same change underground within a minute or two and *vice versâ*. Observation on the surface was quite sufficient.

Mr. HUGH BRAMWELL said barometric variations had practically no influence upon the issue of gas from the coal itself, but there were always cavities which contained more or less gas. In Scotch mines gas was in fissures as well as in open cavities; and here the influence of barometric changes would be felt. It was conceded that the barometer was too rough an instrument—the mercury was not sufficiently sensitive—to really give useful comparisons between atmospheric changes and the issue of gas at a particular point in the mine. Where the issue of gas could be observed in the mine accurately, they could foretell changes in the barometer; thus, they ought to have the issue of gas first and the observable change in the barometer following.

Mr. **WILLIAM JOHNSON** deprecated a deduction from previous observations that the barometer was not an eminently useful instrument, with, of course, limitations.

Mr. **BRAMWELL** and the **PRESIDENT** associated themselves with Mr. Johnson's statement.

Mr. **D. C. DAVIES**, at the same time, thought there was a great danger of firemen relying too much upon the readings of the barometer.

Dr. **W. N. ATKINSON** H.M. chief inspector of mines for South Wales, said the analysis of mine gas was going to be very much to the front in the near future. With reference to the detection of gas by the safety lamp, he thought the "personal equation" was a matter that was not sufficiently appreciated. Every man required to be calibrated for the observation of gas separately from other men. One might see a "cap" which was not visible to another.

The **PRESIDENT** said, if he might intervene, he thought it would be of interest if he mentioned that he examined about 600 firemen last month, and he was astonished to find the "personal equation" singularly absent. Most of the men were able to tell within ¼ per cent. the quantity of gas represented by the "cap."

Dr. **ATKINSON** presumed the men saw the same "cap"; but the **PRESIDENT** said they were called upon to judge several different "caps."

Dr. **ATKINSON** said he had known men who could see a "cap" where he could not see it at all, and on the other hand, men failed to see a cap that he could see quite distinctly.

The **PRESIDENT**: They must have been owners.

Mr. **W. D. WIGHT** said that, seeing how regularly analyses of mine gas synchronised with the records of the barometer, was it necessary in ordinary work-a-day duties to go further? The barometer had been discredited in some quarters because it was too slow in its operation; but slow as it was, it was not so slow as a chemical analysis. Could anything more be done to make the barometer a more sensitive instrument? He was not decrying the usefulness of analyses, but he thought legislation had gone too far in insisting so much upon them.

Mr. **JACOB RAY** said the fireman in estimating the percentage of gas in the "cap" must judge not only by the length but by the quality of the "cap."

Mr. **HUTCHINSON** agreed.

Mr. **H. T. WALES** said the new Mines Act laid down that the quantity of inflammable gas in the intake airway should not exceed ½ per cent. He did not think it had been customary to analyse the intake air, but if the authors had done this, it would be interesting to know what percentage they found. He believed there was no definition in the Act of what an intake airway was, but he presumed that the intake ran from the bottom of the downcast pit to the first working place. Another useful information would be for the authors of the paper to state what was the quantity of air circulating per minute in proportion to each square yard of the face.

Mr. **HUTCHINSON** said they were now taking the air passing through various districts, and analysing the samples in order to ascertain the information sought by Mr. Wales.

Mr. **LLEWELLYN DAVIES** said with regard to the methods of sampling mentioned in the paper, it would be better in all cases to use clean dry bottles, in which event the samples of air were available for carbon dioxide and oxygen estimation as well as inflammable gas. He had made up a portable mine air sampler, specimens of which were on the table. The whole apparatus was contained in a box which could be put in the coat pocket, and the box was strong enough to send through the post. The joint testing suggested by Messrs. Hutchinson and Evans could be made in the case of collieries where there was no resident chemist if the lamp test and sample of air were taken as proposed, and the sample of air sent for analysis and the fireman's figures compared with the analytical results.

The **PRESIDENT**, referring to the statement by the authors as to the varying results shown by the Winstanley apparatus, said it was simply a question of mixing. If this was done thoroughly, they obtained the same sized "cap" at the commencement as at the end. Many of the false results which had been published during the last 30 or 40 years by experimenters were due to inadequate mixing.

Mr. **W. D. WIGHT** said the same thing had occurred in connection with shot-firing experiments.

The discussion was adjourned.

Reinforced Concrete.

The consideration of a paper on this subject by Mr. **T. E. THAIN**, B.Sc., was deferred; and the proceedings closed with a vote of thanks to the president.

NORTH OF ENGLAND INSTITUTE OF MINING AND MECHANICAL ENGINEERS

Visit to Easington Colliery.

On Friday, July 12, some hundred members of the North of England Institute of Mining and Mechanical Engineers participated in the excursion meeting at Easington Colliery, co. Durham, at the invitation of the Easington Coal Company Limited.

On arrival at Easington Colliery, the members were received by Sir **JOHN S. BARWICK**, Bart., and were entertained to light refreshments by the coal company, following which an inspection was made of the surface and other arrangements of the colliery.

There are three shafts at the colliery. Sinking operations were commenced in 1899. In the following year, four 24 in bucket-lift pumping sets were installed in the south shaft for the purpose of dealing with the water. During January 1902 an inrush of sand and water occurred in the south shaft at a depth of 462 ft., which effectually choked the pumps and stopped sinking operations. It being found impossible to continue sinking with the pumping plant as then installed, it was decided to try other means of dealing with the difficulty. Preparatory to freezing, boring operations were commenced at the north and south shafts in October 1902 and carried out in about 17 months. In March 1904 freezing operations were commenced at the north shaft, sinking operations being resumed in October of the same year and continued until the following month. At that time, the sand bed had been reached; and while sinking was in progress about 5 ft. below the top of the sand, water broke into the shaft and caused a further suspension of operations. Freezing operations were continued until March 1905 and then abandoned, and it was decided to make a further attempt to deal with the water by means of pumps. During the latter part of 1905 and the early part of 1906 a very extensive pumping plant was installed, comprising eight 30 in. and two 24 in. bucket-lift sets, these being afterwards supplemented by two No. 11½ pulsometers, steam being supplied by 13 Lancashire boilers 30 ft. in length and 8 ft. in diameter. Pumping operations were commenced in the three shafts in May and proceeded until August 1906, when they were abandoned, it being found impossible to reach the bottom of any of the shafts. In February 1907 it was decided to again try the freezing process. Operations commenced in May 1907, the previous boreholes being reopened, an additional borehole being put down at both the north and south shafts. Freezing operations were recommenced in August 1908, and sinking was resumed at the north shaft in January and at the south shaft in March 1909. At the north shaft the coal measures were reached in April 1909, and the Hutton seam in July 1910, while the same seam was reached in the south shaft in September of that year. On the completion of the sinking operations the permanent equipment of the south shaft was proceeded with. The respective depths of the north and south shafts are 1,480 and 1,500 feet, and the finished diameter of each shaft is 20 ft. The diameter of the west shaft is 17 ft., but it is not yet through the sand. The Main coal, Low Main and Hutton seams are worked, the two former being drawn at the north shaft and the latter at the south shaft.

Steam is supplied from 13 Lancashire boilers installed in two batteries. Each boiler is 30 ft. in length and 8 ft. in diameter, and works at a pressure of 120 lb. per square inch.

The north and south shafts are equipped with the ordinary type of high-pressure engine, fitted with Corliss valves, the cut-off being variable and controlled by a governor driven from the crank shaft. The winding drums are 20 ft. in diameter and 10 ft. in width, the locked-coil winding ropes at the north pit being 4½ in. in circumference and those at the south pit 7 in. The pulleys are 20 ft. in diameter, the same as the winding drums. The rope sockets are of the Reliance patent and the detaching hooks are Ormerod's. The cages at the north shaft have two decks, each carrying two tubs, while, at the south shaft, three-decked cages, carrying 12 tubs, are in use. The total load on the winding rope at the south shaft is about 30 tons. The balance-rope is 8 in. in diameter and weighs 8 tons.

The power-house contains the fan engines and air-compressing plant in the first bay, and the electrical plant in the second bay. The fan, 22 ft. in diameter, is driven, by rope-drive, by a cross-compound Corliss engine which has high and low pressure cylinders 24 in. and 42 in. in diameter by 4 ft. stroke. The fan produces 500,000 cubic feet per minute at 6 in. water-gauge. The air-compressing plant consists of one two-stage air-compressor, driven by a cross-compound Corliss engine, the air cylinders being driven tandem to the steam cylinders. The capacity, per minute, of the plant is 3,000 cubic feet of free air, raised to a pressure of 90 lb. per square inch.

The mixed-pressure turbine now in course of erection will have a normal output of 350 kw. at 3,000 volts. The switch-house contains medium- and high-tension switchboards, the former having panels—(*a*) spare, (*b*) yard, (*c*) screens, and (*d*) incoming feeders from the transformer; while the latter has (*a* and *b*) pit feeders, (*c*) transformer panel, (*d*) incoming feeder from the supply company, (*e*) No. 1 generator, and (*f*) voltage regulator. The lighting switch-board is in course of erection.

At the south shaft, both at the pit top and bottom, the three decks of each cage are unloaded and loaded by means of hydraulic rams. The hydraulic pump and accumulator are situated in the basement of the south shaft winding-engine house and the hydraulic pressure at the pit bank is 650 lb. per square inch. The screening plant is electrically driven, and comprises three automatic revolving tipplers, distributing shakers, laying-out belts, main screens, and picking belts. The subsidiary plant consists of two conveyors for small coal, two cobbles screens, two picking belts for cobbles, and three dirt belts, with cross conveyor for dirt

The visitors were considerably impressed by what they saw. The ingenious labour-saving devices and the general scheme of the colliery were much admired, and it was asserted that the present output of 1,300 tons per day could speedily be trebled. The quality of the coal produced was regarded as very good indeed.

Some 800 houses are being built under contract for the company for the accommodation of the men and boys employed.

At the conclusion of the inspection, the **PRESIDENT** (Mr. M. W. Parrington) expressed thanks, on behalf of the visitors, to Sir John Barwick and his co-directors and referred in terms of admiration to the way in which the sinking difficulties which at one time, seemed almost insurmountable, had been overcome by perseverance and skill.

Mr. **J. H. B. FORSTER**, agent for the colliery, responded and said that, had the visit been deferred for 12 months, there would have been much more to see on the heapstead.

SPONTANEOUS COMBUSTION IN COAL CARGOES.

Report by Lloyd's Register.

A report has been issued by Lloyd's Register, prepared by Mr. J. T. Milton, its chief engineer surveyor, on the spontaneous combustion of coal. It is noted that during 1911 no fewer than 103 cases were reported in the *Shipping Gazette and Lloyd's List* of vessels arriving at or being in port with bunkers on fire, and 24 cases of vessels reported with cargoes on fire.

Mr. Milton, after a careful consideration of the conclusions arrived at by the Royal Commissioners of 1875, and by Prof. Threlfall, and of the experiments conducted by M. Fayol, considers that, without any doubt whatever, coal cargoes should not have any through ventilation, the very thorough ventilation suggested by M. Fayol, by dividing up the cargo into numerous separated layers, being quite impracticable. Even if the division could be carried out, there would be great difficulty in arranging such through currents of air as to ensure sufficient circulation through every place where there was an accumulation of small coal and dust to carry away the heat generated by the oxidation caused by the limited air supply. The surface ventilation now always provided, if the cowls are properly attended to, is a safeguard against the accumulation above the coal of marsh gas or other inflammable gases evolved from the coal, and the consequent risk of explosion; but it is a question whether this ventilation, supplemented as it frequently is by the opening of the hatches in fine weather, does not aid in producing heating of the coal and the risk of spontaneous combustion, by supplying to the body of the coal the limited quantity of air necessary to permit of the slow absorption of oxygen, which is the cause of the heating of the coals.

It would be safer as regards heating if M. Fayol's suggestion of hermetically sealing the holds could be carried out, arranging, however, provision for the escape of the marsh gas evolved during the voyage. If this method could be adopted care would have to be taken to thoroughly ventilate the surface and the vacant spaces in the holds before discharging the cargo. Also as the holds would soon become full of gas in all the interstitial spaces between the pieces of coal, special attention would have to be given to prevent leakage of dangerous gas through sounding pipes, bilge and deck pump suction pipes, etc. The care necessary, however, would not be greater than that habitually given to such matters in the cases of vessels carrying petroleum in bulk.

From the report by Prof. Threlfall, supplemented by the experiments of M. Fayol, it appears that the presence of pyrites in the coal has not the prejudicial effect which the Royal Commissioners of 1875 supposed, and it is also clear from both these sources that wet or damp coal is not in any way more dangerous to carry than coal which is perfectly dry.

Concerning bunkers, the conditions regarding which are so different from those applying to holds, and in which, while they are being worked, it is necessary to have an ample ventilation throughout, it is desirable that the engineers of the vessels should realise the conditions tending to overheating and combustion, so that in each particular case they may take such precautions as may be necessary. Amongst other points they should understand:—

1. That all coal gives off some inflammable gas when freshly worked, and also when freshly broken, and that this gas becomes explosive when mixed with certain proportions of air. It is the evolution of this gas which requires the ventilation of the bunkers before entering them with naked lights.

2. That heating of coal and the consequent risk of spontaneous combustion does not proceed from the presence of gas, but is caused by the absorption of oxygen from the air.

3. That this absorption, and the accompanying development of heat, is greater at high than at low temperatures, so that when once commenced it proceeds at an increasing rate if the supply of air is maintained.

4. That where heat is being generated by the absorption of oxygen it is probable that more gas will be evolved. The evolution of the gas, however, does not cause the generation of heat. Where such gas is being evolved, if sufficient supply of air is maintained to provide more oxygen than is being absorbed, an explosive mixture is formed amongst the coal.

5. To minimise the absorption of oxygen by the coal in reserve bunkers, or in any bunker in which men are not actually working, the lower doors should be kept absolutely closed, so as to prevent any current of air whatever passing through the bunker and into the mass of coals.

6. If there are any parts of bunkers in which, owing to the proximity of boilers, uptakes, or recesses through which steam pipes, &c., are carried, there is likely to be a higher than normal temperature, these parts should, if possible, be stowed with large coal, and should be worked out as soon as possible. The shoots should be arranged not to deliver small coal into these places.

7. Small coal which accumulates under shoots, &c., should be worked out as soon as possible and not left till the last.

8. If any coal is left in a bunker when a fresh charge has to be taken in, it should be trimmed into a position to ensure its being used on the next voyage. It cannot be too strongly impressed upon those responsible that danger of overheating and spontaneous combustion increases with those with the length of time the coal remains in the ship.

9. Where bunkers are over gutterways, &c., special care should be taken that the limbers are tight. Several fires have originated in bunkers just over the limbers, and there is reason to suppose that they have been caused by air circulating through the coal and coming from the limbers.

10. There is no risk entailed by the coal being wet when put on board; in fact, in cases where coal is known to be of a fiery nature, it would be an advantage for the small coal to be damped when charging the bunkers.

11. If heating of any part should occur where there is no traceable external source of heat to account for it, the heating will probably be local only in a part where the coal is small, and the surrounding portions may not be overheated. In attempting to obtain access to the heated parts for the purpose of applying water, special care is needed to prevent the action taken from supplying the air which is needed to convert a heated zone into an actual fire.

12. Although some kinds of coal have proved to be more liable to spontaneous heating and combustion than others, it should be realised that *all* coal, even anthracite, is liable to these occurrences.

In reply to Mr. Lynch, Mr. T. W Russell states that the Geological Survey of Ireland have surveyed the county Clare, and the maps and memoirs compiled by this Survey contain information regarding the occurrence of minerals in the county. These memoirs indicate that coal occurs in thin seams in some portions of the county. The department's economic geologist will, when time permits, make a further investigation with a view to ascertaining whether coal is likely to be found in payable quantities.

SOUTH STAFFORDSHIRE AND WARWICKSHIRE INSTITUTE OF MINING ENGINEERS.

A meeting was held at the Birmingham University on July 22. In the absence of the president and vice-president Mr. Isaac Meachem was voted to the chair.

The Chairman at the outset proposed a vote of condolence in connection with the death of those Government inspectors and members of the mining profession who had lost their lives through the Yorkshire disaster. The resolution was passed in silence, the members standing.

The Chairman next called attention to the deaths of two of their ex-presidents since the last meeting. The first was Mr. Henry Johnson, whom he had known first as secretary of the institute, and they knew the great interest he had taken in its work The latter might also be said of Mr. Henry Lea whose death was announced that day, and he asked the members to pass a vote of condolence with the relatives of both.

Mr. Alexander Smith seconded the vote, which was passed as before.

On the proposition of the Chairman, seconded by Mr. D. E. Parry it was agreed to offer the congratulations of the institute to Dr. Garforth on his receiving the degree of Doctor of Laws of Birmingham University.

Discussion was then taken on the following papers* (read at the meeting held February 19, 1912) "Notes on the Loss of Mineral Areas in South Staffordshire," by Mr. I. Meachem, and "Notes on the Valuation of Mineral Properties," by Mr. T. A. O'Donahue.

The Loss of Mineral Areas.

Taking Mr. Meachem's paper first, the Secretary read a letter from Mr. L. Holland (Hamstead) in which he agreed that it would indeed be an excellent arrangement if some, such scheme as outlined by Mr. Meachem for the payment of compensation for damage to surface property could be adopted. So far as the community was concerned he was of opinion that they would not understand or feel the loss of these comparatively small areas of coal so long as there were such enormous quantities of coal available, and were being worked and sold at such a low price. The Government of the day apparently realised the low price of this commodity and were anxious to conserve the supply or restrict the use of it, which had the same result, by artificially forcing up the price of it, so that it was not likely they would assist the mineowner to get out further supplies at the present time. Moreover, compensation paid to landowners would not appeal to the community at the moment. If the mineowner had to pay compensation it became necessary for the mining engineer to consider whether there was any means of working this coal so as to reduce damage to the surface. If the depth was great there was a possibility of doing so. Sluice packing was adopted successfully on the Continent and at a cost not exceeding the levy of the Mines Drainage Commissioners, and it would undoubtedly reduce the risk of gob fire to a minimum. The coal could be got out in wide stalls and the openings filled by sluice packing, and when dry the remaining coal in between the stalls would be taken out. If the property was valuable the addition of concrete pillars would assist in supporting the strata.

Mr. D. E. Parry said that generally speaking he was in agreement with the author's general observations and some of his conclusions, but when they came to look at the questions in detail he thought it very likely that some of his remarks were open to criticism. The author in dealing with the subject divided it into two parts. First he dealt with the loss of mineral areas by submersion. He (Mr. Parry) took it that the 40 million tons of coal in imminent danger of being irretrievably lost to the community owing to submersion by water, was not any one area intact, but represented the loss over a rather large district, and it would be distributed in small isolated patches here, there, and everywhere about what might be called the thick coal portion of the South Staffordshire district. He did not know whether Mr. Meachem had dealt with a particular thick coal area in arriving at that figure. Assuming that was so, had not Mr. Meachem taken a rather too pessimistic view of the situation. Personally, he did not know that those areas would be irretrievably lost, although it was quite true that they were so for the present. It was a question whether they should be so pessimistic in view of the very large extension of the coalfield and of what they might term the visible area of the South Staffordshire coalfield. They knew that there were millions of tons of coal yet to be won on the other side of the eastern and western boundaries of the faults; and in view of that he hardly thought it was quite time to be pessimistic, although it was quite true that the output in the South Staffordshire district had been somewhat stationary for some years past. They had to remember the developmente that were going on at Baggeridge, Hollybank, on the western side, and Aldridge and Walsall Wood on the eastern side. So that for a good many years to come there would be a plentiful supply of coal to feed the industries of South Staffordshire. In connection with that 40 million tons of coal, Mr. Meachem had suggested in some portion of his paper that they might have a yield of 1,200 tons per foot per acre. He (Mr. Parry) believed there were many portions over the boundary of the fault where the workable seams would aggregate to a thickness of 50 ft. or possibly more. Supposing, for the sake of argument, that there were 50 ft. of seam areas on the other side of those great faults and they had a yield of 1,200 tons per foot per acre, that would represent 700 acres if it were all in one piece. Mr. Meachem in the latter end of his paper made a suggestion about the State coming to the rescue and finding one-third of the estimated selling value of that coal. What did that really mean? He thought he was very near the mark if he put the average at 6s. 8d. or 6s. 9d. per ton. Mr. Meachem suggested that two-thirds of the value should be taken, which would be 4s. 6d., and that the State should advance a sum of money not exceeding one-third of such value. One-third of the 4s. 6d. would be 1s. 6d., and calculated on that 40 million tons of coal it meant that the State or the community would have to find something like £3,000,000. A little later on he suggested that the coalowner should be drawn upon to the tune of 6d. per ton, and that would yield about £1,000,000, so that they had a prospective expenditure in capital and revenue of something like £4,000,000. The question was whether the game was really worth the candle, in view of the possibilities to which he had previously referred of developments. Personally he doubted whether it was at the present time. But with regard to the second point of Mr. Meachem's paper he believed that he, personally, was more in agreement with him, although he could hardly follow him in all his reasonings. He had known cases where it had been proposed that very large pillars of coal should be left for the support of the surface. The value of those pillars was out of all proportion to the value of the property to be supported, and in such cases he had usually found that representations made to the surface owner, and also to the mineowner, had brought about a satisfactory arrangement. When it could be shown to the surface owner that his property was not likely to be seriously damaged, and that the mineowner with a view to work in the mine was prepared to pay any reasonable compensation, it ought not to be difficult to come to an arrangement. In some cases he had known mining engineers representing colliery people who had been very obstinate when properties had been approached, and slight damage had been done. When their attention had been called to it they had gone on and simply denied liability. He hardly thought that was a proper attitude to take. When surface property was damaged, those who were in charge of the negotiations should exercise a little tact and discretion, and come to an arrangement with the surface owner by which litigation, always very costly, could be avoided. It was inevitable that sometimes difficulties should arise, and in such cases independent valuers might be appointed to assess the damage or the loss to the surface owner. A suggestion of the kind, if it could be carried out, would be of very great value to the mineowner and to the community.

Mr. F. A. Grayston said it might very well be that the property supported was worth only £200, whereas the coal underneath was worth £1,000 to the lessor by way of royalty and of considerable value also to the lessee. But there was the danger, because of that disparity in value, that the owner of the property would want extravagant compensation, and that led to litigation. There was one point in the paper that he did not quite agree with. It appeared that the author in estimating the value of the coal, proposed to base an estimate on the result of the previous year's working in regard to the profits per acre. He (Mr. Grayston) thought that in South Staffordshire it might happen that the profits of the preceding year might be little or nothing, and therefore to arrive at a fair valuation the calculation should cover a much longer period, say three or seven years. He took it that the author did not endorse the view of Mr. F. G. Meachem in his evidence before the Royal Commission on Coal Supplies when he said: "Coal above, say, 18 in. thick, ought to be turned over, and if it does not pay the landlord should help." He (Mr. Grayston) agreed that that was hardly the best practical solution of the difficulty, and it would obviously want a good deal of consideration before it could be adopted. In the discussion Mr. Alexander Smith had referred to large areas being sacrificed because owners disliked or declined to have them worked. He was inclined to emphasise what Mr. Smith said. The Government ought to step in and assess the real value of the mine. Otherwise the area would be lost to the community.

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* *Colliery Guardian*, February 23, 1912.

The CHAIRMAN, replying on the discussion, said that his estimate of 40 million tons lost through submergence was calculated upon one district, but if he had taken it over the whole of South Staffordshire he believed that amount could be multiplied by three at least. Really he was referring to the loss in the submerged area of Tipton, and a great deal remained to be got not in isolated patches but in very large areas. The 700 acres referred to was not more than one-tenth of the area. Mr. Parry has adopted the figure of 1,200 tons used in the paper for valuation purposes, but Mr. Parry was no doubt aware that the Government estimate was 1,500 tons, which made a very material difference to the amount which might be worked in the future, and every year that passed by would increase the expense of reaching that submerged area and also make it more unlikely that the mineral would ever be gotten, for the simple reason that all the mines round the edge of the area had been worked, and as they were worked then the water would flow into that area and it would never pay for the initial cost of getting out the water. In regard to the mines drainage scheme, a very large sum of money had already been advanced to the Commissioners for which they paid interest. That money should be paying interest, and should be used solely for that purpose, because it was for a national purpose. He quite agreed with Mr. Grayston that the calculation based on the profits of the previous year was too short and should be made to cover a series of years. He had merely introduced that matter to establish the principle. With regard to the protection of property, that was quite on a different basis altogether, and there should be no mistake as to its seriousness. By property he meant not only buildings and mines, but canals, railways, and surface property generally. As showing the importance of that subject, many concrete examples of the loss of mineral areas could be given, but he thought he might content himself with adding the following case, which had come under his own observation, as an addition to the paper:—A property, house and grounds, in area about one-third of an acre, and worth about £1,000, stands on a valuable mineral area. It was alleged the house had been damaged by mining operations, the depth of the shallowest mine is 200 yards. The defendant company exhibited their mining plan showing the extent of their mining operations within a circle having a radius of 208 yards from the centre of the property or 200 yards clear from plaintiff's building. Within that circle, and at four different places and near the edge of the circle, at each place coal and fireclay had been worked to a very small extent—namely, coal, 7 ft. thick, worked at two places, total area 3 roods 16 poles; fireclay, 1 ft. 8 in. thick, worked at three places, 2 roods 28 poles. The total area of mine within the circle was 28 acres 0 roods 13 poles, and consists of:—Brooch coal 2 ft. 6 in. thick; Top Thick coal, 7 ft. thick; Bottom Thick coal, 12 ft. thick; old mine fireclay, 1 ft. 8 in. thick; No. I. new mine fireclay, 3 ft. thick; No. II. new mine fireclay, 3 ft. 6 in. thick. It was shown that the property had been weakened by certain alterations and additions. The jury gave a verdict for the plaintiff £300 damages. The cost of the litigation was about £2,000. The result was that the defendant company could not work any more of that area within the circle. The writer had given particulars of this case as an instance of the cost of litigation where, if some method of valuation of the property, and of the subjacent minerals, such as suggested in his paper could be devised, much loss of money and minerals, to say nothing of the worry and anxiety of the litigants concerned, would be saved. The writer had made an estimate of the loss of minerals, and consequently national wealth in this case, taking the yield of coal to be 1,300 tons per foot thick per acre, and the average value of coal per ton based on Mr. T. A. O'Donahue's average value per ton for the period of 25 years comprised 1886-1910, namely, 7s. 4·9d., as follows:

	£
Coal, 755,300 tons	279 776
Fireclay, 639,400 tons, at 12s. ...	383 640
Total	663,415

or more than 220 times the value of the alleged damage. Such examples could be multiplied throughout the district, from his own experience, up and down South Staffordshire.

This closed the discussion on Mr. Meachem's paper.

(To be continued.)

MANCHESTER GEOLOGICAL AND MINING SOCIETY.

Visit to Outwood Collieries and the Lancashire Electric Power Company's Works.

On Saturday last, as the closing meeting for the session 1911-1912, members of the Manchester Geological and Mining Society visited the Outwood Collieries of the Clifton and Kersley Coal Company Limited, and the Lancashire Electric Power Company's station, which adjoins the collieries. The visit to the Outwood mines had been stimulated by the description, given by Mr. Hugh V. Hart-Davis, of a dust-fuel boiler installed there, in a paper read by him at the society's meeting held on February 13, 1912. Then it was thought the members might usefully proceed from the collieries to the neighbouring station of the Lancashire Electric Power Company.

At the collieries the visitors were received by Mr. H. B. Pilkington, Mr. N Whitehead and Mr. Hart-Davis, and under their guidance they inspected the Bettington dust-fed boiler, made by Messrs. Fraser and Chalmers Limited, of London and Erith. This boiler, it was stated, supplies steam to a large air compressor of some 600-horse power. Practically the whole of the compressed air used in the colliery is generated by this means. The boiler generates steam at a pressure of 160 lb. per square inch at a final temperature of 500 degs. Fahr. This boiler is the only one of its kind at any colliery in England, and the interesting point about it is that it uses coaldust as its fuel, this dust being collected from the screening plant, partly by suction plant and partly by rotatory screens of a fine mesh. The amount of dust consumed is about 50 tons per week. It therefore follows that it is a very economical method of obtaining power at a colliery.

The coaldust, after collection at the screening plant, is passed into a combined pulveriser and blower, and then into a large separating chamber, or solid fuel carburetter. The function of this carburetter is to separate the larger particles of dust which are not absolutely impalpable powder, so that they may be sent back for further pulverisation. The powder, mixed with the right proportion of air, is then burnt in the Bettington boiler. The boiler is of the vertical tubular type; its furnace, or combustion chamber, is 20 ft. in height and 5 ft. in diameter, and the action of the slag on the water-cooled surface of the tubes causes this furnace to be self-lining. It is claimed for this combustion chamber that it is the most efficient of any on the market; indeed, this view would appear to be borne out by the working results, as it is quite possible, the guides said, to maintain a 15 per cent. of CO_2 as long as the boiler is working. One was impressed by the absence of smoke from the chimney, which showed that it is possible to consume low-grade fuels efficiently. The boiler has been in operation for two years, and the visitors were agreeably surprised to learn that the furnace has never been relieved, nor has it been found necessary to clean the tubes internally, as all the scale is deposited at the bottom of the boiler. It would seem from these experiences that dust fuel has a future before it, not only for use at collieries but for manufactories of all kinds; for it has been found, even in places where large coal is used, that it is better to grind the coal into powder and use it in that form than to use it in the ordinary way, the upkeep of the pulveriser costing no more than that of the mechanical stokers. The saving in space is considerable, the diameter of the space utilised in this case being only 10 ft. 6 in., while the capacity is certainly equal to two Lancashire boilers.

The electric power for the colliery is supplied by the Lancashire Electric Power Company. Electricity, it was stated, is not taken to the working places in the colliery. It is only used for pumping, for surface driving, for washing, and for lighting. The visitors were interested to learn that the cottages which have been built for the workmen are lighted by electricity at a fixed charge per week, the occupiers of the houses paying for the lamps they use.

The members afterwards passed from the collieries to the electricity works.

Mr. C. D. Taite described the company's works in a paper which was read at the March meeting of the society, and afterwards reported in the *Colliery Guardian*. Mr. Taite (engineer and manager), with Mr. J. Purrett, Mr. M. H. Adams and Mr. C. J. Elliott conducted the party over the works, which are on the bank of the Irwell. The company has authority under its three Acts of Parliament to supply electricity throughout Lancashire, south of the Ribble, with the exception of the cities of Liverpool and Manchester, and the towns of Bolton and Stockport.

At the close of the visit the president of the society, Mr. G. B. HARRISON, H.M. inspector of mines, expressed their indebtedness to the owners and managers of the Outwood Collieries, and to the Lancashire Electric Power Company, and a vote of thanks was accorded, on the motion of Colonel HOLLINGWORTH (honorary treasurer), and seconded by Mr. VINCENT BRAMALL (Pendlebury).

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Number of Men who have Secured Wage Advances—Threat of Fresh Demands—Greater Dock Facilities at Newport—Interesting Law Cases—Federation Discord—Conciliation Board and the Award—Eight Hours Act and Banksmen—Weekly Pays Cause More Clerical Work—Steelworkers and Conciliation Success—Barry Railway: Decreased Revenue.

Nearly 56,000 employees in South Wales collieries have secured advances of wages under the award recently made by Lord St. Aldwyn, but the amounts of award vary widely. About 9,000 get 1s. per day increase, while an equal number receive from 6d. to 1s. By far the greater proportion—over 22,000—obtain 3d. per day, and 15,000 between 3d. and 6d. It is estimated that the total additional cost will be approximately £450,000 per annum, or, say, 2d. per ton on the output.

Mr. Alfred Onions, treasurer of the local Federation, has stated that ostlers and underground labourers benefit most, not less than 70 to 80 per cent. of these classes receiving an advance to the extent of 3s. per week.

Mr. V. Hartshorn, upon the figures cited, has issued a very disquieting declaration. He states that "now the awards have been settled, the time is ripe for us to begin formulating our demands for the future, and to strengthen our organisation for the purpose of enforcing those demands effectually. . . . An immediate claim should be put forward for an advance upon each of the minimum rates set forth in the awards, and for simplifying the rules and making them uniform throughout the kingdom."

This startling declaration is thus specifically made, although Mr. Hartshorn admits that great advantage has been already gained by the Minimum Wage Act, that the wages of over 55,000 men had been advanced, and that "it has been placed outside the power of the coalowners to lower those wages below the minimum fixed." He argues that "the increase means only 2d. per ton," and, "had the award been so drawn as to impose an increase of 6d. per ton, no injury would have accrued to the industry."

In view of the contradictory statements as to the financial effect of the Eight Hours Act upon the miners themselves, it is worth while recording the declaration of a bankrupt publican. He had taken a licensed house in one of the Monmouthshire valleys, but the new law "caused a decrease in the bar trade. The men were not able to work overtime, and had not the money to spend at the house, which was supposed to be doing 14 or 15 hogsheads a week, but did no more than six or seven."

Swansea's position in respect of the metallurgical industry is henceforward to be recognised more clearly, the South Wales Institute of Engineers having decided to hold two meetings each year in that town. The four quarterly meetings will be held in Cardiff as hitherto, papers on mining engineering being then submitted, and two extra meetings will take place in Swansea, where papers upon engineering as applied to the metallurgical and allied trades will be read and discussed, invitations being issued to owners and officials of works in the western district to attend and take part.

Newport Harbour Commissioners have made their annual inspection of the port, the invitation being issued by the chairman, Mr. Edward Steer (of Guest, Keen and Nettlefolds). Chief, of course, was the work accomplished and in progress at Alexandra Docks, where since 1900 the company have spent £1,800,000 additional capital, and are making further very heavy outlay in dock extension. The new lock—1,000 ft. long and 100 ft. wide—is approaching completion, and its depth on the outer sill will be 45 ft. at high water of ordinary spring tides, which is 10 ft. greater than the depth now available. The dock itself will be almost a mile in length, fully equipped with the best appliances, not only for the coal trade but also for general merchandise.

With reference to the institution of weekly pays, it is reported that fresh ballots will be necessary at some of the Rhondda collieries, so that representatives of the management may be present, and the Home Office Order be duly carried out.

The House of Lords judgment in the important case of Watkins *versus* the Naval Colliery Company has now been delivered, this being the case which the South Wales Federation fought on behalf of a collier's widow. The deceased man was killed by being thrown down the shaft with others, owing to an accident to the cage. For the employers, it had been urged that there was no negligence, because they employed a competent manager and other officials, and therefore they were not liable. In the Assize Court the widow gained judgment for £500; this was reversed on appeal, but the House of Lords has now restored the original judgment, all their lordships concurring. Statutory obligation rested upon the owner to provide proper apparatus for raising or lowering the men, and the doctrine of common employment did not apply.

A haulier sued the owners of Tynybedw Colliery for a day's wages, his statement being that he and others descended the pit, harnessed their horses, and had proceeded towards the coal face when a heavy fall occurred, which stopped the working of their particular district. Though ordered up by the fireman, they declined to go unless assured of a day's wage, but remained below till the end of the shift. The case came on at Porth Court, in the Rhondda. For defendants, it was argued that custom had been proved, and that stoppage due to a fall came under the same category as breakage of machinery—being entirely beyond control of the management. For the plaintiff (whose case affected the other men) it was contended that the employers were not entitled to graft upon the contract a custom which was unreasonable and unfair. It was admitted that the employers would be liable to a coal-hewer if he were turned away from his work without notice, but a distinction was set up between a haulier and a coal-hewer. The stipendiary said he would consider the legal authorities cited by the advocates, and would give intimation as to time of delivering judgment.

The Ocean and International Lodge of miners has passed a resolution of protest on the ground that the Garw district is not represented on the Federation executive, and an endeavour will be made to withhold the dues of the district to the executive council until representation is accorded.

Owing to the growth of the tin-plate trade, the trustees of Swansea Harbour have decided to build a new large warehouse at the cost of £2,000, adjoining the King's Dock.

At Cardiff on Monday the South Wales Conciliation Board met to consider the minimum wage award. Mr. F. L. Davis presided over the owners' side, and Mr. W. Brace, M.P., over the workmen's representatives. The miners' executive and the coalowners' association have separately discussed the matter, and the object of the meeting was to agree upon the interpretation to be placed on some of the rules of the award. In regard to the award of a minimum standard rate of 4s. 7d. per day plus percentages, the men's representatives state that the clause contains no guarantee of a minimum in a normal seam, under normal conditions. They allege that 6s. 10½d. is only secured to the workman when the latter can prove that abnormal conditions have restricted his earnings. After discussion, it was agreed to appoint a joint committee to consider certain clauses, including the one already referred to. The committte will be composed of five representatives from each side, and will meet in the course of the next few days.

The effects of the Eight Hours Act are still to be discovered, and each discovery shows how great is the burden to be borne by the industry. At a meeting of the miners' executive on Monday the banksmen in the South Wales coalfield asked the executive to press forward their claim to an eight hour day and a readjustment of their wage rate, arguing that in consequence of the Eight Hours Act their work was now "more arduous." The executive undertook to bring the matter before the owners at an early date.

A fresh strain has been put upon the employer in the weekly pay provision. The new system has entailed a considerable increase in the work of pay clerks, and many of the companies have been forced to add to the existing staff in order to deal with it. The men in the Rhondda, where the innovation was acted upon for the first time on Saturday, were much pleased, and the tradesmen hail the system delightedly, claiming that it will do away with the credit system. Whether it will accomplish this or not remains to be seen.

Giving evidence on Tuesday before the Industrial Council in London, Mr. F. W. Gilbertson, vice-chairman of the South Wales Steel Association, said that the association had direct dealings with the Steel Smelters' Union. A standard wage rate had been agreed on in 1899 and this had been adhered to. No difficulty had been found in keeping agreements, and the association had every confidence in the union, the officials of which always acted reasonably. He was of opinion that the penalties for breach of agreement should be largely increased and strictly enforced. The association, he added, liked to see the unions strong, but he would not be prepared to make a bargain handing over the right of discharge of any of the men employed.

As showing the disastrous effect of the labour troubles in the coalfield, it is to be noted that the half-yearly report of the Barry Railway Company, just issued, exhibits a decrease of £28,873 in revenue, as compared with the corresponding period of 1911. There was, however, an aggregate saving of £9,250, and after placing £5,000 to reserve the directors recommend dividends at the rate of 4 per cent. per annum on the ordinary stock, absorbing £40,024, and of 4 per cent. per annum on the preferred converted ordinary stock, carrying forward £2,918. There is no balance available for the deferred converted ordinary stock. The company's Bill for a new railway near the dock has passed both Houses.

Seven men were slightly injured at the Jubilee Pit, Cymmer Porth (Messrs. Insoles Limited) on Thursday evening last week. Twenty men were being lowered when the cage ran wild and crashed to the bottom.

The Local Government Board having called attention to the shortage of housing accommodation in the Swansea valley (Ystradgynlais area), the local Council has decided, after a stormy meeting, to take immediate steps to erect dwellings under the Housing of the Working Classes Act.

It is rumoured that the Cardigan Engineering Works, which closed down a few weeks ago, will be shortly reopened. Negotiations, it is stated, are proceeding satisfactorily.

At a special meeting on Thursday of last week, the Carmarthenshire Education Committee decided to appoint a lecturer on mining, and to become an approved authority for the granting of competency certificates to firemen.

Messrs. Guest, Keen and Nettlefolds have granted an increase to their mechanics at the Dowlais works, Cardiff, of 3s. a week. This advance is to all who are members of the A.S.E., is to take effect as from July 1, and is an increase of 10 per cent. on the standard, making the weekly wage for the quarter 38s. 3·36d.

At Monday's meeting of the Conciliation Board, Mr. D. Watts Morgan raised the question of the "weekly pays" ballot at the Ocean Company's collieries. After discussion, Mr. Wm. Jenkins, on behalf of the company, agreed to accept the favourable result of the men's ballot, and to put the new scheme into operation as soon as possible.

At a half-yearly meeting of the Great Western Colliery Relief Fund, held at the Angel Hotel, Cardiff, on Saturday, Mr. Godfrey Clark, Talygarn, presided, and it was left with the secretary to carry out an arrangement for filling the vacancy caused by the death of Mr. Thomas.

The dependants on the Park Slip Colliery Fund have held a meeting at Aberkenfig, protesting that an application for increased allowance has not been properly dealt with. They have sent to each member of the committee the copy of a resolution asking full consideration of the application at the next meeting.

A deputation from the Welsh Plate and Sheet Makers' Association waited upon Mr. G. E. Foster, the Canadian Minister of Trade and Commerce, on Monday, and laid before Mr. Foster many matters relating to the import duty on tin-plate, &c., in connection with the Canadian Tariff Act of 1907. They received an assurance that their representations should be considered.

At a meeting at Ton Pentre, on Tuesday, Mr. Morgan advised the workmen to appoint a deputation to claim, under the retrospective clauses of the Act, the wages due to them under the award.

THE NEW KING'S DOCK AT IMMINGHAM.

Royal Visit to Grimsby.

On Monday, their Majesties the King and Queen visited Grimsby and Immingham, and amid scenes of great public rejoicing formally opened at the latter place the great dock which has been constructed by the Great Central Railway Company. The equipment of the dock, which has been open for traffic for some time, was fully described in the *Colliery Guardian* of October 27, 1911. The facilities which it affords have already proved highly acceptable to traders in the thriving industrial centres of South Yorkshire, Notts and Derbyshire, thus completely vindicating the enterprise of the Great Central Company.

Before they came to Immingham, their Majesties paid a visit to Grimsby. On their arrival at Immingham, the King and Queen went on board the steamship "Killingholme," and the King having pressed an electric signal, the vessel passed into the dock. The vessel made a circuit of the dock, and at length brought their Majesties to a reception pavilion in one of the open transit sheds.

Sir Alexander Henderson here presented to the King an address from the Great Central Railway Company. The King, in his reply, congratulated the company "on the wise foresight and steady industry which, by converting a waste site to the uses of commerce, have provided this magnificent addition to your series of docks. It is an achievement not only great in itself, but certain to exercise a potent influence on the future progress of trade and on the wealth and happiness of the whole district which is served by the port of Grimsby."

Addresses were also presented to the King by the chairman and clerk of the Lindsey County Council and the chairman and clerk of the Grimsby Rural District Council. His Majesty handed written replies to the two chairmen. A brief religious service followed, in which the Bishop of Lincoln took part. Next Sir Alexander Henderson made a short statement about the new dock, and asked the King to declare it open and to allow it to be named the King's Dock.

The King said:—"I have now great pleasure in declaring open the new dock, to be known as the King's Dock." Immediately afterwards Mr. Sam Fay, the general manager of the Great Central Railway Company, was summoned to the King's presence to receive the honour of knighthood.

The King and Queen then left the pavilion and entered the Royal train, in which they returned to London.

Public Elementary Schools in Mining Districts.—A circular on the subject of elementary instruction in mining has been sent to local education authorities by the Board of Education, as follows:—(1.) In the report of the Royal Commission on Mines attention was drawn to the desirability of introducing into the curriculum of schools in mining districts some elementary instruction in regard to mining. The Home Office and the Board of Education, after consultation, have agreed to issue jointly the following statement of their conclusions for the information of local education authorities in mining districts. (2.) It is not suggested that any advanced or specialised instruction in mining should be attempted in elementary schools, but only such simple instruction with regard to the nature, occurrence, and use of the minerals worked in the district, the general methods of getting the minerals, the dangers which have to be guarded against, and similar topics connected with mining as would interest school children and create a desire to know more. Such instruction would most effectively be given not in the form of separate and detached lessons, but in connection with the ordinary instruction of the school. Where this can be done the Board of Education would have no objection to such instruction being included in the curriculum of the school. (3.) It is probable, however, that there may be considerable difficulty in finding teachers competent to give instruction of this kind as part of the ordinary school course, unless special measures are taken to give the teachers in mining districts facilities for qualifying themselves for this purpose. It is doubtful whether attendance at ordinary mining classes, *i.e.*, at evening and other classes, provided to meet the needs of working miners, would be really satisfactory for this purpose. It would be preferable, if possible, that special classes should be formed for elementary school teachers, and that the teachers of these classes should not only have a thorough knowledge of mining, but should also understand thoroughly what can be taught to public elementary school children.

THE COAL AND IRON TRADES.

Thursday, July 25.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week, 146,136 tons of coal and 1,395 tons of coke were despatched from Tyne Dock, an increase of 8,501 tons of coal and a decrease of 2,730 tons of coke when compared with the shipments for the corresponding week of last year. The Blyth clearances totalled 88,973 tons of coal and coke, a decrease of 2,013 tons—a falling-off attributable to the fact that last Saturday, being the day of the Northumberland Miners' Picnic, was a close holiday. The following steam coal sales are reported this week:—Two substantial "parcels" of best Blyths for October-December shipment at 12s. 6d. f.o.b.; and 10,000 tons of Durhams for delivery to stipulated ports over the ensuing three months on account of the Norwegian State Railways. With reference to this contract, the balance of 20,000 tons is stated to have been ordered from Derbyshire. The Durham coal has been contracted for at about 13s. f.o.b., and the Derbyshire fuel at from 13s. 6d. to 13s. 9d. Last week some 50,000 tons of best Blyths, Tyne primes and unscreened steams were arranged for, for forward shipment, at from 11s. to 13s. per ton f.o.b., according to quality, and there is now a disposition to extend business on these lines considerably. This is said to be impracticable, however, owing to the high range of present prices. With further reference to the South Metropolitan Gas Company and the London Gas Light and Coke Company's contracts for their supplies over the ensuing 12 months, prices are stated to range from 11s. to 12s. 6d. per ton f.o.b., an advance of from 2s. to 2s. 6d. on expiring contract rates. The following gas coal sales have been arranged during the week:—18,000 tons Wear specials, delivery over the season to the Helsingfors Gasworks, at slightly over 13s. per ton f.o.b.; several lots, aggregating about 100,000 tons, of Durham seconds for delivery over the ensuing 12 months at 11s. 6d.; 30,000 tons Durhams for the annual requirements of the Norresundby Gasworks at about 12s. 6d.; 40,000 tons good seconds for the Eastbourne Gasworks, delivery over 12 months, at 11s. 6d.; 11,000 tons New Pelton-Holmside, for August-September shipment to the Magona Works, Porto Vecchio, at 24s. 0d. c.i.f., or about 12s. 3d. f.o.b., several lots, aggregating 100,000 tons, of Wear specials for delivery over last year, at 13s. f.o.b. a quantity of best Durham seconds for shipment over 12 months at 11s. 10½d.; 30,000 tons best Durhams for similar delivery to the Aalborg Cement Works at about 12s. 6d.; and 60,000 tons best Durhams for delivery from August next up to the end of next year at 12s. The following bunker sales have been successfully negotiated. 3,000 tons ordinary Durham unscreened at 11s. 4½d., f.o.b., delivery over this year; 8,000 tons similar, for like delivery, at 11s. 6d.; several lots for similar shipment at from 11s. 4½d. to 11s. 9d., according to brand; 50,000 tons good ordinary sorts for delivery up to the end of the year at from 11s. 6d. to 11s. 9d. A quantity of good beehive foundry coke has been sold for delivery to the West Coast over 12 months at 25s. per ton, or about 20s. per ton at the ovens. Blastfurnace coke has been sold in considerable quantities for delivery over the first half of next year at 21s. 6d. per ton delivered at the Middlesbrough furnaces, an advance of about 1s. 6d. per ton on the current half-year's contract rates. The contract to supply the Gefle-Dala railways with about 15,000 tons of steams for shipment up to the end of the season has been placed for Durham qualities at 20s. 6d. per ton, c.i.f. Business in the local coal market has been very dull this week, especially for prompt shipment. There is again some shortage of tonnage, and, consequently, supplies are being forced on the market, thereby bringing down prices. Quotations for prompt shipment are as follow:—Best steams, Blyths (D.C.B.), 13s. 6d. per ton f.o.b., a fall of from 3d. to 6d.; Tynes (Bowers, &c.), 13s., 3d. cheaper; seconds, Blyths, 12s., unaltered; Tynes (Hastings or West Hartleys), 12s. 3d., 3d. declined; unscreened, 11s., 6d. lower; smalls, Blyths, 10s., 6d. less; Tynes, 9s., similarly decreased; specials, 10s. 3d., firmer; smithies, 11s. 6d., 6d. down; gas bests (New Pelton or Holmside), 12s. 6d., unaltered; seconds (Pelaw Main or similar), 11s. 6d., firm; specials, 13s., 6d. less; unscreened bunkers, Durhams, 11s. to 11s. 6d., no change; Northumbrians, 11s. to 11s. 6d., steady; coking coal, 11s. to 11s. 3d., 3d. less; smalls, 10s. 9d., 3d. down; households, 14s. 9d., unchanged; coke, foundry, 22s. 6d., 1s. lower; blastfurnace, 19s. 6d., 6d. fallen; and gas coke, 18s. 9d., 3d. weaker.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 92,955 tons of coal and 990 tons of coke as compared with 104,255 tons of coal and 1,200 tons of coke for the corresponding period of 1911, being a decrease of 11,600 tons of coal and 210 tons of coke. The market has a little quieter appearance, both steam and gas coals are offering somewhat more freely, and values have an easier tendency for steams, although second-class gas coals if anything are firmer. Full prices for forward shipment are being asked for all classes of coal. Contract enquiry is still satisfactory, and further orders are expected to be placed shortly. Household coals are quiet. In the bunker trade the demand is good, and for the usual classes of Durham unscreened prices are 11s. to 11s. 6d. free on board, with special kinds at 13s. per ton. Coking coals are firm and in good demand for export. The demand for coke is strong, especially for smelting purposes, both in and also beyond the immediate district. It is stated that blastfurnace coke has been sold in fairly considerable quantity over the first half of next year at 21s. 6d. delivered at the furnaces at Middlesbrough, which is about 1s. 6d. per ton more than the contract price for the current half-year. Other contracts reported are the Eastbourne Gas Company for secondary Durham at 11s. 6d. f.o.b., the Helsingfors Gasworks for 18,000 tons of special Wear gas at a c.i.f. price stated to leave 13s. for the coal, while 100,000 tons of good Durham seconds is said to have made 11s. 4½d. for delivery over 12 months and sales aggregating 13,000 tons of Durham bunkers at 11s. 6d. free on board over this year. The following are market quotations:—Special Wear gas, 14s.; seconds, 11s. 6d. to 12s.; coking unscreened, 11s. 6d.; smalls, 11s.; smithies, 13s. to 14s.; peas and nuts, 13s. to 14s.; household, ordinaries, 14s.; bests, 15s.; foundry coke, 22s. 6d. to 23s. 6d.; blastfurnace coke, 20s. to 21s.; gas house coke, 18s. to 18s. 6d. Bunker quotations are: Pease's, South Derwent, Framwellgate, 11s.; Priestman's, Consett, Burnhope, 11s. 3d.; Morrison's Marley Hill, 11s. 9d.; South Hetton, 11s.; Ryhope, 12s.—all f.o.b. South Dock. Owing to the continued scarcity of tonnage, freights are firm, and rates for the Baltic and Mediterranean tend upwards. Fixtures reported include.—Baltic, Cronstadt, 6s. 3d.; Stockholm, 7s.; Malmo, 7s. Coasting: London, 3s. 6d.; Hamburg, 3s. 9d.; Havre, 4s. 6d. Bay: Bordeaux, 7s. 3d.: Lisbon, 9s. 6d. Mediterranean: Genoa, 12s. 3d.; Civita Vecchia, 12s. 6d.; Marseilles, 12s. 3d.; Alexandria, 12s.; Piræus, 11s. 6d.; Port Said, 11s. 6d.

Middlesbrough-on-Tees.

COAL.

There is an easier tone in the coal trade, and some indication of desire to sell quickly on the part of middlemen. Freights show a tendency to harden. Slow business rules in household coals. Durham ordinary bunkers are quoted 11s. 1½d. to 11s. 3d., with bests up to 11s. 9d.; and ordinary households 14s., with bests 1s. more. There is less demand for coking fuel and coke, owing to the stocks of users having somewhat accumulated. Blastfurnace coke is at 20s. per ton, and foundry coke 22s. to 23s. 6d. Gas coke is at 18s. per ton.

IRON.

There has been considerable activity in the pig iron trade during the week, and Cleveland warrant prices touched 58s. 4d., the highest price recorded for five years. The production is being well absorbed, and there is little iron stored by makers. Connal's stocks have now fallen to 299,745 tons; shipments continue on a satisfactory basis, and the demand suggests that sellers of iron have rosy prospects before them for many months. Pig iron exports to date average almost 3,800 tons per working day, but the quantity thus disposed of is below that for the same number of days last month, when 4,650 tons per working day were dealt with. No. 3 Cleveland g.m.b. pig iron realises 58s. 6d. per ton, and sellers anticipate that ere the present briskness ceases an even 60s. per ton will be recorded as the price. Cleveland warrant prices, which reached 58s. 4d., afterwards eased a little when 58s. 2½d. cash buyers was the figure. Foundry iron is scarce, and realises the same price as No. 3, whilst for No. 4 forge 58s. 3d. was the price at which business was done. Mottled and white iron realises 57s. 9d., whilst for No. 1 makers asked 63s. 6d. per ton. Hæmatite iron is in greater demand than supply, and 73s. 6d. early delivery is the makers' quotation, though second hands were willing to accept slightly less. Rubio ore is maintained at 21s. 6d. to 22s. ex-ship Tees. Finished iron and steel makers are exceedingly busy, and prices of finished material, though very firm, have not yet moved upward, remaining as a week ago.

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South-West Lancashire.

COAL.

The continuance of the summer weather keeps the inland household trade as reported last week, without any change in list prices. There is still a good demand for screened coal for use in forges and manufactories. Bunker coal is in good demand, but is mainly on contract account. There is very little doing in outside orders, and the trouble with dockers at Liverpool, owing to resistance by them to Clearing House system with respect to Insurance Act, is not helping matters, and has a tendency to retard steamers coming to the Mersey, more especially to Birkenhead, where the trouble is more aggravated. The price of screened Lancashire steam coal is as named last week, viz., 11s. 3d. net f.o.b. upwards for better qualities, although in some cases there is a tendency to shade a little for spot lots, to clear wagons. The coastwise and cross-channel trade still continues a fair average summer shipment, with prices ruling for best coals from 14s. 6d. to 15s., with good seconds at 13s. 6d. to 13s. 9d., both f.o.b. Garston net. Slack continues to be scarce, and prices rule unchanged, being for open sale as follows, 9s. 9d. to 10s. for best rough qualities, 9s. to 9s. 3d. for good medium grades, and 8s. 6d. or thereabouts for the commoner and smaller qualities, all per ton at the pit.

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South Lancashire and Cheshire.

COAL.

The holiday season is beginning to have its effect on the attendance on the Manchester Coal Exchange. As may be expected, there is no improvement in the demand for house coal, but prices are steady at late rates, which for best coal rule from 16s. to 16s. 9d., good medium qualities 14s. 6d. to 15s. 6d., and kitchen qualities 11s. 9d. to 12s. 9d., all at the pit. Furnace coal continues in good call, and the price is firm at about 12s. 6d. per ton at pit. Shipping coal is enquired for, and prices are firm at 12s. to 14s. f.o.b. Partington. The demand for slack is maintained, and prices are firm at about 9s. to 9s. 6d., with seconds at 8s. to 8s. 6d., all at the pit.

IRON.

There is no change to report in pig iron, and prices remain firm. Forges are fully occupied on crown iron bars at £8, second quality £7 10s., hoops £8 7s. 6d., sheets £9, less 2½ per cent., and deliveries are still very belated. Steelworks are very busy on bars at £7 17s. 6d. to £8, less 2½ per cent., and billets £5 17s. 6d. to £6 net. Wagon builders are pulled out of the place for wagons. Founders and engineers moderately employed.

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Yorkshire and Derbyshire.

Leeds.

COAL.

There was a very full attendance of traders at Tuesday's meeting of the Yorkshire Coal Exchange, and a good deal of business in steam and industrial fuel was dealt with. With the Bank Holiday in view extra supplies for shipping are needed, and all qualities of steam-raising fuel sold readily and at full list prices. The demand for house coal has improved since last week, and the pits have been able to work five days on the average. Larger supplies of best coal have been taken by London merchants at about the following average pit prices:—Haigh Moor selected, 14s.; Wallsend and London best, 13s.; Silkstone best, 13s.; (special qualities, 13s. 6d. to 14s.); Silkstone house, 12s. to 12s. 6d.; house nuts, 10s. 6d. to 11s. 6d. The renewal of house coal contracts in the London district proceeds more quickly, buyers finding the market, if anything, firmer than in June. The coastwise trade is fairly brisk, several cargoes having been shipped into the Thames this week. Current f.o.b. Hull prices:—Haigh Moor house coal, 15s. 3d. to 16s.; Silkstone best, 14s. 6d. to 15s. 3d.; Silkstone house, 13s. 9d. to 14s. 3d.; house nuts, 12s. 6d. to 13s. 6d. In Leeds, Bradford, Halifax, Huddersfield and the heavy woollen districts the retail trade has improved on the week, cooler weather having affected the turnover considerably. The following pit prices are firm both for current sales and for contract:—Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. to 16s.; Silkstone house, 14s. 6d. to 15s. 6d.; ordinary house coal, 14s. to 15s.; secondary sorts, 12s. to 13s. 6d. Supplies of manufacturing fuel are barely adequate for current needs, and the whole district is free from stocks. Forward business is not accepted at less than 2s. per ton advance on the prices in force last September. Current pit prices:—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slacks, 8s. to 9s.; small slacks, 7s. to 7s. 6d.; coking smalls, 6s. 6d. to 7s. Washed furnace coke maintains its firmness, and contracts to the end of December have been booked this week at 16s. per ton at the ovens. Coking smalls have firmed up this week, and as several ranges of patent coke ovens are nearing completion prices are likely to be higher. The holding back of gas coal contracts is still a feature of the market, but buyers find no weakness and are paying full prices for open market supplies. These are by no means plentiful, and several collieries have already withdrawn recent offers. There is no doubt that, considering the strength of the coal trade generally, buyers will have to pay the official advances. Current pit prices:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal 9s. to 10s. The export of gas coal is just now very full. Current f.o.b. Hull prices:—Screened gas coal, 12s. 6d. to 13s. 3d.; gas nuts, 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d. to 12s. 6d.

Barnsley.

COAL.

There has been nothing during the week to interfere with the active state of trade generally and particularly in regard to business for steam coal of all descriptions. The more vigorous demand on export account has been well maintained, and the daily tonnage for the railway companies and large trading concerns has continued at a high level. The steam branch of the trade shows the stronger tone for current trade, but the enquiry for forward delivery referred to last week has hardly continued, and there are indications, though these are only of a slight character, that the higher prices which coalowners demanded for the shipping season are scarcely being realised. The shipments at Hull continue to be on a heavy scale, though a considerable bulk of traffic is being diverted to the new Immingham Dock from collieries which have direct access on the Great Central route. Business for prompt delivery for the best hards continue to be done at 11s. 6d. per ton, and large steams of secondary character are making from 10s. 6d. to 11s. per ton. In regard to the latter class of fuel there is greater fluctuation owing to the keen competition to secure export trade for the already shortened season. There is no change to report in respect of all classes of steam coal and there are reports that, despite the heavy output, the demand is only met with difficulty. This is particularly the case with regard to the best quality of nuts, which are easily making 10s. 6d. per ton, and unwashed samples are not more than 6d. per ton less. The business in slack also continues to be of a very brisk nature, and sellers are having no difficulty in disposing of their tonnage. The best grade make from 8s. to 8s. 3d. per ton and rougher qualities from 6d. to 9d. per ton less. The bulk of the trade for this class of coal is supplied by the West Riding textile districts, which are very busily engaged. In regard to gas coal, as the period for the making of new contracts becomes prolonged there is not a little apprehension being shown as to the basis on which final settlements will be made. Collieries are working full time and there is little buying by consumers on current account, and where collieries have already completed contracts stocks are accumulating. At the present, however, sellers are not disposed to make concessions from their demand for an increase of 2s. 6d. per ton, though it is understood that, owing to various circumstances, in some cases a less rate of advance is being accepted. On the whole, however, progress is very slow. The demand for house coal, despite the warmer weather, is fairly good, and prices are being controlled in a satisfactory manner from the coalowners' point of view. Contracts for the southern and eastern counties continue to be entered into at about 2s. per ton advance on last year's, and for the district trade late prices are maintained as follow:—Best Silkstone, 13s. 6d. per ton; best Barnsley softs, 12s. 6d. per ton; seconds, 10s. 6d. to 11s. 6d. per ton; best house nuts, 10s. per ton. The coke trade is of a more vigorous character, although the output is steadily increasing, and prices are now about 15s. per ton at the ovens.

Chesterfield.

COAL.

Business in house coal is of a steady character, and stocks at the collieries are unchanged on the week. Contracts continue to be renewed at 2s. 6d. per ton advance. Some important buyers decline to close at this figure, and it now remains to be seen which is the stronger—buyer or seller. A week or two will decide the matter. The market for manufacturing fuel is in a very satisfactory position, and the demand for cobbles and nuts for steelmaking purposes is of an exceptionally active character. Prices are very firm, and whenever a change takes place it is in an upward direction. No difficulty is experienced in obtaining an advance of from 2s. to 2s. 6d. per ton for sales for delivery over the next six or twelve months. For slack for steam-raising purposes, there is a strong demand, and contracts for the ensuing twelve months are entered into at prices that mark an advance of 2s. upon those which operated a year ago. It is not improbable that this class of fuel will appreciate in value as the year advances. Stocks at the collieries and consumers' works are unusually low. A brisk demand exists for steam coal for locomotive use, and railway companies are still adding to their stocks. There is much more activity in connection with the export branch of the coal trade, and with a fuller supply of shipping tonnage the demand for steam coal has quickened considerably during the last ten days. Prices, too, have improved, and are now firm at fully 9d. per ton upon the quotations operating a fortnight ago. There are indications that the remainder of the shipping season will be a time of considerable briskness at Hull and Grimsby. Steam coal is not by any means plentiful at present. There is a satisfactory business passing in cobbles and nuts for near Continental ports, and substantial quantities are being shipped. Slack is also in better request. Good sales of washed nuts and washed slack have been made during the week, and no difficulty is experienced in disposing of the production. Prices of these qualities remain firm. The coke market continues to hold a strong position for blast-furnace qualities, and also for foundry and steel-melting sorts. Enquiries for coke for forward delivery are numerous, and prices are still tending upwards. Quotations are as follow:—Best 13s. 6d., seconds 12s., cobbles 11s., nuts 10s., slack 8s.

IRON.

There is a full demand for pig iron and manufactured bars, and buyers are pressing for deliveries. Pig iron prices are higher than they have been for several years. Stocks are declining. The works of the district are in a state of great activity.

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Nottingham.

COAL.

Taking the coal trade as a whole, there has been a falling-off during the past week in Nottinghamshire. The decline has been principally in the house coal section, where the tone is decidedly quiet, and there is little prospect of an improvement until the holiday season is over, as many householders have bought in for a month or so. Local merchants are experiencing a dull time after the recent activity, and business is slow at the landsale depots, notwithstanding the comparatively cold and rainy weather. Values are, however, keeping firm, hand-picked brights making from 12s. 6d. to 13s. per ton, good house coal 10s. to 11s., and cheaper qualities at late rates. There is a brisk tone in the steam coal section. The tonnage sent away for export is very good, and there is a brisk demand for industrials in the home market. The stocks of best hards at the collieries are low, some pits having to work practically full time to cope with the orders. Quotations for best steam are from 11s. to 12s. per ton, and good seconds are offered at from 10s. to 10s. 6d. The position in regard to slacks is favourable. Gas coal is going out of hand fairly well.

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Leicestershire.

COAL.

The conditions of business is not quite so active here as it has been in the past few weeks. The enquiry for household is not so good as it has been, and most qualities of these coals are affected adversely. But there is a continued good demand for steam coals generally. No doubt the holiday season accounts for the falling off in household coal. It is generally held that after the August Bank holidays there will be a marked revival. As it is, the quieter conditions are not very serious, and there is a good amount of business being done on the whole. Frequently at this period things have been duller than they are now. There is a very full amount of business being placed for future delivery at what may be deemed quite satisfactory rates. There is a pretty good output being made, not so much as a week or two ago, but still a satisfactory one, and speaking generally stocks at the collieries are not of any great amount, though some hold much less than others. Local merchants are not so busy, and do not anticipate any renewal of activity till August is well advanced. The market rates are quite firm, and ruling prices for household coals are from 9s. for nuts to 12s. 6d. for best qualities, steam coals from 6s. 6d. to 9s. 6d.; these prices are subject to variation, but not much.

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South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL

There is very little change to report this week in the condition of the coal trade of the Cannock Chase district. On the whole a fairly satisfactory business is being done, and prices are well maintained. The collieries are running fairly regularly, in some cases practically full time being worked. The demand for house coal is somewhat quiet, and the amount of the best qualities in stock has increased. The enquiry for all classes of works fuel continues satisfactory. Business is quiet at the landsale depots.

Birmingham.

COAL.

The coal trade is naturally not so brisk as it was, but prices are exceptionally strong for the time of year. There is still a fair demand for manufacturing fuel. The only falling-away is for household fuel. There is not such a good enquiry, and prices are a shade easier. Coalowners are now reconciled to a smaller output, but the congestion of work in the iron trade is bound to keep the collieries busy.

IRON.

Though consumers have covered their future requirements to a large extent, there is still an active business doing and values remain very firm. Thus far consumptive demand has been very little interfered with by the weather, but calculations are based upon a considerable reduction of the needs of the puddling furnaces during August. This week the whole of the South Staffordshire iron and steel industries have been in full operation, and with several months' work on their books producers are anxious to lose as little time as possible in executing the specifications which are crowding upon them. While a very large proportion of the pig iron output has been sold over the current quarter, users are supplementing their supplies as the urgency of the occasion requires, and a considerable amount of scrap iron is being sold for prompt delivery. South Staffordshire forge iron sells at about 57s. 3d. upwards; part mine can be bought down to 61s. 6d., but this is the minimum; Northamptonshire iron fetches 59s. 6d. to 61s. 6d.; Derbyshire 61s. 6d. to 63s. 6d.; and North Staffordshire makes about the same level. There is no slackening in the demand for high-class Staffordshire iron. Marked bars remain at the £9 basis, and for the best known second-class bars £8 10s. is quoted. None of the leading makers will entertain less than £8 7s. 6d. delivered by boat. Nut and hurdle qualities realise £7 17s. 6d. to £8 delivered at Darlaston. The quotation for Belgian bars of corresponding quality is £6 16s. 6d., but deliveries are nearly three months in arrear, and there is consequently small inducement to consumers to place fresh orders in this direction. There is an active demand for black sheets, 24-gauge hard sheets for galvanising commanding £8 5s. to £8 7s. 6d. delivered. The bulk of the business in galvanised sheets is at £12 5s. delivered Birmingham or f.o.b. Liverpool. Quotations vary 2s. 6d. to 5s. a ton outside this mean, and for very good orders makers do not refuse £12. There is a large volume of business, most of the American houses having well-filled order books, and this is giving the British producer a better opportunity in neutral markets. The great increase in production, however, retards any upward movement in values. The Gas Strip Association met during the afternoon and decided to advance prices 5s. a ton, making the basis £8 5s. to £8 7s. 6d., according to the size of the order. Fine steel strip for the bedstead-tube trade makes £8 10s. Strong strip is not to be bought under £8 2s. 6d. In steel sections the trade is very stiff all round, many sellers declining to do business unless a substantial premium on the association rates is conceded. Billets and blooms realise about £6, and there is no sign of relief, imports having shrunk to very small dimensions. Copper sheets have advanced £2 a ton, making the basis £95.

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Forest of Dean.

Lydney.

COAL.

The condition of the house coal market of this neighbourhood has shown no improvement during the week. Employment at the collieries fluctuates, some of the pits managing up to four days, whilst others have difficulty in running three days. No great activity is expected in the house coal trade at this time of the year, and the increasing popularity of gas and electrical cooking appliances is reducing the summer demand to very small proportions. There has been a fair amount of shipping this week; railborne orders are still very scarce. Prices continue as given in our last report. The steam coal pits are still experiencing a good run of trade; all the collieries are busy and there are no stocks.

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Gloucestershire, Somersetshire and Wilts.

Plymouth.

COAL.

Messrs. W. Wade and Son report that there is a good wholesale demand for house, steam and gas coal at the south coast ports. Several large f.o.b. contracts for nine and twelve months have been arranged during the last fortnight, and also one or two freight contracts. Attempts are being made in various quarters to advance prices, but these are being stoutly resisted by buyers.

THE WELSH COAL AND IRON TRADES.

Thursday, July 25.

North Wales.

Ruabon.

COAL.

The collieries throughout Denbighshire and Flintshire continue to work good time and maintain their output, for which the market is at present good, considering the time of year as regards the household trade. With reference to this class of coal the average price at the pit is 15s. to 16s. per ton, but merchants are buying at less than this figure for quick delivery. This enables them to stock a quantity towards their winter requirements, as they realise the extreme likelihood of considerable advances in price being made, and their inability to make forward contracts at anything less than 2s. advance on their last year's contract price. These bargain lots also enable them to create a little summer business by offering their customers a slight concession for immediate supplies, and householders are able to buy, in some cases, a truck load at about 17s., which is considerably less than they have been able to get it at for some time. The market for fuel for manufacturing purposes is good. The brickworks are all in full swing now, and are taking large quantities of slow-burning and small fuel. Steam coal is going away in large quantities against locomotive and other contracts, and outside these there are a fairly good number of general orders at varying prices from 11s. per ton f.o.r. Gas coal is in good demand, and many of the new contracts are now in operation at the advanced prices and others are being settled quickly. Nuts are particularly well sold and collieries can get 11s. per ton for a great many more than they can supply. Slack of good quality is realising 7s. 6d. per ton, and gas coke varies in different towns from 15s. to 20s. at the works and finds a good market.

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Monmouthshire, South Wales, &c.

Newport.

COAL.

The local coal trade continues in an unsatisfactory condition, mainly owing to two causes—the want of sufficient suitable tonnage to deal with the very heavy stocks which now congest the 100 miles of dock sidings, and the very meagre enquiry for new business, the scantiness of which is really surprising. Very little has been heard as yet regarding contracts for next year, but amongst colliery people the subject is one of interest, the general trend of opinion being that prices will be certainly quoted 1s. a ton above this year's figures, in view of the extra burdens placed upon the industry by recent legislation. At the moment most collieries are struggling to secure enough empties to keep the output going, buyers in many cases benefiting by obtaining concessions for prompt shipment. Smalls, however, are rather firmer, the demand having overtaken the supply available. In other departments of the coal trade there is little change shown, coke and pitwood maintaining the very firm rates of last week. The prevailing demand for coke has led to a projected restart of the fine ovens at Blaina, formerly owned by the Pyle and Blaina Works Limited, whose unfortunate career terminated a year or two ago. Latest approximate quotations may be taken as follow, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. to 15s. 6d.; western-valleys, 14s. 6d. to 14s. 9d.; eastern-valleys, best, 14s. to 14s. 3d.; other sorts, 13s. 6d. to 13s. 9d.; colliery smalls, best, 9s. 6d. to 10s.; seconds, 9s. to 9s. 3d.; inferiors, 8s. 6d. to 9s.; screenings, 9s. 9d. to 10s. 3d.; through coals, 10s. 6d. to 10s. 9d.; nuts, best washed, 11s. to 11s. 3d.; house coals, best, 18s. to 18s. 6d.; seconds, 16s. 6d. to 17s. 6d.; patent fuel, 17s. 6d. to 18s. Coke: Furnace, 21s. to 23s.; foundry, 25s. to 27s. Pitwood: Best French fir, 26s. to 26s. 6d. ex-ship.

IRON.

There is little change to report in the condition of the local iron and steel trades. Works generally are very well employed, and it appears evident that the present strong conditions will be maintained for some time to come. Good business continues to pass at the tin-plate bar and sheet bar mills, where makers have all they can do to keep pace with current orders; £5 12s. 6d. to £5 15s. Bessemer and £5 15s. to £5 17s. 6d. Siemens is to-day's strong quotation for Welsh bars. With good specifications coming to hand at the rail mills, works are well employed and prices firm on the basis of £6 7s. 6d. to £6 10s. for heavy sections, with the usual extras for light ditto. At local blastfurnaces the pressure of work continues very heavy, Welsh hæmatite now being firmly quoted at 78s. 6d. to 79s. 6d. delivered to works in the district. The tinplate market continues steady, with a fair enquiry coming along. Makers have well-filled order books and will not reduce their quotations of 14s. 9d. to 14s. 10½d. Bessemer and 14s. 10½d. to 15s. Siemens for 20 × 14 × 112, with other sizes and grades accordingly.

Cardiff.

COAL.

Although but little more than a week has now to elapse before the commencement of the August Bank holidays, when all the collieries in the district will shut down for three days, there is no appreciable pressure for coals. The charterings last week only totalled about 338,000 tons, being a decrease of over 79,000 tons as compared with the previous six days, so that there is no indication at present of buyers coming forward for extra supplies. The fact is, that with the cessation of the demands by the Admiralty, and the probability that they may take very little coal during the next week or two, buyers anticipate that the market will display an easier tone, and are therefore only covering present requirements. The shipments last week only amounted to 320,000 tons, whereas with the enormous developments that have lately taken place in the colliery districts they ought really to average about 400,000 tons a week. This, however, is no doubt owing to the scarcity of tonnage. Numerous stoppages have taken place at many of the collieries on account of the impossibility of managers to clear their wagons, and as long as this state of things continues there can hardly be any improvement in the market. Some of the best collieries, who had ready tonnage at command, have managed to get 17s. 6d. for best steam coals, but these were exceptional cases. As a rule, not more than 17s. to 17s. 3d. is obtainable. Even at the lower figure buyers do not evince any eagerness to purchase. In many cases they are quite unable to do so, owing to the small quantity of tonnage offering and the consequent high freights demanded. Second-class Admiralty coals are obtainable at from 16s. to 16s. 6d., whilst inferior qualities have been sold at from 15s. to 15s. 6d. per ton. In some of the valleys there is much discontent amongst the miners. Instances are recorded in which they have not worked more than two to three days a week for the last month, and they seem disposed to throw the blame on to the coalowners, though on what grounds is not stated. It apparently never occurs to them that the trade is now suffering from the effects of the late strike and the resulting diversion of tonnage to other parts of the world. In this connection it is interesting to note that the reports published from time to time of the enormous capture of orders by the American collieries are greatly discounted by the official returns just published. For the three months ending April the shipments to the West Indies were only 140,000 tons, and to South America and Continental ports 400,000 tons more than in the corresponding period in 1911. Why America did so little was no doubt owing to the rise in freights, particularly to the Mediterranean. Coal was carried last autumn from Baltimore to Italian and other ports at from 10s. 3d. to 12s. per ton, but in March last the rate paid was from 20s. to 23s. 6d. Since the termination of the strike there have been comparatively few shipments from the United States to the European seaboard. Even to South America, whither the American coalowners can fix to-day on practically the same terms as the Welsh collieries, they fail to make much headway. The high freights are still a great hindrance to the shipment of coals from the Bristol Channel ports, 12s. having been demanded and paid for a 3,600 tonner to Genoa; the same figure has also been obtained for Port Said, while 22s. is quoted for the Plate districts. But, as the old saying goes, "it is a long lane that has no turning," and a strong feeling prevails amongst sales agents that before August is out there will be a considerable improvement in the market. This view is also apparently held by many private contractors, who show more anxiety to arrange for supplies for the rest of the year than they have done for some time past. Of course, they urge that the lowest values at present current should form the basis of negotiation, but they fail to convince coalowners of the justice of their contention. Not so very long ago 19s. was demanded by almost all the best collieries for forward delivery, but until there is much more tonnage available and the freight market returns to more normal conditions, it is felt to be useless to stand out for this figure, and probably 16s. 6d. would now be accepted. The Norwegian State Railways, who came into the market some time ago for 30,000 tons of coal, have, as was anticipated, placed their orders in the north. About 10,000 tons have been secured by a Newcastle firm at about 13s. f.o.b., whilst the remainder of the contract has been placed with Yorkshire collieries. The Finnish State Railways are in the market for 80,000 tons of Monmouthshire and other coals, and tenders for the same have to be deposited at Helsingfors by the 29th inst., but it is doubtful whether any orders will be placed in this district. Most of the Monmouthshire collieries are already heavily committed to the Italian and Egyptian railways, and it is very unlikely that they can enter into successful competition with the collieries in the north. The Portuguese Arsenal department have invited tenders for the supply of three cargoes of 3,000 tons each of best Welsh steam coals. The coal is to be delivered at Lisbon at intervals of one month. The most satisfactory feature of the Welsh market at present is the firmness of small coal. This is due to the diminished production of large coal, which, of course, affects the output of small. Bunkerings are now quoted at from 10s. 6d. to 10s. 9d., best ordinaries 10s. to 10s. 3d., and cargo qualities 9s. to 9s. 3d. per ton. Other smalls, including drys, range from 8s. to 9s. 9d., dock screenings are 11s. 6d. to 12s., best washed nuts are 14s. to 14s. 6d., seconds 12s. 3d. to 13s., whilst best washed peas are 12s. to 12s. 6d., and seconds 10s. to 10s. 6d. per ton. The Monmouthshire coal market is fairly steady. Black Vein coals are 15s. to 15s. 9d., western-valleys 14s. 6d. to 15s., and eastern-valleys 14s. to 14s. 3d. per ton, in each case f.o.b. Cardiff. Some good orders are reported to have been placed for best eastern-valley coals at 14s. 6d. for delivery over the whole of next year. There is no material change in bituminous coals. No. 3 Rhondda large is 17s. to 17s. 6d., through-and-through 15s. to 15s. 6d., and small 12s. 6d. to 13s.; No. 2 large is 12s. to 12s. 6d. (the latter figure having been paid for large quantities for forward delivery), through-and-through is 10s. to 10s. 6d., and small 8s. to 8s. 6d. per ton. Exports of patent fuel have been exceedingly heavy, the Crown Company having shipped 17,125 tons, Swansea 25,675, and Newport 5,350 tons. Best brands are held for 19s., and seconds for 17s. 6d. per ton. Special foundry coke is 28s. to 30s., and ordinary foundry 25s. per ton. There is a good demand for pitwood, and the price has gone up to 26s. 6d. per ton. The following table shows the chief exports both for June last as well as for the corresponding month of last year:—

	June 1911. Tons.		June 1912. Tons.
Russia	50,913	...	52,023
Sweden	5,499	...	16,657
Norway	4,138	...	11,064
Denmark	2,233	...	5,074
Germany	17,992	...	18,139
Netherlands	14,881	...	11,275
Belgium	46,287	...	19,279
France	420,326	...	502,661
Algeria	48,570	...	42,968
Portugal	43,173	...	49,512
Madeira	9,962	...	20,729
Spain	64,937	...	102,555
Canary Islands	46,599	...	50,155
Italy	413,946	...	393,240
Austria-Hungary	10,024	...	19,201
Greece	23,392	...	10,057
Roumania	—	...	7,394
Turkey (European)	6,939	...	1,426
„ (Asiatic)	9,323	...	16,017
Tunis	8,621	...	11,204
Japan	—	...	12,437
Mexico	2,824	...	4,387
Peru	—	...	5,716
Chili	59,956	...	68,385
Brazil	90,331	...	128,815
Uruguay	41,608	...	51,428
Argentine Republic	150,522	...	201,273
Channel Islands	3,357	...	5,956
Gibraltar	30,716	...	11,449
Malta	14,765	...	4,577
Aden	4,462	...	15,482
Ceylon	15,953	...	19,802
West Africa (French)	1,150	...	7,656
„ (Portuguese)	24,305	...	17,185
„ (British)	5,999	...	5,213

IRON.

The great heat of last week affected the output at the tin-plate and steel works very seriously, four-hour shifts having to be resorted to in some of the mills. Receipts at the dock warehouses from works only amounted to 150,000 boxes, whereas the shipments totalled 194,400 boxes. To complete the loading of vessels in the docks, stocks had to be denuded of over 44,000 boxes, and they are now down to 469,000 boxes. This, however, is still double the normal quantity. There is not much activity in the market, but prices are a little firmer, 14 × 20 Bessemer cokes realising from 14s. 7½d. to 14s. 9d. per box, and others in proportion. Through the bursting of the banks of the Tennant Canal, between Neath and Aberdulais, the supply of water to a number of tin-plate and other works has been cut off, and nearly 2,000 workmen rendered idle. The Swansea Harbour Trust has decided to erect a new tin-plate warehouse at a cost of £2,000 to accommodate the increasing trade at the King's Dock. A deputation has this week interviewed the Canadian Minister of Commerce on the subject of the tin-plate duties. At present tin-plates exported from Wales to Canada are admitted duty free, the same as from America, and the object of the deputation was to try and get the Canadian Government to put a duty of 5 per cent. on American tin-plates so as to equalise the competition between the makers. Through the Americans being able to send their plates into Canada so much more cheaply than the Welsh makers, the trade of the latter with Canada has almost disappeared. Notwithstanding the foreign importations steel bars continue in good demand, and prices are very steady. Siemens tin-bars are quoted up to £5 17s. 6d. and even £6 in some cases, whilst the lowest figure for Bessemer bars is £5 12s. 6d. A serious accident has occurred to the bar engine at the Gorseinon steel and tin-plate works. This will cause great inconvenience to several of the tin-plate works for at least a month, and of course the shortage of bars which has been experienced for so long will be accentuated. Prices of galvanised sheets are very irregular, some makers quoting £12 and others £11 15s. for 24-gauge corrugateds, but what little business is doing is at the mean figure of £11 12s. 6d. Welsh pig iron is 77s. 6d. to 78s. f.o.t.

Swansea.

COAL.

The returns of the trade of the port last week were again favourable, both the coal and patent fuel trades being very brisk; the shipments amounted to 112,288 tons. There was a very good attendance on 'Change this morning and there was no material alteration to report in the general condition of the anthracite coal market, the undertone being from steady to firm. Swansea Valley large was moving off very well, but Red Vein large was very slow. Machine-made nuts and cobbles and also beans and peas continued firm. Rubbly culm was in slightly better request, but prices were not materially affected. Duff continued a very strong market. In the steam coal market large was in very poor demand; Smalls, on the other hand, were firm. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 16s. to 18s., less 2½ per cent.; Red Vein large, 12s. to 13s. 6d., less 2½ per cent.; machine-made cobbles, 22s. to 24s.; Paris, French, and German nuts, 23s. to 25s.; beans, 22s. to 23s. 6d.; machine-made large peas, 14s. to 15s.; ditto fine peas, 13s. to 14s., all net; rubbly culm, 7s. to 7s. 6d., less 2½ per cent.; duff, 4s. 6d. to 5s., net. Steam: Best large, 18s. 6d. to 18s. 9d.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s. 6d. to 11s. 6d.; small, 9s. 6d. to 10s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 18s. 6d.; through-and-through, 15s. 6d. to 16s. 6d.; small, 12s. 6d. to 13s. 3d., all less 2½ per cent. Patent fuel, 17s. to 18s., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

During the past week there was a good yield of pig iron and all the steel-smelting plants were fully operating. The aggregate production of tinplates was considerably curtailed, owing to the excessive heat during the early days of the week. The shipments of tinplates last week were large, amounting to 194,431 boxes, receipts from works 150,071 boxes, and stocks in the dock warehouses and vans 468,987 boxes.

Llanelly.

COAL.

There is very little alteration to report in the coal market of this district, but there are many signs that the market will be a lot firmer. The enquiry both from the Continent and inland is better, and there is a general opinion that for the anthracite coals at any rate the position is going to be much firmer, with prices quite 2s. per ton up. Boats are a lot more numerous, but there is a large amount of coal lying in the dock sidings waiting shipment. There has been a strong spurt in the demand for machine-made kinds, and prices are firm. For steam and bituminous coals things are very quiet. There seems to be far too much coal offering, and prices are not at all steady. No improvement is expected until after the August holidays. Prices this week are:—Best malting large, 21s. to 23s.; second malting large, 20s. to 22s.; Big Vein large, 16s. 6d. to 18s. 6d.; Red Vein large, 13s. to 14s.; machine-made large cobbles, 21s. to 23s.; German nuts, 22s. to 23s.; French nuts, 22s. to 24s.; Paris nuts, 22s. to 24s.; machine-made large beans, 22s. to 24s.; ditto second quality, 20s. to 22s.; machine-made large peas, 14s. to 15s.; rubbly culm, 8s. to 8s. 6d.; duff, 5s. to 5s. 6d.; large, 13s. to 14s.; through-and-through, 10s. 6d. to 11s.; small steam, 8s. 6d. to 9s. 6d.; bituminous small, 10s. 6d. to 11s.—all f.o.b.

THE IRISH COAL TRADE.

THURSDAY, JULY 25.

Dublin.

There is no change of any moment in the local trade, business generally keeping very quiet, and although prices are firm it is not expected they will be any higher for another two months. Quotations in the city are as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 21s.; best Orrell slack, 21s.; best coke, 23s.; "bell" coal, 1s. 5d. per sack. The coaling vessels arriving during the week totalled 48, as compared with 64 the week previously, chiefly from Irvine, Troon, Newport, Liverpool, Girvan, Ayr, Swansea, Manchester, Whitehaven, Garston, Workington, Saundersfoot and West Bank.

Belfast.

The demand for house coal continues to be very quiet owing to the prevailing summer weather, and stocks are largely accumulating in consequence. There is a fairly good business in steam coal, and prices keep firm owing to the position of the markets at the other side. Scotch coals continue to show an upward tendency, but there is no further change during the week either in household or steam qualities. City prices are as follow:—Gaunt's Hall Arley coal, 25s. per ton; Hartley, 24s.; Orrell nuts, 24s.; Wigan, 23s.; Scotch, 21s.; Orrell slack, 21s. Quotations ex quay are about:—21s. 4d. per ton for Arley house coal; Scotch, 18s.; Scotch steam coal, 15s to 16s. per ton; navigation steam, 15s. 6d. to 16s. 6d.; Welsh steam, 16s. 6d. to 17s. 6d. Cargoes arriving during the week were chiefly from Garston, Ayr, Swansea, Point of Aire, Ardrossan, Maryport, Glasgow, Workington, Partington, Preston, Ellesmere Port, Troon, Whitehaven, Neath Abbey and Girvan. From June 30 to July 13 the total number of coaling vessels entering this port was 133.

THE TIN-PLATE TRADE

Liverpool.

There is a good deal of business going through in tin-plates just now. Enquiries are numerous, and the tone of the market is cheerful. Works are all very busy, and several are in the happy position of being fully booked up to end of the year. Quotations are firm as follow:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 14s. 9d. per box; I C 28 × 20 (112 sh. 216 lb.), 29s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), to 15s. 3d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. per box; I C 14 × 19¼ (120 sh. 110 lb.), 15s. per box; I C 20 × 10 (225 sh. 156 lb.), 21s. 6d. per box; I C squares and odd sizes, 15s. to 15s. 3d. basis for usual specifications. Terne-plates are steady at 26s. to 26s. 6d. for I C 28 × 20, and charcoal tins are in fair demand at 16s. 6d. to 17s. and upwards according to tinning. Finished black-plate rules firm at £11 per ton for 30-gauge, approved sizes, shipment over six months. Coke wasters are firm and in steady request at following rates:—C W 14 × 20, 13s. 9d. per box; C W 28 × 20, 28s. 3d. per box; C W 14 × 18¾, 13s. 9d. per box; C W 20 × 10, 19s. 9d. per box—all f.o.b. Wales, less 4 per cent.

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THE SOUTH WALES COALFIELD. PART II.

By HENRY K. JORDAN, F.G.S. (Past President and first Gold Medallist of the South Wales Institute of Engineers).

This Paper, which deals with the western part of the Coalfield, has just been published by the South Wales Institute of Engineers. It consists of 81 pages of printed matter with Sections and Diagrams. The large drawings are issued separately and comprise:—

1. A HORIZONTAL SECTION across the anthracite region of Llandybie and Pant-y-ffynnon, and *via* the Dulais Valley to the sea at Swansea. It is drawn to a scale of six inches to one mile, is 8 ft. in length, mounted on linen, and geologically coloured.
2. COMPARATIVE SECTIONS of the LOWER MEASURES in the following areas —

(A) NEATH VALLEY	(E) AMMANFORD.
(B) SWANSEA VALLEY.	(F) LOUGHOR VALLEY.
(C) BRYNAMMAN DISTRICT.	(G) GWENDRAETH DISTRICT.
(D) AMMAN VALLEY.	(H) GWENDRAETH DISTRICT.

These are drawn on one sheet, about 35 by 30 in., mounted on linen, to a scale of 200 ft. to 1 in.

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"THE SOUTH WALES COALFIELD," PART I., by Mr. H. K. Jordan, published in 1903, price £2 2s., dealt with the eastern half of the Coalfield, and may be obtained from the Secretary.

NEW FORMS, &c.,

Recently issued under the Coal Mines Acts.

SEE PAGES 204 & 205.

This List of New Prescribed Forms, &c., appears weekly in the "Colliery Guardian."

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⁂ *For other Miscellaneous Advertisements see Last White Page.*

Forthcoming Annual Meetings.

Institution of Mining Engineers—Provincial Meeting (Birmingham)	September 11, 12 & 13, 1912
North of England Institute of Mining and Mechanical Engineers ...	August 3, 1912
Midland Counties Institution of Engineers	Sept. 1912
Manchester Geological and Mining Society,	Oct. 8, 1912
North Staffordshire Institute of Mining and Mechanical Engineers ...	October 14, 1912
South Staffordshire and Warwickshire Institute of Mining Engineers ...	October 1912 (2nd week)
Iron and Steel Institute—Autumn Meeting ...	September 1912
Association of Mining Electrical Engineers—	October 4 & 5, 1912 (Provis.)

The Colliery Guardian.

LONDON, FRIDAY, JULY 26, 1912.

With this issue we present as a supplement an account of the recent joint meeting of the scientific, mining, and engineering societies in Cornwall.

A return in the form of a White paper [Cd. 6314] has been issued by the Board of Trade showing the estimated value of the imports and exports of the United Kingdom for each of the years 1900-1911, as based on the average prices prevailing in 1900.

The House of Lords have reversed the judgment of the Court of Appeal in the action of Watkins *v.* the Naval Colliery Company. This case, which arose out of a shaft accident at the Ely Colliery in 1909, raised the question of the responsibility of the colliery company for the accident and their liability at common law. The High Court have found in favour of the widow, on the ground that the statute imposes a duty on the employer to provide proper appliances.

In the debate on the Naval Estimates in the House of Commons, on Monday, Mr Churchill referred to the Royal Commission which is about to be appointed to enquire into the question of liquid fuel and its application to warships. He said the enquiry would be a very long business, but it portended no sudden or extensive changes in the methods of naval construction. Lord Fisher had consented to take charge of this enquiry.

The Home Secretary is now prepared to consider applications in connection with the appointment of 15 sub-inspectors of mines and quarries. The salary is £150, rising by £5 a year to £200 a year. The appointment will be by limited competition. Applications for nomination must be made before August 15 next on a printed form, which, with full particulars, can be obtained from the Private Secretary, Home Office, London.

The quarterly general meeting of the South Wales Institute of Engineers was held at Park-place, Cardiff, last week. The paper read before the institute, entitled "Notes on the Analyses of Mine Air," by Messrs. J. W.

JOINT MEETING OF SCIENTIFIC, MINING AND ENGINEERING SOCIETIES IN CORNWALL.

Perhaps the most persistent feature of brilliant ideas is the wonder that nobody thought of them before; and the joint meeting of the Scientific, Mining and Engineering Societies in Cornwall, in July 1912, has proved to be no exception. The various societies in themselves afford facilities for frequent meetings between members of the same profession, but owing to circumstance rather than design such meetings are always more or less exclusive. Recent development in industrial enterprise has, however, tended to break down the barriers which formerly existed between the various professions, and their several members are now constantly being brought into closer contact with each other in most great undertakings. In all descriptions of mining, for example, the highest skill of practically every profession is demanded, including that of the mining, mechanical and electrical engineer, the metallurgist, the geologist, the chemist, the physician, the mathematician, and the educationalist; and in order that the work of each profession may be most effective, it is essential that its representatives should have every opportunity of becoming familiar with the work of their colleagues in the other professions. It is inconceivable that a chemist engaged in evolving a new process of ore treatment would be likely to bring his work to a successful issue from a commercial point of view, without being familiar with the possibilities and limitations involved in engineering and mechanical construction.

Group of Members of the Scientific, Mining and Engineering Societies

Bearing this in mind, there could not possibly have been a more fitting occasion for friendly intercourse and mutual advantage, than the delightful excursion to typical mines and works in Cornwall in which members representing the following societies, institutions, &c., took part:—Royal Society; Geological Society; Geologists' Association; Chemical Society; Faraday Society; Society of Chemical Industry; Society of Public Analysts; Institution of Mining and Metallurgy; Institution of Mining Engineers; Institution of Civil Engineers; Institution of Mechanical Engineers; Institution of Electrical Engineers; Institute of Chemistry; Institute of Metals; Iron and Steel Institute; Chemical, Metallurgical and Mining Society of South Africa; Mining and Geological Institute of India; Canadian Mining Institute; representatives from the Birmingham, London and Sheffield Universities, the Imperial College of Science and Technology, and the Imperial Institute, &c.

The idea of the joint meeting was grandly conceived, and the conception was worthily executed. In the first place, the selection of the ground was eminently happy. Cornwall is admittedly the home of metalliferous mining in this country, and it has been the nursery for mining men throughout the world. The old saying that a Scot, a rat, and a Newcastle grindstone are to be found everywhere, might well be extended to Cornishmen as far as mineral areas are concerned. A study of Cornish mining and Cornishmen makes this fact easily understood, for the qualities of thoroughness, dogged determination and capacity for training are evident everywhere. The history of Cornwall affords a brilliant illustration of the effect of a combination of probably unequalled mineral resources, the ability and courage to exploit them, and the no less courageous and ready financial support which has at all times been supplied, through thick and thin, by the landowners of the county. It is, indeed, an enviable position for a county to occupy, that it could boast of associations with such names as the Dolcoath Mine, Sir Humphrey Davy, James Watt, William Murdock, Richard Trevithick, Robert Were Fox, Davies Gilbert, Enys, Robartes, Basset, Bolitho, and Bain, and numbers of others.

Equally fortunate with the choice of the ground was the selection of the *personnel*. First in order come the names of the members of the Joint Scientific Reception Committee, with the Right Hon. Lord St. Levan as president; Viscount Falmouth, Sir George J. Smith, Hon. H. W. F. Trefusis, Hon. Evelyn Boscawen, Col. C. B. Vyvyan, C.B., Messrs. H. D. Acland, F.G.S., Fred. D. Bain, A. F. Basset, W. J. Bennetts, G. B. Beauchamp, T. R. Bolitho, Horton Bolitho, Charles Bryant, William Colenso, J. B. Cornish, J. Gilbert, R. C. Glanville, Frank Harvey, M. F. Hitchens, J. L. Hedman, E. S. King, Alfred Lanyon, North and Rose, F. Parkyn, Josiah Paull, Rd. Pearce, D.Sc., Arthur Schiff, W. C. Stephens, T. M. Stocker, C. V. Thomas, F. W. Thomas, R. A. Thomas, John Whitworth, and James Wickett, with Mr. Horton Bolitho as hon. treasurer, and Mr. E. W. Newton, F.G.S., as secretary.

These names alone might be considered as an assurance of success, but all who have had intimate experience of the organisation and carrying out of excursions of a similar character are well aware that the ultimate success depends principally upon the executive officers, and here the selection proved to be incomparable. By an excellent division of labour, the London arrangements were left in the hands of Mr. G. T. Holloway, whose intimate association with the various societies and their members, by whom he is held in the highest esteem, was an invaluable asset.

The local arrangements were made by the genial and untiring secretary, Mr. E. W. Newton, and an executive committee.

It is quite impossible adequately to appreciate the almost superhuman service which Mr. Newton so happily and freely gave from start to finish. He was, indeed, the very ideal of a secretary, and the fact that there was not a single hitch in the proceedings nor murmur of discontent speaks volumes for his splendid organisation, attention to detail, provision and unfailing resource, the whole combined with unabating energy and good humour. As a result the visitors returned home each night after a full day of interest and instruction "tired but happy"—to use Mr. Newton's own phrase.

Last, but not least, the success of the undertaking was greatly due to the hearty welcome and open hospitality which the visitors everywhere received, and the glorious weather. The two former are proverbial, whilst the last was heaven-sent.

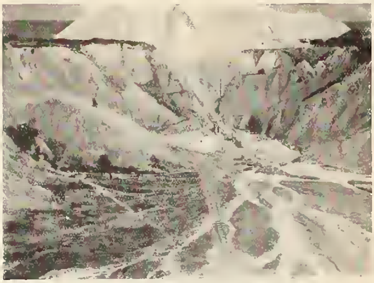
The following is a list of the visitors (the number of whom it was found necessary to limit) who were invited by the President and Reception Committee "to accompany" the excursions:—C. O. Bannister, K. Benham, W. J. A. Butterfield, Prof. J. Cadman, A. G. Charleton, W. Chisholm, J. C. Cloud, T. Fairley, F. H. W. Fox, A. Greenwell, Upfield Green, G. T. Holloway, H. Hemingway, Prof. W. R. E. Hodgkinson, H. J. Humphreys, G. N. Huntly, W. Hutton-Williams, H. Johnstone, J. H. Cordner James, Alfred James, Col. J. T. Lloyd Jones, J. L. Jeffery, H. C. King, H. C. Lancaster, F. A. B. Lord, D. A. Louis, G. C. Lloyd, Prof. H. Louis, C. McDermid, W. H. Merrett, A. Mitchell, Bedford McNeill, L. Pendred, F. Rowley, W. F. Reid, E. Rickard, H. M. Ridge, Col. W D. Rees, A. Tellam, W. P. Thompson, G. Shaw Scott, A. Schiff, P. Strzelecki, A. H. Smith.

In addition to the visitors, a number of gentlemen resident in the locality and associated with the objects of the meeting were also invited. The following is a list of those who were able to be present:—Fred D. Bain, J. J. Beringer, W. J. Bennetts, Horton Bolitho, J. E. Brown, F. J. Bowles, Chas. Bryant, A. M. Bluett, T. J. Chellow, Wm. Colenso, J. H. Collins, G. W. Cox, Frank A. Cozens, F. C. Gann, R. Barclay Fox, Wilson L. Fox, John Gilbert, R. D. Gill, C. Jeens Grace, Frank Harvey, L. A. Hards, R. A. Hoskins, Henry Jenner, E. J. Moseley, C. C. T. Millett, Morley Martin, E. W. Newton, C. Odgers, H. B. Paull, Josiah Paull, F. Parkyn, John Penberthy, R. G. Read, Sir Molesworth St. Aubyn, A. H. Smith, A. Ernest Thomas, C. V. Thomas, R. A. Thomas, F. W. Thomas, Herbert Thomas, Wm. Thomas, John Whitworth, Col. H. W. Williams.

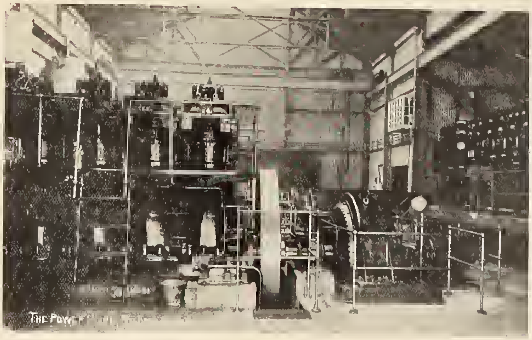
Most of the visitors travelled to Cornwall on Monday, July 15, by the Riviera Express of the Great Western Railway Company, upon which a special carriage was reserved. For the convenience of the visitors, the Great Western Railway Company issued special tickets at a reduced fare, available from Paddington to Truro or Penzance and back, and constituting a season ticket, from July 13 to July 23, for all stations west of Truro, and including Falmouth and St. Austell. During the visit compartments were reserved by the railway company on each train by which the party travelled in the course of the several excursions, which, in addition to the uniform courtesy of their officials, added considerably to the general enjoyment. Previous to their arrival, the indefatigable secretary, Mr. E. W. Newton, had arranged for the accommodation of the members of the party, on special terms, at various hotels, private hotels and pensions ("Trevessa," *en pension*, Beach Hotel and Porthminster Hotel) at St. Ives, each being near the station, and having a fine and uninterrupted view of St. Ives Bay. It is only necessary to add here that the comfort and attention which the visitors received determined many of them to return again to St. Ives on the first opportunity.

On the first day, Tuesday, July 16, the visitors assembled at Camborne and visited the museum and laboratory of the Camborne School of Mines. This school is the principal seat of the School of Metalliferous Mining (Cornwall), the other seats being at Redruth and Penzance. The several Cornish schools were reorganised and combined into one comprehensive institution by the Cornwall County Council in October 1909. The combination has been most successful, rendering each school more useful and at the same time preserving its jealously-guarded traditions. The history of these schools possesses an absorbing fascination, but limitation of space forbids any further reference here. The party then

HYDRAULIC SLUICING AT REDMOOR.



GENERAL VIEW OF A CLAY MINE.



proceeded to the works of Messrs. Holman Bros. Limited, whose drills are famous throughout the world. This firm has been established at Camborne since 1839, and now has branches in every mining field. In recent years the demand for rock drills has increased to such an enormous extent that Messrs. Holman Bros. have found the capacity of their works at Camborne quite insufficient to cope with the requirements, and, in consequence, they are erecting large premises for the sole purpose of this branch of their business. They also manufacture stampers, especially the "pneumatic stamp," besides other descriptions of mining machinery.

Before leaving the works, Mr. D. A. Louis, in a happy speech, proposed the health and continued prosperity of Messrs. Holman Bros., to which Mr. Leonard Holman, one of the directors, responded, saying that although the county had been rather dormant for some years past, there were signs of revival, and that his firm intended to press forward with their works so as to take advantage of it.

The party then proceeded to the Dolcoath Mine, where they were entertained at luncheon, by the kind invitation of the directors. The chairman of the company, Mr. Frank Harvey, presided, and gave a hearty welcome to the visitors. In the course of an interesting speech, Mr. Harvey referred to the great mining work which had been done in the county, and that in this respect the Dolcoath Mine was the *doyen*, the time of commencement of operations upon its site being beyond historical record. Only a few weeks ago they had stopped an old engine that had worked continuously since 1815. In order to keep up to date the old order had to give place to the new, and steam was giving place to electricity. Professors Cadman and Henry Louis returned thanks for the visitors, and paid well-deserved tribute to the progressive spirit and dogged determination of Cornish mining men.

Prof. Bedford McNeill proposed a vote of thanks to the directors and "Success to Dolcoath Mine," and made special reference to the Thomas family—a name synonymous with Dolcoath Mine. They would always remember the late Capt. Josiah Thomas as one representing great ability whom they should endeavour to follow in their profession. Mr. R. Arthur Thomas, the manager, responded, and gave some interesting details concerning the output of the mine and its development. After luncheon the visitors inspected the mine and a number of them descended the new Williams shaft. This shaft is 17 ft. 6 in. in diameter and 3,000 ft. in depth, and has the reputation of being the deepest tin mine in the world.

An interesting article on "The Cornish Tin Mining Industry," by Mr. W. H. Goodchild, is included in the excellent programme of the meeting prepared by Mr. E. W. Newton, for the use of the visitors, and the following extracts are made from it:—

The total production from 1742 to 1910 amounts to about 824,000 tons of metal, which has realised a little over £82,000,000 sterling—an average price of about £140 per ton. The total output of Cornwall from very early times to the present day is probably well over 1¼ million tons of metallic tin, which, at £140 per ton, gives a capital value exceeding £180,000,000 sterling. In addition to this, Cornwall has produced many millions of pounds worth of copper, lead, arsenic, and silver—the annual output of copper alone being worth over £1,000,000 sterling per annum about the middle of the last century. Wolfram, which was formerly a worthless product and a bugbear to the tinminer, has in quite recent times become a valuable asset, a ton of wolfram being worth almost as much as a ton of black tin at the present time. These figures are given for the purpose of showing what an enormous amount of mineral wealth has been taken from a very small area. Cornwall was, and is, in fact, one of the most richly mineralised base metal areas in the world.

The prices at which the greater part of the tin output has been produced are as follow:

Average for century	1751-1850 ...	£94 per ton.
Average for half-century	1851-1900 ...	£102 per ton.

subdivided into decades as follows:—

	Decade.	Average price per ton. £	Average tons per annum.
	1851-1860	116	7,932
	1861-1870	108	8,460
	1871-1880	100	9,696
	1881-1890	100	9,220
	1891-1900	86	6,449
Half-decade	1894-1898	64	5,780

Note the gradual fall in price till the big slump in 1894-1898, which effectually closed down all but the richest producers, also the lack of increase of rate of production since 1870, when modern high-power explosives were beginning to be well known, which is strongly suggestive of a long period of lack of enterprise, considering the county's natural resources.

Tin in 1894 had not dropped below £89, and Cornwall produced 8,328 tons in that year, which is not much below the average rate of production for the last half of the nineteenth century. Five years later production had fallen to 4,648 tons per annum, due to the wholesale closing down of the mines. It was not, however, till a year later that production touched bottom, though in that year tin recovered with a jump to £122, since when it has never averaged less than £118 for the year.

Now as regards the future: It is quite impossible here to attempt to enter into an explanation of modern mining and metallurgical methods. Suffice it to say that present-day methods differ from the methods which have been in vogue in Cornwall, and are still extant there, just as much as an old-fashioned stage coach differs from a modern motor car. Close comparison of methods is, in fact, quite impossible.

Taking all these facts into account, and bearing in mind the enormous rise in the value of tin, it becomes obvious at once what a magnificent field for the investment of capital is offered by the mineral wealth of Cornwall

The natural resources of Cornwall are such that it could probably, under modern conditions, maintain an annual output greater than at any previous period in its history, and once again take a prominent place amongst the world's tin fields.

Where deep mining has been prosecuted in Cornwall it has generally been successful, since the lodes have been usually found to go down without serious diminution in width and the pay sheets have not undergone progressive impoverishment. The deepest mine is over 2,000 ft. below this average depth, is one of the best dividend payers in the county, and has good expectations of a long life ahead.

The decay of the mining industry of Cornwall has been due to a number of adventitious causes already discussed, the great drop in the price of tin over a comparatively long period precipitating the great crash of 1893 and 1898, and inducing a period of depression from which Cornwall has not to this day recovered, but it is not due to the wholesale "petering out" or impoverishment of the ore bodies. Latter-day advances in every branch of engineering science, combined with the very much increased value of tin, make it possible to profitably handle ore bodies, both at surface and in depth, which could not be touched in former times.

The next day, Wednesday, the party assembled at Burngullow, and visited the china clay works of Messrs Parkyn and Peters. Mr. Frank Parkyn and Mr. Lewis Peters personally received the visitors and conducted them over the works, explaining the various methods and processes in use. The party then proceeded to Lanhydrock, where they were entertained at an *al fresco* lunch in the beautiful grounds as the guests of Viscount Clifden. Afterwards the alluvial tin mine at Redmoor was visited, and the party returned, "tired but happy," to St. Ives and Camborne.

On the third day, Thursday, a visit was paid to the historic St. Michael's Mount, the seat of Lord St. Levan, the president of the reception committee. In the unavoidable absence of Lord St. Levan, the visitors were received by the Hon. Piers St. Aubyn, who courteously conducted them through the grounds and castle and explained the points of interest. When it was time for the return journey to be made, the causeway connecting the island with the mainland was still under water, and the sea was not sufficiently smooth to allow of a landing at that point without difficulty. Arrangements were accordingly kindly made for a passage to Penzance by means of a motor boat and a sailing boat, while a few waited until the tide had dropped sufficiently to render the causeway available.

A portion of the party, instead of visiting St. Michael's Mount, went to Hayle and inspected the electrical works, where they were received by Mr. L. S. Hards, on behalf of the Cornwall Electrical Power Company. This station, and a branch station at Carn Brea, supplies power at a moderate price east and west across the county, and is of great service in assisting towards the more vigorous working of the mines.

The entire party was entertained at lunch at the Porthminster Hotel, St. Ives, the chair being taken by Mr. Fred D. Bain.

A hearty welcome was given to the visitors by Mr. R. S. Read, the Mayor, who drank their health in the loving cup which had been presented to the town by Mr. Francis Basset in the 17th century. The Chairman then proposed the toast of "The Mining, Metallurgical and Allied Industries." The toast was responded to by Mr. Walter F. Reid, Mr. T. C. Cloud and Mr. A Ernest Thomas.

Mr. Alfred James then proposed the toast "Success to Cornish Mining," which was responded to by Mr. E. S. King.

Mr. Charles Bryant proposed the health of Mr. O. T. Holloway, and spoke in warm terms of the great assistance which he had given to the executive committee from London, and said that his work, that of the executive committee, and the leviathan labour of Mr. Newton largely accounted for the success of the gathering.

Mr. Holloway and Mr. Newton replied. Further speeches were made by Mr. F. J. Stephens and Mr. Hards.

After luncheon the visitors drove to Trenwith, St Ives Consols and the Giew Mines, under the control of the St. Ives Consolidated Mines Limited, and some interesting experiments with radium were shown by Mr. Arthur Schiff.

On Friday, the safety fuse factory of Messrs. Bickford Smith and Co. Limited, at Tuckingmill, was visited. The works were inspected under the guidance of Mr. Stanley Smith, one of the directors, and afterwards a most interesting demonstration of the capabilities and uses of the fuse was given to the visitors in an adjoining field.

The party then divided, one portion visiting South Crofty Mine and the other party King Edward Mine.

The party then re-united and visited the "Climax" rock drill works of Messrs. R. Stephens and Sons, and saw a number of trials personally superintended by Mr. Stephens. The visitors were then entertained at tea in the beautiful garden of Mr. W. Stephens' house.

On Saturday, the last day of the joint meeting, the visitors travelled to Truro, and after visiting the cathedral and the museum of the Royal Institution of Cornwall, left Truro by steamship "Princess Victoria" for a trip down the beautiful River Fal to Falmouth, visiting Tregothnan Castle, *en route*. On the voyage Mr. L. Pendred, on behalf of the members of the party, made a presentation to Mr. E. W. Newton.

On arriving at Falmouth, the visitors were welcomed by the Mayor in the hall of the Royal Cornwall Polytechnic Society, which is the oldest of these societies in Great Britain, and possesses a brilliant history. The following is a short extract from an historical synopsis of the Royal Cornwall Polytechnic Society, written by Mr. Wilson Lloyd Fox:—

The society was founded in 1833, under the name of "The Cornwall Polytechnic Society." It was originated at the suggestion of Miss Fox, of Penjerrick, who was anxious to encourage a number of clever workmen who were then employed by several members of her family, in Perran Foundry, and who were constantly bringing models and inventions to her father, the late Mr. R. W. Fox, for his inspection. The idea was heartily promoted by her father, and by her sister, the late Miss Caroline Fox, who was the author of the name "Polytechnic."

In the report for the year 1834 it is stated that the original design of its founders was to promote the useful and fine arts, to encourage industry, and to elicit the ingenuity of a community distinguished for its mechanical skill, and that the committee were already called upon to extend the sphere of their operations, and to impart to the society a more important character; by pointing out the most desirable field for research; by calling the attention of the public to the greatest desiderata in art and science, especially as connected with the permanent interests of the county.

Its first patron was the Rt. Hon. Lord de Dunstanville. The first president was Sir Charles Lemon, Bart., M.P., F.R.S., who remained president and one of its warmest supporters, until his death on February 12, 1868. The first vice-presidents were Sir R. R. Vyvyan, Bart., M.P., F.R.S.: Messrs. E. W. W. Pendarves, M.P., F.R.S.; J. S. Enys; J. Williams, jun., F.R.S.; G. C. Fox; J. Taylor, F.R.S.; and G. S. Borlase, F.R.S.

In 1835 his Most Gracious Majesty King William IV. became the society's illustrious patron, and the society was thenceforth called "The Royal Cornwall Polytechnic"

Complimentary presentations of the silver medal of the society were made to the King, to Mr. Davies Gilbert, and to Mr. James Watt (son of the great engineer); the latter, with Dr. Davy, F.R.S., being also elected honorary members.

In 1836, their Royal Highnesses the Duchess of Kent and the Princess Victoria became patronesses of the institution.

From 1837, her Majesty Queen Victoria continued to be the society's revered and distinguished head, and H.R.H. the Duchess of Kent remained vice-patroness until her death.

In 1841, H.R.H. Prince Albert was elected vice-patron.

The Miners' Association was founded at Camborne on October 26, 1859. The scheme had its origin within the walls of the Polytechnic Hall, and was matured under the able superintendence of Mr. Hunt.

In 1863, H.R.H. the Prince of Wales became vice-patron.

In 1866, Dr. C. Le Neve Foster, B.A., F.G.S., was appointed secretary, and Mr. J. C. Stephens assistant secretary.

In 1869, Mr. Warington W. Smyth, F.R.S., presided at the annual meeting, ably treating, in his address, Cornish steam engines and the ventilation of mines.

The party then drove round the interesting and beautiful town, visiting the sub-tropical collection of plants in the grounds of "Rosehill," the residence of Mr. H. Fox.

After tea at Gyllyngdune Gardens, the party dispersed, fully charged with pleasant recollections.

For the photographs showing the works of the Falmouth Consolidated Limited and the power house at the St. Ives Consolidated Mines Limited we are indebted to Mr. S. J. Govier, Chacewater, Scorrier, R.S.O., and for that of the group on page 1 to Bennetts, of Camborne and Hayle. Those desirous of obtaining copies of these photographs or of many others typical of local mining conditions, from which those published were selected, should apply to the addresses named.

The Colliery Guardian Co. Ltd., 30 & 31, Furnival-st., Holborn, London, E.C.

Hutchinson, M.I.M.E., and Edgar C. Evans, B.Sc., A.I.C., was of an extremely important and interesting nature. The discussion will be continued at the next meeting of the institute. In order to suit the convenience of engineers in Swansea and district, the institute has decided to hold a certain number of its meetings at the western town. The first of the series will take place in September next.

On July 18 a meeting took place at the Home Office, Whitehall, of the Committee appointed to carry out the coaldust experiments at Eskmeals and the Advisory Committee. A programme was submitted to and approved by the meeting. The experiments are already in progress. A date was fixed for a visit by the Advisory Committee to inspect the works.

The negotiations which have been proceeding for many months for the acquisition, by Messrs. Furness, Withy and Co. Limited and Messrs. D. Davis and Sons Limited, of the share capital of Messrs. John Lancaster and Co. Limited (the Griffin-Nantyglo Collieries), have now been completed, and the last-named company is now under the control of the purchasers. Half of the capital has been bought by each of the purchasing companies.

A meeting of representatives of the Northumberland coalowners and the men was held in Newcastle last week for the purpose of considering the question of the weekly pays, with a view, it is stated, of arriving at some arrangement on the matter. The recent ballot of the men was in favour of weekly pays, but the validity of the ballot was questioned, it having been taken in many cases before the Mines Act became operative. The owners held that they must carry out the rules and regulations of the Home Office.

At a meeting of the South Staffordshire and Warwickshire Institute of Mining Engineers, held at Birmingham, an interesting discussion took place on Mr. Isaac Meachem's paper on the subject of the loss of mineral areas in the district. Mr. D. E. Parry said he did not take so serious a view of the position as the author. Although the output of the South Staffordshire district had seemed stationary for some years, he claimed that developments at Baggeridge, Holly Bank, Aldridge, and Walsall Wood ensured that for a great many years there would be a plentiful supply of coal to feed the industries of the district. There were untold coal resources on the other side of the eastern and western boundaries of the coalfields. Mr. O'Donahue's paper on "The Valuation of Mineral Property" also gave rise to a notable discussion.

The inquest on the 87 victims of the Cadeby Colliery disaster was concluded at Denaby on Wednesday. The Coroner intimated that a formal enquiry was to be held by the Home Office to investigate as far as possible the whole cause of the explosion and the working conditions generally in the South Yorkshire coalfield. Under the circumstances the proceedings were restricted as far as possible to questions of fact. The jury returned a verdict of "Accidental death caused by two explosions of gas in the colliery."

In the House of Commons, on Tuesday night, Mr. Lloyd George stated that the Government would in the near future introduce legislation for the settlement of trade disputes. The Prime Minister has since intimated that the Bill will be presented to Parliament next year as part of the Government's programme.

A meeting of the South Wales Conciliation Board was held at Cardiff on Monday to consider matters arising out of the minimum wage award for the coalfield. It was decided to appoint a joint committee to consider certain clauses in the award, including the clause dealing with the minimum standard rate of 4s. 7d. per day.

The executive of the Scottish Miners' Federation has decided to ask for a meeting of the Conciliation Board to deal with the question of weekly pays, and, further, that a meeting of the Minimum Wage Board should be convened for the purpose of getting a finding on several points which have arisen over the interpretation of the rules.

The New French Mining Law.

THE new Law which came into operation in French coalmines on February 25 last resembles our own new Coal Mines Act in being a thoroughly comprehensive document, embracing every branch of mining operations, and completely reorganising methods of working in accordance with the modern trend of industrial legislation. It is, in many respects, somewhat similar, in its general form, to the British Act, and nowhere is this similarity more marked than in the way in which certain difficulties have been left for the Minister to deal with subsequently by special decree. Some provisions have purposely been left vague, owing to the feeling of the Government that too rigid a rule would operate unequally under varying local conditions. This reluctance to lay down hard and fast limits is an excellent feature of the Decree, and shows a real appreciation of the difficulties inherent in coalmine legislation.

The Decree contains 233 articles, upon only a few of which will space permit of any comment in this column, but elsewhere we are able to give a more detailed review of its main provisions. There is, however, so much detail involved in these regulations that only by a perusal of the complete Decree can an adequate impression of its scope be obtained.

Work is forbidden, except in cases of absolute necessity, in any working places having a temperature of 35 degs. Cent. (95 degs. Fahr.) or higher, on the dry bulb thermometer, or 30 degs. Cent. (86 degs. Fahr.) on the wet bulb thermometer. The official view in France is that any temperature exceeding 25 degs. Cent. (77 degs. Fahr.) on the wet bulb thermometer must be considered high, and work under such conditions would be oppressive if the degree of humidity should also be considerable. The attention of inspectors is called to the desirability of taking a note of wet bulb temperatures higher than 25 degs. Cent., even although the Law does not allow intervention. This seems to foreshadow a turn of the screw on a future occasion where wet bulb readings prove to be excessive. A point to be noted in this connection, however, is that the French Government are apparently not disposed to rely solely upon the indications of the wet bulb thermometer.

Fiery mines are divided into two classes according to the quantity of firedamp present, the decision as to class being left to the inspectorate, the manager and a men's representative. Any gas percentage above 2 per cent. is regarded as dangerous in a working place. The return airway from any heading must not contain a higher gas percentage than 1·5, and any other return must not exceed 1 per cent. in gas content. The fiery mines of the first class are subject to more stringent requirements as to ventilation arrangements and inspection than those of the second class.

It is to be noted that no mention is made of the quality of the air with regard to the percentage of oxygen and carbon dioxide. Analyses of air will therefore be confined to firedamp indications as afforded by approved lamps of the Chesneau type. The question of carbon dioxide percentage is sufficiently covered by the general provision that the ventilation must be adequate from the point of view of health, and upon the inspectors is placed the responsibility of seeing that enough air arrives at the face *pour en assainir l'atmosphère.* On the whole we think this is preferable to a hard-and-fast rule as to the percentage composition of the air, which cannot fail to give trouble in practice. The main objection is that it throws a great deal upon the inspectorate, which has also other responsibilities of no light weight under these regulations.

As regards dust, coalmines are divided by the Decree into three classes, and the class into which any mine is placed is decided locally in each case. It is recognised, as a direct result of the Liévin tests, that the main factors which determine the degree of danger of coaldust are its volatile constituents, its ash, and its fineness of subdivision. When a mine contains dust of a quality such as can be ignited by an unstemmed shot, it is placed in the first category. If the dust proves to be unable to be ignited it is placed in the third category, which leaves the second category for all mines falling between these two extremes. One advantage of this classification is that the position of any mine is apparently able to be determined by the results shown in the testing gallery; but, as the Minister points out in his explanatory circular, secondary considerations, such as the quantity of dust present in the mine, the size of the roadways, the degree of humidity and the proportion of firedamp present in the ventilation currents, are not to be ignored. Thus there is room for differences of opinion as to the class into which any particular mine should be placed, but apparently, in case of dispute, the final decision is to rest upon the Liévin tests. It is a matter of some importance, because mines of the first and second class are placed under certain ventilation requirements, and those of the first class are also restricted to the use of trucks with closed sides, and these have to be watered before travelling along the main haulage roads.

Surface electric installations are divided into two categories, according to their voltages. In the first of these are placed continuous-current machines worked by currents of less than 600 volts, and alternating-current machines not exceeding 150 volts. Any machines exceeding these limits belong to the second category. In the case of the latter, greater restrictions are imposed. Underground electric haulage on the higher pressures is not permitted except by special permission, nor may such currents be used for shotfiring. In mines subject to sudden outbursts of gas, the employment of electricity is forbidden except in the case of portable safety lamps and shotfiring apparatus. In other fiery mines electric installations are only permitted in the intake, and in certain other parts of the mine in the path of direct ventilation from the intake. By special permission armoured cables may be placed in the return airways in pits of the less fiery class. Telegraph and telephone communication are permissible in all parts of a fiery mine, where gas inspection made at least once a day shows a percentage of gas of not more than 0·4; but only under stringent conditions respecting conductors, and in every case all such communication must be suspended when more than 0·75 per cent. of firedamp is indicated.

Careful attention is paid to hygiene in the pit. Amongst other things, drinking water is to be available below ground. Sanitary measures are enjoined, and both ambulance and surgical appliances have to be provided in specified cases.

Mining plans are required to be on a scale of $\frac{1}{1000}$, and general plans of the workings on a scale of $\frac{1}{2500}$ or $\frac{1}{5000}$ upon transparent paper are to be used in conjunction with surface plans of the same scale. The French mining plans will, therefore, be on a larger scale than our own, unless English colliery owners elect to adopt the same simple fraction. This is a point worth consideration. Map scales are amongst those things which are most conveniently arranged upon an international basis, but we fear British surveyors are too much tied to our units of measurement to render agreement easy upon this point.

On the whole, the new French regulations are admirably expressed, and seem remarkably clear and free from ambiguity.

The New King's Dock.

We are a maritime people, and in honour of that fact, most of our docks have been opened by royalty. The number of King's Docks is a testimony. The visit of the King and Queen to Immingham, however, was invested with a higher interest than that which surrounds a royal progress at other times, for it was the consummation of the personal investigation of the coal trade which King George and Queen Mary have carried out during the past few weeks.

It would be impossible for great collieries to be opened, or employment to be provided for thousands of workmen, were it not for a sagacious development of the facilities for distribution. This is a primary duty imposed upon the common carrier, but the Great Central Railway Company at Immingham have gone far beyond their mere statutory obligations, and they deserve the encouragement of the trading community in consequence.

Those who saw the wastes from which the magnificent dock was cut may find it difficult to admit the statement that the proprietors have been singularly favoured by Nature; but any obstacles that have had to be faced in the construction must be amply redeemed by the geographical advantages of the site. Here the largest vessels may safely seek a safe harbourage under their own steam; there is no port so favourably situated with regard to the great industrial centres of Northern Europe, and in the hinterland is a coalfield which in the years approaching must contribute an increasing proportion to the national output.

But, even where facts are so plainly demonstrative, it is not always easy to induce capitalists to invest in such undertakings, and we should give all the more credit to the Great Central Company when we contrast with their policy of enterprise the pusillanimity of their neighbours on the other side of the Humber. Much of the trade that will now almost automatically flow through the gates of Immingham would undoubtedly have gone to the joint dock at Hull—had the promoters of that undertaking shown any desire to fulfil their pledges and consult their own interests.

We wish to add our congratulations to Sir Sam Fay, the general manager of the Great Central Railway, on his well-deserved honour.

Trade Summary.

The London coal trade continues exceedingly dull. House coals are accumulating at all the large marshalling centres, and merchants have great difficulty in dealing with the loaded wagons *en route*. Colliery stocks also are very heavy. Prices, however, are firm, and although London merchants are holding off from buying, all pit prices are strongly maintained. Renewals of contracts are steadily proceeding. Small nuts and slacks have slightly lowered in price, and the demand is not so strong. Manufacturing qualities are selling freely.

Business at Newcastle has been very dull, especially for prompt shipment, owing largely to shortage of tonnage. Steam coals are cheaper. Gas coals are firm, as are bunkers. Coking coals are the turn lower, and coke is also weaker.

The Durham coal trade is quieter, and both steam and gas coals are being offered somewhat more freely. Secondary gas coals, however, are fairly firm, notwithstanding. The contract enquiry is satisfactory. Coking coals are firm, and the demand for coke is fairly steady.

The Lancashire house coal trade continues quiet, with no change in list prices. The demand for forge and furnace coals is strong, and bunker requirements on contract account are substantial. Slack continues scarce.

In West Yorkshire there is a somewhat improved demand for house coal, and all classes of steam-raising fuel sell readily. Gas coal supplies are short.

The South Yorkshire export trade is vigorous, and home consumers are taking good supplies. Small coals are scarce. The demand for house coal is fairly good. Coke is in strong request.

The business in Derbyshire house coal is of a steady character. The market for manufacturing fuel is in a very satisfactory position.

The market at Cardiff is dull, tonnage being scarce, and buyers inductable. Sellers, however, are not unhopeful as to the future. Small coals are strong. Monmouthshire coals are fairly steady. Bituminous coals are unchanged. Exports of patent fuel have been heavy.

The Scottish coal trade has been quiet owing to the trade holidays.

LABOUR AND WAGES.

North of England.

A meeting of the committee of the Northumberland Miners' Association was held at the Burt Hall, Newcastle, on the 22nd inst., to consider the Explosives Order under the new Mines Act. The subject has already received the consideration of both the owners' and the men's sides. Already an application has been made to the Home Office, asking that a deputation from Northumberland should be heard on the question, but no arrangement for receiving a deputation has yet been come to.

A meeting of representatives of the Northumberland coalowners and representatives of the miners was held on the 18th inst. at the Coal Trade Office, Newcastle, for the purpose of considering the question of the weekly pays, with a view, it is stated, of arriving at some arrangement on the matter. The recent ballot of the men was in favour of weekly pays, but the validity of the ballot was questioned, it having been taken in many cases before the Mines Act became operative. Mr. Wm. Straker put the men's side of the case, and asked that the ballot already taken by the workmen should be accepted. The owners could not agree to this, and held that they must carry out the rules and regulations of the Home Office. Whether there will have to be a ballot vote or not will have to be ascertained according to the rules and regulations.

The votes from the lodges on the new management proposals for the future control of the Northumberland Miners' Association have now been counted, and the result shows that by an overwhelming majority the county favours the new scheme. A number of the union committees will accordingly be abolished, and the association will elect only two committees—viz., a committee of management and a wages committee.

A council meeting of the Durham Miners' Association was held on Saturday, Mr. W. House presiding over a full attendance of delegates. The principal business was the consideration of the Minimum Wage Act, and the rules of Sir Robert Romer affecting the Act in Durham. Several resolutions were moved demanding the amendment of the rules in various particulars, and all these resolutions were carried.

The forty-ninth annual gala of the Northumberland miners was held at Tynemouth on Saturday. Amongst the speakers on the two platforms were:—Mr. J. M. Robertson, M.P., Mr. Ramsay MacDonald, M.P., Mr. John Cairns, Mr. Philip Snowden, M.P., Mr. Robert Smillie and Mr. Charles Fenwick, M.P. Mr. Cairns, in his address, said though they had the principle recognised, the Minimum Wage Act was not altogether satisfactory. But they would proceed leisurely and slowly before entering a strike again. A strike, after all, was a great luxury. It had cost the men of Northumberland £197,000 in two and a-quarter years, or £4 10s. per man for strikes. Lord Mersey's award was not altogether satisfactory. If any of them had been in Lord Mersey's place they could have done no better. Mr. Robt. Smillie referred to the recent catastrophe at Cadeby, and said there might be a danger that they had been depending too much on life-saving apparatus underground. Where 58 lives had been sacrificed in order to endeavour to save at Cadeby some of the 30 men, whom in all probability were past saving before that attempt was made, was a very serious matter indeed. It was a question that would require to be fully dealt with at the forthcoming enquiry as to whether, unless there was some assurance given that human lives could be saved, brave fellows should be called upon to risk their lives merely for property saving underground.—Mr. Fenwick said he entirely disagreed with those who preached the doctrine that if they stopped the railways and the mines they would bring the whole country to a standstill. Society would always protect itself against measures of that kind. Arbitration and conciliation were things they would have to keep steadily in mind, and the sooner they reconstituted their Conciliation Board in this country the better. Their joint committee and their Conciliation Board had been two of the best things they had had as miners in Northumberland.

A circular has been issued to members of the Northumberland Miners' Association with respect to the weekly pays question. The executive state that, after a full discussion with the coalowners and the consideration of proposals and counter proposals, the following agreement has been come to:—The pits are, as before, to work 11 days a fortnight; pays are to be made in alternate weeks on Fridays and Saturdays, the pay to be made up to the previous week-end. Where the manager desires it, off-takes are to be deducted fortnightly, and the Home Office regulations are to be observed. It is explained that while the Owners' Association would not accept the ballot already taken, no objection is made to individual managers doing so. Where managers do not accept the ballot taken, a lodge meeting must be called, and if large the manager may accept its expression of opinion. In that case there must be a reasonable time given to prepare for weekly pays, as otherwise the manager might insist on a ballot to gain time, and that would occupy six weeks.

At Durham, on the 17th inst., John Morris was summoned by the Charlaw and Sacriston Coal Company for payment of 7s. 6d. damages for wrongfully absenting himself from work. It was explained that 64 workmen had been summoned, and the present was a test case. Counsel said that as far as he could gather the reason the men absented themselves was no reason at all, but he understood it had something to do with the minimum wage. There had been a dispute at the colliery with reference to a man called Johnson, and in accordance with the practice, on the morning of June 21 the owners' representatives met the miners' representatives and agreed to an umpire being appointed to decide Johnson's case. No one anticipated any trouble, and the shift which these men comprised was to have gone down about a quarter to three o'clock. A few minutes before this Mr. Noble, the manager, received a telephone message from the checkweighman to say that the men were not going down the mine unless Johnson's wages were paid. As a matter of fact, although it had nothing to do with the case, the umpire decided against Johnson. The men by refusing to go to work consequently broke their contract. The magistrates ordered the defendants, with the exception of five of them (who produced doctor's certificates) to pay the damages, 7s. 6d. each.

Federated Area.

Mr. W. Carter, assistant secretary of the Notts Miners' Association, gave an address on the minimum wage award for Notts, at the half-yearly meeting of the Bulwell section of the men employed at Broxtowe pit at the Albert-street schools, Nottingham, on Saturday, July 20. Having explained the figures and application of the award, Mr. Carter referred to Table B, which he considered very unsatisfactory as compared with the hard coal table. The rates for both holers and datallers were a great deal lower in the table for other than Top Hard pits than the table for Top Hard pits, and there were seven classes of workers who were not given 5s., which could hardly be considered a living wage, as promised by the Premier. Representatives were appointed to the local committee, which is working to obtain redress of these and other grievances.—Speaking on the minimum wage award at a meeting of Brierley Hill miners at Sutton-in-Ashfield, Mr. G. A. Spencer, president of the Notts Miners' Association and a member of the Board for Notts, explained the various safeguards in the award and also the methods for settling differences. He directed attention to the fact that in abnormal places stallmen must in all cases pay their daymen the prevailing rates and not merely the rates existing under the award. In such cases men would be entitled to their old wages where these were in excess of the amount named in the award.

At the Rotherham West Riding Police-court, on the

22nd inst., David Walsh, Fred Fretwell, Albert Hemmingway, Fred Roberts, and John William Spinks, employed at Roundwood Colliery, were summoned under the Employers and Workmen's Act by the Dalton Main Colliery Company Limited for breach of contract, the company claiming 5s. damages in respect of each defendant. Mr. W. M. Gichard, who prosecuted, explained that on July 12 a man was fatally injured in the pit and died the same day at the Rotherham Hospital. The pit was opened for work on the following day, but only one man, for whom the deceased man had acted as trammer, went down the pit. In all 240 men stayed away from work without any permission having been given them to do so. The company had only prosecuted the five defendants in order to save the great expense that would have been incurred if the whole of the men had been summoned. There had been a custom at several collieries in South Yorkshire that when a man was killed, or actually died, in the pit, the men employed there should suspend work for 24 hours. This had on many occasions been put into practice, but the company had never admitted that the men were entitled to cease work. It might be suggested that it had become a custom or usage, and, therefore, become part of the contract of service; but if that were so it would not apply in this particular instance, as death did not take place in the pit.—The chairman (Mr. E. Hoee) said the magistrates thought the men had been under the impression that they had a perfect right to stay away from work because of the accident that had occurred, but they thought it was a wrong impression. They had decided, therefore, to assess the damages as 1s. in each case, each defendant having also to pay 5s. 6d. costs.

A case arising out of the dispute at the Sneyd Colliery, Burslem, where nearly 2,000 men and boys are idle owing to a strike of surface workers, was heard at the Hanley Stipendiary Court on the 22nd inst., when Thomas Clewes, banksman, employed at the pit, was charged with intimidation. The case was adjourned until next Tuesday, bail being allowed in the sum of £20. A statement on behalf of the Sneyd Colliery Company states that the strike is the result of a demand made by the Navvies' Union for an all-round increase of 6d. a day to banksmen, irrespective of the wages now paid. The statement says the Navvies' Union has never before attempted to interfere with colliery labour, and now Sneyd is the only colliery in the district where it has sought to obtain a footing. Out of nearly 2,000 men employed at the colliery, less than 200 are banksmen, and only a portion of them have recently been persuaded to subscribe to the Navvies' Union. The colliery company has declined to recognise the Navvies' Union, which has no more claim to represent colliery labour than have the shipbuilders' or railwaymen's unions. The colliery company has offered, provided the men first return to work, to meet either a deputation of the Sneyd men or accredited representatives of the Miners' Union, and to discuss frankly any alleged grievance.

A South Lancashire correspondent says many miners in the Manchester district are now breaking away from their unions and forming organisations of their own. During the last few weeks close upon 1,000 men and youths have left the ranks of the Pendlebury and Clifton Miners' Association, which is affiliated with the Lancashire Miners' Federation, and formed a separate union of their own. Similar secessions of miners (on a smaller scale) are reported from various parts of the Lancashire coalfields.

For some time the pit boys of Bentley Colliery, Doncaster, have complained of grievances, and one day last week they brought matters to a head by declining to go down the pit. Their complaints were they were not paid the wages of neighbouring collieries, had no "snap time" on Saturdays and were not properly treated by the under officials. The management refused to consider any question until the boys returned to the pit and enabled work to be resumed, and this they did. A deputation was then received, when a definite promise was made regarding snap time, and arrangements made for a price list to be drawn up and submitted to the management at a later date.

Mr. J. T. Todd, the general manager of the Blackwell Colliery Company, recently received a deputation from the workmen to discuss the conditions and the payment of the minimum wage. The question of back pay was also discussed. Mr. Todd laid it down that in any calculation of the minimum wage for contractors such calculation must be based upon the minimum rates of every man in the stall, ignoring absolutely the prevailing rates paid to the daymen by the contractor. Such a calculation thus placed the onus on the contractor of paying any difference between his men's minimum rates and the prevailing district rates. The deputation pointed out that they had been advised that if the contractors paid full day rates to their workmen they could claim anything short of their minimum from the owners. Mr. Todd said the contractors had no right to pay the prevailing rates if the contractors' rate as a result fell below the minimum. The miners would take the total earnings in a stall, and if there was sufficient to pay the minimum rate to each man as specified by the Act, the management would acknowledge no further liability. He would pay every claim where the men proved they were entitled to it.

Over 1,000 miners connected with Wollaton Collieries, Nottingham, have been rendered idle throughout the week, owing to a strike of pit lads, who alleged they had not, in many cases, been paid the proper rate of wages. Upon a promise of grievances being adjusted, the officials of the county association urged the lads to resume operations on the 19th inst., and it was understood they would do so. The men, who had been forced into the position of unwilling inactivity, attended for the purpose of continuing work, but at the last moment a determined feeling was again manifested, the strikers refusing to descend, and the men having to return home.

The North Staffordshire Miners' Federation adopted a resolution on Wednesday at Stoke-on-Trent, calling on the Labour Party to arrange for a general stoppage of miners, railwaymen, and other workers, in the event of the Government not taking effective measures to bring about an honourable settlement of the London dockers' dispute.

Bristol and Somerset.

Resolutions were passed at a recent delegate meeting of the Bristol miners held at Kingswood, expressing disagreement with the award given on the 12th inst. by Alderman George Pearson, chairman for the Bristol district under the Coal Mines (Minimum Wage) Act, 1912, in the degree that:—(1) Its tendency will lie to further reduce in the future the wages of a large section of the workmen employed in the Bristol pits; (2) because the award does not take into account any increase in the price of coal by increasing in proportion the minimum wage paid over the coalfields prior to the award being given; (3) because in the fixing of the minimum wage for the pieceworkers due force has not been given to the language contained in section 2, subsection (1) of the Act. It is contended that the process by which the average daily wage should have been obtained under the Act was by taking the sum total of money earned by each section of pieceworkers over a fixed period, and dividing this sum total of money by the sum total of turns worked for which such money was paid, thus finding for the various sections of pieceworkers the average daily wage to be awarded.

Despite the minimum wage settlement, there is at present a great feeling of unrest in the Somerset coalfield, and on the 18th inst. the men and boys employed at the Bromley Pit came out on strike. The colliery in question is situated in the parish of Stonton Drew, and is owned by the Pensford and Bromley Collieries Company. One of the veerers at the pit—who are paid on tonnage—it is stated, asked the head manager for some extra pay in consequence of additional work which it is said had been placed upon him. It is alleged that not only did the manager refuse his request, but he discharged him from the works. The other veerers at the pit considered he had been unjustly dealt with, and, in sympathy with their work-mate, they refused to remain at work until he had been reinstated.

Scotland.

At Hamilton Sheriff Court, on the 18th inst., William Whiskers, jun., Holmes-street, Hamilton, pleaded guilty to the charge of having, on June 17, at No. 1 Pit, Greenfield Colliery, Hamilton, uttered as genuine a copy of his birth certificate, on which he had substituted "1896" for "1897," thus pretending that he was 15 years of age, and obtaining from the company 3s. 3d. per day instead of 2s. 7d. This was the first case under the Coal Mines (Minimum Wage) Act, 1912. Sheriff Shennan imposed a penalty of 30s., and gave the boy's father a fortnight to pay the fine.

About 400 miners employed in the pits of Messrs. Kenneth and Sons, at Shewalton and Montgomeriefield, near Dreghorn, who went on strike a fortnight ago, are still idle, and have again asserted their intention to remain on strike until their demands have been conceded by their employers. Their grievance, they state, is that about 20 men who, since the recent general strike have refused to pay union fees, are employed in these pits. These 20 men are still at work in the pits.

A meeting of the executive of the Scottish Miners' Federation was held in Glasgow on the 19th inst., Mr. Robert Smillie in the chair. At the close of the meeting it was officially stated that a long discussion took place on the question of the difficulties which had arisen over the working of the Minimum Wage Act, and it was agreed to ask for a meeting of the Scottish Coal Trade Conciliation Board to deal with the whole question of weekly pays. It was further decided that Sheriff Mackenzie should be requested to convene a meeting of the Minimum Wage Board for the purpose of getting a finding on several points which have arisen over the interpretation of the rules. Intimation was made of the new Explosives Order issued by the Home Office making it compulsory that in blasting in naked light mines a certain class of fuse with an igniter attached must be used in future. This, it was stated, had created considerable dissatisfaction among Scottish miners, and the executive resolved to put the matter before the Home Office with a view to securing exemption from certain clauses of the new Order.

The Iron, Steel, and Engineering Trades.

The Secretary of the Midland Iron and Steel Wages Board, has issued a circular to the members of the Board stating that at the meeting of the standing joint committee, on the 15th inst., the following agreement was arrived at:—"That a bonus be given to puddlers of 6d. per ton, and that the hours of work for a puddling furnace be considered 11 hours for six heats and 9½ hours for Saturdays, on the weekly average, but that in the case of general excess of this time the operatives may bring forward such case for the consideration of the standing committee; this bonus to come into operation from August 5, the date of next ascertainment. That the notice to terminate the sliding scale, dated June 2, 1912, is withdrawn as from this date." The Board controls wages in Staffordshire, Worcestershire, Shropshire, South Wales, Lancashire, and Yorkshire. The men applied for a wage of not less than 10s. per ton for puddling, and a working day of not more than 10 hours. The present rate of pay is 9s. 3d. per ton, so that the decision arrived at will bring it up to 9s. 9d., although it is not unlikely that the automatic action of the sliding scale, which is based on selling prices, will give the men an advance of another 3d., making the wages 10s.—on the Birmingham Iron Exchange yesterday general satisfaction was expressed at the settlement. One effect will be to increase the cost of production, and an early advance in selling prices may be anticipated.

CONTINENTAL MINING NOTES.

Austria.

Austrian Coal Production during the First Six Months of 1912.—Total output, coal, 7,718,524 tons (7,217,717 tons in 1911); briquettes, 83,043 tons (73,167 tons); coke, 1,115,561 tons (1,026,232 tons). To the coal output, the Ostrau-Karwin district contributed 4,274,629 tons (3,989,842 tons), Kladno 1,374,260 tons (1,331,503 tons), Pilsen 651,837 tons (626,497 tons), Galicia 909,088 tons (769,049 tons), and the remaining districts 508,710 tons (500,826 tons). The bulk of the coke, viz., 1,078,721 tons, was produced in the Ostrau-Karwin district. The total production of lignite during the same period was: Coal 12,747,064 tons (12,593,732 tons), briquettes 116,138 tons (100,228 tons), of which the Brüx-Teplitz-Komotau district contributed 8,549,527 tons (8,579,450 tons) of coal, and 1,711 tons (2,767 tons) of briquettes; the Falkenau-Elbogen-Karlsbad district, 1,901,454 tons (1,846,348 tons) of coal, and 112,238 tons (96,997 tons) of briquettes; Leoben and Fohnsdorf, 513,780 tons (480,224 tons) of coal; and the other districts 1,782,303 tons (1,678,710 tons) of coal.

Belgium.

The Coke Syndicate has fixed 23 fr. as the price of ordinary coke, and 28 fr. as that of half-washed coke during the third quarter of the year—advances of 1½ fr. and 2½ fr. respectively.

The following shows exports and imports in the first half of the year:—

	Imports.		Exports.	
	1912. Tons.	1911. Tons.	1912. Tons.	1911. Tons.
Coal	3,834,851	3,696,581	2,452,953	2,585,883
Coke	454,372	331,466	463,408	501,187
Briquettes	201,295	165,236	338,828	251,983

During the first five months of 1912 Belgium imported 1,875,506 tons of coal from Germany and 601,978 tons from France, as against 1,774,935 tons and 353,139 tons respectively in the corresponding period of 1911. On the other hand, imports from Great Britain fell from 897,916 tons to 556,643 tons.

France.

In accordance with the price of Cleveland *g.m.b.* and the prices realised in the Belgian railway contracts, the price of blastfurnace coke has been fixed at 22 fr. 99 c. during the third quarter of the year.

The Eight Hours Law.—The Senatorial Commission on Labour in Mines have received a deputation from the Comité Central des Houillères de France, for the purpose of emphasising once again the dangerous consequences of the restrictive regulation of the liberty of labour on the elasticity of production, the cost of production, and the earnings and safety of the workmen. They urged especially the necessity of preserving as between the hauliers and the hewers the distinction not in the effective duration of work, but in the presence below ground, which corresponds with the conditions and the exigencies of working; the necessity of observing latitude in the exemption of officials, &c.; the necessity of making the regulations as elastic as possible and avoiding by too great a regard for formula the danger of precipitation in winding; and the necessity of providing liberal exceptions to allow for the exigencies of a constantly growing consumption.

Exports and Imports of Fuel.—The following table shows the returns of import and export during the first five months of 1912 and 1911:—

Imports.

	1912. Tons.		1911. Tons.
Coal—			
England	3,011,300	...	3,988,400
Belgium	1,297,600	...	1,638,200
Germany	1,298,800	...	1,217,800
Other countries	100,400	...	99,400
Totals	5,708,100	...	6,943,800
Coke—			
Belgium	152,000	...	213,300
Germany	912,000	...	796,200
Other countries	22,400	...	17,500
Totals	1,086,500	...	1,027,000
Briquettes—			
England	39,500	...	50,200
Belgium	275,000	...	347,400
Germany	92,200	...	45,500
Other countries	40,600	...	56,000
Totals	447,900	...	499,100

Exports.

	1912. Tons.		1911. Tons.
Coal—			
Belgium	577,913	...	346,052
Switzerland	77,725	...	80,475
Germany	1,907	...	1,627
Spain	25,662	...	11,742
Other countries	122,468	...	40,545
Shipped as bunkers { French	59,718	...	39,375
Shipped as bunkers { foreign	92,307	...	18,321
Totals	957,700	...	538,137
Coke—			
Switzerland	16,844	...	21,546
Italy	16 687	...	12,118
Other countries	34,147	...	31,954
Totals	67,618	...	65,618
Briquettes—			
Switzerland	16,681	...	14,618
Other countries	27,956	...	10,169
Shipped as bunkers { French	38,435	...	24,328
Shipped as bunkers { foreign	4,590	...	60
Totals	87,662	...	49,175

Germany.

Hamburg Coal Imports.—Mr. H. W. Heidmann, of Hamburg, writes as follows:—The imports of coal into Hamburg have been in June:—

From	1912. Tons.		1911. Tons.
Northumberland and Durham	354,668	...	221,545
Yorkshire, Derbyshire, &c.	60,037	...	50,562
Scotland	133,228	...	114,416
Wales	6,297	...	9,040
Coke	697	...	37
Total	554,927	...	395,600

Ruhr Coal Market.—The situation remains practically unchanged, the active demand for industrial coals, especially by the ironworks, being undiminished; and the deliveries of gas and open-burning gas coal are also very large. In spite of the renewed English competition, the export trade does not appear to suffer; and, on the other hand, large consignments are going forward to South Germany, where, although new sales are very small, demands for delivery under contract are heavy, particularly by the iron industry. In the coke market the previous unsatisfactory ratio between output and consumption is maintained, and it seems not improbable that the Syndicate will have to increase the restrictions on production.

Coal Market in Upper Silesia.—Owing to the scarcity of labour, the traffic returns for the early part of the month show a slight decline in comparison with last month. Notwithstanding this, the situation keeps very satisfactory, the deliveries of industrial coals having attained record height; and in view of the strong position of the iron industry, no falling off is anticipated. A revival is becoming apparent in the house coal trade, dealers being afraid of running short if they delay placing their orders until the rush of autumn trade sets in. Gas coal and coking coal both go off well, the condition of the river favouring shipment. Exports to Russian-Poland are increasing, and Austria-Hungary is taking large consignments. On the other hand, English competition is affecting the trade with northern Germany and Berlin. The coke market is in good trim, both blastfurnace and foundry coke being taken as fast as produced, and no extensive quantities of other grades having to be stocked.

THE LONDON COAL TRADE.

Thursday, July 25.

The London coal trade for the past week has shown a very serious slump in all departments of the wholesale trade. House coals are entirely neglected and the hot weather has completely cut off all public orders for the time being. Many of the merchants complain that the depot trade has altogether ceased and that they have very great difficulty in unloading the wagons coming forward from day to day, especially as the stacking ground has become filled to its utmost capacity and all the great centres of the marshalling junctions are becoming congested. The most difficult month, however, of the whole year is now rapidly drawing to its close, and with the turn of August, with its limited output and repeated interruption, the house coal trade begins to gradually turn the corner and the demand usually increases. The attendance on the market has not been very large during the week, and on Wednesday it was noticeably small, the business done was also of very small dimensions and the merchants are evidently holding out as long as possible before ordering any further consignments. Meanwhile stocks are accumulating at the colliery end to an alarming extent and also on the main roads to the metropolis. Wagon owners are also finding their own rolling stock is bringing forward more than they can conveniently deal with, and are therefore exceedingly keen on having the coal placed before siding rent begins to accrue. The manufacturing market has been more active and the demand is better sustained, but considerable difficulty is met with in maintaining the present advanced prices. The difficulties on the river still prevent seaborne qualities from being definitely offered, and although Durham and Yorkshire coals are coming forward the quoted prices still remain nominal. It is, however, fully understood that the quantity coming forward is a gradually increasing one, and that the tugs and barges on the river are being moved about with greater freedom and regularity, although so many of the watermen remain out on strike. The demand for small nuts and slacks has shown a marked falling off, and prices have slightly reduced. This, however, is looked upon as a temporary matter, for with the lessened output of large coal during August, and the consequent diminishment of the slacks and small nuts available, the demand is confidently looked upon as being likely to increase rather than recede. Gas coals by water are coming forward freely now, and the orders for railway-borne coal has fallen to its normal level. Since Monday nine cargoes are scheduled as entering the River Thames. On Monday, a large number of the principal London merchants, particularly those interested in shipping, travelled down to Grimsby and Hull to be present at the opening ceremony of the new Immingham Docks on the Great Central Railway. The new docks will afford accommodation for dealing with 11,600 wagons, and the eight coal hoists are capable of dealing with 700 tons of coal per hour, so that the heavy congestions and serious delays to steamers in the Humber ports for the past few autumns ought now to be considerably relieved. The Port of London Authority have adopted two very important schemes for the extension of the London Docks. Some additional work is at present in progress at the South Albert Dock, but these new schemes are in addition to that. The Port Authority have accepted a tender of £200,394 for extensions at the East India Dock, increasing the depth and improving the accessibility—a total of 32 acres of water within 3 miles of the City of London will soon be at the service of the largest class of steamers. The Tilbury Dock is also being extended, and an additional 1,480 ft. of quay made available. This work is to be put in hand at once, at a cost of £240,000. These extensive alterations and improvements are forming part of the scheme foreshadowed by the Port of London Authority some months ago.

THE BY-PRODUCTS TRADE.

Tar products:—The market, as a whole, is steady. Pitch and benzols are perhaps the strongest products, though carbolics are firm at the recent advance for crude. Naphthas and creosote are steady, the latter being on the upward grade. Nearest closing values are:—

Benzols, 90's, 11½d.; ditto 50's, 10½d.; toluol, 10½d.; carbolic acid, crude (60 per cent.), 2s. 6d. to 2s. 7d.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 11d., as in quality and package; crude ditto, 4½d. in bulk; creosote, 3d. for ordinary qualities; pitch, 52s. 6d. to 53s. 6d. f.o.b. east coast; ditto, 53s. to 54s. 6d. f.a.s. west coast; ditto, 57s. 6d. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—Business is very quiet, as is natural at this time of the year, and buyers are trying to make the most of the position, but prices keep wonderfully steady, especially for forward delivery and producers seem content to bide their time, which is hardly surprising to the introspective. Closing prompt prices are:—

London (ordinary makes), £13 7s. 6d.; Beckton, £14; Liverpool, £14 5s. to £14 6s. 3d.; Hull, £14 5s.; Scotch ports, £14 7s. 6d.; nitrate of soda (ordinary), 11s. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

We regret to announce the death of Mr. William E. Teale at his residence, Sindsley House, Swinton, on the 14th inst., at the age of 69. Mr. Teale was a son of Dr. Teale, of Salford, and at an early age devoted his energies to the improvement of safety lamps for use in mines. He was the inventor and patentee of the "Protector" and other safety lamps, and was well known amongst colliery owners and managers in all parts of the country.

Our readers will be interested to hear that Messrs. Marple and Gillott Limited, of Sheffield, Newcastle, Birmingham, &c., have now opened an extension of their business in London. The London branch, which is situated at Sufferance Wharf, Woolwich, S.E., will be under the supervision of Mr. Ernest W. Moseley. We learn that Mr. Moseley is now ready to receive enquiries from all who have scrap iron, steel, rails, metals, machinery or works for dismantling, and that all commissions will receive his prompt and personal attention.

THE SCOTCH COAL AND IRON TRADES.

Thursday, July 25.

Glasgow and Lanarkshire.

COAL.

The volume of business in the coal trade of this district has been greatly reduced by holidays. At the time of writing, however, the holidays are at an end, and the coal markets are assuming a healthy briskness. The past week's shipments from Scottish ports amounted to 222,799 tons, compared with 373,741 in the preceding week and 221,411 in the corresponding week of last year. The previous week's heavy figures, of course, occurred in anticipation of the holidays, while the past week's returns, it will be noticed, are almost identical with those of the holiday time a year ago. The reduction in business in consequence of the holidays was probably more decided in Glasgow than in any other district, and the foreign shipments were specially meagre. The quantity despatched abroad from Glasgow was 14,469 tons, and the coastwise shipments 25,687, the total of 40,156 tons comparing with 86,684 in the preceding week and 41,647 in the corresponding week of last year. There has been a scarcity of coal tonnage, but as the tendency in the freight market has not been so strong, it is expected that an increased number of vessels will soon be available. The demand for shipment in the last few days has been increasing. Prices are well maintained, and the quotations f.o.b. at Glasgow are for steam coal 11s. to 11s. 6d., ell 11s. 6d. to 11s. 9d., splint 12s. to 12s. 6d., treble nuts 12s. 3d. to 12s. 6d., doubles 12s. to 12s. 3d., and singles 11s. 6d. to 12s. per ton. The demand for hard coal for furnace use is very strong, owing to the resumption of work this week by manufacturing consumers. The quantities called for at iron and steelworks, foundries and engineering works, &c., are very heavy, and the activity thus occasioned serves to make up for the lack of business in the household department due to the fine weather.

IRON.

The Glasgow iron market has been strong since last report, with higher prices. The demand for Cleveland iron, both for home use and export, is such that stocks continue to be reduced, notwithstanding increasing outputs, and the prospects of business are highly encouraging. Since last report Cleveland warrants have sold from 57s. 1½d. to 58s. 4d. cash, 57s. 5d. to 58s. 7d. one month, and 57s. 11d. to 59s. 3d. three months. Business has also been done at 57s. 8d. for delivery in 24 days. Hæmatite has been quiet, but firm in price. The output of Scotch pig iron has been increased by the addition of two furnaces, and there are now 87 furnaces in blast compared with 79 at this time last year. The demand for pig iron has been active, and prices are again advanced, in some cases from 6d. to 1s. 6d. per ton. The quotations f.a.s. at Glasgow are, for Monkland No. 1, 68s., No. 3, 66s. 6d.; Carnbroe, No. 1, 70s. 6d., No. 3, 66s. 6d.; Summerlee, No. 1, 73s. 6d., No. 3, 69s. 6d.; Calder, No. 1, 74s., No. 3, 69s.; Clyde and Langloan, Nos. 1, 74s. 6d., Nos. 3, 69s. 6d.; Gartsherrie, No. 1, 75s., Nos. 3, 70s.; Coltness, No. 1, 90s. 6d., No. 3, 70s. 6d.; Eglinton at Ardrossan or Troon, No. 1, 66s. 6d., No. 3, 65s. 6d.; Glengarnock, at Ardrossan, No. 1, 75s., No. 3, 70s.; Dalmellington, at Ayr, No. 1, 68s., No. 3, 66s.; Shotts, at Leith, No. 1, 74s. 6d., No. 3, 69s. 6d.; Carron, at Grangemouth, No. 1, 75s., No. 3, 70s. per ton. The shipments of pig iron from Scottish ports in the past week were 2,189 tons foreign and 4,180 coastwise, the total of 6,369 tons showing an increase of 122 tons over the quantity despatched in the corresponding week of last year. The arrivals at Grangemouth of pig iron from Middlesbrough and district were 5,103 tons, being 202 tons less than in the corresponding week. In the early part of the week comparatively little work was done in the finished iron and steel trades, furnaces and mills being only starting after the holidays, but the works are now running to their full capacity, and the orders in hand will suffice to keep them busy for some time. There is no lack of fresh enquiry, but business has been difficult to arrange owing to advancing prices.

Renfrew, Ayr and Dumbarton.

COAL.

The coal trade has been more active in the inland branches owing to the extra demand in Greenock and Port Glasgow districts after the holidays. In the last few days there has also been more enquiry in Dumbartonshire for coal for manufacturing purposes. Trade is fairly active throughout Ayrshire. The foreign shipments have been moderate, amounting to 4,310 tons, while the coastwise shipments reached 28,154 tons. At Bowling 345 tons were shipped, Irvine 1,330, Greenock 2,235, Ardrossan 3,052, Troon 8,029, Ayr 17,473—total 32,464 tons, against 37,245 in the preceding week and 34,679 in the corresponding week of last year. Prices of coal are generally steady to firm. The inland household branch is very quiet owing to warm weather.

Stirling, the Lothians and Fife.

COAL.

Business has been affected to some extent in the Firth of Forth district by holidays in some quarters from which coal supplies are drawn. At some of the docks, however, such as Grangemouth, loading has been very active owing to the arrival of Welsh coal by rail for shipment into Admiralty colliers, in order to supply the fleets that have been engaged in naval operations on the east coast. The week's shipments of coal have been at Granton 6,357 tons, Bo'ness 8,025, Grangemouth 42,904, and Leith 44,543—total 101,829 tons, compared with 116,567 in the previous week, and 96,909 in the corresponding week of last year. Best screened steam coal is quoted at Leith 12s. to 12s. 6d., secondary qualities 11s. to 11s. 6d., treble nuts 12s. 6d. to 13s., and doubles and singles 12s. to 12s. 6d. per ton. The shipments at Fife ports have been very much reduced by holidays throughout the district. At Methil 33,690 tons were cleared, Burntisland 10,175, Alloa 3,031, Wemyss 627, Tayport 465, Charleston 362—total 48,350 tons, compared with 133,345 in the preceding week, and 48,176 in the corresponding week of last year. First-class screened navigation coal is quoted at Methil and Burntisland 15s. to 16s., unscreened 13s., first-class steam coal 12s. 6d. to 13s., third qualities 10s. 6d. to 11s., treble nuts 12s. 6d. to 13s. 6d., doubles 11s. 6d. to 12s., and singles 11s. 6d. per ton. There is a moderate business doing in the inland branches of the trade, at steady prices.

AWARDS UNDER THE MINIMUM WAGE ACT.

(*Continued from page* 138.)

South Derbyshire.

The Joint District Board for the district of South Derbyshire have settled the following minimum rates of wages for underground workmen and boys and made the district rules hereto annexed.

	Minimum rate of wages per day. s.	d.
Stallmen and chargemen machine cutters	6	0
Chargemen shifters	5	6
Holers, loaders and onsetters	5	0
Datallers, general labourers, and machine cutters' assistants	4	6
Boys starting at the age of 14	2	0

rising half-yearly at an increased rate of 2d. up to the age of 21, when the boys shall be regarded as adult workmen.

Boys starting over the age of 14, 4d. less for the first year than the above rates for the actual age of starting, otherwise at the same rates as for boys starting at the age of 14, provided always that no boy shall be paid less than 2s. per day.

Nothing in the settlement of the above rates shall prejudice the operation of the agreement of December 3, 1910, by which stallmen are to be paid 4s. 4d. per day, plus percentage, for abnormal places. It is understood that the said agreement of December 3, 1910, is binding on all the collieries in the district

District Rules.

[*Rules 1-13 deal with the Rules of Procedure for the Conduct of the Business of the Board.*]

Aged Workmen.

14. Workmen who have attained the age of 65 years and upwards shall be excluded from the right to wages at the minimum rate, provided that if any aged workman be employed in an abnormal place and shall, for four weeks previously whilst working in a normal place, have maintained the average rate of output of the district, he shall be entitled to be paid the "abnormal place" rate.

Infirm Workmen.

15. Workmen who are not capable of maintaining in a normal place the average rate of output of the district of the pit in which they work shall be excluded from the right to wages at the minimum rate. Where any difficulty arises in a working place, such as bunkers, faults, bad roof, falls, water, &c., or difficulties arise from the default of the management, rendering it impossible for the workman to earn a day's wage (unless caused through his own negligence), it shall be considered an abnormal place.

Regularity of Work.

16. All workmen shall attend as far as possible each day on which coal is turned, unless prevented by illness, or accident, or other justifiable cause, or unless permission to be absent be granted, such permission not to be unreasonably withheld.

Efficiency of Work.

17. A workman who fails to maintain in a normal place the average rate of output of the district of the pit in which he works shall not be considered to be an efficient workman. (*See Rule 15 for definition of abnormal place.*)

18. A workman who fails to comply with the conditions as to regularity and efficiency of work laid down in these rules shall forfeit the right to wages at the minimum rate, except in cases where the failure to comply with the said conditions is due to some cause over which he has no control.

Interruption of Work.

19. If a workman when he presents himself for work at the pit bottom or at a station within 300 yards therefrom is informed that something has happened in or about the mine to prevent his working, he will return to the surface, and not be entitled to claim any wage in respect of that shift.

20. If a workman is informed at any part of the shift that for any cause he cannot continue his work, *e g.*, that tubs cannot be supplied to him, he shall only be entitled to that proportion of the minimum wage which the time at which he was at work bears to the total period of the full time in the shift.

21. In the case of any accident or breakdown in the shaft which would prevent the further output of fuel in that shift, and the workman is informed of it, he shall only be entitled to the proportion of the daily minimum wage up to the time, in relation to the total period of the shift, when he was informed that further coal-winding during the shift was stopped.

22. If from any cause, *e.g.*, shortness of wagons on the surface, it became necessary to "knock off" at an earlier hour than that at which the shift would ordinarily terminate, *e g.*, one-quarter, one-half, or three-quarters of the shift, a workman shall only be entitled to one-quarter, one-half or three-quarters of the minimum wage as the case may be, for that shift. Men working in abnormal places shall be notified, in case of the pit working short time, whether they are to work pit time or otherwise.

Matters in Dispute.

23. Should any question arise as to whether any workman in the district is a workman to whom the minimum rate of wages is applicable, or whether a workman has complied with the conditions laid down by these rules, or whether a workman who has not complied with the conditions laid down by these rules has forfeited his right to wages at the minimum rate, the following procedure shall be adopted, viz.:—

(*a*) An endeavour shall be made by the workman and the colliery officials to settle the difference.

(*b*) Failing a settlement the matter in dispute shall be submitted to the manager of the pit and the agent of the miners' association of the district, or the checkweighman of the colliery.

(*c*) Failing agreement by them the matter in dispute shall be referred to the Joint District Board. Each party to pay their own expenses, unless the chairman otherwise determines.

(*d*) Whenever a decision is arrived at by either of the above methods the person or persons giving the said decision shall give a certificate, signed by him or them, embodying the said decision, to both parties to the dispute.

MINING AND OTHER NOTES.

The Dean of York (chairman of the Governing Body) and the Rev. E. C. Owen (headmaster) write to say that they propose to place a tablet to the memory of Mr. W. H Pickering in the chapel of his old school, St. Peter's School, York.

A special meeting of the Chapter-General of the Order of the Hospital of St. John of Jerusalem in England was held on the 19th inst. at St. John's Gate. The Sub-Prior (Lord Knutsford) presented medals and certificates of honour recently awarded in recognition of distinguished acts of gallantry in saving or attempting to save life on land. Two men, Cornelius Phillpot and John John, who, at great risk to their own lives, went down the workings at the Hetty Pit, Pontypridd, in January last and recovered seven men who were unconscious, were presented with silver medals by the King during his recent visit to Cardiff. Bronze medals were awarded to the following:—J. F. Booth (sergeant, St. John Ambulance Brigade), and H. Merritt, A. Harley, and J. Thomas (miners).

At a meeting of the Ophthalmological Congress at the Oxford Eye Hospital on the 19th inst., resolutions were passed affirming that the character of the illumination was the chief feature in the production of miners' nystagmus, and asking that a departmental committee should be appointed to make enquiries into and report upon the exact conditions under which it occurred. Dr. J. Court, of Staveley, in the course of a paper, said that the increase in the number of cases of nystagmus was considerable, there being 1,618 in 1910 as compared with 460 in 1908 claiming compensation. The numbers would go on increasing unless there was better illumination, because every year shallow pits, where naked lights were used, would be worked out, and the men would go to the deep collieries, which were nearly all fiery, and safety lamps were necessary.

At an inquest held on Tuesday at the Royal Victoria Infirmary, Newcastle, to enquire into the circumstances surrounding the death of a coal hewer, the deputy was closely questioned by the mines inspector (Mr. J. B. Atkinson) and admitted that he knew that the new Coal Mines Act made it compulsory for him to make two visits to the men working in the pit at each shift. In this case he only made one. That was because he had not time to go round twice. The man had been visited by the overmen, however. The coroner remarked that it was important that the provisions of the new Act should be thoroughly understood by all deputies and he suggested that printed synopsis of the requirements might be handed out to them.

By order in council Mr. Otto Beit has been appointed a member of the governing body of the Imperial College of Science and Technology, in succession to the late Sir Julius Wernher, for the remainder of his unexpired term of office, namely—four years from June 1, 1911

Reference was made at a meeting of the Doncaster Rural District Council this week to the letter received from the Local Government Board regarding the town planning scheme affecting the new colliery area. The Rev. T. F. Rolfe mentioned the question of drainage, and referred to the late Mr. Pickering's report. They ought not to allow the opportunity to slip by. It was decided to refer the question to the Sanitary Committee. Ald. Nicholson drew attention to a burning colliery tip at Maltby. It had been on fire for two years and the fumes were destroying vegetation. It was decided that the inspectors should investigate and report

There was a large attendance of officials and workmen connected with the Blackwell Company's Sutton Colliery at the Victoria Hotel, Stanton Hill, recently, when a presentation was made to Mr W. H. Mascall, formerly manager of the Brierley Hill Pit, who has been appointed to the management of the Nunnery Colliery, Sheffield. Mr. J. T. Todd (general manager of the Blackwell Colliery Company) presided, and was supported by the new manager at Brierley Hill (Mr. Strachan.) Before making the presentation—which consisted of a silver coffee service —on behalf of the officials and workmen, the chairman made a touching reference to the Cadeby catastrophe.

At the Wesleyan Conference at Liverpool on Tuesday, the Rev. Thomas Kirkup submitted the report of the South Yorkshire Coalfield Commission. They had to remember, he said, that there were other new fields besides those in the neighbourhood of Sheffield, but for the moment that was the most pressing. The scheme before completed would cost £40,000. The Sheffield district had undertaken to raise half that amount. The colliery owners were in full sympathy and one had already promised a site.

Mr. G. A. Lewis, Derby, Mr R. Laverick, Nottingham, Mr. Percy W. Lewis, Derby, and Mr. C. S Bragge, of the Granville Colliery, Swadlincote, have been appointed under the Coal Mines Act, 1911, as examiners for Derbyshire of candidates for colliery deputies in gas testing, hearing, and measuring ventilation.

During their visit to South Yorkshire, the King and Queen showed their interest in the colliery developments in the Doncaster district by making a special call at the Woodlands model village, where they alighted and visited the cottage of Mr. and Mrs. Brown, who live in the Park. The King chatted with Mr. Brown, and the Queen made an inspection of the rooms of the house. Their Majesties have not forgotten the incident, and the sequel occurred last week-end, when Major Atcherley, the chief constable for the West Riding, and the Bishop of Sheffield went to the house of Mr. and Mrs. Brown, and, on behalf of the King and Queen, presented the couple with framed photographs of King George and Queen Mary.

Last week a bing of 10,000 tons of coal at Granton gasworks caught fire, and the aspect of affairs became so serious that the Edinburgh Fire Brigade were called to the scene in the hope that they would be able to extinguish it, but their efforts proved unsuccessful. Eventually, when it was seen that the ordinary methods of extinction were useless—the coal is piled about 14 ft high—it was decided to cut a passage through the mass, and thus confine the fire to one end of it.

At a meeting of the Middlesbrough Chamber of Commerce on the 18th inst. correspondence was read with reference to traders' complaints of a shortage of wagons on the North-Eastern Railway. It was stated on behalf of the company that between January I and the end of June this year the company's stock had been augmented by the equivalent of over 2,000 ordinary wagons, and this augmentation was continuing. It was suggested that a good deal of assistance could be given by traders during times of pressure by the speedier release of wagons under load. The secretary also submitted a copy of correspondence between the Tees Furnace Company and the North-Eastern Railway Company on this subject. The North-Eastern Railway Company stated that they were both building wagons at their own shops in considerable numbers, and were also hiring a number of other wagons in anticipation of the increased trade for some time to come.

Mr. Isaac Thomas Glasbrook, of Oystermouth, Glamorgan, colliery proprietor and timber merchant, of Messrs Glasbrook Brothers Limited, of Swansea, and a director of the Penrikyber Navigation Colliery Company Limited, who died on March 17, intestate and a bachelor, aged 60, left estate of the gross value of £247,070, of which £244,088 is net personalty. Letters of administration of his property have been granted to his brother, Mr. John Glasbrook, colliery proprietor, of Sketty Court, Swansea, as one of the next-of-kin, and he has had to find bond in a sum of £494,140.

Considerable progress, both under and above ground, is being made at the new Coventry Colliery, Keresley. Each of the two shafts, which have an inside diameter of 21 ft. 6 in., have been sunk to a depth of 40 yards of their total depth of 750 yards. It will be some three or four months before the permanent winding plant will be in position, and when this is ready for use much greater progress will be made. At the present time there are some 300 men engaged on the work. The chimney stack has now been completed, having been carried to a height of 180 ft., and a number of the boilers will be under steam during the next few days.

The Mayor of Rotherham (Mr P. Bancroft) has opened a relief fund for the victims of the Cadeby disaster, and has headed the list with a subscription of ten guineas. It is felt that the public are not subscribing as readily and generously to the various funds as was expected would be the case. The following gentlemen have been appointed trustees for the administration of the funds:—Viscount Halifax, Mr. F. J. Montagu, Sir Charles Nicholson, Bart., M.P., Mr. Charles Thellusson (High Sheriff of Yorkshire), Mr. W. W Warde Aldam, and the Earl of Yarborough.

The Light Railway Commissioners held an important enquiry at Doncaster last Friday, relative to an extension of the Doncaster tramway system to adjoining colliery villages, at a cost of £40,700. The scheme has been brought about mainly by the large colliery developments around Doncaster, it being now proposed to link up the model village of Woodlands and Brodsworth with the trams and also the Warmsworth and New Edlington district, where the Yorkshire Main Colliery is situated. The distance to the model village is 3 miles 3 furlongs, and to Warmsworth 1 mile 2 furlongs 7½ chains. The Town Clerk stated there were now 2,400 persons working in the mine at Brodsworth and in twelve months' time there would be 3,000. The output was 3,200 tons per day, which would be increased by the end of the year to 4,000 tons per day. The population, including Adwick, was over 6,000. The Edlington Colliery, he understood, was to be the largest in the kingdom, and matters had developed very much during the past year. Colonel Boughey, speaking for the Light Railway Commissioners, said they thought time should be allowed to consult with the local authorities and the landowners, with a view to securing land for widening the road, especially at Warmeworth.

Mr. W. H. Dick, who joined the board of directors of Messrs. Wailes, Dove and Co Limited, Newcastle-on-Tyne, at the end of last year, has now been appointed a manager at their head office. Mr. Dick is son-in-law of Mr. E. J. Dove, the managing director, and has for many years been a departmental manager with Messrs. Holzapfels Limited. Messrs. Wailes, Dove and Co's business has largely developed during the past few years both at home and abroad, their most recent achievement (entrusted to their American House) being an extensive contract, the largest in the world ever placed for this class of work, viz., for the coating of 46 pairs of lock gates in the Panama Canal over three million feet of surface. The firm have also just secured a large order from John Brown and Co. Limited, Clydebank, for the Royal Mail steamer "Aquitania" now being built for the Cunard Line.

The application of the Workington Iron and Steel Combine to convert a wagon way from Distington to Lowca into a light railway for the conveyance of their workmen to their new and rapidly developing colliery there, came before the Light Railway Commissioners at Workington on Saturday. Sir John Randles, chairman of the combine, stated that his company employed 5,000 or 6,000 men, and they hoped eventually to have 2,000 working at the colliery, coke ovens and brickworks at Lowca. There was no room for them at either Lowca, Parton or Distington, but they could easily be housed at Workington, where it was estimated there were 500 vacant houses, and at Harrington. The company preferred to carry the men the five miles from Workington than build houses at Lowca, where nearly £250,000 had been spent on works which were developing and would continue to develop. Formal evidence was given in support of the application, and the proceedings only lasted an hour.

Mr. Walter Stowe Bright McLaren, M.P. for the Crewe Division, of 56, Ashley-gardens, London, S.W., left gross estate of the value of £16,798, with net personalty £16,626.

We learn that the Manchester Ship Canal Company, in connection with the opening of new industries by the Partington Steel and Iron Company and other engineering concerns at Irlam, are about to construct a railway underneath the Canal not far from the Barton Aqueduct. The object of this latest development is to connect the company's railway lines on each side of the bridges, and this will bring the important new industries at Irlam into rail communication with others alongside the canal on the Eccles side and with the docks at Salford. During the last six or seven years the traffic on the waterway has been supplemented by a considerable volume of rail traffic along its banks, and this, it is said, will probably be largely augmented in the near future. Tunnelling under the Ship Canal, near Barton, for the Manchester Corporation's third waterpipe is now nearing completion.

Replying to Mr. Vincent Kennedy, Mr. T. W. Russell states that the Geological Survey of Ireland have surveyed the county Cavan, and the maps and memoirs compiled by this Survey contain information regarding the occurrence of minerals in the county. Some time ago the department's economic geologist made an inspection of a supposed find of anthracite coal at Ballyjamesduff. He found that the material in question was a graphitic shale and of no commercial value as a fuel. He also made an inspection at Kilnaleck where a mine was at one time worked for anthracite coal. He reported that, in his opinion, this deposit could not be successfully worked. Several samples of minerals have been recently submitted by persons in the county of Cavan for purposes of examination, and the department's expert, when his other engagements permit, will visit the districts where these samples have been found.

A party of 120 representatives of the commercial side of the coalmining industry in South Yorkshire, Derbyshire, and Notts, were, on Wednesday, conducted over the new dock at Immingham, by Mr. T. C. Higgins, the Great Central Company's mineral manager. The party witnessed the eight coal hoists in operation, each capable of dealing with some 700 tons per hour.

The announcement was made this week that the whole of the employees of the Oakwell Colliery, near Ilkeston, have received notice to terminate their employment in 14 days' time. Including the official and clerical staff, about 600 persons are affected. It is stated, however, that negotiations are in progress for the sale of the colliery as a going concern. The present owners have come to the conclusion that no more coal can be got at a profit. During the last few years the company have been very unfortunate in regard to fire and water troubles in the pit, and they have also had to contend with faults in the coal strata which made the working unprofitable. The colliery is owned by the Ilkeston Colliery Company Limited. The pit was sunk in 1872, and one of the richest seams of household coal has been mined. Dividends were always paid until a fire which occurred in 1910. The trouble which that outbreak caused has now been practically mastered, and the new roads that have been made are now almost up to the district in which it occurred.

COLLIERY ACCIDENTS.

Cadeby Main.

The inquest concerning the disaster at Cadeby Main Colliery, Conisborough, in which 87 men lost their lives on the 9th inst., was opened at the Denaby Main Hotel on Tuesday afternoon. The proceedings were purely formal and the jury were bound over to appear at the same place on Wednesday morning at 10.30. The coroner (Mr. Frank Allen) said he had every hope the proceedings would not be extended beyond two days. A formal enquiry was to be held by the Home Office to investigate as far as possible the whole cause of the explosion and the working conditions generally in the South Yorks coalfield.

At the resumption on Wednesday, the coroner reviewed the circumstances attending the disaster. There were still 14 bodies in the mine. The seat of the explosion was sealed and these seals had been successful, no further explosions resulting. The Home Secretary had instructed the mining inspectors to reserve all technical examination of witnesses for the later enquiry. The explosion was supposed to have originated in a gob fire, which fires were prevalent in these South Yorkshire collieries.

William Humphries, a road layer, of Denaby, was the first witness. He detailed his experiences in the pit on the morning of the explosion at great length, and his evidence, like that of all the witnesses, was taken down by shorthand writers. Humphries' story has already appeared in our columns.

Dr. John James Huey, of Mexborough, who inspected the bodies of the unfortunate victims as they were brought out of the pit, gave evidence that the deaths were due to a combination of gases; he could not say that carbon monoxide alone accounted for the deaths.

Evidence was also given by Joseph Farmer, John Bullock, George Fisher and James Springthorpe (whose evidence was read). This last witness gave a graphic and quite new account of the second explosion, in which Mr. Pickering and the inspector perished. "I heard a rush and a clout," he said, "and shouted 'Look out, Herbert!' I was 8 or 10 yards above the level. My lamp went flying; then I caught the rails and crawled. I saw flame as well as mud and dust; there was such a rattle and a clatter, not so much of a boom. There was a lot of hot black dust. I was scorched and my head smarted. Mr. B. Pickering helped me in the chair at the pit bottom. He knew that his father was down the mine."

Harry Hulley, one of the rescue party, said the full force of the explosion seemed to be at 64 gates down the crossgate and into 14's. The bodies at 19 crossgates were badly burned and showed signs of violence, but the bodies in other parts of the pit did not.

Percy Murgatroyd, another of the rescue team, said they first went to 14's, where there was great disorder. They then went to 19's crossgate. Witness accompanied Mr. Bury around the whole of the affected area. They only took one apparatus with them They passed a door which was shut and in working order, and then came to a fall, a big fall. Another 100 yards up there was a further fall. They then came to a stopping and found an electric lamp burning and a safety lamp out. In 64's some bodies were found. The props were scorched and had ½ in. of dust on them The dust appeared to have been drawn into the props and was all round them, making it difficult to see in which way the explosion travelled. The coal face looked like a stone face. The effect was the same in 19's. In 131 the temperature was very hot. At 14's level there were several bodies. A watch, hung up at the coal face, had stopped at 10 minutes past one, indicating the time of the explosion. When the second explosion occurred, witness had the apparatus on, and that was probably what saved his life. Asked by the coroner to describe his experiences, witness said the explosion was like when a door shut which had a lot of pressure behind it. There was a blast, and a thud, and a continuous roar; there was no flame, the door would keep the flame back. The explosion came along 14 levels. In a very short time the crossgate was filled with smoke and dust, and afterdamp. The dust was so thick that he could only just see the electric lamp he had in his hand when he held it close to his face. As soon as he was able to move he put the tubes of the apparatus in his mouth. Had he not been quick in getting them in he would not have been present that day. All the party made for the crossgates before they were overcome. Luckily for him he ran into something which brought him to his senses, and he then sat down. The breathing apparatus was working splendidly, but he was somewhat short of auxiliary air. He could not see at all; in his struggles he had lost his goggles, and was holding his hand over his eyes to protect them from the smoke. He proceeded down to the junction, where the bodies of Mr Pickering and the others were lying. He could not see the bodies, and did not know they were there till he fell over them. He was too weak and exhausted to rise, and stayed there for about 10 minutes. He then came to a door which was shut, and which he opened with some difficulty just sufficiently for him to get through and get some fresh air. After that he crawled along to 14 landings, where he fell over some more bodies. There were bodies all the way. At the end of the lane there was another fall, and at the end of the junction he was not able to get over it, so he sat down to think. The thought came to him that he might telephone somewhere, and he went and rang to the pit bottom. He got an answer to the ring, but not to the voice. He did not know anything more until someone came and rescued him.

Benjamin Hatfield, one of the rescue party, said he came across three bodies in a peculiar position. Mr. Bury asked him to leave them as they were, as he wanted the opinion of the inspector upon them. They seemed to have been running away from their working places. They came across the body of a miner who appeared to have died just as he was about to have a "snap." He was sitting up grasping his water bottle, which was half full of water, in his right hand. Some of the bodies were slightly burnt and some did not seem to have a mark on them at all.

Mr. H. S. Witty, agent of the pit, detailed the steps that were taken after the explosion. Witness went down the mine after the second explosion, and Murgatroyd told him where Mr. Pickering's body would be found. He found fire in 14 levels; a man's waistcoat was burning. At 121 crossgate the air was very thick and foul. Mr. Pickering lay with his legs under Mr. Hewitt's head. They did not appear to have struggled at all. The air was breathable at this point. He pulled Mr. Bury and Farmer out into the fresh air. He heard someone breathing but could not tell who it was and the breathing ceased soon after. There was a cry of fire and he sent by telephone for two extinguishers, but they were not required. One of the stoppings built in the affected area was 15 ft. and the other 9 ft. Witness stated that he got to know that a gob stick was reported. The next report was on the Saturday night and was the same—slight gob stink. He had another report to the same effect on Monday morning. Stoppings were put in by Mr. Bury. Mr. Witty admitted there had been several gob fires in Cadeby Pit from time to time. There was generally a smell before a fire broke out, but they often had these smells and nothing serious happened from them; they came to nothing He did not go into the return airway to test it, but he did test it in the 33 levels.

Mr. J. R. R. Wilson, H.M. inspector of mines, then read his report on the disaster. In answer to Mr. Smith, he said the affected portion of the mine, in addition to being sealed up as previously described, had had 10 ft. of dirt thrown against it, and a 14 in. wall had been put up in front of that. Mr. Wilson's narrative of the disaster was that on the morning of the 9th, he was called on the telephone by Mr. Pickering, who informed him of the disaster, and asked him to go over, as he had to meet the King that morning at 10 o'clock. He caught the first available train from Leeds, and took Mr. Hudspeth, the junior inspector, with him. He arrived at the colliery office about 10 o'clock, and then learned that Mr. Pickering, Mr. Hewitt, and Mr. Tickle, had arrived, and had just descended the colliery. Mr. Witty met him, and explained that all the men on the night shift on certain levels had been killed, that the district had since been completely examined, and no gas or fire was present. Finding Mr. Pickering had not taken with him a sketch plan of the district concerned, they waited while the draughtsman drew one out. Mr. Basil Pickering arrived, said he knew the district and could show them the way, and Mr. Ashwin, agent for the Wath Main Colliery, joined them. After they had proceeded about half a mile from the shaft they were met by a sudden blast of slightly warm air filled with dust, which made it difficult for them to see where they were. They all realised what had happened, and turned to run up the plane. When they had gone a few yards he called a halt, as the air current was then taking its usual course. They saw some men suffering from burns and bruises, and pushed on to 33 level where the doors were good. At 14 levels there was a huge fall of roof blocking the roadway, so they went back to 33 level. On going through the second door they encountered smoke, and he asked Mr. Basil Pickering to hasten to the pit bottom and secure assistance to make a road through the fall. Mr. Hudspeth and he went along the plane to 166. The air was leaking through the first door. They stopped the leak with bricks and cloth, and went back. Some pieces of stone were falling from the roof, and it appeared a very hopeless problem. Mr. Hudspeth found he could squeeze between a fallen girder and the walls of an upturned tub. He had a powerful electric light with him. They heard a faint voice the other side. It was that of the witness Murgatroyd who was wearing an apparatus and was too weary to get through the fall. Mr. Hudspeth got through. Witness's lamp was behaving strangely, and he found there was gas near the fall. Mr. Hudspeth pulled him through and they found Mr. Murgatroyd on the level A. They told him they were breathing fresh air, and that he might take off his oxygen tube, which he did and applied it to the mouth of a comrade near to. The air was very sluggish, the tube had been twisted, and about a few yards from them there was a group of nine men, two of whom were alive. Mr. Hudspeth returned through the fall for water, and those who still lived were given water. He saw Mr. Douglas Chambers, but later lost sight of his light, and could not get any reply from him. He counted 22 bodies at the crossgate, and he heard a man breathing badly. Witness's eyes were smarting, and his heart throbbing. He reported that he had lost touch with Mr. Chambers, and wanted help. Mr. Chambers, senr., then returned, having been up the crossgate, and found his son.

The Coroner said he did not propose to call any other evidence at that enquiry. When the other 14 bodies were recovered there would have to be another enquiry. That enquiry would terminate for the present.

The jury, after a brief absence, returned a verdict of "Accidental death, caused by two gas explosions on July 9."

Barnsley.

An inquest was held at Hoyland Common, Barnsley, on the 20th ult., on Harry Gillis, pit labourer, who was instantly killed by an electric shock from a coal-cutting machine in the knoll drift of the Wharncliffe Silkstone Colliery on the 11th ult.

Arthur Mitchell, foreman machineman, said he was in charge of the machine with which the deceased was working about 1.45 a.m. on the same day. He felt a shock to his toes, and saw the plug which forms the connection between the machine and the electric current begin to burn. As soon as he could he went to the switches some 24 yards away, to cut off the current. As he went he fell over the body of the deceased, which he found across the steel haulage ropes to which the coal-cutting machine was attached. He was apparently dead. Witness said the work was dangerous, and they were liable to receive shocks. They were working in a wet place at the time.

Albert Otway, foreman electrician at the colliery, said he was aware of the new rules which had come into force in March. These required that an earth wire connected with an earthing system on the surface should be fixed to the framework of electrically-driven machines. Although the steps for complying with this new rule had been taken before the accident, they had not got the earth wires fixed to the machines at the time. They required the framing cables.

Mr. Robert Nelson, M.M. electrical inspector of mines, said he had inspected the machine and the scene of the accident. In his opinion, the accident was primarily caused by bad contact between the plug and the coal-cutter motor. He thought the electric spark formed and made the machine frame "alive." Gillis, who was found dead near the machine, would receive a shock from the haulage rope, which would be electrically connected with the machine frame. Mr. Nelson pointed out that the new rules which were issued in March last provided, amongst other things, that the coal-cutter should be connected to earth. In his opinion, the management had had ample time to comply with these regulations, and if they had been properly complied with the accident would have been avoided. He was of the opinion that to have carried out all the work, if the materials had been ready, and to have fixed the wires to the machines in this part of the workings would have required only about two days, and had that been done the accident would not have happened.

Mr. J. Wroe, manager of the colliery, said that immediately the rules were out his company had taken steps to put them into effect. They had secured the services of a consulting electrical engineer from London. Their system of switches was rather obsolete, and they had been working hard to carry out the Home Office requirements in this respect. They had, perhaps, started at the wrong end.

The inspector pointed out that the time allowed to put into effect the requirements respecting the switches of which Mr. Wroe spoke was up to January 1, 1920, but the earth wire should have been fixed at once.

The jury returned a verdict of "Accidental Death," but added that the colliery company should have taken steps to have earlier complied with the new regulations.

The Coroner's enquiry into the deaths of Walter Jepson, deputy, Stairfoot; Thomas Hunt and Thomas Eltoft, machinemen, both of Barnsley, which occurred in an explosion at the Barnsley Main Colliery, Hoyle Mill, on the 6th inst., was completed at Barnsley last week.

Thomas Moore, labourer, said he had been working with the deceased, and left to enquire at the surface about the faulty feeding with compressed air of the cutting machines. Jepson was about to fire some shots. Witness had seen sparks from the machines. When he was returning to the place he heard that the machine face had been blown up, and men had rushed to the pit bottom.

Joseph Walton, night under-manager, said he found smoke which was like steam. He restored the ventilation, and got to the men, who were dead. Eltoft had fallen with his arms across his face. Jepson was in a kneeling position by the side of the gate, and Hunt was on his face near the machine. When he got to the machine it was still running.

James William Baxter, certificated manager of the colliery, said he had made inspections, and he was of opinion that the machine, which was cutting some hard stone under the coal, had caused sparks which ignited coal-dust. The deceased were capable men. He was of opinion there could not have been much gas, though it might have been sufficient to cause the explosion.

Dr. Townsley said death was due to shock from the severe burns and carbon monoxide gas.

Mr. Wilson, H.M. inspector of mines, gave evidence of his investigation of the scene of the explosion on three days. The evidence of the coaldust coating on the props pointed to the fact that the explosion had occurred at the point where the machine was. There could be no doubt that two shots had been fired. On the Monday following, after the coal had been removed, they found a break in the roof which could not have been discovered before, and this would emit some gas. He did not wish to hurt the memory of the deceased deputy, but it was possible he charged both shot-holes at the same time. He fired the first shot, and before the dust had subsided, and before it was possible for him to complete his examination, he fired the second shot, which ignited the gas from the coal and caused the explosion. With regard to the position of Hunt by the machine, he did not suppose anyone could explain it. All the men knew what shotfiring meant. If he was sitting at the end of the machine it was possible that he would think with the coal being brought down in the ordinary way, the fall would not touch him. That was the only reason witness could assign for the position in which Hunt was found.

Mr. Riley, on behalf of the miners' representatives who inspected the place, said they agreed with the evidence of Mr. Wilson.

The Coroner, in summing up, said the disaster might easily have been of a more serious character. Mr. Baxter's theory of coaldust being ignited by a spark was interesting, but could not be supported by experience. The coal-cutting machine was a most useful machine, and if they could accept the machine theory it would be a serious matter. They must accept Mr. Wilson's opinion. There was no doubt there was an escape of gas at the time of the shotfiring.

The jury, after consideration, returned a verdict that the men were accidentally killed by an explosion after shotfiring owing to an outburst of gas from the coal face. They did not attach any blame to any living person. They also wished to express their appreciation of the efforts of the brave men who risked their lives in the effort to render assistance.

SUB-INSPECTORS OF MINES AND QUARRIES.

Further Appointments to be made.

The Home Secretary wishes it to be known that he is now prepared to consider applications in connection with the appointment of 15 sub-inspectors of mines and quarries.

Each sub-inspector will be appointed for and attached to one of the six divisions into which the United Kingdom will be ultimately divided for the purposes of inspection. The 15 appointments will be allotted as follows:—

	For coal-mines.	For quarries.	For ironstone mines.
Scotland	2	1	—
Newcastle and Durham districts	1	1	1
Yorkshire	1	1	—
Manchester and Ireland and Liverpool and North Wales districts	1	1	—
South Wales	2	1	—
Midland and Southern districts	1	1	—

The salary of sub-inspectors is £150, rising by £5 a year to £200 a year. The appointment will be by limited competition—that is to say, a certain number of candidates, who appear after careful enquiry to possess the best qualifications in training and experience for the work, will be selected from the total number of applicants in the division, and they will be nominated to compete among themselves for the appointments in that division.

One of the two appointments for the Newcastle and Durham districts will be specially allotted to the inspection of the stratified ironstone mines in Cleveland, and there will be a separate examination, limited to men working in those mines.

Nominations are given only by the Home Secretary, on the advice of the board for mining examinations, who will consider all applications impartially on their merits. No recommendations or testimonials are considered unless based on personal knowledge of the candidate's character and attainments. Candidates are therefore particularly advised, in their own interest, not to seek political or social influence, which will prejudice rather than assist the candidature.

The examination will be partly written and partly oral, and will have special reference to the methods of mining or quarrying in the district for which the appointment is to be made. The prescribed age for candidates at the time of examination is between 30 and 40 years, and no exception can be made to this rule.

No person can be nominated as a candidate for a sub-inspectorship of mines who has not had at least five years' practical experience of general underground work in coal* mines, and who is not engaged in such work at the time of nomination. He must also hold a first-class or second-class certificate under the Coal Mines Regulation Acts. Other things being equal, preference will be given to candidates holding first-class certificates.

Candidates for sub-inspectorships of quarries must have had at least five years' experience of general work in quarrying, and must be engaged in quarrying work at the time of nomination.

Applications for nomination must be made before August 15 next, and must be made on a printed form, which, together with full particulars as to the appointment and subjects of examination, can be obtained from the private secretary, Home Office, London, but it is unnecessary for any candidate who has applied on a previous occasion to send in a fresh application.

OBITUARY.

The death of Alderman William Land, J.P., an ex-Lord Mayor of Bradford, last week, removes from Bradford one of its most useful citizens and from the coal distributing trade a valuable worker. Alderman Land, who died at his home, Frobisher House, Lister-avenue, after an illness following upon a seizure some weeks ago, whilst leaving his office, had been progressing so satisfactorily recently that hopes were entertained of his complete recovery. Last week, however, he became worse and steadily declined. Born in 1854 at Barnsley, Alderman Land came to Bradford in 1870 and commenced business as a coal factor some ten years later, and he continued his association with the coal trade to the last. He was a well-known figure on the Yorkshire Coal Exchange. Keenly interested in local government and political life, Alderman Land entered the Bradford Town Council in 1892 and sat until 1897, the year in which the town was made into a city. He became an alderman in 1907. In 1905 he declined an offer of the chief magistracy of the city, but in 1909 accepted the office.

The death occurred on Saturday of Mr. Henry Lea, the head of the firm of Henry Lea and Son, consulting engineers, Bennett's Hill, Birmingham. Mr. Lea, who was one of the leading engineers in Birmingham and the Midlands, had been in failing health, and he died at his residence, 18, Portland-road, Edgbaston, on Saturday, at the age of 73 years. Mr. Lea was elected a member of the Institution of Mechanical Engineers in 1860, and he was also a member of the Institution of Civil Engineers and the Institution of Electrical Engineers. He was a life governor of the Birmingham University and one of the representatives of the Institution of Mechanical Engineers on the Engineering Standards Committee.

Midland Institute of Mining, Civil and Mechanical Engineers.—The annual general meeting of the members of the institute will be held in the institute rooms, St. James'-chambers, Church-street, Sheffield, on Tuesday, July 30, 1912, at 3 30 p.m. A paper on "Some Experiences with Winding Ropes and Capels," will be read by Mr. W. D. Lloyd. The paper on "Modern Ventilating Machines," by Mr. W. Charlton, South Staffordshire Institute, will be discussed. After the general meeting there will be a meeting of the new council.

Rescue and Recovery Work.—In view of the recent Mines Accidents (Rescue and Aid) Act, 1912, a bulletin just published by Messrs. Siebe, Gorman and Co. Limited, of the Neptune Works, Westminster Bridge-road, S E, should prove of special interest to those whose duty it will be in the future to see that their collieries are suitably equipped in accordance with the Act. The bulletin contains particulars of a few recent cases in which the "Proto" (Fleuss-Davis patents) breathing apparatus has been employed for serious rescue work in this country. The number of cases cited, though being only a few which have come before the notice of the inventors, are far too numerous to be given the prominence they so rightly deserve, in so short a notice as space permits. Perhaps one of the most striking cases to which reference is made are a few particulars given of the Hulton Colliery explosion, being an extract from the report of Dr. W. A. Hatton, the colliery surgeon, who speaks in the very highest terms regarding the excellent work accomplished by the rescue party, consisting of over 100 men, all of whom were equipped with the "Proto" apparatus. In connection with the same appalling disaster, Mr. Gerrard, H.M. inspector of mines, also alludes to the splendid work done by the rescue teams fitted with the breathing apparatus. Mr. J. V. Maden, a mining official at the Rishton Colliery, near Blackburn, in giving his views of the "Proto" apparatus, subsequent to the Hulton disaster, further states that "its value could not be exaggerated." Accounts are also given in the bulletin where the equipment has rendered sovereign service at some other twelve colliery disasters which have taken place from time to time. It is thought that a more striking testimonial as to the efficiency of the "Proto" equipment could hardly be wished than the revelation of the fact that upwards of 200 sets of the apparatus have been supplied to the Lancashire and Cheshire Coalowners' Association, for their rescue station at Howe Bridge, Lancs., and affiliated collieries. Copies of the booklet are to be had upon application to the makers, Messrs. Siebe, Gorman and Co. Limited, at the address given above.

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* In the case of candidates for the Cleveland appointment substitute "stratified ironstone" for "coal."

COAL, IRON AND ENGINEERING COMPANIES.

Anglo-South American Agency and Coaling Company Limited.—This private company has been registered, with a capital of £250,000 in £1 shares, to carry on the business of colliery proprietors, coke manufacturers and dealers in all kinds of solid and liquid fuels, &c.; to establish agencies for the sale of and to deal in coal, coke, and solid and liquid fuels, &c.; to acquire Morro Island, Bay of Panama, including the gridiron and other apparatus and buildings erected thereon, and certain land in Tobogo Island, and the water tanks, pipes and buildings erected on the said islands and certain lighters, hulks, and tugs and stock of coal and stores belonging to the Pacific Steam Navigation Company. The first directors are Sir Owen Crosby Phillips, K.C.M.G., and T. Rome.

Belhaven Limited.—This private company has been registered in Edinburgh, with a capital of £35,000 in £1 shares (10,000 preference), to purchase the business and certain assets of the Belhaven Engineering and Motor Works, Wishaw. First directors, R. R. Mellor and T. G. Morton. Registered office, Belhaven Works, Wishaw.

Bristol and South Wales Railway Wagon Company Limited.—The directors of the Bristol and South Wales Railway Wagon Company Limited announce an interim dividend of 3s. per share, being at the usual rate of 10 per cent. per annum.

Brown Bayley's Steelworks Limited.—The directors have declared interim dividends of 10s. and 5s. per share on the £10 and £5 shares respectively, payable, free of income-tax, on July 29.

Cantrell (W. E.) and Co. Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to adopt an agreement with W. E. Cantrell for the acquisition of the business of a general engineer and millwright carried on by him at the Humber Works, Beeston, Notts. First directors, W. E. Cantrell and W. Tompson (both permanent, subject to holding 300 shares each). Registered office, Humber Works, Beeston, Notts.

Centrum Syndicate Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to acquire and turn to account patents relating to internal combustion and other engines. Registered office, 31-3, High Holborn, W.C.

Chant and Paddon Limited.—This company has been registered, with a capital of £80,000 (£1) (40,000 7 per cent. cumulative preference), to take over the business of steam trawler owners, fish salesmen, coal merchants and ship chandlers, &c., carried on by J. Chant and T. Paddon at Plymouth, Devon, as Chant and Paddon.

Consett Iron Company Limited.—The directors recommend a dividend of 52s. 6d. on the ordinary shares (35 per cent.) for the past year.

Consett Spanish Ore Company Limited.—A final dividend of 9s. per share has been declared, payable on August 8.

Dilworth and Carr Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to take over the business carried on at Bow-lane, Preston, as Dilworth and Carr, and to carry on the business of ironfounders, heating engineers, &c., and to adopt an agreement with J. W. Leeming and E. J. A. Carr. First directors: J. W. Leeming and E. J. A. Carr, the latter is governing director. Registered office, Bow-lane, Preston, Lincs.

Eastern Continental Coal Syndicate Limited.—This private company has been registered, with a capital of £2,000 (1,900 preferred ordinary shares of £1 each and 2,000 ordinary shares of 1s. each), to acquire an option to purchase and work by means of a subsidiary company or otherwise a lease or concession of a coalmining property in Europe. Signatories, E. McBean, 433, Old Kent-road, S.E., and W. G. Curtis, Dorincourt, Sandringham-road, Leyton. Table A mainly applies. Registered office, 18-17, Devonshire-square, Bishopsgate, E.C.

East Indian Coal Company Limited.—The report for the half-year ended April 30, 1912, states that after making the usual allowance for the depreciation of buildings, plant and machinery, the half-year's working, as a result of the fires, has resulted in a loss of £914. In the belief that this loss may be looked upon as a special matter, the board have taken £4,000 from the general reserve account, and are thereby enabled to recommend the payment of a dividend for the half-year at the rate of 5 per cent. per annum as follows:—Transfer from general reserve account, £4,000, brought forward from last account, £797; total, £4,797. Deducting loss on half-year to April 30, 1912, £914, and the dividend at the rate of 5 per cent. per annum, £3,000, there remains to carry forward £882. The output was 197,568 tons during the half-year, as compared with an output of 241,319 tons for the half-year ended April 30, 1911. The approximate loss of output for the half-year from the areas affected by the fires was 92,210 tons. This was offset by an increase of 48,459 tons from other districts, leaving a net loss of output of 43,751 tons. The loss of revenue, both direct and indirect, was severe, but not more than the board anticipated. Although the prospects of the current half-year are somewhat uncertain, the board are of opinion that the company has got through the worst. The wagon shortage has seriously affected the delivery of old contracts and thereby prevents the company from benefiting by the improved prices obtainable at present. For 1913 an improvement of about 1 rupee per ton will probably be realised, and one contract has already been made at this advance.

Fowler (D. and J.) Limited.—The gross profits for the year ended March 31, including dividends on investments, &c., after deducting trading expenses and provision for bad debts, amounted to £37,524. Trustees' fees, directors' fees, and departmental remuneration, together with interest on the debenture stock, absorbed £9,300. The directors recommend a dividend of £8,000 on the ordinary shares, making, together with £6,000 interim dividend, a total of £14,000, equal to 7 per cent. for the year, and propose to pay £1,028 as additional remuneration to the directors in respect of departmental management, and to carry forward £10,659.

Hird (W. Walstell) and Co. Limited.—This private company has been registered, with a capital of £7,000 in £1 shares, to take over the business of a coal, &c., merchant, carried on by A. Hildreth at County Bank Chambers, Middlesbrough, and at West Hartlepool and Stanhope, Durham, as W. Waistell Hird and Co. Permanent governing director, Ada Hildreth. Qualification, £5. Registered office, County Bank Chambers, Middlesbrough.

Marbella Iron Ore Company Limited.—The directors have resolved to pay an interim dividend at the rate of 2s. per share, free of income-tax.

Sheane Brothers and Co. Limited.—This private company has been registered in Dublin, with a capital of £2,000 in £1 shares, to acquire and carry on the business of engineers and ironfounders, &c., carried on at Main-street, Wicklow, as Richard Sheane. First directors: R. Sheane and J. Sheane. Registered office, Main-street, Wicklow.

Talana Collieries Limited.—A compulsory winding-up order having been made, the statutory first meetings of the creditors and shareholders were held on Tuesday at the Carey-street offices of the Board of Trade. Mr. H. E. Burgess, Official Receiver, reported that this was the third in a series of four companies which had been formed to take over coalmines in South Africa. After several reconstructions the property was transferred in September 1910 to the Talana Collieries Limited for £89,530 10s., which was satisfied by the issue of 105,337 shares of £1 each, credited with 17s. per share paid. At the date of that transfer £17,000 was due to the bankers, who held a charge over the property, and a second charge for £5,000 had been given to the Talana Collieries Limited (registered in Rhodesia). The bank was applying in the local courts for power to sell in Natal, and it would be the duty of the liquidator to protect the English creditors at that sale, as unless the property sold for a good deal over £20,000 there would be nothing for the English creditors, whose claims amounted to £4,619. The company had carried on business for three years, during which time the total sales of coal amounted to £149,806. Owing to the very heavy charges, which included £62,800 for freight and carriage and £32,800 expenses at the mines, the business had only just paid its way, and there had never been any return to the shareholders. The failure of the company was attributed by the directors to want of capital, but having regard to the heavy expenses, he (the Official Receiver) was of opinion that the effect of additional capital would only have been to delay the liquidation for a time. In conclusion, the chairman stated that he understood that the fourth company had now gone into liquidation. He agreed that the shareholders appeared to be hardly treated, and suggested that they should put the matter in writing before the Comptroller. The liquidation was left in the hands of the Official Receiver.

Vickers Limited.—The following interim dividends for the half-year ended June 30 last are announced: 2½ per cent. (less income-tax) on the preferred 5 per cent. stock and 5 per cent. preference shares; 1s. per share (free of income-tax) on the ordinary shares.

Western Coal and Ventilator Works Limited.—This private company has been registered, with a capital of £300 in £1 shares, to carry on the business indicated by the title. First directors, J. H. Grant and W. C. Lobb. Registered office, Treguddick, Wadebridge, Cornwall.

West Fife Coal Company Limited.—At an extraordinary general meeting of the shareholders, held at Edinburgh on Saturday, resolutions were passed for the winding up of the company. The company was formed in 1900 with a capital of £105,000 to work the Townhill Colliery, near Dunfermline, and the Saline Valley Colliery, 8 miles north of Dunfermline. The venture proved unsuccessful, and the whole of the capital has been lost. In addition, the directors had become responsible for guarantees to banks and other creditors amounting to £59,000, and of this only £6,000 has been recovered. The assets realised only 2s. 4½d. per £, but through the generosity of the directors the ordinary shareholders have been paid in full.

Wetmore and Bird Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to take over (1) the business of a coal factor and merchant carried on by R. L. Wetmore at Montpelier Station, Montpelier, Bristol, as Robert Wetmore and (2) the business carried on by E. H. Bird at 10, Marsh-street, Bristol, as Ernest H. Bird. First directors: R. L. Wetmore, E. H. Bird and L. Scull.

THE FREIGHT MARKET.

Outward chartering has been very moderate on the north-east coast this week, tonnage being once more somewhat scarce. Coasting business is based on about 3s. 7½d. to Hamburg, North France is being done at 4s. 6d. to Havre, the Baltic at from 5s. 9d. to 6s. 3d. to Cronstadt, and the Mediterranean at about 12s. 3d. to Genoa for handy-sized vessels. At South Wales there has been a fair amount of business. The market for prompt loading is very firm, with the Mediterranean standing at from 11s. 3d. to 12s. to Genoa from Cardiff. South America is steady; other directions are rather dull. At the Clyde, there is a fair enquiry and a moderate business at about steady figures. The Humber market is normally active. Coasting rates are based on 3s. 9d. to Hamburg, the Baltic on from 8s. to 6s. 7½d. to Cronstadt, and the Mediterranean on about 12s. to Genoa. Homewards, rather more chartering has been doing. At the Black Sea there is a steady feeling, and shippers are more inclined to operate for autumn loading. Old grain stocks are still considerable, and holders are anxious to clear before the new grain arrives in large bulk; therefore, rates are steadily improving. The same influences operate at the Danube and Azof. The Mediterranean and ore trades have an active demand, and are firm. The Baltic is steady. America and the River Plate have an improving tone. The East is steady, with a brisk enquiry and no overplus of tonnage.

Tyne to Alexandria, 4,500, 12s.; Bari, 3,600, 13s., 600; Barcelona, 3,200, 12s.; 3,800, 12s. 6d., from Dunston; Brindisi, 2,400, 13s. 3d.; Buenos Ayres, sail, 1,200, 24s., ppt.; Cronstadt, 3,000, 6s. 3d.; 4,800, 5s. 9d., spot; Christiania, 800, 7s.; Cette, 3,800, 13s.; Genoa, 7,000, 11s. 6d.; 4,300, 12s. 3d.; 8,900, 12s. 3d.; 4,600, 12s. 3d.; Havre, 1,200, 4s. 6d.; Hamburg, 1,800, 3s. 7½d.; 2,200, 3s. 7½d.; Leghorn, 12s. 3d., Genoa terms; Las Palmas, 6,300, 11s. 6d.; 11s. 6d., August; Marseilles, 2,300, 12s. 3d.; 4,500, 11s. 9d., August; 12s. 3d., 600; Port Said, 5,800, 11s. 8d., from Dunston; 5,500, 11s. 6d.; Rouen, 1,000, 5s. 9d.; Randers, 1,200, 7s.; Spezzia, 2,200, 14s.; Teneriffe, 6,300, 11s. 8d.

Cardiff to Alexandria, 5,800, 11s. 6d., 500, ppt.; 11s. 6d., 700, ppt.; 5,200, 11s., August 5; 5,500, 11s., 700, August; 6,000, 11s. 6d., July 25; Almeria, 2,800, 11s. 9d., ppt.; Alderney, 230, 7s. 6d.; Brindisi, 3,900, 12s., 500, July 23; Buenos Ayres, 5,000, 22s., August 10; Cape Verds, 6,000, 12s.; 5,200, 11s. 9d., mid-August; 3,300, 12s., July 25; Chantenay, 2,500, 8 fr.; Calais, 3,200, 5s.; Charente, 1,650, 8½ fr.; Corunna, 950, 6s. 6d.; Carthagena, 2,000, 12s., end July; Cadiz, 1,000, 10s. 6d.; Flushing, 650, 6s. 3d.; Genoa, 4,200, 11s. 9d., spot; 5,200, 11s. 6d.; 5,800, 11s. 3d.; 3,600, 12s.; 5,700, 11s. 6d., July 29; Havre, 600, 6s.; 1,700, 4s. 9d.; Honfleur, 1,500, 5s. 9d.; Leghorn, 3,900, 11s. 3d., July 27; Londonderry, 250, 4s. 9d.; Monte Video, 22s., August 1; 5,300, 21s. 6d.; 23s. 6d., option part cargo; 21s. 6d., August 5-30; 5,500, 21s. 6d., early August; Marseilles, 5,700, 13¾ fr., ppt.; 6,800, 13½ fr., early August; 6,800, 13½ fr., July 30-August 16; Malta, 3,600, 9s. 3d.; 1,500, 9s. 3d.; 4,000, 9s. 3d., Admiralty; Naples, 5,600, 11s. 7½d., 800, ppt.; 3,900, 11s. 3d., July 27; 5,700, 11s. 4½d.; Oporto, 960, 9s. 9d.; 1,600, 9s. 3d.; Port Said, 6,500, 11s. 6d.; 5,200, 12s.; 6,800, 11s. 6d., July 24; 5,900, 12s., spot; Portland, 2,400, 4s. 1½d., spot, Admiralty; Para, 3,600, 17s. 6d., July 29; Perim, 13s. 3d., July; Piræus, 3,600, 12s., end July; Port Nolloth, sail, 24s. 6d., coke, August; River Plate, lower ports, 23s., August 1; Rouen, 1,500, 6s., ppt.; Rosario, 4,300, 23s.; 25s.; Rio de Janeiro, 19s. 3d., July; 6,200, 19s. 3d., early August; 5,600, 19s. 3d.; River Plate, 22s.; Sante Fe, 23s.; St. Vincent, 8,000, 12s., early August; Stockholm, 2,000, 7s. 9d., ppt.; 1,700, 7s. 7½d.; Savona, 5,700, 11s. 6d., July 29; 5,200, 11s. 6d.; Spezzia, 5,600, 11s. 6d.; 5,700, 11s. 6d., July 29; Taranto, 4,000, 12s., 800, ppt.; Torre Annunziata, 3,900, 11s. 3d.; Trieste, 7,000, 11s. 4½d., 500, early August; Venice, 6,000, 11s. 3d., 500, ppt.; 6,000, 12s. 3d., 500, August 1; Valencia, 3,600, 11s. 9d.

Swansea to Genoa, 12s. 6d. coal, 13s. 3d. fuel; 3,100, 12s. 6d., 400, 10d.; Savona, 12s. 6d. coal, 13s. 3d. fuel; 3,100, 12s. 6d., 400, 10d.; Bordeaux, 950, 10 fr.; Rouen, 1,800, 6s., ppt.; Dover, 1,200, 5s. 3d.; La Pallice, 2,400, 8 fr.; London, 1,800, 4s. 9d.; Nantes, 1,300, 8½ fr.; St. Malo, 7,000, 5s. 6d.; San Felin, 1,200, 14s. 6d. and 15s. 6d.; Valencia, 900, 12s. 9d.; Trieste, 3,500, 12s. 3d.; Oran, 1,800, 14½ fr. and 15 fr.; 2,850, 14½ fr. and 15½ fr.; Carloforte, 2,900, 14s. 6d.

Hull to Hamburg, 3s. 9d., ppt.; Cronstadt, 2,200, 6s. 7½d., ppt.; 5,000, 6s., end July; 4,900, 6s., August 8; 2,700, 6s.; Riga, 2,000, 6s. 3d.; Lerwick, 600, 5s. 3d., f.d.; St. Petersburg, 2,200, 6s. 3d., August 1; Genoa, 4,900, 12s., ppt.

Burntisland to Monte Video, 23s.; Buenos Ayres, 23s. 6d.; Helsingborg, 2,300, 7s. 3d.

Newport to Gibraltar, 1,400, 10s. 3d.; Alexandria, 5,500, 11s.; Marseilles, 6,800, 13½ fr., early August; Valencia, 900, 12s. 9d.; Huelva, 2,600, 9s. 6d.; Genoa, 5,800, 11s. 8d.; Savona, 5,600, 11s. 6d.; Spezzia, 5,600, 11s. 6d.; Salerno, 1,800, 13s. 8d., ppt.; Malaga, 2,300, 12s., ppt.

Goole to London, 1,500, 4s. 3½d.; 1,500, 4s. 1½d.; Poole, 700-800, 5s. 3d., ppt.; Beckton, 1,450, 4s. 1½d., spot.

Hartlepool to Naxo, 500, 8s.; Genoa, 5,000, 12s. 3d.; 4,500, 12s.; Marseilles, 6,000, 11s. 8d.; 3,000, 12s.

Wear to Bordeaux, 2,300, 7s. 3d.; Piræus, 4,500, 11s. 6d.

Glasgow to Gefle, 1,400, 8s.; Hamburg, 2,700, 3s. 9d.

Fife port to Cronstadt, 4,000, 6s. 7½d.

Forth to Sundswall, 2,100, 7s.

Wales to Las Palmas, 11s. 6d., August; Teneriffe, 11s. 6d., August.

Immingham to Cronstadt, 3,300, 6s. 6d., ppt.

Rotterdam to Barcelona, 5,000, 11s. 6d., ppt.; Port Said, 7,000, 11s., 300 tons coke same freight, ppt.; Christiania, 7,000, 3¾ m., briquettes; Genoa, 5,500, 11s. 9d. steam coals, 500 fuel same rate, ppt.; Leghorn, 4,800, 12s. steam coals, 12s. 9d. fuel, 14s. coke, ppt.; St. Nazaire, 3,400, 7s., Trignac terms, ppt.; Chantenay, 1,900, 7s., ppt.; Bordeaux, 8,600, 7s. 3d. steam coals, 8s. fuel, ppt.; Marseilles, 5,000, 13½ fr. steam coals, 14½ fr. fuel, August 1; 5,500, 13½ fr. steam coals, 500 tons coke same freight, August 5-20.

Blyth to Hango, 1,200, 7s. 9d.; Cronstadt, 5,400, 8s. 3d.; Huelva, 1,500, 11s. 3d.

Grangemouth to Horsens, 1,300, 7s. 3d.

Homeward charters:—Poti, 5,000, Maryport, 16s., August; 4,800, Rotterdam, 13s. 9d., July; Bombay, 1,736 net, United Kingdom-Continent, two ports, 25s. on d.w., July-August; San Lorenzo, 3,500, 10 per cent., United Kingdom-Continent, 20s. o.o., less 6d., August 1; 4,200, 10 per cent., 20s. o.o., less 6d. if 500 load £15 despatch, days, August 1; 4,600, 10 per per cent., 19s. 9d. o.o., less 6d., August 5-31; 4,500, 10 per cent., 19s. o.o., less 6d., full despatch clause, days, August 1; 4,200, 10 per cent., 20s. 1½d. o.o., less 6d., August 15-September 15; 4,500, 10 per cent. 20s. o.o., less 6d., September 25-October 25; 3,400, 10 per cent., 20s. o.o., less 6d., October; 4,500, 10 per cent., 20s. o.o., less 6d., August 15-September 15; 1,891 net, 19s. 6d. o.o., less 6d., ppt.; 5,500, 10 per cent., 19s. 6d. o.c., less 6d., with down river options, August 1; 19s. o.o., ex France, July-August; 20s. o.o., option West Italy 1s. 6d. extra, two ports 2s. extra, August 1-15; 5,000, 10 per cent., 19s. 8d. o.c., less 8d., August 20-September 20; 6,000, 18s. 10½d.; Santander, 1,900, Boucau, 8½ fr., ppt.; Bilbao, 3,500, Middlesbrough, 6s. 9d., August; 2,700, 6s. 10½d., ppt.; 2,600, Grangemouth, 7s.; 3,500, Rotterdam, 6s. 9d., ppt.; North Pacific, sail, 40s., United Kingdom-Continent, December; 38s. 3d., January; Puget Sound, sail, 85s., South Africa; 81s. 3d., Newport, Mon.; time charter, Baltic trade, 4,700, £1,550, one round trip; time charter, Eastern trade, about 8s. 3d., Java to United Kingdom-Continent; Miramichi, 1,100 stds., West Britain or East Ireland, 56s. 3d. p.p., end August; 57s. 3d., end August; Huelva, 2,300, Bristol, 9s. 9d., Tharsis terms; 6,000, Philadelphia, 12s., f.d., August 1; 2,200, Antwerp, 10s., ppt.; 5,500, two ports Northern United States, 10s. 9d., Tinto terms, early August; Calcutta, Rs. 9, Bombay, July-August; 2,752 net, Bombay or Kurrachee, Rs. 8 8d., ppt.; Archangel, 82s. 6d., Sharpness; Cape Tormentine, 1,000 stds., Belfast, about 52s. 6d., ppt.; Taltal, sail, 25s., United Kingdom-Continent; Azof, 2,400, 14s. 9d. n.o. or any, 15s. 8d. Hamburg, with options, August 25-September 25; 4,800, Hull and or Leith, 13s. one port, 13s. 6d. both ports, ppt.; Novorossisk, 3,600, Denmark, 17s. 3d. one port, 17s. 8d. two ports, 17s. 9d. three ports, oilcake, July; Japan, 2,678 net, United Kingdom-Continent, basis 31s. 6d. one port to one, timber, August; 2,629 net, Colombo, 10s. 9d., August-September; Kurrachee, 8,000, United Kingdom-Continent, basis 20s. 6d., p.p., August; 6,400 max., 20s. 3d., France 1s. extra, August; Carthagena, 6,200, Emden, 7s., ppt.; 3,000, Middlesbrough, 8s., ppt.; Christmas Island, 6,000, Fiume, 30s., August-September; Australia, 8,000, United Kingdom-

Continent, 28s. 9d., Mediterranean 30s., wheat, ppt.; New York, 6,700, Japan, three ports, 30s., steel, August; Bahia Blanca, 5,000, 10 per cent., two ports West Italy, 21s., wheat-maize, ppt.; Limiona, 5,300, Glasgow, 8s. 4d., ppt.; Almeria Pier, 4,500, Sunderland, 7s., ppt.; Wyburg, 1,800 stds., Alexandria, 85 fr., d.b.b. and baulks, August; Iquique, sail, 27s. 6d., United Kingdom-Continent, October-November; Newcastle, N.S.W., sail, 23s. 6d., direct nitrate port, option Valparaiso 24s., November-December; time charter, Transatlantic trade, about 9s. 6d., 40 days minimum, delivery Gulf, redelivery United Kingdom-Continent; 5,200, 5s. 3d., delivery Rotterdam; Bombay, 25s., Genoa-Marseilles, d.w. basis, August; Nicolaieff, 4,000, Rotterdam or Amsterdam, 9s., ore, ppt.; Taganrog, 3,200, Denmark, 19s., two ports, oilcake, ppt.; Newcastle, N.S.W., 2,624 net, one port North Java, 11s. 6d., August; Sicily, 3,300, Folkis, Walkaus and Kotka, 12s. one loading place, 12s. 3d. two loading places, ppt.; 2,500, Gothenburg, Norrkoping and Wyburg Town, 12s. 6d. one loading place, ppt.; 2,750, Sundswall and Urstviken, 12s. 9d., one loading place, August 1-15; Hornillo Bay, 5,700, Middlesbrough, 7s. 9d., 700-500, end July; Upper Zone, 1,100 fathoms, Cardiff or Barry, 47s. per fathom, props, end July; Wasklot, Wasa district, 700 fathoms, Bristol Channel, 45s. 6d., props, spot; San Francisco, sail, 35s., United Kingdom-Continent, November-December; nitrate ports, sail, 23s. 9d., United Kingdom-Continent, August; 26s. 9d., November-December; 28s., new season; 29s., new season; Pugwash, 52s. 6d., West Britain-East Ireland; Santa Fe, 24s. 6d., Hamburg, quebracho.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Athlone, July 31.—Tenders are invited by the Athlone Urban District Council for 1,000 tons of gas coal, delivered into the Council stores in good and dry condition, as required over the ensuing twelve months. Analysis should accompany the tender. Tenders must be placed in sealed envelopes marked "Tenders for coal," and must be sent by registered post so as to reach the undersigned not later than 6 p.m. on Wednesday, July 31, 1912. The lowest or any tender not necessarily accepted. By order, P. V. C. Murtagh, clerk, Town Hall, Athlone.

Blackburn, August 3.—The Electricity Committee is prepared to receive tenders for the supply and delivery of steam coal for the 12 months ending August 31, 1913. Specifications and forms of tender may be obtained on application at the Electricity Works, Jubilee-street, on and after Saturday, July 20, 1912. Sealed tenders endorsed "Steam coal," and addressed to the Chairman of the Electricity Committee, will be received at the Town Hall up to midday, Saturday, August 3, 1912. The lowest or any tender will not necessarily be accepted. P. P. Wheelwright, M.I.E.E., engineer and manager, Corporation Electricity Works, Jubilee-street.

Abstracts of Contracts Open.

Ballymahon, August 1.—For supply of best Whitehaven and best Irish coal, free from slack, for one year ending August 31, 1913, for the Guardians.

Bangor (Ireland), August 5.—For supplying about 3,800 tons of the best screened gas coal, to be delivered and trimmed into coal stores at the gasworks, Bangor, for the Urban District Council.

Batley, July 31.—For the supply and delivery at the gasworks of 20,000 tons of screened gas coal, for the Corporation.

Batley, July 30.—For the supply and delivery at their electricity works of 3,000 tons of steam coal, for the Corporation.

Birmingham, July 29.—For supply of coal and sleck to the departments in their charge for period ended March 31, 1913, also alternatively to March 31, 1914, for the Estates Committee. The approximate quantity required for each period is 500 tons of coal and the same quantity of sleck.

Blackburn, August 3.—For supply and delivery of steam coal for 12 months ending August 31, 1913, for the Electricity Committee.

Bromley, July 30.—For coal and coke, for the Corporation.

Colchester, July 29.—For supply and delivery of about 5,000 tons steam coal at the electricity supply works, Osborne-street, for the Electricity Supply Committee.

Darlington, July 31.—For approximately 60 tons per week of best steam coal, for the Tees Valley Water Board.

Dublin, July 29.—For 200 tons of house, 60 tons of Welsh steam coal and 200 tons of coke, for the Board of Governors.

Evesham, July 30.—For from 500 to 3,500 tons (or less if required) of best screened gas coal, for the Corporation.

Hastings, July 30.—For 500 tons of best Welsh anthracite gas peas, for the Corporation.

Hastings, July 30.—For 1,400 tons of Welsh steam coal, for the Corporation.

Hereford, August 10.—For 12,000 tons of gas coal, for the Corporation.

Hebden Bridge, August 5.—For supply of screened gas coal, to be delivered at the gasworks, Crow Nest, Hebden Bridge, for the Hebden Bridge and Mytholmroyd Gas Board. The probable quantity will be from 6,000 to 8,000 tons.

Keighley, August 5.—For coal, for the Keighley and Bingley Joint Hospital Board.

Letterkenny, August 10.—For supply of such quantities of gas coal as they may require for the financial year ending March 31, 1913, to be delivered at the gasworks, Letterkenny, for the Letterkenny Urban District Council.

Littlehampton, July 31.—For Nixon's steam Navigation coals, for the Urban District Council.

Oldham, August 6.—For gas coals, for the Gasworks Committee of the Corporation.

Plymouth, August 6.—For the supply of the following to the Plymouth Royal Eye Infirmary—viz.: (1) 30 tons of coal, (2) 15 tons of coke (broken), (3) 16 tons of anthracite.

Portsmouth, July 31.—For supply of about 1,200 tons of Welsh steam coal and about 1,200 tons of house coal, including delivery, also supply of coke (crushed and uncrushed), for the Guardians.

Ramsbottom, July 29.—For coal, for the Bury and District Joint Hospital.

Rochester, September 3.—For coal, for the Corporation.

Southampton, July 29.—For supply of 250 tons best seaborne house coal, screened and delivered, for the Committee of the Royal South Hants and Southampton Hospital.

Surbiton, August 1.—For supply of Nixon's navigation Welsh smokeless steam coal, to the extent of about 50 tons per annum; also for ordinary steam coal, to the extent of about 10 tons per annum, for the Urban District Council.

Swadlincote, August 1.—For supply, for the Swadlincote District Urban District Council, of 1,500 tons (more or less) of best screened gas coal.

Tewkesbury, July 31.—For supply of 120 tons of coal (best kitchen nuts), to be delivered at the union workhouse, Tewkesbury, immediately.

Warwick, July 31.—For supply and delivery of coal to some public elementary schools in the neighbourhood of Rugby, Southam, Kineton, Stratford-on-Avon, Nuneaton, Warwick and Leamington, in the educational county, for the Warwickshire County Council.

Whitecroft (I.W.), August 6.—For the supply of house and steam coal and coke for 12 months ending July 31, 1913, to the Isle of Wight County Asylum.

Widnes, August 2.—For coal, for the Corporation.

The date given is the latest upon which tenders can be received

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Adelaide, August 20.—*Pipes, &c.*—The Imperial Trade Correspondent at Adelaide reports that tenders will be received by the Chairman of the Supply and Tender Board, Adelaide, South Australia, up to 3 p.m. on August 20, for the supply and delivery of galvanised wrought iron, socket-jointed service pipes and fittings.

Bedlington, August 5.—*Steel Tubes.*—For supply and delivery of 100 yards of 15 in. steel tubes, coated, in 18 ft. lengths, and delivered at Doctor Pit siding, Bedlington, Northumberland, for the Bedlingtonshire Urban District Council.

Belfast, July 29.—*Pipes and Specials.*—For supply of about 6,650 ft. of 48 in., 30 in., 18 in., and 12 in. steel pipes and specials, for the Improvement Committee.

Congleton, August 6.—*Boilers.*—For supply and delivery on their seatings of two 24 ft. by 7 ft. Lancashire boilers, for the Water Committee.

Cork, August 1.—*Sinking Wells.*—For sinking wells, supplying and erecting pumps at (*a*) Ballygarvan, (*b*) Ballyman, (*c*) Feggot Hill, Clogheen, for the Cork Rural District Council.

Eastbourne (Sussex), July 31.—*Well.*—For the sinking and construction of a well in the parish of Easebourne, for the Midhurst Rural District Council.

Elham (Kent), August 8.—*Tubing, &c.*—For the supply of 1,450 ft. of galvanised water tubing and for the supply of various fittings, for the Guardians of Elham Union.

Hull, July 31.—*Pipework, &c.*—For the supply and erection of sundry steam and water pipes, pumps, &c., in connection with the installation of certain boilers and turbines at their electricity works, Sculcoates-lane, Hull, for the Electricity Committee.

Lichfield, July 31.—*Weighing Machine.*—For the construction of a public weighing machine, for the Corporation.

London, July 31.—*Rails, &c.*—For the supply and delivery at any of the railway piers at Williams-town, Melbourne, of rails and/or fishplates, for the Agent-General for Victoria, Australia, viz.:—(Contract 22,918) approximately 2,100 tons of 60 lb. steel rails, approximately 144 tons of steel fishplates for 60 lb. rails; (contract 23,038) approximately 13,146 tons of 80 lb. steel rails, approximately 1,174 tons of steel fishplates for 80 lb. rails.

Lyttelton (New Zealand), August 31.—*Pumping Plant.*—For the supply and erection of a gas-driven high-lift turbine and reciprocating pumping plant.

Matlock, August 3.—*Cable.*—For about 1,967 lineal yards of patent steel wire tramway cable with manilla core (3½ in. in circumference), for the Matlock Urban District Council.

Melbourne (Australia), August 6.—*Cable.*—For supply of 9,200 yards of 0·2 square inch concentric cable and 2,200 yards 0·1 square inch concentric cable, for the City Council. Messrs. McIlwraith, McEacharn and Co. Proprietary Limited, Billiter-square-buildings, London, E.C., agents.

Salford, July 31.—*Standards, &c.*—For the supply, delivery, and erection of cast iron standards and wrought iron gas tubing, &c., at the sewage works, for the Corporation.

Shoreham, August 3.—*Boiler.*—For supply and fixing in tug "Stella" a new marine multitubular boiler, for the Shoreham Harbour Trustees.

Southgate, July 30.—*Fencing.*—For the construction and erection of 930 yards or thereabouts of open iron rail fencing with reinforced concrete posts, for the Southgate Urban District Council.

Sunderland, August 1.—*Plant.*—For the following works, for the Corporation:—(Contract D) two rotary steam-driven boiler feed-pumps; (E) one air-compressor; (F) one low-lift motor-driven centrifugal pump; (G) pipework, supports and jointing material; (H) valves.

Sunderland, August 8.—*Steam Boiler, &c.*—For provision of a steam boiler, alteration to steam pipes, economiser, &c., at the workhouse, Hylton-road, Sunderland, for the Guardians.

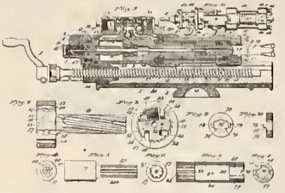
Tipton, July 30.—*Boiler.*—For supply and delivery of a Lancashire boiler, 20 ft. long by 7 ft. diameter, at the gasworks, for the Tipton Urban District Council.

Valletta, August 8.—*Pipes.*—For the supply of galvanised cast iron pipes.

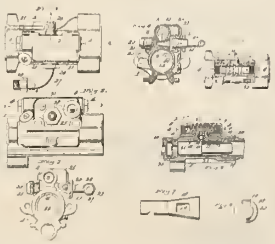
Walsall, July 30.—*High- and Low-tension Switchgear.*—For high- and low-tension switchgear, for the Corporation.

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

1344 (1912). *A Mechanism for Intermittently Rotating the Drill Bit of Rock-drilling Engines.* J. G. Leyner, of 1707, Glenarm-street, Denver, Colorado, U.S.A.—The present invention has for its object to provide improvements in drill bit rotating mechanism of the kind described. To this end drill bit rotating mechanism is provided having in combination a ratchet ring arranged in and extending beyond an axial recess bore in the rear cylinder head, a rear cylinder ring against which said ratchet wheel is pressed with a frictional slipping or yielding pressure by means of side bolt rods acted upon by coiled expansive springs, said bolts also serving to hold the sections of the engine body together, and a disc-shaped head forming part of the rifle bar arranged within and being narrower than said ratchet ring and provided with spring-pressed pawls. Further features reside in the shape and number of the pawls, and the recesses in which they are housed and in their arrangement in the rifle bar head. Fig. 1 is a longitudinal sectional elevation of a modern type of rock-drilling engine, showing the application of the drill bit step by step rotating mechanism to it; fig. 2 is a side view of the rifle bar in position within the ratchet ring, the said ring being in section; fig. 3 is an end view of the same, the head of the rifle bar being partly broken away for clearer illustration; fig. 4 is a rear end view of the piston hammer; fig. 5 is a side elevation of the piston hammer, showing its straight fluted hammer bar extension; fig. 6 is a front end view of the hammer piston, showing in end elevation an end view of the hammer bar extension and its straight flutes; fig. 7 is a longitudinal sectional view of the drill bit holding chuck sleeve, showing a straight fluted nut threadedly secured in one end; fig. 8 is an end view of the opposite end of the chuck sleeve from the fluted nut, showing keyway recesses in the opposite sides of its end and oppositely-arranged introverted key portions; fig. 9 is a side elevation of the drill bit locking ring; fig. 10 is a central sectional elevation of fig. 9; and fig. 11 is a plan view of fig. 1 made to a smaller scale. (Four claims.)

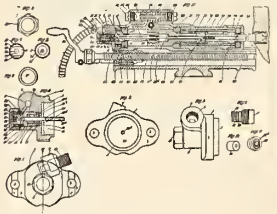


1349 (1912). *Improvements in and relating to Rock-drilling Engines.* J. G. Leyner, 1707, Glenarm-street, Denver, Colorado, U.S.A.—This invention relates to rock-drilling engines, and more particularly to mechanism for controlling the supply of air to the valve chest of such engines, and has for its object to provide a construction which is simple, efficient and quick in operation, and comprises in combination a hollow tapering or bell-shaped valve body having an open end and formed with a port through its shell, a circular stem at the end of the valve body serving for the attachment of the operating handle, a chamber communicating with the open end of the said valve, a conically-shaped pressure fluid inlet leading to said chamber, and a swivelling elbow with a conical end to fit in said inlet, and with a hose attaching coupling at its free end. The aforesaid mechanism is preferably used in conjunction with a reciprocating piston-controlling slide valve, and possesses many features of advantage when co-operating therewith in a rock-drilling engine. Fig. 1 is a plan view of a cylinder of a rock-drilling engine, provided with the improvements in accordance with the invention; fig. 2 is a side elevation of fig. 1; fig. 3 is an end elevation of figs. 1 and 2; fig. 4 is a section of fig. 1 on line 4—4; fig. 5 is a horizontal sectional view on the line

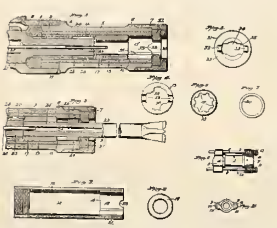


5—5 of fig. 2; fig. 6 is a vertical longitudinal sectional view of the cylinder on the line 6—6 of fig. 1, showing the same provided with cylinder heads and with a piston hammer; fig. 7 is a side elevation of the inlet valve; and fig. 8 is an end elevation of the valve shown in fig. 7. (Five claims.)

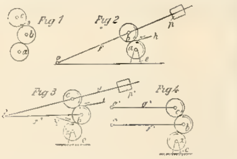
1368 (1912). *Improvements in or relating to Rock Drilling Engines.* J. G. Leyner, 1707, Glenarm-street, Denver, Colorado, U.S.A.—This invention relates to improvements in water-conveying devices for rock drilling engines of the kind in which water under pressure enters a water inlet aperture in the rear cylinder head and passes through a tube through the axial centre of the engine and is discharged into the drill bit for the purpose of ejecting the rock cuttings during the drilling operation, a through bore for the water tube being made in the rifle bar and hammer piston and said rifle bar and piston having movement upon said water tube. In particular the invention relates to devices of the kind described and claimed in the prior British Patent No. 6183 of 1904. The object is to provide a water-conveying device of the above kind constructed and arranged so as to be easily removable and renewable and at the same time simple, reliable and efficient in operation. To these ends the invention consists in clamping said tube in position in such manner that it can be readily removed, and at the same time so that it will always be efficiently packed when fixed in position, a compressible rubber plug being employed to assist in clamping the aforesaid tube in position, which rubber plug also acts as a packing medium. The invention presents certain features of a constructional nature in connection with this plug. Air from the front end of the driving cylinder is permitted to commingle with the water, as has heretofore been proposed, in order to increase the efficiency of the washing action. Fig. 1 is a rear view of the rear cylinder head that forms a part of and supports the greater part of the water-conveying apparatus for rock-drilling engines. Fig. 2 is a front view thereof, the pipe-receiving nipple shown in fig. 1 being omitted. Fig. 3 is a side view of the rear cylinder head. Fig. 4 is a vertical longitudinal sectional view on the line 4—4 of fig. 1. Fig. 5 is a front view of the cap nut. Fig. 6 is a perspective view of the washer which is interposed between the cap nut and the end of the head. Figs. 7 and 8 are rear and front views respectively of the plug by which the water tube is fixed. Fig. 9 is a side view thereof. Fig. 10 is a perspective view of the rubber plug which is housed in the fixing plug and surrounds the water tube. Fig. 11 is a perspective view of the clamping washer, against which the rubber plug is compressed; and fig. 12 illustrates a central longitudinal section through a modern type of rock-drilling engine, and shows the co-operative arrangement of the improved water-conveying and rock-cuttings ejecting apparatus in a complete rock-drilling engine. (Five claims.)



1383 (1912). *Improvements in and relating to Rock-drilling Engines.* J. G. Leyner, of 1707, Glenarm-street, Denver, Colorado, U.S.A.—This invention relates to improvements in drill bit holding chucks for rock-drilling engines and consists in a drill bit chuck having in combination a chuck sleeve arranged in a cylindrical bore of the front cylinder head, a key ring provided with projecting lugs which hold it from rotative movement relatively to the sleeve and also having an approximately oblong aperture, a cap holding said key ring in position by means of side bolts which also serve to hold the various sections of the engine body together, and a drill bit provided with lugs upon its shank adapted to pass through said oblong aperture in the key ring and also adapted after the drill bit has been given a partial turn to engage lugs upon the inner periphery of the chuck sleeve and be thereby locked. The invention also resides in the particular construction and arrangement of parts of the drill bit chuck. Fig. 1 is a longitudinal sectional view through the drill bit holding chuck, the drill bit being omitted; fig. 2 is a similar view showing the drill bit in the chuck; fig. 3 is a longitudinal sectional view of the chuck sleeve; fig. 4 is an end view of the same; fig. 5 is a back view of the drill bit locking ring; fig. 6 is a front view of the fluted chuck nut; fig. 7 is a front view of the chuck ring; fig. 8 is a front view of the chuck bushing; fig. 9 is a fragmentary plan view made on smaller scale than figs. 1, 2 and 11, and showing the housings of the springs of the side rods in section; fig. 10 is a front view of the cylinder head cap. (Five claims.)

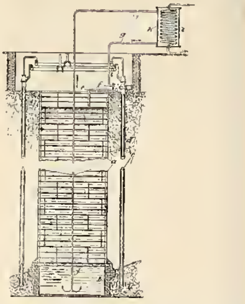


2876 (1912). *Improvements in Mills for Crushing Sand, Coal, Coke and like Materials.* R. Lochner, of Dortenstrasse 9, Sterkrade, Rhine Province, Germany.—This invention relates to improvements in crushing mills of the kind in which several rolls are arranged above a stationary bottom roll, and has for its object to provide an improved construction of mill, the improvements consisting chiefly in the method of mounting the various rollers. According to the invention, in the case of a three high mill or a mill having at least two rolls arranged above the lowest roll, the upper rolls are mounted upon one-armed levers freely rocking about fulcrums or axes which may be either stationary or movable. In consequence of this arrangement the upper rolls are permitted to move vertically and bear against the lowest roll only by reason of their own weight. If preferred, the one-armed levers may be weighted for increasing the pressure between the rolls. In all cases the pressure between the rolls, to which the materials to be crushed is subjected, is prevented from exceeding a predetermined limit. In the case of a mill having one upper roll only, the said upper roll is movably mounted upon a one-armed lever, as above described, but said roll is directly driven by mechanical means and not by frictional contact with the other fixed roll. Fig. 1 illustrates diagrammatically a crushing mill with three superposed rolls, a predetermined minimum space being left between the two upper rolls; fig. 2 illustrates a crushing mill constructed according to one form of the invention having a single upper roll; fig. 3 shows a similar mill but with three superposed rolls, of which the two upper rolls are severally mounted to turn in two pairs of one-armed levers rocking about the same axis; fig. 4 shows a mill with three superposed rolls, of which the two upper rolls are severally mounted to turn in one-armed levers rocking about separate axes on the same side of the mill. (Six claims.)

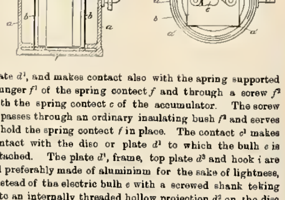


21374 (1911). *Improvements in the Manufacture of Gas and Coke.* A. Rollason, of 13, Lime-grove, Long Eaton, Derbyshire.—This invention relates to the treatment of coals which become semi-fluid in the retort, and has for its object the reduction of the temperature in the retort, and the period of carbonising, also to improve the quality of the coke produced. This is effected by the addition of certain substances whereby the coal, when in the retort, is kept in an open state, and the ash contents rendered more fusible. The invention is carried out by taking a portion of ordinary coke, coke breeze or coke dust, and adding this to the coal which is low in alumina, and to be carbonised, for the purpose of keeping the coal, when in the retort, in an open state to allow the free evolution of the gases. A percentage of lime is also added to reduce the temperature required in the retort, and to increase the rate and volume of the gases evolved from the coal during carbonisation. The addition of coke products will not materially increase the ash contents of the coke, therefore the quantity added can be greater than in the case of lime, which increases the ash contents. The quantity of coke products to be added may vary between 3 and 6 per cent., and in some cases where the coals are high in volatile matter even higher, the quantity of lime between ½ and 2 per cent., according to the nature of the coal to be carbonised, the coal varying considerably between a good Durham coal and common cannel. With ordinary Durham coal, approximately 3½ per cent. of coke products and ¾ per cent. of lime is added to the coal to be carbonised; the mixture of coal and coke products and lime is crushed below ¼ in. in diameter, and thoroughly mixed before charging the retort. The temperature required for carbonisation can now be reduced to below 900 degs. Cent., and the time of carbonising reduced fully 20 per cent.; the coke produced will be of lower specific gravity, and more suitable for domestic purposes. (One claim.)

22052 (1911). *Improvements relating to the Production of Shafts in Quicksand, and the like.* L. Gebhardt, of Grimmel-Allee 44, Nordhausen, Prussia, and The Shaft Freezing Company Limited, of 11, Ironmonger-lane, London E.C.—This invention relates to the production of shafts in quicksands and the like by means of freezing and thawing the shaft after completion by warmed water. According to the invention, after the shaft is completed and the lining erected within it, the quicksand which surrounds the shaft and which has been previously frozen artificially, is thawed out by filling the entire shaft with warmed water that is caused to circulate in or through the shaft. Conveniently, the water is pumped out of the shaft into a heating apparatus and is led back from the heating apparatus to the bottom of the shaft by means of a pipe. The accompanying illustrative drawing shows in central vertical section one arrangement of a suitably constructed shaft plant adapted for carrying out this invention. (Three claims.)



25416 (1911). *Improvements in Miners' Electric Safety Lamps.* H. F. Atherton, of 113, Manchester-road, Tyldesley, Lancashire.—Fig. 1 is a sectional elevation; fig. 2 a sectional plan on the line A—B, fig. 1, and fig. 3 a plan of the bottom portion of an improved electric safety lamp. In these views *a* designates the bottom of the lamp made preferably of aluminium, and recessed internally and slotted vertically at a^1 to receive an electric accumulator *b*, to the terminals of which are connected two spring contacts *c* c^1; *d* is a ring screw threaded internally, and d^1 is a disc or plate which is screwed into the upper part of the ring *d* and in conjunction with the top plate d^3 and pillars d^4 to hold the parts in position after the manner of the ordinary following-up ring commonly used in miners' safety lamps, the lower part of the same threaded portion of the ring being screwed on to the base *a*. The electric bulb or lamp *e* is screwed into a hollow projection d^2 formed on the disc or plate d^1, and makes contact also with the spring supported plunger f^1 of the spring contact *f* and through a screw f^2 with the spring contact *c* of the accumulator. The screw f^2 passes through an ordinary insulating bush f^3 and serves to hold the spring contact *f* in place. The contact c^1 makes contact with the disc or plate d^1 to which the bulb *e* is attached. The plate d^1, frame, top plate d^3 and hook *i* are all preferably made of aluminium for the sake of lightness. Instead of the electric bulb *e* with a screwed shank taking into an internally threaded hollow projection d^2 on the disc or plate as shown, it is possible to employ an ordinary centre contact bayonet lamp holder screwing into a collar on the disc or plate and thus dispense with the hollow projection d^2, the spring contact *f*, insulating bush f^3 and screw f^2. Round the electric lamp *e* is the ordinary cylindrical lamp glass *g* and a movable reflector *h* is preferably provided to enable the light to be concentrated on any given spot. The top plate d^3 is turned out concave on its underside to act as a reflector and throw the rays from the electric lamp *e* downward; and a hook *i* is attached to the usual eye or



BRUSSELS EXHIBITION: "GRAND PRIX." ALLAHABAD, 1910.
ROUBAIX EXHIBITION, 1911: "GRAND PRIX."

HOPKINSON'S
"RDS" Steam Trap

PATENT
SUITABLE FOR ANY PRESSURE.

A large number of these traps have been in use for several years, and our experience has been so satisfactory that we have every confidence in recommending them to steam users. The workmanship and material are of the highest quality, and is altogether a far superior article to the many cheap bucket traps now on the market.

SPECIAL FEATURES.

SIMPLICITY.
RELIABLE.
QUICK IN ACTION.
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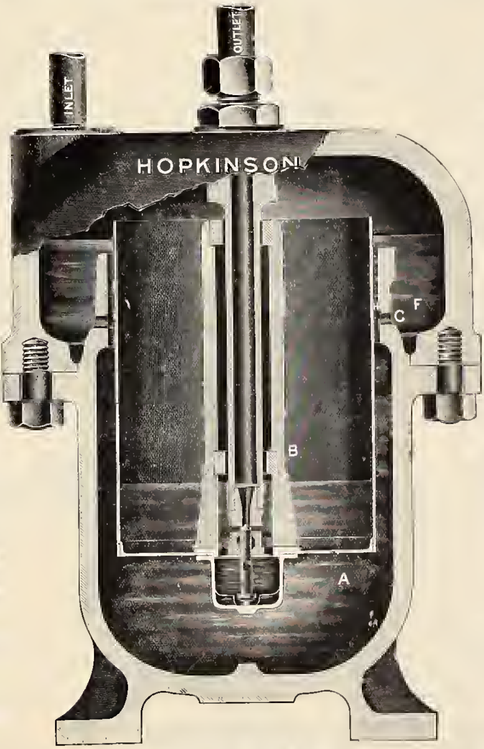
STRONG INTERMITTENT WATER DISCHARGE.
QUICK CUT-OFF.
WILL LIFT ITS WATER 2 ft. FOR EVERY 1 lb. STEAM PRESSURE.
FITTED WITH VALVE AND SEAT OF . . HOPKINSON'S 'PLATNAM' METAL, which is five times harder than . bronze and admirably suitable for with- . standing the cutting action of the water.



CAST IRON BODY AND LID,
HOPKINSON'S "PLATNAM" METAL VALVE AND SEAT.

DESCRIPTION.

This steam trap is of the open float type, and consists in its simplest form of a Water Chamber **A**, Float with central guide **B**, Valve **C**, Water Inlet Pipe, and Water Discharge Pipe. The discharge pipe forms the guide for the float.

The valve remains on its seat until the float has sunk low enough to touch the collar on valve; it then immediately begins to discharge.

The Gallery or Water Pocket **F** is an important feature, as it fills with water when the Float is at rest; when the Float begins to rise from its lowest position, the water thus collected flows through the hole **C** into the body **A**, thus ensuring a rapid elevation of the Float independent of a small amount of water passing into the trap. The valve is not rigidly connected with the bucket, and it is therefore held on to its seat until the Float acts on the Valve. This device is, therefore, most valuable under all conditions of working, but more especially when the volume of water entering the trap is small. Its lifting effect on the Float is indicated by the sharpness with which the water discharge is cut off.

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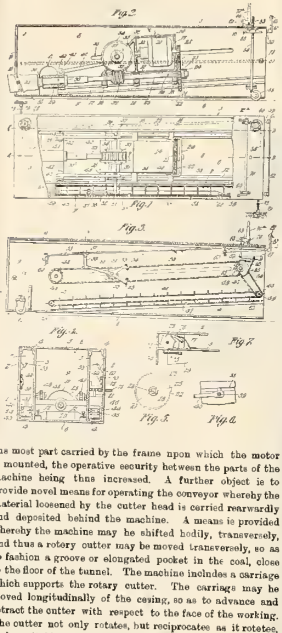
No. 200.

projection i^1, or it may be a swivel hook on the upper side of the top plate which is connected by any convenient number of pillars d^4 to the ring d in the ordinary manner. The upper part of the lamp is locked to its base or bottom after being screwed thereto by means of a hasp *j* and staple *k* and then sealed by a lead rivet, or any other convenient and suitable known method of locking the lamp may be employed. The accumulator is protected against jars by means of asbestos or other packing *l*, and the glass is made gas tight by means of the usual asbestos washers *m*. When the lamp top is screwed on to the bottom portion carrying the accumulator the spring contact *c* comes into contact with the screw f^3 and the plate d^1 comes into contact with the other spring contact c^1, thereby closing the electric circuit and lighting the lamp which remains burning continuously until the top part is unscrewed or the accumulator is exhausted. The accumulator *b* can be readily charged and recharged, and is designed to supply a 2-candle light for a period of, say, 14 hours. (Two claims.)

29051 (1911). *Improvements in Mining Machines.* L. F. Hess, and J. M. Myers, both of Ansted, of Fayette County, West Virginia.—This invention aims to provide improved means for projecting and retracting the carriage upon which the cutter head is mounted, the casing with which the motor is directly assembled, being united with the track supported bearings to form the carriage. A further object is to provide a device in which the driving and driven parts are for the most part carried by the frame upon which the motor is mounted, the operative security between the parts of the machine being thus increased. A further object is to provide novel means for operating the conveyor whereby the material loosened by the cutter head is carried rearwardly and deposited behind the machine. A means is provided whereby the machine may be shifted bodily, transversely, and thus a rotary cutter may be moved transversely, so as to fashion a groove or elongated pocket in the coal, close to the floor of the tunnel. The machine includes a carriage which supports the rotary cutter. The carriage may be moved longitudinally of the casing, so as to advance and retract the cutter with respect to the face of the working. The cutter not only rotates, but reciprocates as it rotates, and a suitable mechanism for accomplishing this result is provided. Fig. 1 shows the invention in top plan, parts being broken away so that the interior actuating mechanism may appear; fig. 2 is a longitudinal section upon the line A—B of fig. 1, parts appearing in elevation; fig. 3 is a longitudinal section upon the line C—D of fig. 1, parts appearing in elevation; fig. 4 is a transverse section upon the line E—F of fig. 1; fig. 5 is a fragmental transverse section upon G—H of fig. 2; fig. 6 is a fragmental longitudinal section upon the line K—L of fig. 1; fig. 7 is a fragmental horizontal section, the view showing a portion of the means whereby the cutter is fed forwardly, independently of its longitudinal reciprocating motion. (Two claims.)



NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

16471. Vertical gas retorts of the continuous type. R. Dempster and Sons Limited and H. J. Toogood.
16484. Composition for use with explosives, for neutralising noxious fumes therefrom after decomposition. W. H. Mawdeley.
16501. Brake apparatus for railway vehicles. E. S. Luard.
16517. Power-machine plant. Allgemeine Elektricitäts-Ges.
16536. Mining cartridges. N. Field.
16539. Automatic lubricator for the bearings of railway vehicles and the like. J. J. Elsdon and W. A. Galle.
16546. Furnaces of the Siemens reversible regenerative type. A. Reynolds.
16575. Pick for mining purposes. J. Johnson and G. Morris.
16608. Pumps. W. A. Drewett.
16634. Protective devices for electric circuits. British Thomson-Houston Company Limited.
16659. Pedestals or bearings for colliery tubs and the like. S. Berrisford.
16673. Guard or protector for the eyes of ponies or horses at work in mines and the like. P. Woodhall, T. W. Lawther and T. B. C. Longstaff.
16691. Luffing jib cranes, derricks and the like. D. M. Petty and D. S. Petty.
16708. Protective devices for electric circuits. British Thomson-Houston Company Limited.
16710. Steam turbine plant for working with live and exhaust steam. Vereinigte Dampfturbinen G.m.b.H.
16737. Screen or filter for use on ventilating fans. M. C. Morris.
16741. Firing steam boilers. D. H. Simpson.
16755. Brakes for railway wagons and like vehicles. T. Locker.
16759. Air and gas mixing device. J. R. Milne and J. Cowan.
16762. Construction of conveyor and means for varying its position. W. G. Read.
16822. Wire-drawing machines. R. D. Connor.
16826. Hydraulic briquetting machinery. G. H. Denison and C. Korte.
16835. Adjustable drill chucks or the like. J. W. Barnes.
16855. Production of nitrogen for use in preventing or extinguishing explosions or fires in coalmines, factories and the like. J. Harger.
16861. Water-softening apparatus. H. J. Fox.
16864 Jigger or sorting machine for coarse and finer ores, coal and other substances. K. Hirtz and A. Krahé.
16884. Manufacture of steel. A. M. Chretien.
16903. Shot-firing by powder fuses and the like. A. Price and W. Pryse.
16908. Drilling machines. J. H. S. Asquith and W. Asquith.
16934. Automatic sack-filling and weighing machines. Richard Simon and Sons Limited, W. G. Simon and F. R. Simon.
16940. Method and apparatus for grading or sizing solid materials. C. L. McKesson and B. F. Rice.
16963. Electric primers for mines. J. Sou.

Complete Specifications Accepted.

To be published on August 8.

1911.

11508. Steam generator and other furnaces. Gregory, and Direct Gas Fuel Limited.
16094. Reciprocating conveyors or screens. Norton.
16311. Closure devices or cover plates for retorts. Clarke and Campbell.
16380. Drilling or boring tools. Treglown and Noble.
16550. Respiratory apparatus for use in diving and working in poisonous atmospheres. Kermode and Davis.
17004. Crushing and grinding mills. Smith.
17368. Rotary fuel supports for gas-producers utilising brown coal and lignite. Koller.
17458. Haulage clips for colliery and like rope haulage railways. Blundell and Hemsley.
18091. Machine for dividing and loading clay and other substances or materials. Thos. C. Fawcett Limited and Bottomley.
18176. Apparatus for charring peat and the like. Kesson.
18973. Valve for air and gas compressors and exhausters, liquid pumps, and the like. Titterton.
19596. Braking apparatus for railway wagons and the like mounted on the permanent way. Clower and Marriott.
19663. Method of and apparatus for ascertaining and indicating the presence of gases other than those ordinarily contained in the atmosphere for use in mines or for other like purposes. Barry.
19933. Safety apparatus for mining cages and lifts. Walton.
20280. Valve mechanism for pneumatic tools. Allison.
20982. Method of and means for quenching coke. Astbury.
21420. Tubular regenerators and like heat-exchange apparatus. Mathesius.
21589. Utilisation of waste gases for production of calcium cyanamide and bisulphide of carbon. Govan.
24896. Gear for the prevention of overwinding and for controlling the speed of winding and hauling engines and the like. J. R. Shaw.
25779. Bottom discharge buckets, boxes, skips, and the like for handling, or receiving and discharging coal grain and other materials. Provay.
26057. Buffers for railway vehicles. Rees and Moreton.
26692. Manufacture of fuel briquettes. Faraday.
29349. Chucks or like tool holders for boring and drilling machines and the like. Swinburne.

1912.

435. Apparatus for testing miners' safety lamps. Roby and Walkden.
3491. Theodolites for measuring horizontal and vertical angles. Brandenberg.
8883. Regenerative furnaces. Imray.
9269. Apparatus for quenching coke. Berlin-anhaltische Maschinenbau Akt-Ges.
9659. Devices for arresting the motion of pit cages, lifts, and hoists when the hauling rope breaks. Alcock.
11539. Hygrometers. Taylor.
13929. Turbo-centrifugal pump units. G. and J. Weir Limited, and Petermoller.

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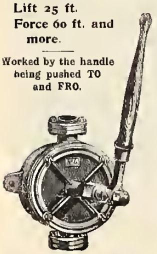

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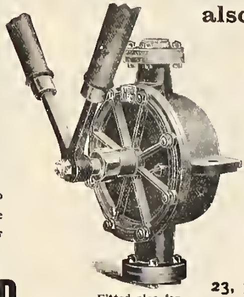

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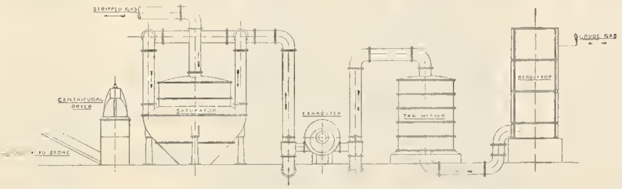

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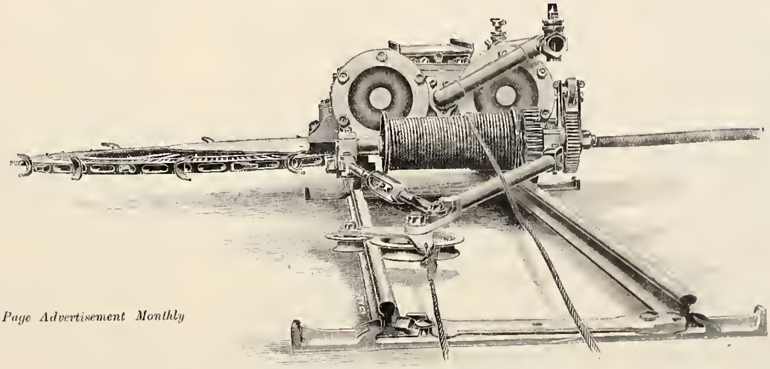

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Longbotham, H. H., and Co. Ld., Wakefield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Electric Meters
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Electrical Plant
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Gt. Central Railway, 216, Marylebone-rd., London
Jones, Geo. H., 74, Blackfriars-road, Salford
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne
Ward, Thos. W., Limited, Albion Works, Sheffield

Electrical Pumps
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Electrical Stores
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C., Ld., Dudley

Emery Wheels
Hook, G. T., 19, Bridge-street Manchester

Enamelled Plates for Notices for Mines
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Theedam, E.C., Ld., Dudley

Enamel Manufacturers (for all Metals)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalbitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Engineers (Consulting)
Entreprise Générale de Fonçage de Puits, 5, Rue de Surêne, Paris
Radford, H. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

Engines (Blowing)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Gas-Compressing)
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Hauling and Winding)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Jones, G. H., 74, Blackfriars-road, Salford
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, H. H., and Co. Ld., Wakefield

Engines (Hauling and Winding)—continued.
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Nott
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, R., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

Engines (Locomotive)
Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Jones, G. H., 74, Blackfriars-road, Salford
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)
Mather and Platt Ld., Manchester

Engine Merchants
Jones, Geo. H., 74, Blackfriars-road, Salford
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

Engines (Oil)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping (See **Pumps**)

Engines (Rolling Mill)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany

Engines (Steam)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Jones, G. H., 74, Blackfriars-road, Salford
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Exhaust Turbine Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Jones, G. H., 74, Blackfriars-road, Salford

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Jones, G. H., 74, Blackfriars-road, Salford
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allan, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Jones, Geo. H., 74, Blackfriars-road, Salford
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Jones, Geo. H., 74, Blackfriars-road, Salford
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Files
Hardy Patent Pick Co. Ld., Sheffield
Spencer, Matthias, and Sons, Sheffield
Waterfall, H. & H., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

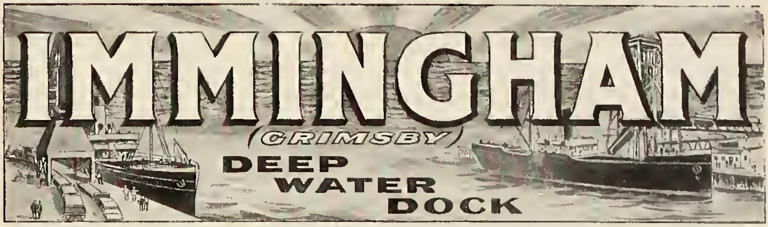
Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

Fire Appliances
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

The NEW COAL PORT



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SAM FAY, General Manager.

Purchasers' Guide to Advertisers' Specialities.—(continued).

Firelighter Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Fishplates
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

Fittings (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

Forged Draught
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

Forges
Hardy Patent Pick Co. Ld., Sheffield

Forgings
Bagnall, W. G., Ld., Stafford
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld., Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Fuel Economisers
Jones, Geo. H., 74, Blackfriars-road, Salford
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld., Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Hammerton-st., Burnley
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall

Fuses (Safety)
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Bricks

Gas Engines
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Glover, M., and Co., Holbeck-lane, Leeds
Jones, Geo. H., 74, Blackfriars-road, Salford
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Gas Exhausters
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Gas Plant
British Westinghouse Electric and Manufacturin Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Tipton

Gas Valves
Haslam and Schontheil Ld., Bristol

Gauge Glasses
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Jacobson, Richard, 70, Shoe-lane, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gear (Special for Motor Lorries Cars &c.)
Brown, David, & Sons (Hudd.) Ld., Huddersfield

Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroen, Andre, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Nuneaton Engineering Co. Ld., Nuneaton.
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Jones, G. H., 74, Blackfriars-road, Salford
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Rods Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones
Rook, G. T., 19, Bridge-street, Manchester

Gunpowder
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, H., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan

Heapsteads—continued
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Hoists
Bleichert, A., and Co., 99-100, Palmerston House Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

Hooks or Links (Safety)
Deutsche Maschinenfabrik A.G., Duisburg Germany
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Harvey, G. A., and Co., Loampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturin Co. Ld., Manchester

Hydraulic Jacks
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Hyland-street Works, Birmingham

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Jones, G. H., 74, Blackfriars-road, Salford
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Hyland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hydrometers
Davis, John, and Son (Derby) Ld., Derby

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" Tunnel Avenue, East Greenwich, S.E.
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CARDIFF East Moors.
MANCHESTER Great Marlborough Street.
SHEFFIELD Celtic Works, Savile Street.
NEWCASTLE-ON-TYNE Boyd Street.
GLASGOW Rosehill Works, Polmadie.

Purchasers' Guide to Advertisers' Specialities—(continued).

Incline Rollers
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Steel, Alfred, and Sons Ld., Brightside, Sheffield

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Reddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Jones, Geo. H., 74, Blackfriars road, Salford
Lowmoor Co. Ld., Bradford, Yorks.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld.; Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

Jointing Cement
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

Jointing (Sheet)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Joists (Rolled Steel)
Heenan and Froude Ld., Worcester
Jones, G. H., 74, Blackfriars-road, Salford
Renton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Keps (for Winding Cages)
Benthaus, D., 45, Bank-street, Sheffield
Wood, John, and Sons Ld., Wigan

Lamp Cleaning Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Gauze Brushes
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Glasses
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Oil Filling Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Re-Lighting Apparatus (Underground)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Arc)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Lamps (Electric)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

Lamps (Electric Safety)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 79, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Rd., Ld., Belvedere Works, Belvedere, Kent
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Miners' Safety)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Outdoor)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

Lathes
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Jones, G. H., 74, Blackfriars-road, Salford
Tangyes Ld., Cornwall Works, Birmingham

Leather Appliances

Lessons by Post
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

Lifting and Hoisting Tackle
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Renton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

Lightning Conductors
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Theedam, E. C., Ld., Dudley

Locknut Washers
Renton, B. M., and Co., Sheffield

Loose Collars
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster S.W.

Lubricators
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C

Machinery (Second-hand)
Bute Works Supply Co. Ld., Cardiff
Foot, R. G., & Co., 11, Queen Victoria-st., E.C.
Jones, G. H., 74, Blackfriars-road, Salford
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Renton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

Machine Tools
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.
Jones, G. H., 74, Blackfriars-road, Salford
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

Mathematical Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mechanical Stokers
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

Metal Perforators
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

Metallic Packing
United States Metallic Packing Co. Ld., Soho Works, Bradford

Meteorological Instruments
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mills (Grinding)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

Mining Dials
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C
Thornton, A. G., Ld., King-st. West, Manchester

Mining Machinery
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Spencer, Matthias, and Sons, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Mining Tools
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Spencer, Matthias, and Sons, Sheffield

Motors
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Motors—continued.
Jones, G. H., 74, Blackfriars road, Salford
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

Motor Starters
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne

Motor Vans and Wagons
Avonside Engine Co. Ld., Bristol
Foot, R. G., & Co., 11, Queen Victoria-street, E.C

Nails, Spikes, &c.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Firth, William, Ld., Leeds
Frost, Albert, and Co., Howard street, Sheffield
Renton, B. M., and Co., Midland Works, Sheffield

Office Furniture and Appliances
Glover, M., and Co., Holbeck lane, Leeds
Thornton, A. G., Ld., King st. West, Manchester

Oil Bottles
Baker, John, and Son, Bilston, Staffs
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'gham

Oil Cabinets
Valor Co. Ld., Rocky-lane, Aston Cross, B'gham

Oil Switches
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Oils and Lubricants
Ackroyd and Best Ld., Morley, nr. Leeds
Asbestos and General Paint Co. Ld., Birmingham
Gannt and Hickman, Oil Works, Wolverhampton
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., & Co. Ld., 23, Southwark-st., E.C

Overhead Travellers
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Spencer and Co. Ld., Melksham, Wilts
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Overwinding Gear
Barclay, Andrew, Sons and Co. Ld., Kilmarnock,
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Oxygen Manufacturers
British Oxygen Co. Ld., Elverton-st., Westminster
Knowles Oxygen Co. Ld., Wolverhampton

Packing (Engine)
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Green and Boulding Ld., London, E.C.
Greens, Tweed and Co., Westminster
Lancaster and Tonge Ld., Pendleton, Manchester
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E

Paint
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Kalbitum Paint Co. Ld., Belvedere, Kent
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

Paint (Fireproof)
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent

Patent Agents
Harris & Mills, 34 & 35, High Holborn, London
Radford, R. H., Son, and Squire, Sheffield

Pedestals
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham

Perforated Plates
Barns, W., & Son, Queensland-rd., Holloway, N.
Firth, William, Ld., Leeds
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Norton's (Tividale) Ld., Tipton
Theedam, E. C., Ld., Dudley

Picks and Shovels
Baker, John, and Son, Bilston, Staffs
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Spencer, Matthias, and Sons, Sheffield
Theedam, E. C., Ld., Dudley

Pinions
Cort, Arthur & Co., 303½, Camberwell-rd., London

Pinions (Raw Hide and Paper)
Bridge, David, & Co. Ld., Castleton, Manchester
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan

Pipe Joint Paste
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Pipes (Steam and Water)
British Mannesmann Tube Co. Ld., London Wall
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Isca Foundry Co., Newport, Mon.
Lewis, Edwin, and Sons, Wolverhampton
Pulsometer Engineering Co. Ld., Reading
Russell, John, & Co. Ld., Alma Tube Wks., Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Nile-st., Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

Pistons
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

Piston Springs
Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

Pit Props (Steel)
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Bute Works Supply Co. Ld., Bute Docks, Cardiff
Firth, William, Ld., Leeds
Heenan & Froude Ld., Worcester
Henderson and Glass, Liverpool
Lewis, Edwin, and Sons, Wolverhampton
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Tren
Spencer, John, Ld., Globe Tube Works, Wednesbury
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton

Pit Props (Wood)
Baird, J. W., and Co., West Hartlepool
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Osbeck and Co., Newcastle-on-Tyne

Pit Prop Withdrawers
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Spencer, Matthias, and Sons, Sheffield

Pit Water Gauges.
John Davis & Son (Derby) Ld., Derby

Planing Machinery and Appliances (Wood)
Glover, M., and Co., Holbeck-lane, Leeds

Plates for Colliery Notices
Davis, John, and Son (Derby) Ld., Derby
Railway and General Engineering Co. Ld., Notts
Theedam, E. C., Ld., Dudley

Plates (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Jones, G. H., 74, Blackfriars-road, Salford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Stewarts & Lloyds Ld., Birmingham & Glasgow
Stringer, John, and Son, Dept. 11, Blackburn

Points and Crossings
Bagnall, W. G., Ld., Stafford
Firth, William, Ld., Leeds
Heenan & Froude Ld., Worcester
Isca Foundry Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Ld., Albion Works, Sheffield

Portable Railways
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington

Preparation for Exams.
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Mining School, Porth, Glam.

Preservative (for Plant)
Kalbitum Paint Co. Ld., Belvedere Works, Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Publications
Colliery Guardian Co. Ld., 30 & 31, Furnival-st., Holborn, London, E.C.
Griffin, Charles, and Co. Ld., London, W.C.
Southern, T. A., Universal Mining School, Cardiff

Pulley Blocks
Deutsche Maschinenfabrik A.G., Duisburg Germany
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

Pulleys (Haulage and Shaft)
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Frost, Albert, and Co., Sheffield
Humble, Stephen, 9, Victoria-st., London, S.W.
Jardine, John, Deering-street, Nottingham
Jones, G. H., 74, Blackfriars-road, Salford
Llewellyn and Cubitt Ld., Pentre, R.S.O. Glam.
Spencer and Co. Ld., Melksham, Wilts
Steel, Alfred, and Sons Ld., Brightside, Sheffield
Thompson and Southwick Ld., Tamworth
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Pulleys (Pit-Head)
Bever, Dorling and Co. Ld., Bradford
Daglish, Robert, and Co. Ld., St. Helens, Lancs,
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Head, Wrightson and Co. Ld., Stockton-on-Tees
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam,
Spencer and Co. Ld., Melksham, Wilts
Thompson and Co., Wigan
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Pump Buckets and Strips
Cort, Arthur, and Co., Camberwell, London
Daglish, Robert, and Co. Ld., St. Helens, Lancs.

Pump (Packing)
Greens, Tweed and Co., Westminster
United States Metallic Packing Co. Ld., Soho Works, Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Pumps and Pumping Machinery
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Cameron, John, Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, John, and Son (Derby) Ld., Derby
Evans, Joseph, & Sons (Wol. Ld.) Wolverhampton

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to any Specification.

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Purchasers' Guide to Advertisers' Specialities—(continued).

PUMPS AND PUMPING MACHINERY—*continued.*

Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Isca Foundry & Engineering Co., Newport, Mon.
Jones, G. H., 74, Blackfriars-road, Salford
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co. Ld., West Gorton, Manchester
Phillips, C. D., Newport, Mon.
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.
Wood, John, & Sons Ld., Brook Foundry, Wigan

PUMPS (TURBINE)

British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Tickle Brothers, Vulcan Ironworks, Wigan

PUNCHING BEARS

Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street, Birmingham

RAIL BENDERS

Deutsche Maschinenfabrik A.G., Duisburg, Germany
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. G., Ld., Dudley

RAIL SAWING MACHINES

Deutsche Maschinenfabrik A.G., Duisburg, Germany
Youngs, Ryland-street Works, Birmingham

RAILS (IRON AND STEEL)

Bagnall, W. G., Ld., Stafford
Bute Works Supply Co. Ld., Cardiff
Firth, William, Ld., Leeds
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

RAILWAY CARRIAGES AND WAGONS

Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
Bristol and South Wales Railway Wagon Co. Ld., Bristol
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester
Lancashire and Yorks. Wagon Co. Ld., Heywood
Lincoln Wagon and Engine Co. Ld., Lincoln
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld. Midland Works Birmingham
Moy, Thomas, Ld., Railway Works, Peterboro'
Rigley, Wm., Bulwell, Nottingham
Rolling Stock Co., Darlington
Wigan Wagon Co. Ld., Springs Branch, Wigan

RAILWAY PLANT

Avonside Engine Co. Ld., Bristol
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Bute Docks, Cardiff
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Firth, William, Ld., Leeds
Gt. Central Railway, 216, Marylebone-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester
Isca Foundry and Engineering Co., Newport, Mon.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld., Midland Works Birmingham
Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Ryland-street Works, Birmingham

RAILWAY PLANT (ELECTRICAL)

British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester

RAILWAY WAGON ASSOCIATION

Association of Private Owners of Railway Rolling Stock, Clarence Chambers, Gloucester
Chorley Railway Wagon Co. Ld., Chorley, Lancs.

RAILWAY WAGON FINANCIERS

Bristol and South Wales Railway Wagon Co. Ld., Bristol
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lincoln Wagon and Engine Co. Ld., Lincoln

RAILWAY WAGON REPAIRERS

Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, near Birmingham
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Heenan & Froude Ld., Worcester
Lancashire and Yorkshire Wagon Co. Ld., Heywood, near Manchester
Lincoln Wagon and Engine Co. Ld., 11, St. Mary-street, Lincoln
Moy, Thomas, Ld., Railway Works, Peterboro'
Rigley, Wm., Forest Wagon Works, Bulwell, Nottingham

RAILWAY WAGONS (TIPPING)

Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester

RAKES (PIT)

Baker, John, and Son, Bilston, Staffs
Hardy Patent Pick Co. Ld., Sheffield

REDUCING GEAR

Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, and Sons (Huddersfield) Ld., Park Gear Works, Lockwood, Huddersfield

REDUCING VALVES (FULL BORE AND STANDARD)

Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield

REFRIGERATORS

Pulsometer Engineering Co. Ld., Reading

REFUSE DESTRUCTORS

Heenan & Froude Ld., Manchester

REGULATING VALVES (FULL BORE)

Auld, D., and Sons, Whitevale Foundry, Glasgow

RESCUE APPARATUS

British Oxygen Co. Ld., Elverton-st., Westminster
Davis, E., 2, Aire-street, Leeds
Jacobson, H., 70, Shoe-lane, London, E.C.
Knowles Oxygen Co. Ld., Wolverhampton
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., 187, Westminster bridge-road, S.E.

RESPIRATORS

British Oxygen Co. Ld., Elverton-st., Westminster
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., Westminster

RIVETS

Baker, John, and Son, Bilston, Staffs
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley
Ward, Thos. W., Limited, Albion Works, Sheffield

ROCK DRILLS

Aqncone Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Spencer, Matthias, and Sons, Sheffield
Stephens, B., and Son, Carn Brea, Cornwall

ROLLERS AND PULLEYS (HAULAGE)

Bagnall, W. G., Ld., Stafford
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

ROOFS AND OUTDOOR BUILDINGS

Heenan & Froude Ld., Newton Heath, Manchester
Isca Foundry & Engineering Co., Newport, Mon.
Norton's (Tividale) Ld., Tipton
Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton

ROPES (COTTON DRIVING)

Kenyon, Wm., & Sons Ld., Dukinfield
Wright, J. and E., Ld., Birmingham

ROPES (DRIVING)

Kenyon, W., & Sons Ld., Dukinfield Manchester

ROPES (HEMP AND MANILLA

Wright, J. and E., Ld., Birmingham

ROPE PRESERVATIVE

Wright, J. and E., Ld., Birmingham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

ROPES (WIRE)

Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Cooke, William and Co. Ld., Tinsley, Sheffield
Elliot, George, and Co. Ld., 16, Great George-st. Westminster, S.W.
Glover, Wm. Jas., and Co., St. Helens, Lancs.
Haggie Brothers Ld., Gateshead-on-Tyne
Latch and Batchelor Ld., Hay Mills, Birmingham
Thompson and Co., Wigan
Wright, John & Edwin, Ld., Garrison st., B'ham

ROPEWAYS

Bleichert, Adolf, and Co., 99-100, Palmerston House, Bishopsgate-st. Within, 60, E.C.
Tickle Brothers, Vulcan Ironworks, Wigan

RUBBER-COVERED ROLLERS

Roddaway, F., & Co. Ld., Pendleton, Manchester

SAFETY VALVES

Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster and Tonge Ld., Pendleton, Manchester

SAWS AND SAWING APPLIANCES

Appleby, E. G., and Co., 10, Victoria-street, Westminster
Glover, M., and Co., Holbeck-lane, Leeds

SCOVING FOR COAL AND COKE

Baker, John, and Son, Bilston
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. G., Ld., Dudley

SCREENING

Barns, W., and Son, Globe Works, Holloway, N
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

SCREENING PLANT

Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

SCREWING MACHINES

Frost, Albert, and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

SCREWS (STRETCHING)

Youngs, Ryland-street Works, Birmingham.

SEWAGE TREATMENT PLANT

Mather and Platt Ld., Manchester

SHAFTING

Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Hardy Patent Pick Co. Ld., Sheffield
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Phillips, C. D., Newport, Mon.
Spencer and Co. Ld., Melksham, Wilts
Uskside Eng. Co. Ld., Newport Mon.
Wright, Joseph, and Co., Tipton

SHAFT SINKERS

Trefor Boring and Mining Co. Ld., 41, rue Royale, Brussels

SHEET IRON

Firth, Wm., Ld., Water-lane, Leeds
Harvey, G. A., & Co., Leampit Vale, Lewisham, S.E.
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

SHEET METAL WORKS (FOR CYLINDER CASING

Baker, John, and Son, Bilston
Kenyon, Wm., & Sons, Ld., Dukinfield
Valor Co. Ld., Rocky-lane, Aston Cross, B'ingham

SHIPPING

Gt. Central Railway, 216, Marylebone-road, N.W.

SHOT-FIRING BATTERIES AND CABLES

British Explosives Syndicate Ld., Glasgow
British Insulated and Helsby Cables Ld., Lancs.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Haslam and Schonthell Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

SHOVELS AND SHOVEL TREES

Baker, John, and Son, Bilston, Staffs
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

SIDINGS

Bagnall, W. G., Ld., Stafford
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, & Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

Purchasers' Guide to Advertisers' Specialities.—(continued).

Sleepers (Iron and Steel)
Allen, W. G., & Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
Baird, J. W., and Co., West Hartlepool
Bute Works Supply Co. Ld., Cardiff
Firth, Wm., Ld., Water-lane, Leeds
Renton, B. M., and Co., Midland Works, Sheffield

Smiths' Tools
Hardy Patent Pick Co. Ld., Sheffield

Smith Work
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Wright, Joseph, and Co., Tipton

Smoke Helmets
Siebe, Gorman and Co. Ld., Westminster, S.E.

Speed-Reducing Gears
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Sphincter Grip Armoured Hose
Reddaway, F., & Co. Ld., Pendleton, Manchester

Springs
British Wagon Co. Ld., Rotherham
Lancaster and Tonge Ld., Pendleton, Manchester
Skinner, J. P. and Co. Ld., Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Stampings
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Steam Experts
Tickle Brothers, Vulcan Ironworks, Wigan

Steam Fittings
British Mannesmann Tube Co. Ld., London Wall
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Russell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staffs.

Steam Mains and Pipe Installations
Stewarts and Lloyds Ld., Birmingham & Glasgow
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

Steam-Saving Appliances
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Burnley
Yorkshire Boiler Co. Ld., Bradford

Steam Traps
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster & Tonge Ld., Pendleton, Manchester
Stewarts & Lloyds Ld., Birmingham and Glasgow
United States Metallic Packing Co. Ld., Soho Works, Bradford
Wright, Joseph, and Co., Tipton

Steam Winches
Bridge, David, & Co. Ld., Castleton, Manchester
Clarke, Chapman & Co. Ld., Gateshead on Tyne
Phillips, C. D., Newport, Mon.
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Steel
Cooke, William, and Co. Ld., Tinsley, Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Latch and Batchelor Ld., Hay Mills, nr. B'ham
Mining Engineering Co. Ld. (The), Sheffield
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Spencer, Matthias, and Sons, Sheffield
Stewarts & Lloyds Ld., Birmingham and Glasgow
Thompson and Co., Wigan
Waterfall, H. & R., & Parker, Bridge-st., Sheffield

Steel Blooms Billets
Renton, B. M., and Co., Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Flats and Rounds
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Tinbars
Scott, Walter, Ld., Leeds Steel Works, Leeds

Stone Breakers
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln

Structural Steel Work
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Wright, Joseph, and Co., Tipton

Sulphate of Ammonia Plant
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Sulphur Recovery Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Superheaters
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
Pulsometer Engineering Co. Ld., Reading
Stringer, John, and Son, Dept. 11, Blackburn

Surgical Appliances
White & Wright, 93, Renshaw Street, Liverpool

Surplus Steam Valves (Full Bore)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Hopkinson, J., and Co. Ld., Huddersfield

Surveying (Books on)
Thomas, Wm., Cambrian Mining School, Porth

Surveying (Instruction)
Thomas, Wm., Cambrian Mining School, Porth

Surveying Instrument Makers
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavement, London
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Switch Boards
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne

Switch Gear
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne

Swivels (Ball-Bearing)
Bridge, David & Co., Ld., Castleton, Manchester
Youngs, Ryland-street Works, Birmingham

Tamping Plugs

Tanks
Bagnall, W. G., Ld., Stafford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Harvey, G. A., and Co. Loampit Vale, Lewisham
Isca Foundry & Engineering Co., Newport, Mon.
Jones, G. H., 74, Blackfriars-road, Salford
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Valor Co. Ld., Rocky-lane, Aston Cross, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

Tanks (Ferro-Concrete)

Tar Distilling Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Technical Education
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Telephones
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Timber (Colliery)
Baird, J. W., and Co., West Hartlepool
Osbeck and Co., Newcastle-on-Tyne

Tipplers.
Bagnall, W. G., Ld., Stafford
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Spencer and Co. Ld., Melksham, Wilts
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

Tools
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Tram and Wagon Corner Plates
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Theedam, E. C., Ld., Dudley

Transformers (Electrical)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Reyrolle, A., and Co. Ld., Hebburn-on-Tyne

Transport Plant
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Trommels
Barns, W., and Son, Globe Works, Holloway
Heenan & Froude Ld., Worcester and Manchester
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts

Truck Shunting Plants
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Tubbing and Well Cylinders
Head, Wrightson and Co. Ld., Stockton-on-Tees
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Tub Drawbars
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Ormerod, Edward, Atherton, near Manchester
Renton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

Tube Expanders
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

Tube Fittings
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Wednesbury
Stewarts & Lloyds Ld., Birmingham and Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tubes (Iron and Steel)
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Lewis, William, and Son, Bilston
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tub Greasers and Controllers
Theedam, E. C., Ld., Dudley

Tubs (Colliery)
Allen, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Humble, Stephen, 9, Victoria-st., London, S.W.
Longbotham, R. H., and Co. Ld., Wakefield
Theedam, E. C., Ld., Dudley
Wigan Wagon Co. Ld., Springs Branch, Wigan
Wright, Joseph, and Co., Tipton

Tunnel Segments
Railway and General Engineering Co. Ld., Notts
Tickle Brothers, Vulcan Ironworks, Wigan

Turbines
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Jones, G. H., 74, Blackfriars-road, Salford
Mather and Platt Ld., Manchester

Turbines (Exhaust)
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Turbo Compressors
Tickle Brothers, Vulcan Ironworks, Wigan

Turntables
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Isca Foundry & Engineering Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Tuyeres
Baker, John, and Son, Bilston, Staffs
Railway and General Engineering Co. Ld., Notts
Russell, John, and Co. Ld., Walsall
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C. Ld. Dudley

Valuers
Radford, R. H., Son, and Squire, Sheffield
Stringer, John, and Son, Blackburn

Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Green and Boulding Ld., 28, New Bridge-st., E.C.
Haslam and Schontheil Ld., Cardiff
Hopkinson, J., and Co. Ld., Huddersfield
Mather and Platt Ld., Manchester
Russell, John, & Co. Ld., Alma Tube Works, Walsall

Vices
Frost, Albert, and Co., Sheffield
Glover, M., and Co., Holbeck-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

Vulcanised Fibre
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Washers
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Jardine, John, Deering-street, Nottingham

Washers—*continued.*
Renton, B. M., and Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Water Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Water Filters
Pulsometer Engineering Co. Ld., Reading
Wright, Joseph, and Co., Tipton

Water Softening and Purifying
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Wright, Joseph, and Co., Tipton

Water Tube Boilers
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
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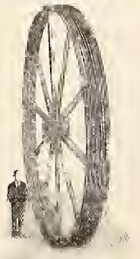

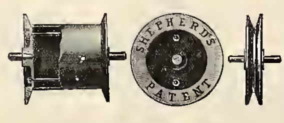

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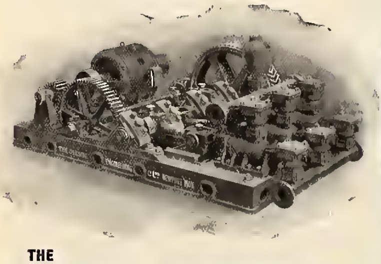

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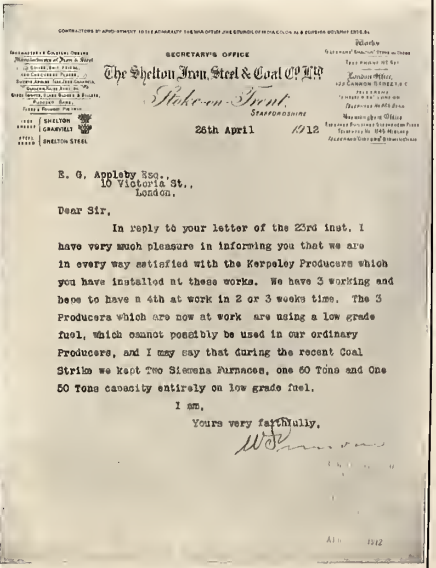

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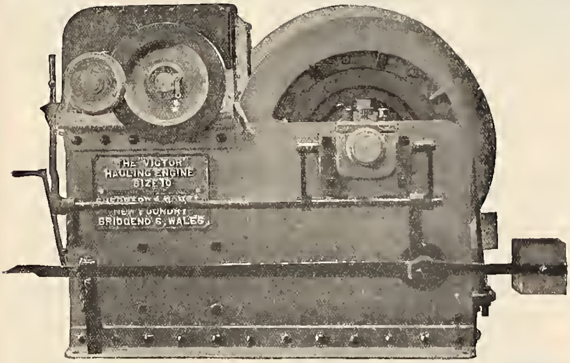

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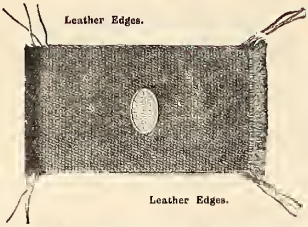

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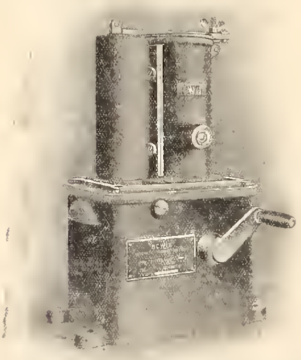

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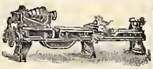

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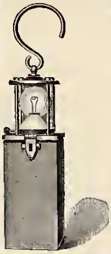

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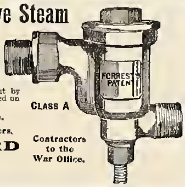

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The simplest, most effective, and cheapest controller made. For description, see *Colliery Guardian* of Dec. 22, 1911, report of paper read by Mr. Paul before the Mining Institute of Scotland.

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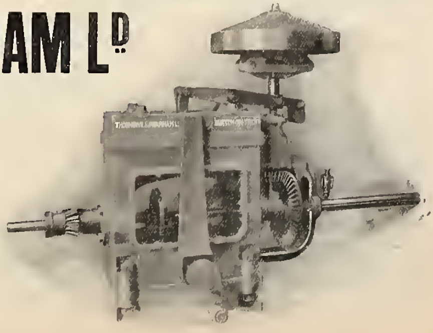

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For Sale, New Steel Lancashire Boilers, ready for immediate delivery:— Other sizes in progress.
30 ft. long by 8 ft. diameter, for 100 lb. working pressure.
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Locomotives of every description, Colliery or main lines; COAL-CUTTER MACHINES to undercut up to 6 ft.—**YORKSHIRE ENGINE CO. LTD.,** Meadow Hall Works, Sheffield.

Boilers and Machinery (good Second-hand) for sale; if you are requiring Boilers, Engines, or other plant, please send us particulars as we shall probably have something suitable to offer you.—**JOHN STRINGER & SON,** Dept. 11, Blackburn.

Locomotives, two 10 in., 4-wheel coupled, by Pecketts, suitable for sidings; quantity 20, 24, 56, 70 lb. per yard good relayable Flange Rails; 300 tons good relayable Bull Head Rails, suitable for sidings, with Points and Crossings, Chairs, second-hand or new Sleepers, Crossing Timbers, and Turntables; twenty 24 in. gauge Tip Wagons and Portable Railway for sale at low figure to clear.—**D. M. BENTON & CO.,** Midland Works, Sheffield.

Four Dry Back Marine Type Boilers, by Frasers, 11 ft. 2 in. diameter by 13 ft. long, suitable for 180 lb. steam, 1,000 gallons per hour evaporated each, heating surface 2,000 square feet; will be sold cheap before removal; seen London.—Apply, **BARRY H. GABDAM,** Staines.

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Electric Plant, comprising 400-H.P. Belliss Engine, and 225-kw. Generator, 460 volts; 150 kw. 2 cylinder Compound Belliss-Morcom ENGINE, cylinders 14 in. and 19 in. by 10 in.; two Sunderland Forge Triple-expansion High-speed ENGINES and D.C. DYNAMOS, cylinders 9 in., 14½ in., 23½ in. by 10 in. stroke, 380 r.p.m., dynamos 168-kw. each, 220 volts; Electric GENERATING PLANT, comprising pair 18½ in. by 11 in. "Robey" Vertical Engines, and B.T.H. Generator, 125 k.v.a., 40 cycle, and exciter; one ditto, comprising 21 in. by 21 in. Vertical Engine and two-pole Dynamo, 600 volts 168 amps. 500 revs.; ditto, comprising 60 kw. 3-phase B.T.H. Alternator, 40 cycles, 440 volts, and Exciter, with Westinghouse Engine, cylinders 10 by 18 by 10.
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Required, 30 Colliery Trams, Second-hand, to hold not less than one ton, gauge 2 ft. 10 in.—Reply, **TYNYWAIN COLLIERY,** Bryncethin, near Bridgend, South Wales.

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For Sale by Tender, 3 Second-hand Cornish BOILERS, 30 ft. long by 7 ft. diameter by ⅜ in. shell plates; the boilers may be seen at Risca Collieries, near Newport, Mon.—Tenders to be addressed to the **UNITED NATIONAL COLLIERIES LTD.,** Exchange, Cardiff, on or before the 10th prox.

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Fifty ¾-yard Steel Side-tipping Wagons, 24 in. gauge.
20 capital second-hand Crane Skeps, cheap.
500 tons specially selected hard Steel B.H. Rails, about 80 lb. per yard, with all accessories.
4/500 tons of splendid second-hand 50/56 lb. Flange Rails, with Fishplates, Points and Crossings, &c., to match.
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Cash Buyers of Machinery, Plant, old Iron and Steel Scrap, Metals, Indiarubber, &c., New and Second-hand Rails, and all Accessories, Sleepers, &c.

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Two Motor-driven Double-acting Air COMPRESSORS, Reidler's patent, 125-b.h.p. Motor, capacity of each 750 ft. of free air.
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5-ton Compound STEAM TRACTOR, on springs (by Aveling & Porter).
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40-ton Hydraulic FORGING PRESS, 14 in. ram.
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Telegrams: "Gething, Cardiff."
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For Sale, one Twin Compound Engine, by Walker Bros., Wigan, cylinders 18 in. and 30 in. by 3 ft. 6 in. stroke, fitted with expansion valves to both cylinders, cylinders covered with teak lagging, pipes and valves for separate working of each engine, bend rail and pillars, one flywheel pulley 16 ft. diameter, with 9 grooves for 1¾ in. diameter ropes, smaller pulley 8 ft. diameter, steam pressure 120 lb.; the engine is in excellent condition, and has only been running a few years driving a 22 ft. Walker fan; the engine may be seen working any day up to August 3rd, at Ferndale, T. V. Railway.—Apply, **D. DAVIS & SONS LTD.,** Colliery Proprietors, Cardiff.

Wanted, good 10 in. or 12 in. Loco., 4 wheels coupled, for temporary purposes, must be good and cheap; also 9 or 10 End-tip Wagons.—**Box 4860,** *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

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The Electricity Committee is prepared to receive TENDERS for the supply and delivery of STEAM COAL for the twelve months ending August 31st, 1913.

Specifications and forms of tender may be obtained on application at the Electricity Works, Jubilee-street, on and after Saturday, July 20th, 1912.

Sealed tenders endorsed "Steam Coal," and addressed to the Chairman of the Electricity Committee, will be received at the Town Hall up to midday Saturday, August 3rd, 1912.

The lowest or any tender will not necessarily be accepted.

Corporation Electricity Works,
Jubilee street,
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Engineer and Manager.

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The set may be seen running, by appointment, any week day after 3 o'clock p.m., at Risca Collieries, near Newport, Mon.

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Universal Mining School. Lessons by Post. Thorough preparation for all Mining Exams. Syllabus free.—Principal, **T. A. SOUTHERN,** 215, the U.M.S., Cardiff.

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The Matriculation Examination for the Degree in Mining will be held on September 10th, 1912.

For information apply to the Registrar before August 24th.

The MINING DIPLOMA (Day) COURSE commences on October 2nd, 1912.

The CERTIFICATE (Saturday afternoon) COURSE commences on September 21st, the Derby Mining Course on September 21st, and the Mining Teachers' Course on September 28th.

The COURSES in Electricity applied to Mining commence on September 28th.

For particulars, apply to **W. M. GIBBONS,** Registrar.

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SCHOOL OF MINING.

Professor	JOHN CADMAN, M.Sc., D.Sc. (Lond.), F.G.S.
Demonstrator in Coal Mining and Lecturer in Surveying	ALEXANDER CLUBB, B.Sc.
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In connection with the Mining Classes there will be frequent visits of inspection to mines in the neighbourhood of Birmingham, and a SUMMER MINING SCHOOL will also be held in the long vacation in some mining district either at home or abroad.

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Specification & Workmanship equal to Main Line Engines.

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Advertisements can be inserted under a Box number, and replies will be forwarded free of charge.

Copies of Testimonials—*not originals*—should accompany applications for situations.

Where possible, information will be given in these columns when appointments advertised have been filled up.

Experienced Colliery Electrician Wanted for the Midlands; direct current, generating, hauling, and Diamond coal cutters, telephones, &c.; able to do own repairs.—Apply, giving references, age, experience, and wages, to **Box 4847,** *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

Wanted for six months, a thoroughly competent DRAUGHTSMAN and SURVEYOR to make some new plans for a large colliery in Lancashire.—Address, stating qualifications and salary required, **Box 4848,** *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

A large manufacturing firm employing several thousand hands is willing to pay a liberal salary to an energetic man to control their PURCHASING DEPARTMENT; qualifications required, wide knowledge of markets, including all classes of general stores; organising ability, experience in similar position of trust; state age, experience, and present salary.—Reply, **Box 4852,** *Colliery Guardian* Office, 30 & 31, Furnival street, Holborn, London, E.C.

Required for a Colliery in India, Assistant MINING ENGINEER of good education, age under 30; first-class certificate and qualifications, and experience of thick coal would be an advantage; three years' engagement at Rs. 400/-, 425/-, and 450/- per month, with free bungalow, &c., renewable.—Write, **"J. M. S.,"** care of J. W. Vickers & Co. Ltd., 5, Nicholas lane, London, E.C.

Wanted, First-class Certificated Colliery MANAGER for a Lancashire Colliery.—Apply, stating age, experience, and salary required, to **Box 4855,** *Colliery Guardian* Office, 30 & 31, Furnival street, Holborn, London, E.C.

Wanted, First-class Certificated Colliery MANAGER to act under agent at a South Wales steam coal colliery.—Apply, giving particulars, age, experience, salary, to **"A. Z.," Box 4859,** *Colliery Guardian* Office, 30 & 31, Furnival-st., Holborn, London, E.C.

Wanted, a Coal Salesman, salary between £200 and £300 per annum, with contract ticket and reasonable personal expenses; must have been connected with the coal trade, and have a knowledge of the Lancashire district; coal merchants in *actual business* will not be appointed; applicants to state age and experience, and send not more than 3 testimonials or references, also say when they can enter on the duties.—Apply, **Box 4858,** *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

The position of Master Mechanic for Coal Mine, Spitzbergen, has now been filled. Thanks are tendered to the applicants.

Wanted immediately by large Colliery firm in South Wales, competent DRAUGHTSMAN to take charge of drawing office; must be experienced in electric generating station and power practice, compressed air installations, and general colliery work.—State full particulars of experience, age, salary required, and when at liberty, to **Box 4861,** *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

Wanted, a Manager for a Colliery in the Midlands; must have had experience in coal cutting and gob fires.—Apply, giving age, experience, references, and salary required, to **Box 4884,** *Colliery Guardian* Office, 30 & 31, Furnival st., Holborn, London, E.C.

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Assistant Manager with Colliery Managers, first-class certificate, required by firm controlling large coal interests in Bengal, not exceeding 30 years of age; thoroughly practical, four years' agreement, commencing with £280, rising to £360 a year; good prospects for good man; free furnished quarters; second-class passage out and home.—Write, with full particulars, to **"D. D.,"** care of J. W. Vickers & Co. Ltd., 5, Nicholas-lane, E.C.

A Colliery Manager of large and varied experience is open to engagement; only businesslike firms need reply.—**Box 4854,** *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

Required, position as Colliery Salesman or TRAVELLER; well known west and south England, Eastern Counties, Ireland, and Channel Isles; would accept position as Book-keeper or Correspondence Clerk.—**"B.A.O.T.," Box 4841,** *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

Wanted by a capable man of 15 years' experience, position as AGENT or TRAVELLER for a good colliery; thorough knowledge of districts of Staffs, Cheshire, Lancashire, Shropshire, North and Mid Wales; small salary and commission.—**"B.A.O.T.," Box 4842,** *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

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Situation required as Traveller or Wharf CLERK; good knowledge of South and West of England and part Midlands; experienced and able; good references; wages moderate.—**"B.A.O.T.," Box 4844,** *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

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*** *For* **later Advertisements** *and* **Scale of Charges,** *see* **Page 182 (Leader Page).**

Printed and Published by the Proprietors, The Colliery Guardian Company Limited, 30 & 31, Furnival Street, Holborn, London, E.C. Friday, July 26, 1912.

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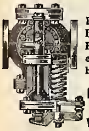

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We have Crane Ropes working on the same Barrels as Chains.
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Chains of every description.
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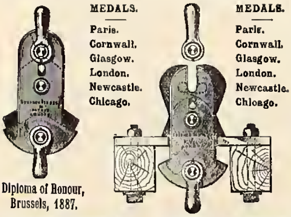

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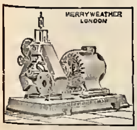

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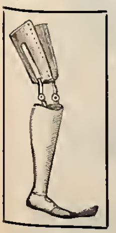

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Treated with
CLING SURFACE
May be run SLACK WITHOUT SLIPPING and give INCREASED POWER.

There are now many imitations of Cling Surface, but they only deceive and disappoint.

Photos of Belts and Ropes running SLACK in the most important works in England sent on application to—

THOMAS & BISHOP, Sole European Agents,
Head Office—119-125, Finsbury Pavement, London, E.C.

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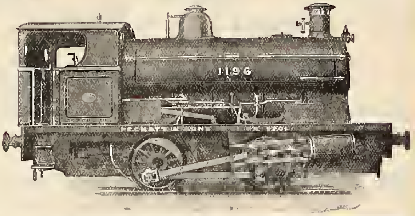
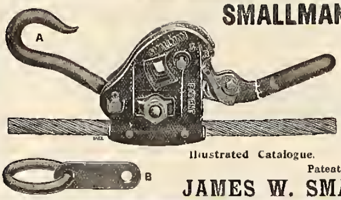
PECKETT & SONS, BRISTOL.

Speciality—
TANK LOCOMOTIVES
Locos. of various sizes specially designed for
COLLIERIES, IRONWORKS, CONTRACTORS, &c.,
always in Stock,
READY FOR IMMEDIATE DELIVERY.
Photographs, Prices and Specifications on application.
Telegraphic Address—"Peckett, Bristol."
National Telephone—No. 7306.
Established 1864.





SMALLMAN Patent **HAULAGE CLIPS.**
New Model: Nine Sizes.
Patented 1902, 1906 and 1910.
Automatic Detachment.

The 1911 lever has large lateral stops and a wedge-shaped head.

Drop-forged shells (two sizes), levers (four sizes), catches and couplings.

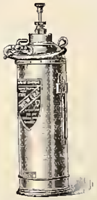
Clips can be had without catches.

Illustrated Catalogue.

Patentee and Sole Manufacturer:—
JAMES W. SMALLMAN. NUNEATON, England.

New Regulations regarding Fire Protection in Collieries.

THE "NEW ERA" FIRE EXTINGUISHER



in time of need is like a trusted friend—DEPENDABLE. Protect your

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with the "NEW ERA." Don't delay. Do it now. To-morrow it may be too late. It is better to have the "NEW ERA" than to wish you had!

Full Descriptive List and Prices will be sent on application to—

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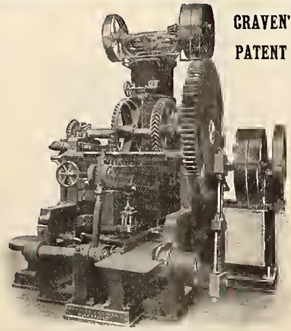

CRAVEN'S PATENT **BRIQUETTING MACHINE.**

SPECIALLY DESIGNED FOR PRODUCING LARGE BRIQUETTES FOR MARINE AND INDUSTRIAL USE.

EXERTS HEAVIER PRESSURE and GIVES BETTER RESULTS than any other—either British or Continental.

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For HIGH LIFTS in MINES,

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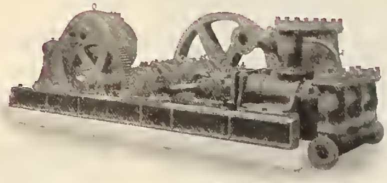
SALISBURY HOUSE,
LONDON WALL, E.C.

- Sinking Pumps,
- Direct Acting Steam Pumps (Simple and Compound),
- Duplex Pumps (Simple and Compound),
- High Lift Power Pumps,
- Boiler Feed Pumps, AND
- Steam Pumps of every description.



HORIZONTAL ELECTRICALLY DRIVEN TREBLE RAM PUMP.
1,200 feet Pattern.

- Electrically Driven Pumps,
- Centrifugal Pumps,
- Wire Rope Driven Pumps,
- Horse Pumps,
- Hand Syphon Pumps for Colliery Work, AND
- Hand Pumps of every description.

JOSEPH EVANS & SONS (WOLVERHAMPTON LIMITED)

Culwell Works, WOLVERHAMPTON.

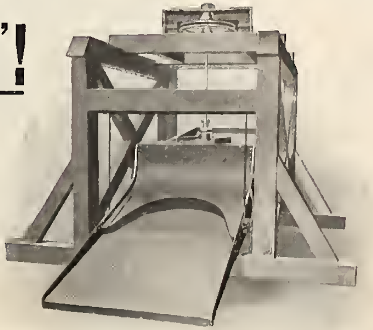
THE RIDDLE!

Which is the Best Screen for Tender Coal ?

AND THE ANSWER?

THE "VIBROMOTOR"!

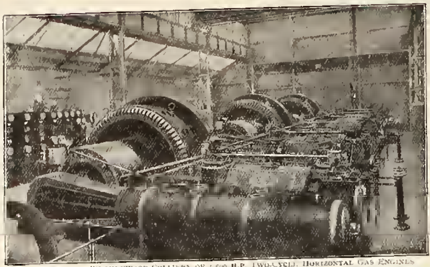
BECAUSE it has the same motion as the hand riddle carried out mechanically.



Full particulars and illustrations of standard sizes on application to the
SOLE MAKERS—

THE HARDY PATENT PICK CO. LTD., SHEFFIELD.

CONVERT STEAM POWER TO GAS POWER.



Installation at Birchenwood Colliery of 1,500 H.P. Two-Cycle Horizontal Gas Engines direct-coupled to our Three-Phase Generators.

WHY? By doing so fuel costs are reduced at least one half, no matter whether the fuel be coal or waste gases. The by-products of the fuel are made a source of income The water consumption is reduced to a minimum. In the case of coal fuel the smoke nuisance is abolished. We have had a large experience in the application of our two-cycle gas engine for all classes of work, especially when using waste fuels and waste gases, and the success of these various installations prove that our patent two-cycle gas engine is a thoroughly reliable prime mover.

Every Stroke
is a
Driving Stroke.

Mather & Platt, Ld.
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TUBES FOR MINES—EDWIN LEWIS & SONS,
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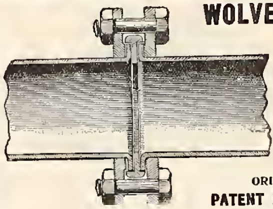
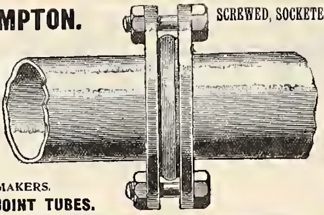
SEND FOR
PRICE LISTS
of every class of
TUBE
USED IN
MINING





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SCREWED, SOCKETED & FLANGE-JOINTED
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Ascending
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Safeguarded.

No
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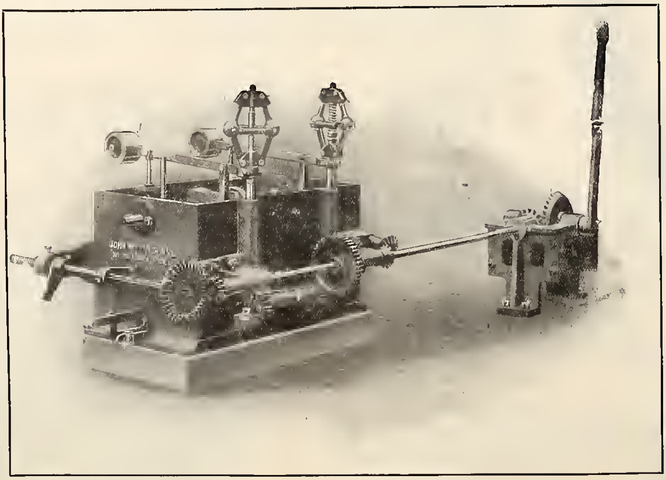

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assured
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The most
Effective
Machine on
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160
at work.

Write for particulars to JOHN WOOD & SONS Ltd.,
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EVERYTHING YOU REQUIRE IN

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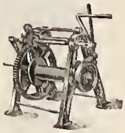

YOUNGS,
Ryland Street Works,
BIRMINGHAM, ENGLAND.
Write for Catalogue No. 36.

THE COTTON POWDER CO. LTD.
EXPLOSIVES ON THE PERMITTED LIST.

FAVERSHAM POWDER. The Safest of all Permitted Explosives. The remarkable spreading effect in action makes it specially adapted for Coal Blasting. CONTAINS NO NITRO-GLYCERINE. WILL NOT FREEZE.

REXITE. Specially designed for Hard Coal, Stone, Sinking and Driving purposes; most useful Explosive for all-round work in the Mine. NO THAWING REQUIRED.

NORMANITE. For getting Hard Coal, and general Blasting work in the Mine.

SWALITE. For Ripping, Brushing, Driving and Sinking.

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BLASTING GELATINE
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EXPLODERS, SHOT-FIRING CABLE, SAFETY FUSE and all Accessories.

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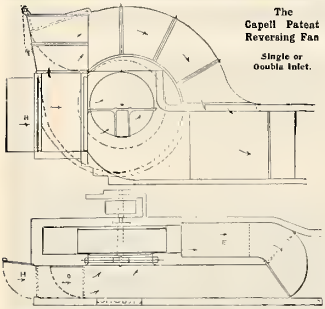


The Capell Patent Reversing Fan
Single or Double Inlet.

CAPELL PATENT FANS (1906-1907).
REVERSING FANS ARE REQUIRED BY NEW MINES ACT.

These give larger Volumes and higher Manometric Effects. The Result is a Smaller Fan is now used for all duties. Fans—Rope or Belt or Direct Driven.

SOME RESULTS OF THESE NEW FANS ARE NOW GIVEN.

1. IN ENGLAND.
Fan, 12 ft. 6in. × 7 ft. 0 in.
Date, Oct. 5th, 1907.
Revols. 265
W.G. . ... 8 inches
Cubic ft. per min. 376,000
H.P. in av. . . 472
H.P. indicated ... 579
Useful Effect 81·5 %

2. IN PENNSYLVANIA.
Fan, 16 ft. 0 in. × 8 ft. 0 in.
Direct Driven.
Date, October 6th, 1907.
Revols. 158
Cubic ft. .. 431,700
W.G. ... ... 4·3 inches
Useful Effect 80 %

3. IN ENGLAND.
Single Inlet Fan.
16 ft. 0 in. × 5 ft. 0 in.
Revols. 170
Cubic ft. . 208,000
W.G. .. .. 5¼ inches
Useful Effect 74 %

INDUCED DRAUGHT. IN-BYE FANS, CUPOLA FANS, FORCE FANS, HAND MINING FANS, AND DUPLICATE MINE FANS.

Sole Makers—
THE CAPELL FAN CO., 13, Mosley Street, NEWCASTLE-ON-TYNE.

Telegrams—"CUBITT, PENTRE."
Telephone—G.P.O., No. 5, PENTRE.

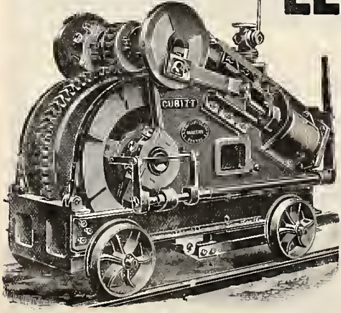
LLEWELLYN & CUBITT L^TD.
Engineers, Iron and Brass Founders and Boiler Makers,
RHONDDA ENGINE WORKS, PENTRE, R.S.O., GLAM.,
YSTRAD STATION, TAFF VALE RAILWAY.

ELECTRICAL HAULAGES —A— SPECIALITY.

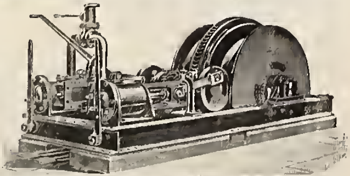
WINDING ENGINES.

Improved Self-contained Underground Hauling Engines. Horizontal & Vertical Stationary Engines

ENGINES SPECIALLY EQUIPPED FOR ELECTRIC LIGHTING.
AIR COMPRESSORS.
VENTILATING FANS.
STEAM FORCE PUMPS.
COAL-CRUSHING MACHINERY.
Lancashire, Cornish, Multitubular, and Vertical BOILERS.
Wrought-iron or Steel Pithead Frames.
Pithead Pulleys to 20 ft. diameter.
And all kinds of Colliery Requisites.
Makers of Machine-moulded Spur, Mitre and Bevel Wheels.
Haulage Pulleys of all sizes.
Pit Cages. Fangs, & Automatic Banking Arrangement. Coal-screens and Endless-chain Creepers.
Makers of Automatic Expansion Gear for Winding Engines.



"CUBITT"
Portable Hauling Engine.



"UNIVERSAL"
Long Type Self-contained Hauling Engine.

CLARKE, CHAPMAN & CO. LTD.,

Victoria Works,

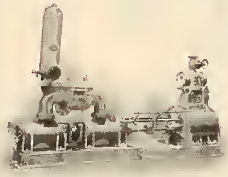
GATESHEAD.

GENERAL & ELECTRICAL ENGINEERS
— AND —
BOILERMAKERS.

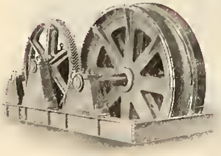
Specialists in Colliery Power Plant,
Haulage and Winding Gears,
Water Tube Boilers ("Woodeson" Patents),
Pumps for all Purposes
(Steam and electrically driven).

Telephones—
1070-1073 Central, Newcastle. 137, City.

Telegrams—
Cyclops, Gateshead.



Direct-acting Mine Pump.
"Woodeson" Patent.



Electrically-driven Endless-rope
Haulage Gear.

AUTOMATIC COAL WASHING PLANT.

SHEPPARD & SONS LTD.,

FOUNDED 1862.

By our recent Patents our Machinery is made **ABSOLUTELY AUTOMATIC WITH INCREASED EFFICIENCY.**

Machines of our older patterns can be converted at a small cost.

Samples washed and reported on free of cost.

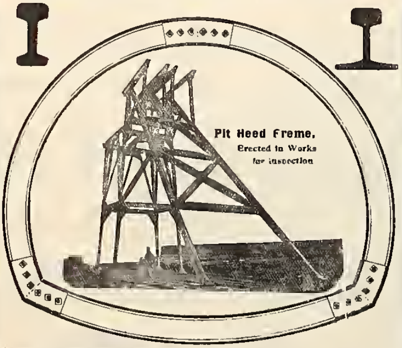
S. WALES. **NEW FOUNDRY, BRIDGEND.**

WALTER SCOTT LTD.

Leeds, LEEDS STEEL WORKS. England

MANUFACTURERS OF

BRITISH STANDARD ROLLED STEEL JOISTS, CHANNELS. TRAMRAILS AND PERMANENT WAY RAILS, &c.



Pit Head Frame.
Erected in Works for inspection

Example of 10in. × 6in. × 42lb. R.S. Joists curved for Framework to Roadway

ROLLED STEEL JOISTS for PIT PROPS, FRAMEWORK TO ROADWAYS, &c.

STRUCTURAL STEELWORK FOR BUILDINGS, &c.

Mild Steel Blooms, Billets, Slabs, Timbers, Rounds & Flats.
Rolls cut for Special Sections and to approved quantities.

Books of Sections and other information on application

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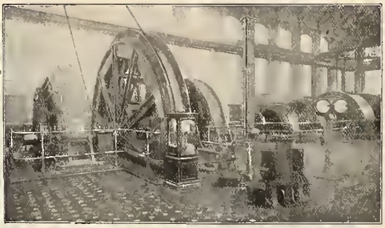
Duisburg, Germany.

Werk BECHEM & KEETMAN, DUISBURG.
Werk BENRATH, BENRATH.
Werk STUCKENHOLZ, WETTER-RUHR.



Manufacturers of Complete

MINING MACHINERY PLANTS.

WINDING ENGINES. HAULING GEARS.
CAGES. ROPE PULLEYS.
ROPE CLAMPS & FITTINGS.

MACHINERY FOR COKE OVENS.

COAL STAMPING MACHINES AND COKE PUSHERS.

TRANSPORTING & LOADING PLANTS

FOR COAL AND ORE.

ROTARY TIPPERS. GRABS.

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FOR EFFICIENCY
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KENYON'S
Specialty
Compounded
"KISOL" (Reg.)
CEMENT.

Ask for "HINTS" on the Covering of Steam Pipes, Boilers, &c.

ILLUSTRATED
LECTURE on
"THE
TRANSMISSION
OF
POWER BY ROPES."
Post Free on Application.

Wm. Kenyon & Sons Ltd.,
CHAPEL FIELD WORKS,
DUKINFIELD, NEAR MANCHESTER.
London Address—95 & 97, Finsbury Pavement, London, E.C.

Permitted High Explosives.

Official Figures for 1910 show
NOBEL'S
"SAMSONITE" most used,
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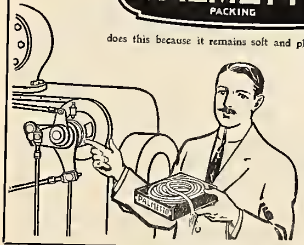
This is the result of Superior Quality.

NOBEL'S EXPLOSIVES COMPANY LTD.,
195, West George Street, GLASGOW.

Corliss Valves require a packing that will keep the box steam tight without friction.

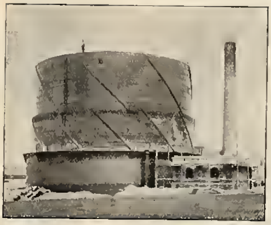
PALMETTO
PACKING



does this because it remains soft and pliable in service. Its perfect single strand lubrication allows the valve stem the full reciprocating motion so necessary to the Corliss type of valve.

Send for Free Working Samples and you will see what we mean.

GREENE, TWEED & CO.,
Sole Manufacturers,
QUEEN ANNE'S CHAMBERS,
TOTHILL STREET,
WESTMINSTER, LONDON.



Large Two-Lift Spiral Guided GAS HOLDER & STEEL TANK coated with WAILES, DOVE & CO.'S Patent

"Bitumastic"

Solution & Enamel.

THE
"WORLD'S RECORD"
ANTI-CORROSIVES.

"BITUMASTIC"
ensures
PERMANENT PROTECTION
from CORROSION to all Iron and Steel Structures exposed to weather extremes, hot smoke, chemical fumes, &c.

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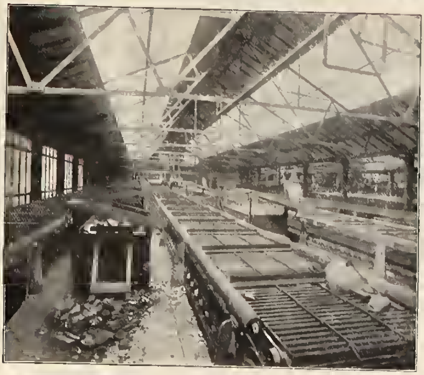
Every Office on the Telephone — *Telegrams "BITUMASTIC."*

PLOWRIGHT BROS. LTD.,

Brampton Iron Works, Chesterfield.

Speciality—

COAL SCREENING & CONVEYING.



SECTION OF SCREENING PLANT AT BENTLEY COLLIERY, DONCASTER.

CONSIDERABLY OVER
100 PLANTS NOW AT WORK IN GREAT BRITAIN AND THE COLONIES.

Estimates and Designs on application.
Agent for South Wales: A. LEIGHTON STEVENS, 16, Fields Road, Newport, Mon.

BRUSSELS EXHIBITION: "GRAND PRIX." ALLAHABAD, 1810.
ROUBAIX EXHIBITION, 1911: "GRAND PRIX."

HOPKINSON-FERRANTI

Patent STOP VALVE

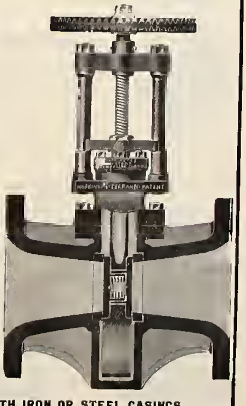
FOR STEAM AND HIGH PRESSURE WATER SERVICE.

The Greatest Advance in Valve Construction of the Times.

LESS WEIGHT, COST AND LEAKAGE.
This Valve has been invented and designed to enable a valve having operative parts of half the ordinary diameter to pass a large amount of steam through a small working part.

PRINCIPLE:
Converting the pressure of the fluid into velocity and re-converting the velocity into pressure, thereby passing an amount of steam equal to full carrying capacity of pipe.

SELLING POINTS:
Passes same quantity of steam as a full-bore valve.
Reduction in cost over ordinary fullway valves.
Considerably less weight.
Seats half diameter of ordinary sluice valve, therefore halves possible leakage.
Reduces vibration in pipes.
Graded opening—no sudden rush of steam in opening.
No bye-passes necessary, thereby saving their cost.
Is not subject to wedging action or mechanical strain.
The discs slide with a flexible pressure upon the seats, thereby preventing cutting & scoring.
When the valve is open the seats are protected from the flowing fluid by the eyepiece.
Always easy to open and close under pressure.
It is an ideal valve for high temperature superheated steam, as there are no cast iron internal working parts.



Discs and Seats of
HOPKINSON'S
"PLATNAM" METAL.
Suitable with Superheated Steam

VALVES IN STOCK WITH IRON OR STEEL CASINGS.
UPWARDS OF 8,000 IN USE AT 220 Collieries, 180 Electric Power Stations, 90 Iron and Steel Works, 130 Textile Mills, Turbine Makers, &c., &c.
HOPKINSON'S PATENT SAFETY BOILER MOUNTINGS AND VALVES
For High Pressure Superheated Steam, High-class Exhaust and Water Sluice Valves for Condensing Plants, &c., Automatic Exhaust Valves, Reducing Valves, Steam Traps, &c., &c.
Upwards of 500 tons of Standard Steel Castings kept in stock.
We can give immediate delivery of iron and steel valves.

J. HOPKINSON & CO. LD., Huddersfield
No. 199 London, Glasgow, Edinburgh, Cardiff, Oldham, Paris & St. Petersburg.

BY-PRODUCT COKE OVENS

WITH PATENT "DIRECT" RECOVERY OF BY-PRODUCTS
SIMPLE IN DESIGN—MINIMUM STEAM AND POWER REQUIRED
NO NOXIOUS EFFLUENT—PERFECTLY WHITE SALT

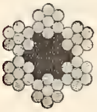
BAUM COAL WASHERS

SIMON-CARVES LD. MANCHESTER

LATCH & BATCHELOR LD.

Wire Drawers, Manufacturers of all classes of Wire Ropes.
Patentees and Manufacturers of
LOCKED COIL AND FLATTENED STRAND WIRE ROPES.
HAY MILLS, near BIRMINGHAM.

Fig. 2. HAULING.



Lang's Lay Ropes.

Fig. 26. WINDING.

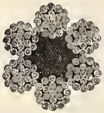
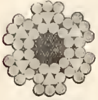


Fig. 1. HAULING.



Patent Flattened Strand Ropes.

Fig. 4. WINDING.

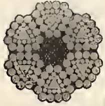
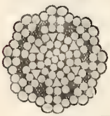


Fig. 13a. SINKING.



Advantages of Patent Flattened Strand Ropes

1. Greater wearing surface, therefore longer life of rope and less wear upon pulleys.
2. Greater strength, thereby admitting of smaller ropes being used for existing loads, or of increased loads without increase in size of rope.
3. Spliced easily and more effectively.
4. Less tendency to twist and stretch in working.

Fig. 13a for Sinking and Fig. 11b for Cranes, &c., are non-twisting.

Fig. 11b. CRANE, &c

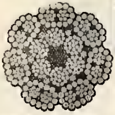


Fig. 15a.

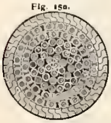


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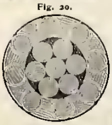
Fig. 20.



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COKE OVEN BY-PRODUCTS IN 1911.

Report Under the Alkali Works Act.

The forty-eighth annual report of the Chief Inspector under the Alkali, &c., Works Regulation Act, 1906, contains, as usual, much useful information in regard to coke ovens. We give below some extracts from the report relating to this subject:—

Dealing with sulphuric acid works, the chief inspector, Mr. W. S. Curphey, observes that an active and general demand for sulphuric acid kept works of this class busy throughout the year.

The number of processes under the head of "Sulphate and Muriate of Ammonia, and Gas Liquor Works" under inspection was 626, or 26 more than in 1910. This increase in number was associated with a further increased production in this most important "residual" product. The following table shows the quantity of ammonia recovered in the United Kingdom as a by-product from the various industries (expressed in terms of sulphate):—

	1911. Tons.	1910. Tons.	1909. Tons.
Gasworks	168,783	167,820	164 276
Ironworks	20,121	20 139	20,228
Shale works	60,765	59,113	57,048
Coke oven works	105,343	92,665	82,886
Producer-gas & carbonising works (bone and coal)	29,964	27,850	24,705
Total	384,976	367,587	349,143

The aggregate increase over 1910 is 17,389 tons. This increase is slightly less than the corresponding figure of 18,444 tons recorded for that year as compared with 1909, but the influence of unrest in the labour world which retarded advance in 1910 continued to have a similar influence throughout 1911, especially as regards the extension of recovery plant in connection with coke ovens.

The method of removing ammonia from crude gases by submitting these to the action of sulphuric acid, without in the first place forming an ammoniacal liquor, now known as the "direct" process, was brought into further use during the year, but not to the extent which might have been anticipated. In the case of coke-oven works, one cause is indicated above; in the case of gasworks, many considerations have to be weighed before deciding upon what type of plant, if any, should be adopted, so that it is perhaps not unnatural that there should be a tendency to wait for further accumulation of experience with regard to the new method. The readiness with which ammonia escapes from ammoniacal liquor is an important point to consider in this connection. This tendency of ammonia was referred to in the report for last year, and during the heat of last summer many cases occurred where large losses of ammonia occurred. In one case the ammoniacal liquor had become so weak that on distillation it failed to form a solid salt in the saturator when operated on in the ordinary way.

The figures show an increase from every source of supply save from ironworks, where the trifling reduction of 18 tons has to be recorded. This contribution to the general production is furnished by those iron-smelting works in which coal is the sole or chief fuel used in the blast furnaces. This custom is largely confined to Scotland, where it is general. In those districts where the character of the coal at command renders it desirable to use coke in the blast furnaces for iron-smelting, the problem of ammonia recovery is transferred from blast-furnace gases to the gases driven off the coal in the coke ovens during the process of making coke.

The largest industrial source of sulphate of ammonia is still the widely distributed and important manufacture of illuminating gas from coal, but the relative proportion as compared with the total production is becoming less owing partly to advances in methods of gas manufacture which permit of a greatly increased production of gas per ton of coal carbonised, and partly to the rapid growth of the more recent processes for recovery of by-products from coke-oven gases, and from producer gas.

During the past year much attention was attracted to methods by which ammonia present in crude gas either from the gas retort or from the coke oven could be obtained in the form of a solid salt fit for sale, but without the necessity of providing sulphuric as is the case at present in all works producing sulphate of ammonia. Progress has been made towards this goal, but up to the end of the year, practical results within the United Kingdom were not sufficiently advanced to permit of any definite report being made on a proposition which is at once attractive and hopeful—attractive because of the utilisation of that most noxious constituent of the crude gas, sulphuretted hydrogen, in place of the sulphuric acid now required; hopeful because of the favourable accounts which have been given of the successful operation of one of these processes abroad.

No material change has to be noted in the methods of dealing with the waste gases evolved when distilling ammoniacal liquor from gasworks. Continued experience confirms the opinion that the heap form of purifier has advantages over the older forms of box or walled purifiers, and that the low broad-based heap is to be preferred to the high conical heap with comparatively restricted base. The behaviour of oxide of iron in these purifiers varies greatly, and this variation has an immediate bearing upon the efficiency of the purifier and the cost of upkeep. It is desirable, therefore, to elicit, if possible, some at least of those factors which influence for good or for evil the action of the oxide used in the purifiers attached to plant for the manufacture of sulphate of ammonia. The results so far attained point to the desirability of more accurate knowledge of the conditions existing in purifiers when these are in operation—as regards temperature both during the sulphiding and the revivifying stages, the proportion of moisture, the proportion of air added to the waste gases when concurrent revivification is practised, and the proper distribution of the waste gases throughout the mass of purifying material. The sufficient cooling of the waste gases before these reach the purifier is likewise most important. No definite cause has been recognised to account for the occurrence of "souring" being more frequent in Scotland than elsewhere. It may be associated with the observations of Gedel, that with gases of an acid character the reactions in the oxide of iron purifier differ from those taking place when the gases are faintly ammoniacal. This difference in behaviour has also a bearing on the comparison of oxide purification for waste gases from sulphate of ammonia plants with oxide purification of coal gas. It may also be of practical importance in those numerous cases where oxide already partially exhausted in gas purification is transferred for finishing in purifiers connected with the sulphate of ammonia plant, or where oxide previously used in the sulphate purifiers is applied to gas purification.

There were 163 works registered as tar works during 1911, an increase of nine as compared with the preceding year. The increased number of tar works under inspection is in large measure due to the installation in gasworks of plant for the production of prepared or boiled tar in order to meet the widely-spread demand for a tar suitable for roadmaking. It is satisfactory that the practice adopted by some of using crude gas tar for road surfacing is being departed from.

If the crude tar be not sufficiently heated before use, part of the ammoniacal water and naphtha will remain in the tar, whence they may be removed by weathering, to the possible detriment of local drainage and probable injury to the road surface through deterioration of the imperfectly prepared tar.

In his report on the North of England district, Mr. E. Morley Fletcher states that four new sulphate of ammonia and gas liquor works were registered during the year, making a total of 78. These were all in connection with coke oven plant for the recovery of the ammonia in the crude gas. Here the waste gases are dealt with as formerly, sulphuric acid being made from these in two cases. The recovery of the ammonia by the semi-direct and direct processes continues to increase, and the disposal of the waste liquors associated with the older methods becomes a less troublesome problem. The progress in the erection of coke ovens with recovery of by-products in place of the older beehive ovens is an important factor in the industrial development of this district. The annual value of waste products in the form of residuals and heat recovered during the last 10 years has increased with remarkable rapidity. The recovery of the ammonia in the form of sulphate last year amounted to a value of over £650,000, and to this must be added the value of tar and benzol also recovered. Except on a small scale the sulphur contents of the gases have not been utilised as yet, only about 1,000 tons of sulphuric acid having been derived from this source, but further advance in this direction is anticipated. The amount of surplus gas and heat available can be roughly estimated as capable of developing 80,000-horse power continuously if used under boilers. A large proportion of this surplus is economically utilised in co-operation with the various electric power companies whose mains extend over the whole industrial area of the north-east coast. In this connection it is interesting to note that, apart from the power company, practically no coal is burnt on the Tyne for power purposes except in the chemical works; this being all in the direction of smoke reduction and coal economy. The remainder of the surplus is utilised at the coke oven works for steam raising or in gas engines. One instance of modern practice is seen in a large steelworks where a battery of ovens supplies all the requisite coke for the blast-furnaces, and the surplus gas mixed with the blastfurnace gas is utilised in gas engines and the whole motive power of the works so obtained for the steel and rolling mills—the only steam raised, for use mainly on the sulphate of ammonia plant, being obtained from an experimental boiler heated by coke oven gas working on the surface combustion system recently introduced by Prof. Bone. There has been extension in the number of tar works owing to the increase in coke oven tar produced. Plant has been erected at a works already on the register, making a total number of 20 works.

Mr. R. D. Littlefield, in his report on the East Midland district, states that the number of works registered under the heading of sulphate and muriate of ammonia and gas liquor works remains as last year, namely, 59.

During the year a new installation of the complete direct absorption of the ammonia contained in coke-oven gases has been inaugurated. The process is working very satisfactorily.

Separating the sources of ammonia liquor into coke-oven by-product plants, and gasworks plants, the increase in the former case amounts to 5 per cent., and in the latter to 3·3 per cent. over the corresponding figures for 1910.

In his report on the South Midland district, Mr. Edward Jackson states that the number of works registered at the close of the year where either ammonium sulphate, chloride, or carbonate is manufactured, or gas liquor concentrated, was 106; but, as more than one of these operations is carried on at some of the works, the number of separate processes under inspection is now 120. Five new works, all with sulphate plants, have been registered during the year. Four of these are at gasworks, and the noxious saturator gases are arrested in oxide of iron purifiers. The fifth works is in connection with coke ovens. Plant for the direct method of sulphate of ammonia manufacture has been erected, *i.e.*, after abstraction of tarry matter in the hot gases by means of a special tar-washer, the hot gases are passed direct into sulphuric acid. The gases, after the ammonia has been taken out, are then returned to the ovens, or other parts of the plant, for combustion. By this means it is hoped that no spent liquor will have to be dealt with. Ammoniacal compounds are recovered at 21 coke-oven plants. Sulphate of ammonia is produced at 20 of these, and gas liquor concentrated at two. At four works muriate of ammonia is also recovered from the thick tar from the mains. The usual method adopted in this class of works for dealing with the waste saturator gases in the sulphate of ammonia manufacture is to return them to the gas plant. The sulphate of ammonia manufactured in these works is still increasing, and represents 37·5 per cent. of the entire production in the district this year.

Only two ironworks recover ammonia and tar products from the blast-furnace gases. In fact, these are the only ironworks in England where recovery plant is worked. The percentage of coal used in blast furnaces generally is said to be so small in relation to the coke where it is employed at all, as not to warrant attempt at recovery.

Producer plants are increasing. The producers are of the Mond type. A large new plant with 13 producers has been put into operation this year. Capacity per producer 25 tons fuel per 24 hours. There are now six plants working, and these are responsible for 10·2 per cent. of the sulphate of ammonia produced this year in the district. The following statement shows the proportion of ammoniacal liquor from various sources in the district—gasworks, coke ovens, producer-gas, ironworks, and carbonising works—on a sulphate of ammonia basis. The last three years' figures are given for comparison:—

From—	1911. Per cent.	1910. Per cent.	1909. Per cent.
Gasworks	48·8	51·2	54·9
Coke ovens	37·5	35·2	34·0
Producer-gas	10·2	9·9	6·9
Ironworks	2·1	2·3	2·8
Carbonising works	1·3	1·4	1·4

The increase in production in the district this year over 1910 is 5·1 per cent., calculated on sulphate of ammonia basis. Coke ovens and producer plants are responsible for almost the whole of it; only 0·08 per cent. is due to the ammoniacal liquor produced in the ordinary gasworks. This is the first time that the year's production from this source has remained practically stationary. It will be observed that coke ovens and producer-gas plants now contribute nearly half the sulphate of ammonia produced (47·7 per cent.) in the district.

In his report for South and South-West England, Dr. A. C. Fryer states that the direct method of making sulphate of ammonia by bubbling the coal gas through dilute sulphuric acid and the solution evaporated with a steam coil to obtain crystals of sulphate of ammonia is now in use at four works in the district. In the method the ammonia is fixed with sulphuric acid as fast as it is produced, thus doing away with the necessity for storing any ammoniacal liquor. Dr. Fryer thinks the Burkheiser process for the production of sulphate of ammonia without the addition of sulphuric acid is one which gas engineers will examine carefully. The Burkheiser method holds out a prospect of cleansing coal gas and producing sulphate of ammonia in one process, for the Burkheiser salt is the immediate product of the purification of the gas and the complete utilisation of the raw material, viz., the coal. Up to now the sulphur in coal has been considered a deleterious impurity, and costly plant has been employed for its removal. The inventor of the Burkheiser process takes advantage, however, of the sulphur and utilises it, first absorbing it in a specially active oxide of iron, then converting it into sulphurous acid which binds the ammonia in the gas. The process is a fascinating one to the chemist, and one of the works in this district is at present engaged in making some experimental trials with it.

In South Wales and Monmouthshire, says Dr. T. Lewis Bailey, the number of works registered was 18, an increase of three over last year, two new plants having been erected during the year at gasworks, and one new coke work with by-product plant having been started. At the present time one new sulphate plant to treat gas liquor and one coke oven work, with by-product plant, are in course of erection. The unrest in the coalfield during the past year has, for the time being, prevented the extension of by-product coke oven plant in, at any rate, one instance. The direct process of sulphate of ammonia manufacture has not yet been introduced into South Wales.

Mr. J. W. Young, chief inspector for Scotland, in his report states that there were 106 works registered as gas liquor, sulphate and muriate of ammonia works last year, three being added and one removed. The total quantity of liquor distilled was equivalent to 20,206 tons of sulphate.

There has been no change in the methods of the ironworks, shaleworks, coke ovens, and producer gas-works. A second cokework is now recovering its ammonia by direct scrubbing of oven gas with sulphuric acid. Five works were registered for the refining of crude shale oils, one starting again after complete reorganisation.

The total production of sulphate of ammonia in Scotland continues to expand. The net increase for 1911 over 1910 was 4,381 tons, contributed as follows:—

	Tons.	Tons.
Gasworks yielded a decrease of	—	128
Ironworks yielded an increase of	46	—
Shaleworks yielded an increase of	1,652	—
Producer gas, &c., works yielded an increase of	2,811	—
	4,509	128

The decrease in the case of gasworks synchronises with a movement in gasworks practice to obtain from coal a larger volume of gas per ton with a consequent reduction in the quantity of coal required to meet a given demand for gas. The small increase from ironworks is associated with a slight decrease in the total production of Scottish pig iron and a fractionally smaller average number of furnaces in blast. The pig iron produced in Scotland in 1911 was 1,401,000 tons as compared with 1,414,000 tons in 1910. The increase from shaleworks shows continued activity in this industry. The increase from producer gas, coke and carbonising works is due to a further extension of processes in operation classed under this heading. Gasworks have now fallen to the third place as regards production of sulphate of ammonia in Scotland, in a minor degree owing to the relatively smaller yield of by-products already referred to, but chiefly because of the recent development of recovery plant attached to gas producer and coke oven works.

The "direct" system of recovery of ammonia received further extension during the year for treating coke-oven gases, but has not so far been adopted in any Scottish gaswork for ammonia recovery.

The following figures have been compiled from the statistical returns to the Home Office on mines and quarries for the last 10 years to December 31, 1911, and from returns of sulphate of ammonia manufactured:—

Year.	Total shale mined and quarried in Scotland.	Total sulphate of ammonia recovered from the shale in paraffin oil works.	Yield in lb. per ton of shale.
	Tons.	Tons	
1902	2,105,953	36,931	39·3
1903	2,009,265	37,353	41·6
1904	2,331,885	42,486	40·8
1905	2,493,081	46,344	41·6
1906	2,545,724	48,534	42·7
1907	2,690,028	51,338	42·7
1908	2,892,039	53,628	41·5
1909	2,967,017	57,048	43·1
1910	3,130,280	59,113	42·3
1911	3,116,803	60,765	43·7

Of recent years there has not been great variation in the yield of sulphate of ammonia calculated per ton of shale mined and quarried in Scotland. It may be well to repeat that this ratio is affected by various factors, amongst which may be mentioned:—(1) Shale used elsewhere than in oil works; (2) variations in the nitrogen contained in the shale; (3) methods of treatment of the shale. This last is the only one under the control of the management in shaleworks. The methods of shale distillation have now attained a high degree of efficiency combined with very low costs. The system of vertical retorts now attracting much attention in gasworks practice has for many years been effectively applied to extraction of oil from shale, and this lengthened experience has led to highly efficient designs of retorts being now in operation—the outcome of many minds which have sought to improve on previous practice.

Unemployment Insurance.—Amongst further decisions of the Umpire appointed under the Unemployment Insurance (Umpire) Regulations, it has been decided that contributions under Part II. of the National Insurance Act are payable in respect of workmen engaged in the construction, reconstruction or alteration of coke ovens or by-product plant ("alteration" relating to work which involves a substantial change or variation in the original design). Contributions, however, are not payable in respect of workmen employed in the repair of kilns and ovens used for the firing of pottery, tiles, sanitary ware, &c., or those employed in the repair of ovens for the manufacture of coke and of by-product plant (other than buildings or machinery).

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, July 23, 1912, is as follows:—Antwerp, 89 tons; Amsterdam, 736; Aalborg, 286; Altona, 2,308; Abo, 157; Buenos Ayres, 614; Bremen, 1,470; Christiania, 1,581; Cronstadt, 22,944; Copenhagen, 704; Drontheim, 272; Ghent, 513; Gothenburg, 150; Gefle, 8,157; Hamburg, 2,505; Harburg, 4,840; Husum, 543; Harlingen, 1,106; Kiel, 1,819; Konigsberg, 2,079; Libau, 407; Landscrona, 1,741; Leghorn, 349; Monte Video, 3,394; Marseilles, 306; Nakskov, 1,201; Nykjobing, 1,863; Naples, 602; Odense, 1,203; Oldenburg, 299; Pernau, 1,363; Reval, 4,393; Rotterdam, 6,590; Riga, 6,171; Rouen, 2,502; Santos, 3,997; Sark, 282; St. Malo, 339; Stockholm, 960; St. Petersburg, 4,188; Stettin, 204; Wasa, 407; total, 92,586 tons. Corresponding period, July 1911, total, 67,683 tons; corresponding period July 1910, total, 110,572 tons.

EXPLOSIONS IN MINES.

First Report of the Committee.

The Explosions in Mines Committee have submitted to the Home Secretary the first report on the enquiry undertaken by them on behalf of the Home Office into the causes and means of prevention of coaldust explosions in mines. The report is signed by Sir Henry Cunynghame, Mr. R. A. S. Redmayne, Capt. A. P. H. Desborough, Prof. Harold B. Dixon, and Mr. W. C Blackett, the members of the committee.

At the outset the report records the recent history of the coaldust question. It may now, say the committee, be considered established beyond all doubt that coaldust suspended in air is capable of being ignited without the presence of any inflammable gas, and of propagating an explosion through the dusty galleries of mines.

The Royal Commission on Mines which was appointed in 1906, after hearing a considerable quantity of evidence upon the part played by coaldust in mine explosions, referred the matter to a committee of their own number, which unanimously decided that experiments on a large scale were necessary, if only for the purpose of concentrating the attention of the mining world upon the danger that coaldust constitutes. Eventually, experiments were undertaken at the expense of the Mining Association of Great Britain, and under the direction of a committee appointed by them, consisting of Sir Lindsay Wood (representing Northumberland, Durham and Cumberland), Mr. W. E. Garforth (Yorkshire, Staffordshire and Midland Counties), Mr. C. Pilkington (Lancashire and North Wales), and Mr. W. W. Hood (South Wales). This committee, after considering in 1907 a programme of experiments, commenced operations in February 1908, at the Altofts Colliery, Normanton, Yorkshire, under the superintendence of Mr. W. E. Garforth. A large experimental gallery was constructed of disused boiler shells 7 ft. 6 in. in diameter and about 600 ft. in length, and fitted with pressure gauges and other instruments, a full description of which will be found in the *Record* of the experiments published by the Mining Association of Great Britain in 1910.[*]

In May 1908 Mr. Wheeler was appointed chief chemist to the committee, a position which has been continued under the present committee. Experiments were conducted with this gallery and in the adjoining laboratory during the years 1908-10. The effect of these experiments was, in the first place, to demonstrate conclusively the fact that coaldust, in the complete absence of firedamp or other inflammable gas, is explosive when raised as a cloud in air and ignited under conditions which may exist in a coalmine, and moreover is capable of producing such destruction as is observed after a colliery disaster. In the second place, the experiments indicated that the admixture of increasing proportions of an incombustible dust with the coaldust rendered the initiation of an explosion increasingly difficult to accomplish; and that, therefore, a means of preventing coaldust explosions in mines might possibly exist in the treatment of the roads with incombustible dust such as stonedust. In the third place, the experiments on the mode of propagation of coaldust explosions gave an indication of the manner of their development during the initial stages, and suggested a way for a more complete study of the problem.

Not only in this country, but also on the Continent and in the United States, Government departments and mineowners have recognised the importance and magnitude of the problem, and have instituted large scale experiments on the propagation of explosions in coalmines. Such experiments are now being carried out under the direction of M. J. Taffanel, at Liévin, and it is to be hoped that the experimental mine installed near Pittsburg, under the direction of Dr. J. A. Holmes (director of the Bureau of Mines) will soon be yielding valuable results.

In the year 1910, the Mining Association approached the Royal Commission on Mines with the view of ascertaining whether the Government would be prepared to continue the experiments at the public cost, and offered to lend to the Government the experimental plant and apparatus that they had accumulated. This proposal was communicated to his Majesty's Government, which ultimately undertook to find the funds necessary for the purpose. An executive committee to carry out the experiments was appointed by the Secretary of State for the Home Department, consisting of Sir Henry Cunynghame (chairman), Mr. R. A. S. Redmayne, Capt. A. P. H. Desborough, Prof. H. B. Dixon, and Mr. W. C. Blackett. The members of the Royal Commission on Mines, together with the coaldust committee of the Mining Association already referred to, were constituted as a consultative committee. The first meeting of the executive committee was held at the Home Office on May 11, 1911.

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[*] Record of the first series of the British Coaldust Experiments, 1910.

The New Experimental Station.

The site at Altofts being no longer available, it became necessary to seek for a new one. An endeavour was made to secure a suitable locality which should be at a fairly equal distance from the various coalfields in England, Scotland and Wales, which should be remote from dwellings and at the same time should be near a railway so as to afford convenient access for heavy material. After the examination of numerous sites a piece of land on the sea shore was chosen, near Eskmeals, in the county of Cumberland, adjoining the gun range of Messrs. Vickers. Fig. 1 is a map of the locality, and fig. 2 a plan of the site and works. The works are surrounded by sand hills. The space available for a gallery measures 600 yards in length from the eastern side to the sea shore.

The large gallery has been removed from Altofts, and has been placed east and west in the position shown so as to point seawards, and extends to a length of 800 ft. A smaller gallery, 3 ft. in diameter and 400 ft. long, has been fixed alongside the large gallery for the purpose of making comparative experiments, and the number of recording instruments for following the course of explosions has been accordingly increased. From the large gallery, branches with elbows have been erected at each end. At the extremity of the branch on the eastern end a fan-house has been built containing a fan driven by a semi-portable engine capable of developing 25-horse power. The two galleries, with their connections, form the "first unit" of the explosion plant. On the sandhill overlooking the galleries there is erected a splinter-proof "firing station" from which the firing apparatus and recording instruments are controlled. Adjoining this is a small meteorological station. To the north of the galleries a chronograph house has been built for the adjustment and measurement of the recording instruments.

A railway runs alongside the galleries, and curving westward through the grounds of Messrs. Vickers, joins the main line of the Furness Railway. A lamp-testing

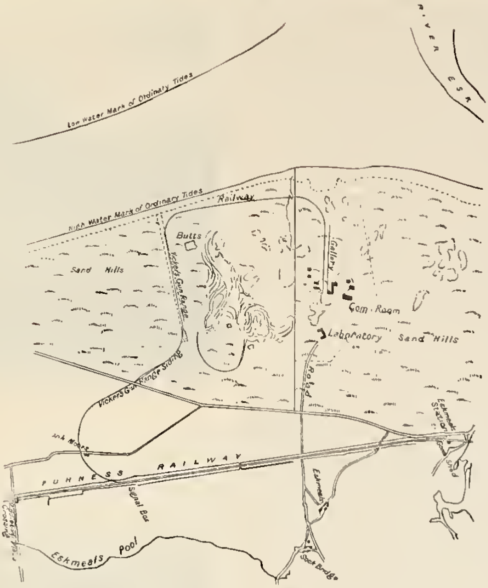


Fig. 1.—Map of Eskmeals, showing Experimental Station.

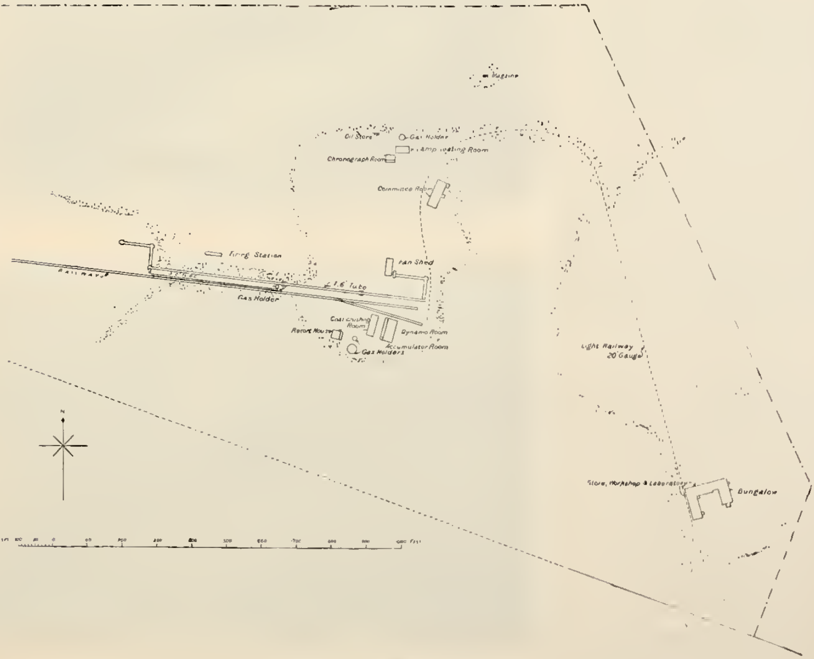


Fig. 2.—Plan of Experimental Station.

station containing an apparatus for testing lamps, with a gas holder capable of containing 1,500 cubic feet, has been erected a short distance away. Near by is a building containing a committee room, a secretary's room and other offices, together with some living rooms, rooms for a caretaker, and a kitchen. On the south side of the railway is the electric light and power generating house, containing two 25-horse power semi-portable steam engines with coal bunkers, and two dynamos together with switchboards and measuring and recording apparatus. In an adjoining room, 60 ft. long, is a set of accumulators. Adjoining the electric power house is the coal crushing house, containing a 10-horse power semi-portable steam engine, which, by means of a counter shaft, drives the coal crushers employed for producing the dust to be used in the experiments. To the south-westward of the coal crushing house are two gas holders of a capacity of 4,000 ft. and 1,000 ft. respectively, and adjoining them is a retort house for making gas. To the west of this house is a large shed for holding stores. Two strongly protected observation stations have been constructed at a distance, and splinter-proof shelters have been made at other points near the galleries for the protection of the workmen during explosion experiments.

The committee say they have no reason to apprehend danger from the proximity of these buildings to the tube—in fact they are, most of them, further from the tube than similar buildings at the French experimental station at Liévin, and than some of the sheds at Altofts. In order to afford security to the buildings nearest to the galleries, strong barriers have been constructed where they seem to be required. The works are screened from the surrounding country by the sand hills.

The laboratory and other buildings are connected together by telephone wires. A supply of pure water has been brought in pipes from Bootle, and connected to all the buildings. The committee rooms, the fan house, the electric power-house, coal crusher house, retort house, and chronograph house, have all been constructed of brick, plastered with Portland cement rendered waterproof by a special process. The roofs are either of slate or iron, placed on boards covered by felt. The houses thus built are of substantial character, and will last, if kept in repair, for a very long period. The laboratory has been placed in a position beyond the sand hills on the east side of the site, and removed about 350 yards from the works. It consists of four large rooms, which are supplied with gas, water, and with electricity at 100 and 200 volts. The laboratories are equipped with a very complete set of apparatus. Two of these rooms are designed for physical and chemical experiments, one is a workshop containing a lathe and a set of tools for small repairs. The remaining room is a store.

Adjoining the laboratory is a dwelling house for the chief chemist, who will thus reside on the spot. The provision of this dwelling house, and of some living accommodation near the committee room, has been possible owing to the generosity of the Mining Association, who, learning that the money placed at the committee's disposal by the Government did not include any available sum for housing, presented a sum of £1,500, to be used in assisting to provide accommodation for such of the staff and experimenters as it was desirable should be always available upon or near the spot. The neighbourhood is very sparsely inhabited, and this timely gift has been of great service, and will materially contribute to the success of the operations.

The Use of Stonedust in Mines.

From the foregoing description of the extent of the works it will be seen that provision has been made for complete investigations into the initiation and spread of coaldust explosions, whereby it is hoped to ascertain the means of preventing or limiting them. It may, therefore, be some time before the committee will be able from their own experiments to recommend definite precautions. There is, however, one point to which it is desirable to draw attention—the proposal to use an inert dust as a preventative. It is difficult to state the exact date of the idea of using stonedust as a protection against coaldust explosions, and the report does not pretend to give a complete history of the progress of thought upon the question. Mention is made, however, of a few instances in which it was brought prominently into notice. That an inert dust might prevent the ignition of coaldust seems to have been suggested by the facts observed in several mines explosions such as that at Seaham in 1880.

In the record of the Mining Association (pp. 105 to 108) details are given of experiments upon the effect of mixing stonedust with coaldust. They show that the liability of dry coaldust to ignite is largely reduced by

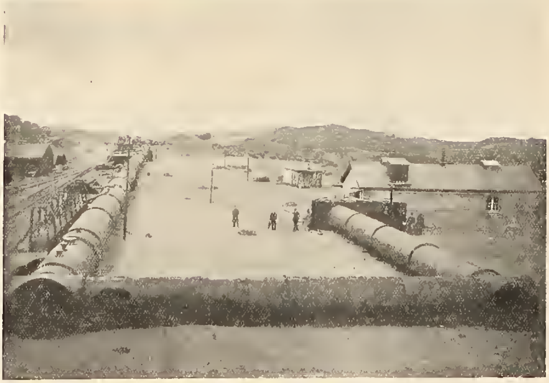


Fig 3.—General View of the Works Looking Westward, Showing Large Gallery with Return Gallery to Fan-House.

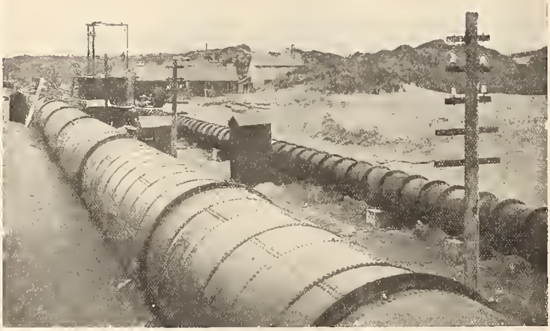


Fig. 4.—General View of the Works Looking Eastward, Showing the Large and 3 ft. Galleries, Gas-Holder and Engine Rooms and Retort House Beyond.

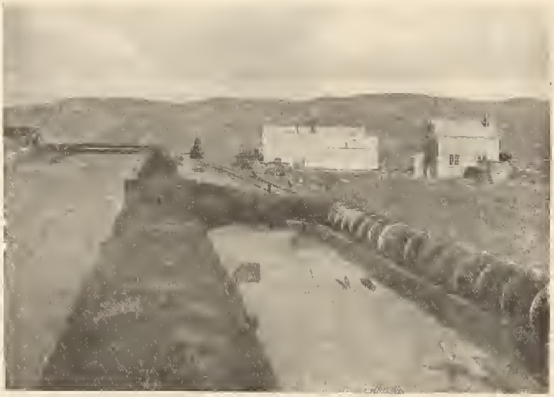


Fig. 5.—General View of the Works Looking Eastward, Showing the Junction of the Large and Small Galleries.

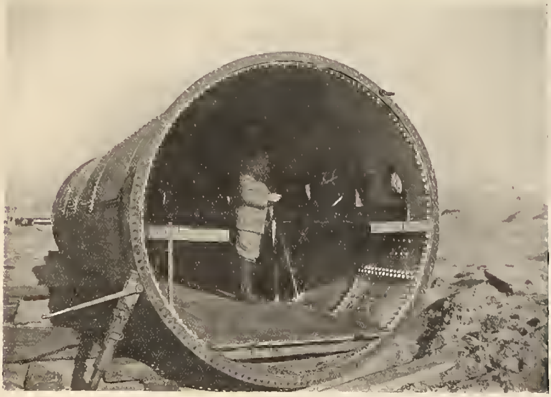


Fig. 6.—The Firing Station on Sandhills above Galleries.

Fig. 7.—General View of the Works Looking Eastwards.

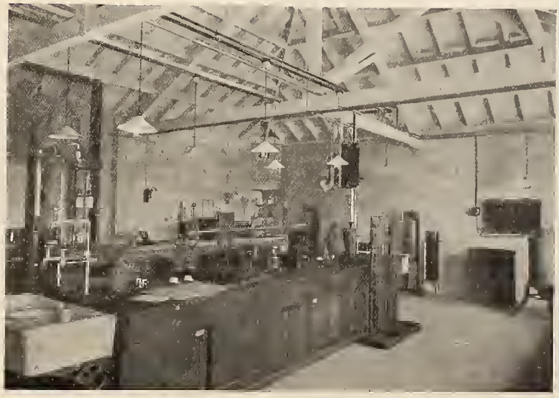


Fig. 8.—The Chemical Laboratory, Gas Analysis Room.

an admixture of fine stonedust. Further, on this point the committee say:—"In our opinion further experiments upon the action of stonedust are essential before any final recommendation can be made. For instance, it has not yet been proved that a flame of coaldust that has attained full explosive violence in a mine will be extinguished on reaching a region where stonedust has been strewn over the coaldust, nor that an explosion of firedamp would not be 'extended' by a thin layer of coaldust deposited on stonedust. Further experiments also are needed to test the correctness of Sir F. Abel's conclusion that the presence of an incombustible dust may increase the danger of a gas explosion. The latter experiments we have already started.

"We think, however, that we ought to call attention to the steps that have been taken—not only at Altofts in Yorkshire, but also at the Charlaw, Sacriston, and Kimblesworth collieries in Durham, at the New Moss Colliery, near Manchester, and elsewhere—to put this theory into actual practice. At the present time inert dust is not put on in zones, but is scattered by hand over the whole surface of such haulage roads as require it. This application of inert dust needs no considerable expenditure of capital, nor laying down of plant, and is not a costly operation, and we are of opinion that even in the present incomplete state of our knowledge as to the exact action of inert dust, those who are working and carrying coal along dry and dusty roads would be well advised to take into consideration this means of obviating danger.

"We do not, of course, question the utility of watering and of keeping the mine clear of dust, or of safety cartridges, tamping, and the various other remedies which it will be our duty to examine. Moreover, the proposal to prevent the ignition of coaldust by admixture with an inert dust may not be applicable in all mines, but we consider that the results of the experiments so far as they have gone are sufficiently striking to merit serious attention.

"We desire to say that in this connection we think that the thanks of the community are due to Prof. Galloway and the brothers Atkinson for their persistent advocacy of the coaldust theory, and to Mr. W. E. Garforth for his practical application of stonedust as a means of preventing explosions."

The Effect of Dusts Upon Health.

In view of the position now reached in the trial of stone and other incombustible dusts, and considering the question that has been raised whether the sprinkling of such dusts in a mine might be injurious to health, the committee believed it would be desirable to enquire how far such dusts, even if mixed freely with the air of the mine so as float about in it, would be injurious to health. This question had not escaped the attention of the committee by whom the Altofts experiments were conducted; and on their consulting Dr. Haldane, F.R.S., the well-known authority on injurious dust, he expressed the view that coaldust or dusts containing no free silica would not be found to be injurious in any marked degree, but that dust containing uncombined silica or other hard material was exceedingly dangerous. The same question has been repeatedly the subject of enquiry by the Royal Commission on Metalliferous Mines, which is now sitting. The evidence before that Commission, so far as it has gone, entirely bears out Dr. Haldane's view. Inasmuch as the introduction of dust into mines might, unless carefully regulated, produce evils worse than those which it aimed to cure, the committee deemed it their duty at the outset to take every possible step to make sure that the opinions above cited were correct, and to see whether it was possible to devise some test to which dust about to be introduced into mines should be submitted.

With this view they requested Dr. Beattie, professor of pathology at the University of Sheffield, to conduct some special experiments. He did so, and a communication from him is given in an appendix to the report. The dusts which Dr. Beattie was requested to examine were (1) the coaldust used by the committee in the experiments carried on at Altofts Colliery, and (2) the shaledust which has been, and is being, used there with a view to making the mine safe from explosions.

In making his experiments, the object that Dr. Beattie had in view was not to give tubercular disease to the animals. On the contrary, the greatest care was taken to prevent tuberculosis from attacking them in any way. What was done was to expose their lungs to dust to such an extent as to produce fibrosis of the lung—a condition which, while it does not greatly impair the general health, renders the lung very subject to tubercular infection; for it must be clearly understood that dust does not of itself, and acting alone, produce tuberculosis. Tubercular disease is microbic. What, however, the dust does, is to induce in the lung a fibroid condition, and the work is completed either simultaneously or subsequently by tubercular infection. Whether fibrosis alone, without tuberculosis, produces disease appears to be a disputed point, but there can be no doubt that far the most harmful aspect of fibrosis is its tendency to prepare the way for tuberculosis.

The results of Dr. Beattie's experiments have been in a very marked way to confirm the opinion of Dr. Haldane. They seem to show that dust, if of slate or shale, or other argillaceous substances, is not dangerous. On the other hand, all kinds of dust containing finely powdered silica in its crystalline condition, such as is found in Sheffield grinders shops, are apt to produce fibrosis of the lung, and thereby to facilitate the production of tuberculosis. It follows, therefore, that such dusts as these are likely to be dangerous.

The committee thought it would also be of interest to ascertain whether the dust either of Altofts shale or of coal injuriously affects the horses or ponies employed in the mines. They therefore asked Dr. Beattie to make an examination of the lungs of a dead pony which had worked about 14 years underground at Altofts, and for the last year had been subjected also to the effect of the shaledust employed there. He reported that very little coaldust and no shaledust was found in the lung, which was quite free from fibrosis, and added that this might be explained by the length and diameter of the windpipe, which, having large superficies, absorbed the dust readily, so that comparatively little reached the lung.

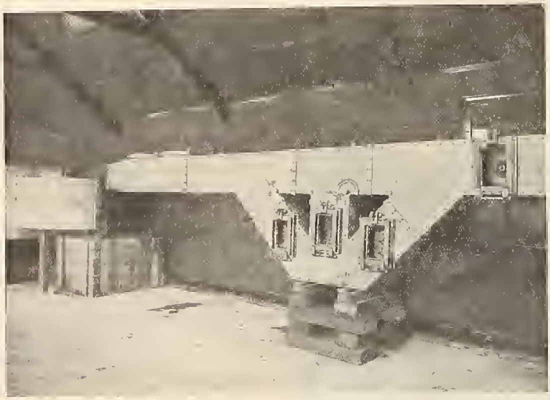


Fig. 9.—Interior of Lamp-Testing Room.

It would, therefore, appear that no injury is to be anticipated to animals in the mine by the use of shale-dust such as that at Altofts.

According to Dr. Beattie's experiments, the shale dust used by him does not seem any more injurious than ordinary fine coaldust, and we have no doubt that other dusts, when submitted to similar tests, will be found equally innocuous. It is proposed to have such tests made of other dusts.

The committee think that this method of investigation is likely to prove valuable not only to the mining industry but also in other industries. As dust is actually being used at present in several mines, and may probably be tried in others, it was deemed advisable to place at the disposal of the public without delay the best information on the subject of the dusts that are least harmful physiologically.

In concluding this preliminary report the committee record their thanks to Lord Muncaster, to the general manager and the officials of the Furness Railway, to Messrs. Vickers and their officials, and to Mr. Clarke, the trustee of the Eskmeals site, for the courteous assistance they have afforded. They also bear testimony to the excellence of the work of Mr. Redpath, under whose superintendence the buildings and experimental galleries have been erected.

Dr. Beattie's Report.

Dr. Beattie's paper is entitled "A Comparative Study, by Experiment, of the Effect Produced on the Lungs by the Inhalation of Coaldust, Powdered Shale (from an Argillaceous Grey Bind) and a Stonedust Rich in Silica (the Dust from the Grinding Wheels Used in the Cutlery Industry)." The experiments on which the paper are based were originally started with the object of studying in detail the processes concerned in the production of the so-called "grinders' phthisis," and particularly its relation to tuberculosis. For the particular experiments recorded Dr. Beattie used (1) ordinary coaldust, (2) powdered shale from an argillaceous grey bind, which was the dust used in the experiments conducted by the committee of the Mining Association, and which dust was obtained from the Altofts mine, and (3) a stonedust rich in silica.

In carrying out the experiments some of the animals were exposed in specially made boxes, whilst others were exposed in a tent in which the only dust circulating was that which escaped through the crevices of the special boxes. The "box" animals were thus exposed in a very thick atmosphere of dust far more dense than would be usually found in a mine. The boxes, however, were well ventilated, and the animals were not fixed in any way, so that they were able to breathe quite freely. It was a striking feature of the experiments that the general health of the animals did not suffer in the least, and when killed they were all in extremely good condition. The "tent" animals were exposed to an atmosphere much more like that existing in coalmines. The concentration of the dust in the atmosphere, however, produced the changes more rapidly and to a more marked degree, and therefore as a test of the effect produced by various forms of dust, the "box" method is the more important, provided that care is taken in judging results. A marked degree of fibrosis produced in a short time in the lung of a guinea-pig by the "box" method proves definitely that the inhaled material has an irritating effect upon the lung tissue, and the more intense the fibrosis the more injurious is the material used. On the other hand, a well-defined fibrosis in the lung of the guinea-pig, produced by the "box" method, does not prove that a similar degree of fibrosis would be produced in the lungs of a man working in a dusty atmosphere. All dusts are irritating to the lungs, and it is a well-established fact that prolonged exposure produces fibrosis, but it is an equally established fact that workers who are constantly exposed to certain forms of dust do not suffer any impairment in their general health. On the other hand, there are varieties of dust which not only cause an impairment of health, but which, by their injurious action, shorten life either directly or by rendering the lungs more susceptible to infective diseases, such as tuberculosis.

Experiments such as have been carried out make it possible to establish at least two important facts:—

1. The relative power of irritation and, therefore, the relatively injurious effects on the lung tissue of various dusts.

2. In conjunction with the knowledge we already possess of the effects produced in the lungs of workers exposed to certain forms of dust, these experiments enable us to determine, with a considerable degree of accuracy, whether the inhalation of any particular form of dust is or is not injurious to the general health of the worker.

The experiments with coaldust and powdered shale were commenced on July 14, 1911, and the animals which had been exposed to the dusts were killed on September 4, 1911. The experiments with the dust from the grinding wheels have been in progress for almost two years, and typical specimens have been selected from a very considerable number of experiments for the purpose of this comparative enquiry.

In the experiments with coaldust and with powdered shale there was positive evidence, even in animals exposed for only a few hours, that the dust had reached the lungs. The particles of coaldust and of shaledust quite readily distinguishable from one another could be seen in the air spaces as well as in the connective tissue framework, and in the lymphatic vessels of the lungs.

In miners who have been exposed to the inhalation of coaldust for long periods the lungs are quite black, and are filled with coaldust. This dust acts as an irritant, and over extensive areas of the lung there is an overgrowth of fibrous tissue—that is, the supporting framework of the lung. With this overgrowth there is of necessity an encroachment in the air-containing spaces of the lung. The coaldust is found in the air spaces, in the fibrous tissue of the supporting framework of the lung, and in the lymphatic channels. The amount of the coaldust varies in different lungs and in different parts of the same lung. Likewise the amount of "fibrosis"—*i.e.*, overgrowth of the framework of the lung—varies considerably. It is, however, a well-established fact that this "fibrosis," if not excessive, has comparatively little effect on the general health of the miner.

In grinders' lung or stone-cutters' lung, the stone particles, if rich in silica, are very irritating to the lung tissue, and in the workers considerable areas of lung tissue lose their aerating capacity altogether; very dense nodules of fibrous tissue are formed which encroach on and more or less completely obliterate the air-containing parts of the lung. Other changes follow, and the worker not unfrequently becomes incapacitated at a comparatively early age.

A comparison of the microscopical sections after exposure for 21 hours, in especially constructed boxes, from the lungs of the guinea-pigs which had been inhaling coaldust, shale, and stone rich in silica, shows that with the coaldust and the shale there is only a moderate degree of change from the healthy lung, whereas with the silica there is a well marked increase in the fibrous tissue, with a corresponding diminution in the air-containing and therefore in the functioning tissue of the lung. In all the sections the particles of coal, shale and stone can be seen in the air spaces, in the fibrous tissue septa between the air spaces, in the lymphatic channels and elsewhere in the lung. At the places where they are lodged there is a moderate degree of dilatation of the blood vessels, and also a definite increase in the number of cells. The new cells are derived by multiplication from the pre-existing cells, and are those from which the new fibrous tissue is eventually formed. These groups of cells, therefore, are the first indications that a new tissue is being formed and the direct evidence that the inhaled dust is causing irritation of the lung tissue. The degree of this cellular increase varies with the irritant. With the coal and the shale, though quite evident, it is not a marked feature of the condition, and there is practically no evidence of transitions between these cells and the fibres or fibrous tissue in the sections at this period. The stone from the grinding wheels, on the other hand, produces a considerable amount of this cellular increase, and transition stages between the original cells and the fibres of fibrous tissue, to which they give rise, can be made out. Between the effects produced by coal and those produced by the shale used in these experiments, it would be difficult to draw any distinction. The shale certainly does not produce more change than the coal.

A comparison of the microscopical sections after exposure for 65 hours shows similar changes to those seen after 21 hours' exposure, but the changes are more intense in degree and more widely spread over the lungs. The lung appears more solid and the air spaces are obliterated to a much greater extent. The increase in the cells is more marked, the transitions between them and the fibres of fibrous tissue are more evident.

In the areas in which the dust has accumulated, both in the lungs exposed to coaldust and in those exposed to powdered shale, the formation of new fibrous tissue which is encroaching on and obliterating the air-containing tissue is quite marked. Between the lung exposed to coal and that exposed to shale there is no marked difference in results, though, if anything, the fibrosis in the "shale exposed" lung is less widely distributed than it is in the lung exposed to coaldust. With the stone from the grinding wheels, the fibrosis at this period is very marked, and in certain areas the alveolar structure of the lung is completely lost.

Dealing with the results obtained after exposure for 65 hours in the tent, Dr. Beattie repeats that the atmospheric condition under which the animals in this series of the experiments were exposed, more closely approximates to that found in mines and in the grinding shops. A comparison again shows that the changes are of the same nature but very different in degree. The particles of dust can be seen both in the air spaces and in the fibrous tissue framework of the lungs. There is dilatation of the blood vessels in the neighbourhood of the dust accumulations, but comparatively little increase in the number of the cells. Fibrosis cannot be said to have occurred at all, though the indications are that with a longer exposure it would be produced.

His conclusions are as follow :—

"The comparatively short period of exposure to the various dusts does not justify me in giving a definite opinion as to the final effect of each irritant used in the experiments, but certain conclusions can be drawn:—

"1. That the effects produced in the lungs of guinea-pigs which have been exposed to the inhalation of dust correspond with those produced in man.

"2. That the effects produced vary with the time of exposure and particularly with the quantity and quality of the dust which is inhaled.

"3. The more concentrated the dust in the atmosphere the more rapidly will fibrosis be produced; and the more irritating the dust the more intense will be the fibrosis. It is therefore of the greatest importance that means should be taken, especially with very irritating dusts, to extract them from the atmosphere or to prevent the worker from inhaling them.

"NOTE.—Later work makes one doubtful whether the irritating effects of certain stonedusts is due to the high percentage of silica or to the shape and size of the particles.

"4. The inhalation of such stonedusts as are rich in silica seems particularly injurious.

"5. That the powdered shale used in these experiments does not produce more irritation in the lungs than does coaldust, and, judging by the comparatively non-injurious effects of coaldust on the general health of the workers, powdered shale may also be regarded as comparatively harmless."

Royal Commission on Metalliferous Mines and Quarries.—Meetings of the Royal Commission on Metalliferous Mines and Quarries were held on Thursday and Friday, July 25 and 26, at Winchester House, 21, St. James's-square, S.W. Evidence was given by Prof. Beattie on the subject of his recent researches into the question of the effect of the inhalation of stonedust. Evidence was also given in behalf of the workmen at iron ore mines in Ireland by Mr. Daniel Birt, Mr. Daniel Dickson, Mr. Hugh McCann, and Mr. Patrick McIlwaine.

A Coal Delivery Case.—At the West Riding Summer Assizes at Leeds on Monday, Mr. Justice Bankes heard an action in which Albert Coppe-Mahieu, coal importer, of Bruges, Belgium, sued Messrs. Richard Fosdick and Co., coal exporters, of Hull and Goole, for damages for breach of contract. Mr. Tindal Atkinson said that the first transaction between the parties took place in July 1911, when the plaintiff bought some coal out of a ship called the "Knottingley," then lying at Bruges, the coal being the property of the defendants. The Lancashire and Yorkshire Railway Company had a line of steamers which sailed from Goole and Hull, and it appeared that the defendants had been in the habit of using these steamers for supplying coal to the Continent. On July 31, 1911, a contract between the parties was entered into for the supply of 1,000 tons of coal a month from August 1 to December 31. Deliveries under the terms of the contract were made from time to time, but the full quantity stipulated for was not delivered up to the termination of the contract period, and as a matter of fact at the end of December there were still 1,400 tons of coal undelivered. In January this year a further delivery of some 700 tons was made, leaving 600 or 700 tons still to be delivered, and then a second contract was entered into. The defendants intimated that as they were unable to obtain sufficient accommodation in the Lancashire and Yorkshire Railway steamers they could not deliver the coal, and their difficulties in obtaining boat space for the shipment of the coal were enhanced by the impending coal strike. In the witness-box the plaintiff said that he had been seriously inconvenienced by the non-delivery of the coal he had contracted for. The only coal he could purchase at Bruges was of an inferior quality, and it could only be obtained in very small quantities owing to the fact that those who had the coal were holding it back in view of the impending strike. For the defence Mr. Scott-Fox contended that by the terms of the contract the defendants were protected against liability by their inability to obtain space in the Lancashire and Yorkshire steamers, and they were not bound to charter other steamers to complete the arrangement.—The judge decided in favour of the plaintiff, assessing the damages at £420. Judgment was given accordingly, with costs.

A NEW GAS-CAP OBSERVATION MACHINE.

Messrs. Ackroyd and Best Limited have just placed upon the market an apparatus entitled the "Hailwood Gas-Cap Observation Machine" for use in the instruction of firemen, rendered obligatory by the new Coal Mines Act. For this machine it is claimed that its manipulation calls for no superior or expert knowledge on the part of the operator, and that it requires no motor or similar expensive device. Its fundamental function lies in the velocity created by a gas flame in the chimney of the apparatus. The lamp body may be actually handled whilst the wick is raised and lowered, without removing the lamp from the machine or disturbing the gas mixture supply.

The machine consists of a double gallery J about 5 ft. 9 in. long, one portion being in the rear of the other, and joined at the left-hand end, so that in reality it forms one long gallery folded back upon itself. The front portion of the gallery is provided with two lamps S of the Hailwood screw-off bonnet type (although fittings to suit any type of lamp may be provided) the middle rings of the lamps being threaded and screwed tightly into threaded bushes permanently attached to the gallery in such a manner as to close up the ordinary air inlets to the lamp. The bonnet of the lamps having been previously removed, the gauze is, therefore, completely exposed to the gaseous mixture travelling along the gallery, and the lamp flame draws all its air from the gallery by way of such gauze.

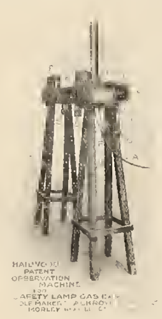


FIG. 1.

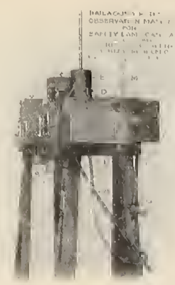


FIG. 2.

Two other lamps of any usual pattern or size may be placed in the gallery underneath covers P, the lower end of the covers sitting in water seals. Four observation windows Rx are provided, two being for any lamps arranged underneath the covers P, whilst the other two may be employed to observe the state of the gauzes of the lamps S.

Gas from any suitable source, such, for instance, as a cylinder of coal gas (similar to oxygen cylinder) or from the town's main, is led by way of pipe A to an accumulation box B. To this box one end of a water gauge N is connected by way of pipe C. Tube D provided with a cock is also carried from the same box and enters chimney E, terminating in a gas jet pipe Ex (*see* fig. 2). A smaller regulator box Bx is attached to the side of the accumulation box B, a pipe from the upper part of B passing down and through the bottom of Bx through a glycerine regulating cup L. Box Bx being provided with an overflow pipe M, the overflow gas may be ignited at the upper end of pipe M. Tube F conveys gas at a regulated constant pressure by way of a measuring valve G, and tube H to one extremity of the gallery. This same extremity is also provided with regulatable air supply holes K. At intervals along the gallery gauze, mixing plates are arranged.

On commencing to use the apparatus, the gas from the main by-pipe A is turned on, the regulating screw cup L is revolved up or down until the water-gauge reads at a certain figure, dependent upon the size of apparatus supplied; in one size the water-gauge reads at $\frac{3}{8}$ in., the sliding head on measuring valve G is then moved inwards, this movement uncovering a port hole in the valve body through which the gas will pass into the apparatus, the area of the port exposed at any one time fixing the percentage of gas passing into the apparatus, a pointer on the valve slide indicating the various percentages of gas, such as, say, 1½ per cent., 2 per cent., and so on, rising in ½ per cent., the gas passing up pipe H and entering the gallery. Jet Ex in the chimney is then ignited, thereby creating a natural draught in the gallery of the apparatus, this pulls at a uniform velocity the gas through the pipe H, and air through holes K, the mixture being well blended in passing through the gauze mixing baffles, and on its way to the chimney passes through the four lamps fixed in the gallery.

Having started the operations of the apparatus, the percentages may be varied by the simple operation of measuring valve G. With this apparatus it is possible to very quickly change the percentages from zero to the explosive point and *vice versa*, and to check the skill of the student in reading caps, the quick change from one percentage to another enabling the student to better remember the various changes in the percentages.

The covers P, which sit in water seals, act as safety valves in the event of an explosive mixture being provided and ignited in the gallery, and two other similar though smaller covers are provided in the rear portion of the gallery as additional reliefs. Tubes T may, where desired, be provided for drawing samples from the gallery and for checking and proving the gas percentages. Amongst the advantages claimed by the makers for this machine are the following: no motor is needed; the course of procedure in manipulating it is exceedingly simple and may be performed by any unskilled person; by reason of the steady velocity of the mixture along the gallery it conforms more to an actual mine; by the time the mixture arrives at the lamps it is thoroughly blended and as the lamps are completely enclosed, as at P, or have the entire upper part completely enclosed in the gallery, as at S, they are not so subject to eddy currents of gas, and, therefore, the caps truly indicate the percentage of mixture passing along the gallery.

The machine was patented so long ago as March 24, 1910, and the inventor's experience is that a machine having chimney at one end of the gallery (as shown in the illustration) and pulling the mixture past and through the lamps, gives an infinitely superior result to those in which the current is *driven at* the lamps, as with the latter method the gas seems to advance in layers or waves or eddies, and by the time it gets to the lamp it may not be thoroughly blended, and, therefore, lamps placed in different positions in the testing chamber of such machine give varying unknown percentages, and which do not correspond with the indicator.

Fig. 1 shows the apparatus conveniently fixed on trestles U. For use in daylight, rods may be passed through the loops V, and a cloth screen supported round the operator. Fig. 2 shows an enlarged view of one end of the apparatus, with the chimney E removed so as to expose Ex.

Speaking at the formal opening of the Royal Sanitary Institute Congress at York, on Monday, the Archbishop of York, who this year is president, referred to the housing question. The South Yorkshire coalfield, he said, offered a great opportunity to prove that they had passed the turning of the ways, and were no longer content to erect the ugly haphazard pit villages of the last century. A good start was made in the new coalfield, but somehow or other suspicion and stagnation had since set in. There were, however, still good grounds for hope, and he trusted that another conference of the authorities concerned would take place before long. "Meanwhile," to use the words of the medical officer of health for the West Riding, "the door of opportunity is rapidly closing. Houses have to be built, they are being built, built often before there is any adequate provision for the supply of either drainage or of water."

THE DANDY VENTILATOR.

In remote districts of a pit and also in the opening-out stages of new seams, it is often desirable to stimulate the normal air current by means of an auxiliary supply. In such cases considerable expense is frequently involved in directing to the required district a larger proportion of air from the general ventilating system. The ventilation of headings, drifts, crosscuts, &c., frequently presents considerable difficulty until through communication can be opened up, and an air circuit established in connection with the general ventilating system.

Where electric power is available, and the in-bye use of electricity is permissible, an electrically-driven auxiliary fan provides a convenient solution of the problem. Where the power service is compressed air, fans driven by air motors are sometimes employed, but the efficiency of such combinations is extremely low. A branch connection from the compressed air mains is not infrequently made for the supply of fresh air to a heading, and when the compressed air so used does not seriously deplete the supply for power purposes, the extravagance of this proceeding is condoned on account of its convenience.

THE DANDY VENTILATOR.

Where compressed air is available, the Dandy ventilator, which has recently been designed by Messrs. Mavor and Coulson Limited, provides a simple, inexpensive, and convenient means of inducing an air current for the adequate ventilation of headings or other working places remote from the main airways.

This ventilator, as adapted for headings, consists of two steel tubular truncated cones joined at their apexes and flanged at their bases. In the interior, at the junction of the cones, is fixed an air ejector of special form from which the pressure air issues through annular orifices of minute radial width. The compressed air thus issues in an extremely thin expanding hollow cone, and propels forward the surrounding air with which it is brought into intimate contact and to which it imparts velocity. The ejector nozzle ring is detachable, and spare adjusting rings are provided to suit the required conditions. When the heading to be ventilated is short, and low water-gauge is required, a ring with a small orifice is used, and, as the heading advances, the ventilation can be increased by using a ring with larger orifice and so increasing the water gauge. The nozzles also permit of adjustment to the pressure of the air supply, and they thus secure the most economical use of the pressure air. A hand hole with cover gives access to the nozzle without disconnecting the ventilator, and attachments for a water gauge are provided.

The ventilator is made in four standard sizes, the flanged ends being adapted for bolting to the flanges of 9 in., 12 in., 15 in. and 18 in. diameter pipes respectively. It is equally suitable for forcing or for exhausting air. It is found, however, in practice, that in regard to headings the best results are usually obtained by laying the ventilating pipes as near as practicable to the advancing face and withdrawing the foul air.

Adjusting nozzle rings for each ventilator are made in five sizes. The reference numbers of the nozzle rings relate to the radial width of the orifices in thousandths of an inch. The following table (which has been supplied to us, together with the foregoing information, by the makers), gives the equivalent volumes of free air passed by the nozzles at the stated pressures:—

EQUIVALENT VOLUME OF FREE AIR PASSED

Number of nozzle.	3		6		9		12		15	
Air pressure, lb. per sq. in	30	45	30	45	30	45	30	45	30	45
Air pressure, atmospheric	2	3	2	3	2	3	2	3	2	3
Cubic feet per minute	12	17	17	24	23	34	30	41	36	47
Cubic metres per minute ..	0 35	0 48	0·48	0·68	0·66	0·97	0·86	1 18	1·04	1 35

SOUTH STAFFORDSHIRE AND WARWICKSHIRE INSTITUTE OF MINING ENGINEERS.

(Continued from page 177.)

The Valuation of Mineral Property

As an opening to the discussion on Mr. T. A. O'Donahue's paper, the SECRETARY read a letter from Mr. Charles S. Morris (Cardiff), in which he said he agreed that a uniform principle of valuation, on a recognised and sound basis, should be adopted. The principle which Mr. O'Donahue advocated in his paper read in October 1906 before the North of England Institute of Mining and Mechanical Engineers, was that he accepted Hoskold and Gray's mixed percentage methods for immediate annuities, but whereas they discounted on single rate tables to get the present value of a deferred annuity, he used mixed percentages. Now he appeared to have changed his opinion. But, although he realised the fallacy of two rates as applied to immediate annuities, he continued to advocate the two rates principle in dealing with deferred annuities. Such inconsistency got him into difficulties, which he surmounted by stating the method is "near enough for practical purposes." For convenience, he (Mr. Morris) set out a synopsis of the various methods he dealt with in valuing deferred annuities, taking the remunerative rate at 10 per cent., and the accumulative rate at 3 per cent:—

Method.	Deferred period.		Revenue period.		
	Original capital to bear interest at per cent.	Interest to accumulate at per cent.	Original capital to bear interest at per cent.	Interest accumulated during deferred period to bear interest at per cent.	Sinking fund to be invested at per cent.
Single rate table (Inwood)...............	10 ...	10 ...	10 ...	10 ...	10
Mixed table (Hoskold's)	10 ...	10 ...	10 ...	10 ...	3
Mr. O'Donahue's 1906 method	10 ...	3 ..	10 ...	3 ...	3
Mr. O'Donahue's 1912 method	10 ...	3 ...	10 ...	10 ...	10
Mr O'Donahue's "theoretical" method ...	10 ..	3 ...	10* ...	3 ...	3

* On outstanding capital only.

It would be seen that Mr. O'Donahue still held to his 1906 method, though he admitted its inaccuracy. The writer proceeded to test the method by several simple cases. It appeared to the writer that the formulæ could not be satisfactory either for "general" or "special" application, and that the only sound method was for valuers to adopt the single rate of interest tables, which gave consistent results in whatever way they were applied. An "eminent actuary" had stated that insurance companies in his experience did not use calculations involving two rates of interest in their valuations of properties.

Mr. ALEXANDER SMITH, whilst again commending Mr. O'Donahue for his excellent paper, said his ground of contention with the author was that the latter did not take fully into consideration the many risks of mining, and that as he extended his theories or rules, they all tended to increase the initial values of mining property. Those who used their money in this way bargained for large profits, which they knew could only be obtained in the case of success, and because there was great risk of losing part or the whole. It had become the custom to value collieries upon the annuity system, probably because the length of life could be pretty well ascertained, but why the ordinary method of dealing with other properties, such as manufactories, was entirely ignored, the speaker could not exactly understand. However, as the annuity tables were those adopted, it was essential that they should be correct and just, and that sufficiently liberal interest should be utilised. The valuer was grateful for the assistance of those tables, as the calculations were otherwise very intricate. When, therefore, they had Inwood, Hoskold, Gray, King and O'Donahue at variance somewhat, not on the tables, but as to how they should be applied for the valuation of annuities, it was difficult for the valuer to decide. It was convenient to have the tables, and pretty well every amplification could be dealt with from those in existence excepting the present value of a capitalised deferred amount at two rates of interest; but this was now met to some extent by the very useful table provided by Mr. O'Donahue in his paper. In the present paper the author stuck to the principle of the two rates of interest for the deferred period but advocated a single rate, which gave a higher present value for immediate annuities, and the revenue period of deferred annuities. The latter surely was inconsistent, as it assumed that the investor could re-invest the comparatively small accumulative interest each year at the high stipulated rate, which in practice was unreasonable. He also assumed the investor could use the extra interest, over a gilt-edged rate, for insurance, but this was, in the speaker's views, hardly the fact. This would be all right providing all transactions were successful; but, as before stated, the investor in mining securities had in his mind the many losses, and the good return he hoped to get, but he was never secure from loss till the last payments were made. If he lost it was no consolation that someone had gained and that in the aggregate the industry returned a gilt-edged interest. He, for taking the risk, hoped for the high interest, and in no way expected to apply part of it for insurance, even if he could, to simply come out at the Consols rate. The speaker agreed that the investor was not bound to re-invest his redeemed capital, nor insure his extra interest, and the only reasonable and sound way of dealing with these valuations was to allow a sufficiently large interest to cover the exceptional risk, and to allow a lower or trust security rate for the redemption, as it was most unreasonable to suppose the comparatively small sums could be reinvested each year at the higher rate and in addition without trouble the whole of the capital, supposing the venture to be successful, was intact at the end of the term. To sum up the matter and look at it from a commonsense point of view it was a condition of all such transactions that the remunerative or stipulated rate of interest was to be realised on the whole of the capital for the entire period during which it was unredeemed, and not merely on the outstanding amount. If, however, Mr. O'Donahue whittled all successful investments down to a gilt-edged remunerative rate of interest, then in the aggregate, taking in the unsuccessful, the mining enterprise would be a losing one, and no one would go into it. He said the essence of the contract was the return of a portion of the capital each year, and not the payment of the stipulated interest for the whole term. In this he was decidedly wrong, as the contract distinctly was the obtaining of the stipulated interest from the whole term, and a sufficient surplus that could be safely invested to return the capital at the end of the term. There was, therefore, no question of repayment of capital by instalments nor insurance. He (Mr. Smith) was bound to confess that he was rather pessimistic about the prospects of collieries as profit-earning concerns, when they considered properties like Hamstead, suffering from "bumps" and fires, and Sandwell, which, in the course of its operations at the new sinking, had come upon old rocks. He was constantly getting notice of collieries stopping. For example, he had just had a notice from one which said that unless a large amount of extra capital was found it would be impossible to carry on longer than to-morrow. He had worked 12 months with Mr. O'Donahue in trying to settle the value of a colliery which had been fairly successful and was likely to go on so to the end of its natural life. There were two pits, both of which were working very successfully, but one was suddenly drowned out, and within three months the other was burnt out, and had not been opened up or done any business since.

Mr. H. BRADSHAW (Birmingham) said Mr. O'Donahue's paper had been subjected to searching criticism, which was very illuminating. In his opinion, two facts clearly emerged from the paper and its discussion. First, that no tables at present evolved were correct enough for universal application, and that their chief function should be that of a handy guide to indicate approximate values which must in actual practice be adjusted by the valuer in cases where there was an obvious inaccuracy. Second, that the single-rate table was, on the whole, the simplest and most practical, especially for immediate annuities; although even that produced results which were obviously inconsistent. Take, for instance, two mineral properties, similar in all respects except that one would produce a royalty rent of £1,000 a year for 30 years and the other the same rent for 100 years. By the 10 per cent. table the present value of the former would be £9,420, and of the latter £10,000—a difference of only £580 for an extension of an income of £1,000 a year for 70 years. In the event of a sale of the two properties, there was little doubt that the difference in purchase price would be very much greater. Throughout the paper and discussion the question of the tables overshadowed all others; but, in his opinion, from the standpoint of practical valuation, another point dealt with in the paper was of equal, if not greater, importance and worthy of more emphasis. That was the question of the most suitable rate of interest to be adopted. As Mr. O'Donahue pointed out, the same rate was frequently used whether the valuation was in respect of a first-class certain rent or of a risky mining undertaking. There was undoubtedly a wide range of security in mining properties, and it was surely of prime importance that the degree of risk should be accurately reflected by the rate of interest. The best security was, of course, a first-class certain rent, and this seemed to him to be as good as many 6 per cent. securities in other industries.

Mr. F. A. Grayston said that he had read the paper with very great interest, but there was one point in it that he could not quite understand. That was with respect to the valuation of undeveloped mineral estates, which he presumed meant unproved estates. Mr. O'Donahue in his paper had considered it unnecessary to know precisely the quantity and the gross value of the minerals which would be eventually worked, but that the present value of a mineral estate was in most cases affected little by the question of whether three or four seams might be found to be workable, and that it is almost immaterial whether the revenue was estimated to run for 30 years or 100 years. He (Mr. Grayston) was very much surprised at that expression of opinion, because he considered that the number of the seams, with the duration of the coalfield, and also the question whether the coal was overlaid or formed part of a proved coalfield, or was overlain by new strata, were very important factors in forming an opinion as to the present value.

Mr. O'Donahue, in reply, said that notwithstanding Mr. Morris's objections he saw no reason to modify his introductory remarks that valuations of mineral estates were not frequently required hitherto, and that they were seldom subjected to close criticism. The consideration of a transfer was usually determined by bargaining, and not by the agreement of the parties' valuers on estimates and principles of valuation, which was the only satisfactory method of dealing with the valuations required by legislation. The necessity for uniformity in principles was, therefore, now of much greater importance than hitherto. He still maintained that there should be no risk attendant to the redemption of the principal outside the risks of the original transaction, and he had suggested nothing contrary to that view. In the tabulated statement which Mr. Morris gave of the different methods of calculation, he made it appear that with the single-rate table, and with what he termed his 1912 method, it was necessary to invest a sinking fund at the high stipulated rate of interest to redeem the capital. If that was his view he would ask him to read the paper again.

He was surely not to blame if he did not achieve finality in the 1906 paper. He then set out to prove that Mr. Hoskold's tables of deferment were fallacious, and there were then few mining engineers to support him. Few could now be found to support these tables. He then adopted the dual rate of interest basis as being the one generally favoured, though he pointed out that it was open to objection. Discussions with many mining engineers in recent years disclosed the fact that the dual interest table was frequently applied under the impression that it allowed such benefits only as were obtainable with the single-rate table, and he therefore deemed it desirable to show clearly the premisses on which each was based. He regretted to state that even now it could not be claimed that any finality had been reached, and he was forced to the conclusion that all interest tables at high rates had their limitations.

Dealing more directly with Mr. Morris's criticism, he was fully aware of the anomalies which he showed, and dealt with some of them in his book on valuation, published some time ago. They did not affect his conclusions. The anomalies with the dual rate method were due to the fact that when the annuity was taken as a whole, interest was allowed at the stipulated rate on the whole of the capital for the entire period; and when the annuity was split up, parts of the capital were assumed to be withdrawn from the transaction at certain periods, and the annuity was released of the burden of providing the excess interest on the amounts thus withdrawn. The simple interest table could not be used for apportionments, because a short-term annuity could not be valued at the same rate of interest as a long-term annuity, where high speculative rates are involved, and consequently if apportionments of an annuity were made at the same rate of interest as was originally adopted for the valuation of the whole, the results would be erroneous. He was aware that this was a revolutionary statement, and that it was contrary to the generally accepted view. The single-rate interest table was the only one by which the sum of the apportioned valuations would agree with the valuation of the whole; but, unfortunately, the apportionments were incorrect by this method, so that the consistency in the total afforded little satisfaction.

Assume that an annuity of £100 a year for 50 years is divided into two parts, and compare the apportioned valuations, and also that of the whole based on the single-rate table, as follows:—

	Annuity of £100 for 50 years.	Annuity for 10 years.	Annuity for 40 years, deferred 10 years.
Value secured (4 per cent.)	£2,148	£811	£1,337
Value unsecured (10 per c.)	£991	£614	£277
Value unsecured compared with secured	46 p.c.	76 p.c.	20 p.c.
Profit on transaction if as successful as estimated	117 p.c.	32 p.c.	382 p.c.
Accumulative rate of interest taken at 4 per cent.—			
Average annual return necessary to prevent loss	£46	£76	£20
Portion of estimated annuity available for insurance	£54	£24	£80

There could be little doubt, from these comparisons, that the annuity was over-valued and the deferred annuity under-valued. The annuity for fifty years and the deferred annuity were for identical periods, and the risks were identical, yet the profit, if the estimates were realised, was 117 per cent. in the case of the immediate annuity, and 382 per cent. in the case of the deferred. The error in the case of the deferred annuity was due to piling insurance on insurance during the deferred period.

He did not wish to destroy all confidence in the tables, or to multiply the complications of the subject by pursuing this point further, but it was clear that a table based on a high stipulated rate of interest must be regarded as a convenient practical method of discounting annuities, and not as an exact mathematical formula which would stand the test of addition and subtraction.

In reply to Mr. Alexander Smith, he had to say that the risks of a transaction should be met by the rates of discounting, and not by irregular rates.

He noted with pleasure that he agreed with him that the allowance of compound interest during the period of deferment did not appear to be justifiable. With regard to the single interest method as applied to immediate annuities, his view, however, was that it necessitated reinvesting at the high rate to redeem capital. He had explained in the paper that this was a misconception; there was no question of reinvesting to redeem capital. Mr. Alexander Smith showed that in the example he gave of a 6 per cent. investment the return worked out only at an average of 3¾ per cent. on the original capital. As he had previously stated that "what the purchaser of the annuity did with the portion of the capital which had been redeemed did not concern the annuity transaction," he objected to his stating that the reinvestments of redeemed capital would bring him in further interest, though he apparently clearly saw that this would be so. He bowed to his objection and would not use that argument. If what the purchaser did with the redeemed capital did not concern the annuity transaction, the borrower was certainly entitled to say that it was no part of his business to provide interest on such redeemed capital which was in the hands of the lender. The total interest paid should not be compared with the original capital for the full period when part of that capital had been withdrawn from the transaction and had nothing further to do with it.

As to the point of insurance which Mr. Alexander Smith raised, investors in mineral properties were in exactly the same position as gamblers on a racecourse; they gambled amongst themselves and one's losses balanced another's gains. The mining industry took from the community at large no more and no less for its capital than did any other free industry, but the apportionment of the interest was more irregular in a speculative industry. The capitalist who did not wish to take risks, instead of investing in a speculative industry, and insuring with the excess interest saved himself the trouble of insuring by purchasing properties which gave the accumulative rate of interest direct.

In reply to Mr. Grayston he said that, of course, the value was materially affected by the question as to what extent the minerals had been proved. The point which he had desired to make was that according to the tables the value was practically unaffected by the estimated period of revenue when the period exceeded 30 years. He would have to qualify that statement. The tables showed scarcely any difference in value, but as a matter of fact there was a difference, and the explanation which he had given *re* the short and long term annuities accounted for such difference not being disclosed by the tables. By the 10 per cent. single interest table the reversion of a perpetuity after 30 years was only about half a year's purchase, but that was obviously wrong, and such tables could not be relied upon for the valuation of deferred annuities.

He thanked those members who had contributed to the discussion, but regretted that no new point had been adduced which would enable them to arrive at a simple conclusive solution of the problem. For immediate annuities he thought there was abundant proof that the single interest table was the better one to adopt. For deferred annuities there was the single interest table to determine the value as immediate, and the deferment table, which he gave in the paper, to determine present value. This was the best solution he could offer to those who insisted on a ready reckoner. One point had, he thought, been brought out to advantage, namely, that the tables were only a useful guide to the valuer, and that for valuations of mineral properties something more was required than a boy with a 10 per cent. interest table.

Mr. Smith said there was another matter he would like to ask. When Mr. O'Donahue proposed a single rate table did he take the same rate of interest?

Mr. O'Donahue said he should certainly not do that, the kind of table used did not affect the value, and the rate of interest must be chosen after deciding upon the particular table to be used.

Mr. Alexander Smith, proposing a vote of thanks, said they had clearly a duty to tender their thanks both to Mr. Menchem and to Mr. O'Donahue for introducing those two excellent papers. Sometimes they had papers very interesting in themselves, but nothing arose from them; but the merit of those papers was that considerable discussion of a most valuable character had been elicited.

Mr. Grayston, in seconding, considered that both the papers were of great practical value, and though they were not all able to understand Mr. O'Donahue's paper, it furnished them with a great amount of very useful data.

The Authors briefly acknowledged the compliment.

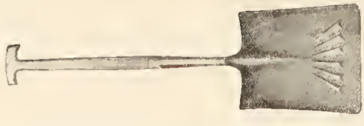
This concluded the meeting.

Grimsby Coal Exports.—The return of the quantities of coal exported from Grimsby during the week ended July 26, 1912:—To foreign destinations (tons): Gothenburg, 4,412; Christiania, 525; Dieppe, 735; Malmo, 2,000; Halmstad, 54; Wisby, 654; Antwerp, 726; Hamburg, 209; Esbjerg, 550; Cronstadt, 5,646; Nexo, 705; Gefle, 3,814; Pernau, 1,338; Kallundborg, 1,517; Ronneby, 646; Randers, 1,100; Fredrikshald, 390; Aalborg, 1,593; and Christiansund, 1,195 tons; total, 27,965. To coastwise destinations (tons): Lerwick, 1,870; and Salcombe 160 tons; total, 2,030 tons. The export for the corresponding week of last year was: Foreign, 38,432; and coastwise, 1,375 tons. During the past week 14,302 tons of coal were exported to foreign destinations from Immingham. The highest shipment was 5,624 tons to Hamburg, others being 2,255 to Copenhagen, 2,093 to Gefle, 1,960 to Cronstadt, 1,179 to Halmstad, and 921 to Amsterdam.

Unemployment Insurance Contributions. — As some misapprehension appears to exist on the matter, the Board of Trade wish to make it known that no stamps can be used for payment of contributions in respect of unemployment insurance other than the special unemployment insurance stamps, which are obtainable at any post office. Health insurance stamps and ordinary postage stamps cannot be used for the purpose, and, if affixed, do not count as contributions in respect of unemployment insurance. Where such other stamps have been affixed, it will still be necessary for the proper unemployment insurance stamps to be affixed, and the liability for affixing them rests upon the employer. For the present, however, as a temporary arrangement and with a view to facilitating the correction of mistakes, the Board of Trade will themselves be prepared, without charge, to affix unemployment insurance stamps in lieu of the health insurance stamps wrongly affixed, obtaining the employer's acknowledgment. For this purpose all unemployment books to which a health insurance stamp or stamps have been wrongly affixed should, as soon as possible, be sent to a Divisional Office, with a request for the affixing of unemployment insurance stamps of value corresponding to the health insurance stamps upon them. The addresses of the divisional offices are as follow.—London and South-eastern: Caxton House, Westminster; South-western: Canada House, Baldwin-street, Bristol; West Midlands: 164, Corporation-street, Birmingham; Yorkshire and East Midlands: 14, Frenchgate, Doncaster; North-western, Lancashire and Cheshire: Cairo-street, Warrington; Wales: Law Courts, Cathays Park, Cardiff; Scotland and Northern: Bath-street, Glasgow; Ireland: 21, Parliament-street, Dublin.

THE "FIRE KING" SPRINKLING SHOVEL.

We give an illustration herewith of a shovel which has been designed chiefly for boiler firing, to ensure better results with cheap grades of fuel, with a minimum quantity of smoke, and a maximum quantity of steam.



With the ordinary firing shovel the fuel leaves the shovel in a thick mass, requiring many shovelfuls to cover the whole surface of the fire. The result is the fire is covered with a thick layer of green fuel, which cools down the furnace, and retards the admission of air at a time when the maximum quantity is required for the complete combustion of the gases driven off.

The sprinkling shovel has been designed to get an effect similar to that of a mechanical stoker, but without the first high cost. It is made by Mr. Clarence A. Fell, Fanshawe House, Dronfield, near Sheffield.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

South Wales Federation: Centralisation Deadlock—The Award: Mr. Tom Richards' Comment—Federation will Apply for Increase—Miners' Executive's Drastic Decision—The Strike and Railways: More Decreases—New Steelworks for Aberavon—Provident Society and the Insurance Act—Ebbw Vale Company's Generosity—Furness, Withy and Co's Expansion.

In some quarters the miners of South Wales show that they do not favour the proposed re-organisation of their Federation upon more centralised lines, and local meetings have instructed their delegates to vote against the proposal. It is a question, however, how far these meetings are really demonstrative of the mind of the whole body of men—a question which applies to most of the resolutions carried at local meetings, where very often the votes of the relatively few in attendance give a wrong idea of the opinion of the majority. Only a ballot can give a trustworthy result; and an indispensable requisite is that the ballot methods should be so re-modelled as to ensure absolute secrecy, for in no other way can the mass vote become unchallengeable.

On Monday, the delegates of the South Wales Miners' Federation met at Cardiff to consider the proposed scheme of centralisation. Mr. W. Brace, M.P., presided There were present 265 delegates, representing 121,984 members. The new scheme suggests the deletion of the 10s. entrance fee, a contribution of 1s. per month, of which 10d. is to go to the central funds and 2d. be retained for the lodge; boys under 18 to pay half contributions and receive half benefits. The agents in the 12 areas are proposed to be placed under the executive council, and a central department is to be set up. Agents are to be paid £4 a week and travelling expenses, and a levy of 1d. per member is to be made for Parliamentary representation, &c. Such in outline is the new scheme, the principle of which the conference accepted by the narrow margin of 61 card votes—the figures being 1,255 as against 1,194; this represents an actual majority of 305 in the coalfield. The delegates further resolved to return to the previous entrance fee of £1, and there was much division of opinion regarding the recommendation of the committee to abolish districts, and to transfer the government of the Federation to an executive council. The recommendation was ultimately negatived by 48 card votes. The executive, it was resolved, should have 24 members, but great difficulty was experienced because the conference had, at the morning session, decided to retain the districts as at present, and this meant that the districts would not be able to bear the heavy expense of sending many members to national and international conferences. Consequently discussion was postponed until Tuesday, when the delegates again met, the scheme committee in the meantime having formulated resolutions in keeping with the views expressed at Monday's meeting. During protracted consideration it was stated that the centralisation scheme could not be carried out without the abolition of the districts as at present constituted. Ultimately the delegates resolved to have a ballot of the coalfield on the question of abolishing the districts, the ballot to take place on September 5 and 6.

Mr Tom Richards, M.P., addressing the delegates of the South Wales Miners' Federation, at Cardiff, on Tuesday, spoke of the award, and said that one question yet to be decided was that regarding the adjustment of the standards of 1877 and 1879. When the percentage advanced, he said, those working under the 1877 standard reaped a benefit over those under the 1879 standard. Whilst the workmen contended that the award continued both standards, the owners, said Mr. Richards, contended that the award gave a uniform minimum wage to all classes of workmen. Further, they had to consider whether the award abolished all standards below the minimum fixed by Lord St. Aldwyn. Many points would arise, he added, and these should be forwarded to the executive so that they might be brought before the board.

At their meeting, on Friday, the executive council of the South Wales Miners' Federation decided to apply, on August 1, for an increase of 6¼ per cent. (upon the standard) in their wage rate. As this now stands at 51¼, the total would be 57½, only 2½ per cent. below the maximum.

The miners' executive on Friday discussed a matter of considerable importance, and passed upon it a resolution of very definite nature. When the strike came to an end upon the Minimum Wage Act, the colliery proprietors gave notice that, pending the fixing of minimum rates, work could proceed only upon day-to-day contracts, thus ousting the Conciliation Board condition of monthly agreements. At the recent meeting of that Board the workmen's representatives urged that, upon the receipt of Lord St. Aldwyn's award, the employers' notice ceased to apply, and that the men were entitled to the monthly contract. But the owners' representatives did not accept this contention, and therefore, at their meeting last Friday, the miners' executive passed a formal resolution that the men should act upon the assumption that monthly contracts existed, and that they "take legal proceedings to enforce the monthly notice in every case where the workman is dismissed without such notice."

With regard to the appointment of assistant inspectors of mines, the executive of the Federation have decided that the attention of the Home Secretary shall be called to "the inadequate number proposed to be appointed" in this coalfield.

At Tuesday's meeting it was resolved to pay the expenses of representatives on local bodies at the rate of 8s. a day plus fare and 2s. expenses. The conference decided also to affiliate lodges to the various Trades and Labour councils.

Following the news last week of a decrease of £28,873 in the revenue of the Barry Railway Company, comes the intimation that on the half-year's working the receipts of the Taff Vale Company are £453,910, as against £493,357 for the first half of 1911. There was, however, a saving in expenditure, but the balance available for dividend was only £141,685, as against £181,791—a decrease of £40,106. The report is considered satisfactory when recognition is made of the disastrous coal strike, but the dividend recommended is only 3 per cent. on the ordinary, whilst the preference stock receives 4. This is the first time for 11 years that the company has declared a dividend of less than 4 per cent. on the ordinary. A sum of £1,743 is carried forward.

Despite the decreases in railway receipts for the past half-year, it is pleasing to note that the Port Talbot Railway and Dock Company are declaring a dividend of 8 per cent. on the ordinary shares, as against 6 per cent. for the first half of 1911, and are carrying forward £3,299, as against £1,481 in the corresponding period of 1911. The revenue was £5,000 more and the expenditure £3,000 less.

The Cardiff Railway Company's directors have recommended dividends of 4 per cent. on the preference shares, a similar amount on the preferred ordinary, and 3 per cent. on the second preferred ordinary. There is no dividend on the ordinary shares.

The dividend of the Rhymney Company is 1½ per cent. less than for the first half of 1911, being 7½ per cent. on the ordinary stock as against 9 per cent. for the corresponding period. To the current half-year's account £2,774 is carried forward.

Although the past half year has been a very unsatisfactory one for the South Wales railways, owing to the loss of traffic occasioned by the strikes, there is abundant evidence that—chiefly in their docks—the railway companies are determined to provide adequately for meeting the increased demands that must soon be made upon them, owing to the great expansion of coal output. The Newport (Alexandra) Company are raising additional capital for the completion of their work, and have issued invitation for subscription of £125,000 preference stock. Barry company have acquired 200 acres adjoining their No. 2 dock, this carrying their ownership to the seashore, and enabling them to control the area into which the Taff Vale Company vainly sought Parliamentary powers to make an extension. It is on this area that fuel works, iron and steel works, &c., have been projected.

It is stated that negotiations for the erection of new steelworks at Aberavon Moors are now completed, and that at an outlay of £100,000 one of the most complete and up-to-date works in the country is to be erected. Further, it is rumoured that three new furnaces will be laid down at the Port Talbot Steelworks, and that a site is being sought at Port Talbot for new blast furnaces. Should these schemes mature, it is estimated that the population of the district will increase by 8,000 to 10,000 persons.

The Swansea district of the South Wales Coalowners' Association met at Swansea on Monday. No matter of special interest came up for consideration, and the small disputes which had been reported were referred for consideration to a committee.

The board of management of the Miners' Provident Society met at Cardiff on Saturday, Mr. B. Ashton presiding. The meeting discussed the Insurance Act, and subsequently a sub-committee, including the chairman, vice-chairman, Mr. Watts Morgan and others, was chosen. The committee will issue a manifesto to colliers urging them to join one large society for the whole coalfield—a method which, it is claimed, will be much more advantageous than joining small societies.

On Wednesday of last week a fire broke out in the gob of No. 2 pit of the Cambrian Collieries, Clydach Vale. Work was suspended for the time being, but the men decided to resume work on Monday. The pit has been examined by Mr. Leonard Llewellyn (general manager) also by H.M. inspector, and by the representatives of the miners, and is reported to be quite safe for work.

On Monday afternoon a new workmen's institute was opened at Victoria under the title of the Victoria and Waunllwyd Workmen's Institute. Mr. Joseph Braileford, the chairman of the directors of the Ebbw Vale Company, was presented with a gold key on behalf of the committee and Mrs. Mills opened the women's section. The directors, said Mr. Brailsford, were in entire sympathy with the institute and had decided to make a grant of £25 annually. Mr. Tom Richards, M.P., urged the men to make good use of the facilities provided. The new buildings have a 68 ft. frontage, billiard rooms, hall, &c., and in the vestibule is a semi-circular window embodying the arms of the High Sheriff of Monmouthshire (Mr. Fred Mills, J.P.). The cost approximated £3,000.

Speaking at the annual meeting of Messrs. Furness, Withy and Co., at West Hartlepool, on Saturday, Lord Furness said that, in association with Messrs. D. Davis and Sons Limited, the company had completed the purchase of the collieries and business of Messrs. John Lancaster and Co. Limited, each firm taking an equal interest. Mr. W. H. Beckingham, the residential director at Cardiff, had been appointed joint managing director of the undertaking. The collieries at Aberbeeg had an output of 1,300,000 tons per annum, and the coals were of superior quality. The company had also purchased an old-established store business, and the board were considering the question of increasing the ordinary share capital to £500,000.

After 26 years' service Mr. G. H. Rowlinson, miners' agent for Dean Forest, has resigned. Addressing the Two Bridges lodge at Blakeney on Saturday, Mr. Rowlinson said he was over 60 years of age, and during the past 18 months "things had not gone so sweetly and smoothly as they should have done." The advice he had given had not been taken on one or two occasions, with the consequence that serious trouble had ensued. The Forest of Dean district, he added, did not permit of the men being extremists. He had always held moderate views.

The dependants of the Park Slip Explosion Fund having appealed for increased relief of 2s. 6d. weekly, the committee, at their meeting at Bridgend on Thursday, considered the petition. The chairman, Col. Turberville, stated that the trust deeds did not allow any increase, and it was resolved to reply to the recipients regretting inability to increase the relief.

Amongst the companies struck off the register last week may be noted the Brynamman Anthracite Collieries Limited, the Western Coal Syndicate Limited, and the Wernberg Colliery Company Limited.

Leeds University.—There are some interesting passages in the eighth annual report of the University of Leeds, covering the year 1910-11. The resignation is recorded of Prof. G. R. Thompson, who has occupied the chair of mining since 1901, to take up the important post of Principal and Professor of Mining at the South African School of Mines and Technology, and the temporary appointment of Mr. David Bowen. Mr. David B. Morgans, B.Sc., has been appointed as assistant in the department. The ordinance relating to the degree of B.Sc. with honours has been modified by the insertion of a provision that honours in mining engineering will be awarded to candidates who, having obtained the ordinary degree, with mining engineering as a principal subject, and being recommended as suitable to proceed with an honours course, shall have spent one year in research or in the preparation of a thesis, attendance at the University during this fourth year not being compulsory. Prof. Kendall reports that in the department of geology researches have been prosecuted by him into the origin of the permian rocks and into the eastern extension of the Yorkshire coalfield, and by Miss Sarah Chapman into the chemical and physical characteristics of the seat earths of coalseams and their mode of formation. A new feature in the work of the department is the establishment of a course of instruction in the practice of geological surveying for students of mining and civil engineering. Mr. Parr states that it is satisfactory to note that the number of regular electrical engineering students has increased, and the total number of students attending the department has been greatly augmented by the institution of an electrical engineering course for mechanical engineering and mining students. Professor Bone reports that the revised scheme of courses in (1) fuel and metallurgy and (2) gas engineering came into operation in October 1910, with satisfactory results. The laboratories have been well attended by both research and ordinary students. Research work on (1) gaseous explosions at high initial pressures has been continued by Mr. J. B. Dawson, B.Sc., in conjunction with Mr. Gray, the demonstrator, and on (2) the scientific aspects of "surface combustion" by Mr. Harold Hartley, M.Sc. (the research Fellow), assisted by Mr. Appleyard, B.Sc. Another post-graduate student took a special course in fuel and metallurgy, qualifying for the diploma which was awarded to him at the end of the session. It is noteworthy that whereas the great majority of the regular students in the department are entered for courses in fuel and metallurgy, the large number of occasional students who attend the special courses of lectures during the second term are mainly drawn from the coal-gas and coking industries. Systematic courses in gas engineering are but little in demand. Mr. Bowen reports that in the department of mining special demonstrations on safety lamp tests and the detection of firedamp were given to about 200 mine officials and students. In connection with the testing gallery that has been established in the mining department, special tests were carried out for the Home Office authorities on lamps recovered after the colliery disasters at Whitehaven and Bolton, Lancs. A departure was made from the usual method of teaching mining by the establishment of a special course of lectures on theory and design in mining engineering. This course met with conspicuous success, and is being followed up this session in the courses for students in their final year. Mr. Frank Mawson carried on research work under the direction of Prof. Thompson and Mr. Bowen on the subject of "Efficiency of Endless Rope Haulage." The results will probably be published shortly. Researches were commenced by Mr. Bowen and private assistants on "Coal Washing," "The Treatment of Slimes," "Safety Devices in connection with Lamps and Electrical Machinery in Mines." These are still being carried on, and it is hoped that some of the results will be published in the course of the coming session. It is a satisfactory feature of the department that the numbers of degree students seem to be increasing, and that there is an evident desire on their part to take honours courses involving research on some subject or other.

GEOLOGICAL RESEARCH IN THE COALFIELDS

Scotland.

(Concluded from page 173.)

Shotts and Fauldhouse District (with part of Ayrshire).—The area on the south side of the big east-and-west fault which passes a little south of Hendrey's Course has lately been re-examined by Mr. R. G. Carruthers and Mr. B. Lightfoot, and it is clear that the bands of limestone and encrinital shale which outcrop near the head of the burn about half-a-mile south-west of the Ordnance Station 1197 do not occupy the crest of an anticline as formerly stated,[*] but are lying almost horizontally over the shales and thin ironstones—Raesgill ironstones—which occur a little lower down the burn.

Mr. Wilson gives details of a section in the lower limestone group at Auchenskeith Quarry. Mr. Carruthers believes that the bottom limestone may represent the Blackbyre limestone and the top limestone the Hurlet limestone. In last year's *Summary of Progress* he correlated the lower limestones at East Kilbride with those of Hurlet, but noted the entire absence of the Hurlet coal in the first-mentioned locality. It is therefore rather interesting to find the coal taking its place in the Ayrshire sequence, and although in the quarry it is only 6½ in. thick, in a bore less than a mile away it is 1 ft. 3 in. A coal 8 fathoms from the Index limestone (the Highfield limestone of Ayrshire) has been worked on a small scale and is locally known as the Lylestone Main. It is sometimes 2 ft. 9 in. thick.

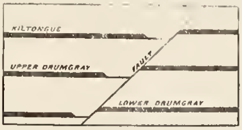
Mr. Clough has detected several exposures of Skipsey's marine band which do not appear to have been hitherto noticed. As this band seems fairly constant throughout the Scottish coalfields, and may in future prove of considerable help as an index bed, it is desirable to describe the fresh information in some detail. Two of the new exposures are on the South Calder, one a little above and the other a little below the bridge nearly half-a-mile west-north-west of Jerviston House. A third crop is seen in the north bank of the Clyde about 70 yards below the Camp Viaduct. Two other exposures are still very well seen in the railway cutting about half-a-mile south of Motherwell Station, where Mr. Macconochie found the bed many years ago.[†] In all these localities the bed has much the same character, being a dark grey limestone, rather shaly in places, and only about a foot thick, but so hard in the main that it breaks up into big slabs, and in natural exposures projects considerably beyond the other strata. The dark grey colour is very like that of many bands of shale or fakes, and this is probably the reason the bed has not been recorded in the journals of many shafts and bores which must have gone through it. A drop of dilute hydrochloric acid gives rise to an almost explosive effervescence, and marine fossils are generally soon found. In the cutting and near the Camp Viaduct, and again in the upper of the two exposures on the South Calder, a thin coalseam lies immediately under the marine band. It is to be noted that no red beds are seen in this section, nor indeed, judging from the journals of various neighbouring bores, do any red beds appear to occur in this locality on any horizon between Skipsey's marine band and the Ell coal. This is very different from the state of matters a few miles further north.[‡]

The Palacecraig section at which Skipsey's marine band was found a few years ago[§] lies about 3¼ miles north of the South Calder exposures, and it is interesting to notice that the beds between the Ell coal and Skipsey's band are much thinner near these exposures than at Palacecraig. At Palacecraig the thickness of the beds between the upper coal and Skipsey's band was estimated at 53 fathoms, and that between the (base of the) Ell coal and Skipsey's band is probably about 73 fathoms. On the other hand, if we calculate from levelled positions indicated in the Splint seam workings of Braidhurst Colliery (Summerlee Iron Company Limited) which adjoin the South Calder exposures of Skipsey's band, it is found that the strata between the (base of the) Ell coal and this band have now diminished to about 56 fathoms. This considerable diminution makes it appear quite possible that the 6 in. limestone recorded in the shaft section of Bothwell Castle No. 3 pit, which lies rather more than 4 miles west of Motherwell, may be Skipsey's band after all.[*] An additional diminution appears to occur in a southerly direction between the South Calder and the Camp Viaduct, but this probably amounts to only about 3 fathoms.

It may be mentioned that in the Barony pit sinking, now being made by Messrs. William Baird and Co. Limited, near Auchinleck, Ayrshire, Skipsey's marine band, with its usual marine fossils and lithological character, has lately been passed through, and that from the data provided by this sinking and an adjacent bore the distance between the (base of the) top thick coal, called the "Ell coal," and this band is calculated to be about 35 fathoms.[†] The Barony sinking lies about 25 miles south-south-west of the Camp Viaduct.

Near the junction of two burns about 200 yards north-east of Shirrell, several thin coals and musselband ironstones are exposed. The measures are much confused with faults, but it is believed that they all lie between the Upper coal and Skipsey's marine band. The ironstones have been searched by Mr. Tait, and he has found abundant remains of *Lingula squamiformis* in the top one.

It has long been known that wants often occur vertically, or almost vertically, above one another in several successive coalseams. An example of this, occurring at Spindleside pit, near Cleland, was visited by Mr. Anderson. In this case the want is linear, running from west to east. It affects the Kiltongue, the Upper Drumgray and the Lower Drumgray, occupying a position progressively further north in the two lower seams. Its southern margin is formed in all three cases by an east-and-west fault, with downthrow to the north of not more than a foot or two, with which the wants are in evident connection.



A whin dyke striking north-west is exposed in various places in the underground workings of Hattonrigg Colliery (Summerlee Iron Company Limited). In the hope of getting the rock in a sound condition, Mr. Clough made an examination of the different exposures, with the kind assistance of the company's officials, and found that where the dyke cuts the Lower Drumgray it is less decomposed than usual. The rock is considerably decomposed, but may be classed as a camptonite, and agrees with many camptonitic dykes described by Dr. Flett[‡] from the West Highlands, where it is supposed that they may be of tertiary age. Apart from its peculiar petrological character, this Hattonrigg dyke is of interest because it sends off a number of thin sills laterally, especially where it comes into contact with coalseams, but the sills observed (in the measures just above the Pyotshaw seam, and in the Blackband and Virtuewell coals) do not extend more than 10 or 12 yards from the dyke. It may be added that Mr. W. Jarvie, of the Bothwell Castle Collieries (Messrs. William Baird and Co Limited), states that the west-north-west whin dyke that passes a little south of Craighead House gives off sills (floats) into every coalseam worked near it, and that a sill in the Ell coal extends as much as 44 yards from the dyke.

Among the boulders separated from the boulder clay used for making bricks in the brickworks at Carfin that belong to the United Collieries Company Limited, Mr. Clough detected a calcareous "coal ball" of the type that occurs in the coal measures of Lancashire. Such coal balls do not appear to have been yet found *in situ* in Lanarkshire, and unfortunately it has not been possible to trace the Carfin boulder to its source.

Mr. Anderson reports that in this district the Ell coal, the Main coal and the Splint have all been wrought a first time (on the stoop-and-room principle) over their entire area. In some cases the stoops have been removed in bulk, while in others a second and sometimes a third system of rooms has been driven through them. Where any of these three coals remains it is in the form of narrow pillars, and in the case of the Ell coal any attempt to work these is fraught with more or less danger of spontaneous combustion. The Humph coal is being wrought at one colliery in this district, and is not much disturbed in spite of the fact that the Splint coal has been wrought out three fathoms below it. The Virtuewell coal is also mostly out, and what coal is left in the district is mainly in the Kiltongue, Upper, Mid, and Lower Drumgray seams. Of these the Kiltongue is usually thin, and although the Upper Drumgray is in places a good seam it is elsewhere hardly thick enough to form a workable subject. The Mid Drumgray is only present in any thickness near Newmains. It is the Lower Drumgray which is most constant, and probably will be the greatest factor in the future development of this district.

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[*] "The Geology of the Neighbourhood of Edinburgh," second edition (*Mem. Geol. Surv.*), 1910, p. 106.

[†] A list of fossils then obtained from this locality is given in the "Explanation of Sheet 23" (*Mem. Geol. Surv.*), 1874, pp. 54, 92.

[‡] *Summary of Progress* for 1908 (*Mem. Geol. Surv.*), 1909, pp. 63-64.

[§] J. Smith and C. T. Clough. *Summary of Progress for* 1907 (*Mem. Geol. Surv.*), 1908, p. 127. On p. 135 the scale of the vertical section has by mistake been put in as 1 in. = 200 ft., instead of 1 in. = 100 ft. The position of the upper coal in the Drumpark section has also been drawn too low.

[*] "The Geology of the Glasgow District" (*Mem. Geol. Surv.*), 1911, p. 77.

[†] It is now clear that the limestone indicated in the bore-journal 51 fathoms above the top of the Ell coal, and referred to by Messrs. Smith and Clough in a footnote on p. 133 of the *Summary of Progress* for 1907, does not represent Skipsey's band, but must be some other bed nearly 100 ft. higher. This higher bed has not been recognised in the material brought out from the sinking.

[‡] "The Geology of the Country near Oban and Dalmally" (*Mem. Geol. Surv.*), 1908, p. 125.

Oil Shales.—During the past year Mr. R. G. Carruthers was engaged in a revision of the Scottish shale-fields, in connection with the forthcoming new edition of the oil shale memoir. The main points observed during the revision may be tabulated as follows:—

1. Modifications of the general sequence of strata, with a separation of the Barracks and Burdiehouse limestones, the former being of local occurrence and lying at the base of the Dunnet group of shales, with the Burdiehouse limestone (at Deans) 120 fathoms below. The suggestion is made that the Dalmahoy shale lies below the Pumpherston position.

2. The discovery of two horizons of marine fossils (*Goniatites*, *Orthoceras*, &c.), one lying towards the top of the oil-shale group, under the Mungle shale, the other much lower down, beneath the Pumpherston shales. These shell-beds have been traced throughout the shale-fields, and have, amongst other results, led to the identification of the valuable Pumpherston shales in the northern fields.

3. A new reading of the Queensferry coast section, east of the Forth Bridge, the so-called Dunnet shale and limestone being now identified with the Burdiehouse position, and the bed formerly regarded as the Burdiehouse limestone being now correlated with a limy cement at the base of the Pumpherston shales.

4. Four new outcrops of the Burdiehouse limestone have been noted, these being of importance on account of the possibility of finding the Pumpherston shales not far beneath: these seams are now more valuable than others owing to their high yield of ammonium sulphate.

5. The recognition of some new lithological horizons of use in boring for certain shales: the most widespread of these is the Barracks Ash, a volcanic bed which has been followed throughout the main shale region of West Lothian.

6. A distinction has been drawn between the behaviour of the teschenite and quartz-dolerite sills: the former, of which at least five have a wide lateral extent, transgress but slightly from their respective horizons, and have a certain stratigraphical value, but the quartz-dolerites often change their position with great rapidity.

7. As before, the Cobbinshaw limestone and coal is taken as the base line of the overlying carboniferous limestone series on the west side of the main shale region, but, in accordance with recent work along the south side of the Lanarkshire coalfield, this bed is now considered to be somewhat below the Hurlet limestone of the West of Scotland, hitherto taken as the base of the series.

The base line of the oilshale group has been drawn at the top of the Corston Hill and Arthur's Seat lavas, as there is evidence that oil shale conditions then set in all over Mid and West Lothian.

Palæontological Work.

Dr. Ivor Thomas has continued his systematic researches on the carboniferous productidæ, and has brought together some of his results with a view to their early publication as a memoir of the Survey. Since this will form a complete unit in itself, it has been thought advisable not to delay its issue until the whole of the projected work on these fossils can be completed. Dr. Thomas has found it necessary to introduce several new generic divisions to include species formerly referred to *Productus*.

Mr. Allen has arranged a case in the museum to illustrate some of the fossils characteristic of the zones of the British jurassic rocks from the lias to the great oolite, inclusive. Two fine examples of *Lepidodendron lycopodioides* Sternberg, from the coal measures of Lancashire, have been exhibited in temporary cases.

The British fossils from the collection of the Geological Society, presented to the Geological Survey by the society, have been transferred from Burlington House, and a large number of them have been placed on exhibition in their respective stratigraphical positions in the Museum.

In connection with the course of geological mapping, fossils have been collected from the carboniferous areas of Central Scotland and the mesozoic rocks of Mull. Fuller information has been acquired concerning the upper carboniferous marine fauna of Central Scotland. Skipsey's marine band, described by Messrs. Smith and Clough in the *Summary of Progress* for 1907, p. 127, has now been got in the Barony pit sinking, Ayrshire, where it occurs as a limestone about 35 fathoms above the base of the top thick coal, called Ell coal, and about 1,173 ft. below a plant bed with upper coal measure plants. The following is the list of the fossils obtained from this limestone by Mr. Tait:—*Crinoid ossicles*, *Fenestellid*, *Chonetes laguessiana* de Kon., *Lingula squamiformis* Phill., *Lingula mytiloides* J. Sow., *Productus sp. nov.* [cf. *parvulus* Nikitin]. *Posidoniella sulcata* Hind, *Pterinopecten papyraceus* (J. de C. Sow.), *Scaldia carbonaria* Hind, ? *Macrochilina sp.*, ? *Gasteropod* (cf. *Trepospira radians* (de Kon.), *Nautiloid shells*, *Goniatite*.

A marine shale occurring 9 fathoms lower down, has yielded *Lingula mytiloides* J. Sow., lamellibranchs and gasteropods, including a Bellerophontid. The fauna of this limestone is very similar to that of the limestone seen in the railway cutting half-a-mile south of Motherwell Station, and in the north bank of the Clyde 1 mile south of Motherwell. At these localities Mr. Tait obtained the following fossils: — *Crinoid ossicles*, *Ambocoelia* aff. *urei* (Flem.), *Lingula mytiloides* J. Sow., *Orbiculoidea nitida* (Phill.), *Productus anthrax* Hind, *Productus sp. nov.* (cf. *parvulus* Nikitin), *Spirifer sp.*, *Posidoniella sulcata* Hind, *Pterinopecten carbonarius* Hind, *Pterinopecten papyraceus* (J. de C. Sow.), *Syncyclonema carboniferum* Hind, *Murchisonid*, *Orthoceras sp.* ? *Pleuronautilus costatus* Hind, ? *Glyphioceras micronotum* (Phill.). The above lists indicate a fauna of the same facies as that described by Messrs. Stobbs and Hind* from the coal measures of the English Midlands. These authors have shown how persistently thin marine beds in the coal measures can extend over large areas in spite of their inconsiderable thickness. Here also the characters of the beds are of a pronounced marine type indicating considerable ingress of the sea, which gives additional weight to the view that the marine bands at these localities are on the same horizon.

The possibility of using marine bands as index-beds in correlating strata is not confined to the coal measures. During the course of his revision of the oil-shale fields of the Lothians, Mr. Carruthers was enabled to recognise the presence of two marine horizons, which proved to be of the greatest service in tracing the sequence from one shale-field to another. The lower of these beds lies at the base of the Pumpherston shale and yields *Orthoceras*, goniatites and pectiniform lamellibranchs, which, though usually indifferently preserved, are sufficient to differentiate the bed—the oil-shale group being essentially non-marine. The other marine horizon occurs immediately below the Mungle shale, at the top of the series, and is characterised by a rich and varied fauna consisting of numerous species of gasteropods, lamellibranchs and cephalopods. Several of these, from the Fordel railway-cutting near Inverkeithing, have been recorded in the *Summary of Progress* for the year 1905, pp. 143-146. The gasteropods, which had not been identified when that report was published, are represented by abundant specimens of a *Ptychomphalina* allied to *P. atomaria* (Phill.), of *Euphemus urei* (Flem.) and of a finely ribbed species of *Bucanopsis*. *Macrochilina rectilinea* (Phill.) and *Tropidocyclus duchasteli* (L'Eveillé) are also present.

That conditions suitable to the development of this fauna extended over a large area is shown by the fact that a very similar assemblage was obtained by Mr. Carruthers 18 miles further south from the cores of a boring near Cobbinshaw, which yielded the following species:—*Productus longispinus* ? J. Sow., *Aviculopecten sp.*, *Edmondia sp.*, * *Posidonomya becheri* Bronn, * *Sanguinolites variabilis* M'Coy, * *Bucanopsis sp. nov.*, * *Ptychomphalina* aff. *atomaria* (Phill.), *Orthoceras gesneri* (Martin), *Stroboceras* ? * *Glyphioceras micronotum* ? (Phill.), * *Glyphioceras truncatum* (Phill.). The species common to the two localities are marked with an asterisk. It is remarkable to find such a a close agreement, considering that this list is based on the limited materials from a boring of small diameter; a favourable field exposure would probably yield a larger number of forms common to the two localities.

It is hardly necessary to add that, in the foregoing remarks, these marine beds are not considered to be anything of the nature of life zones; they are horizons recognised by their aggregate contents, which differ widely from those of the strata above and below.

PARLIAMENTARY INTELLIGENCE

HOUSE OF COMMONS.—July 29.

Minimum Wage.

On the supplementary vote of £3,750 for the Board of Trade and subordinate departments, in respect of fees and expenses of persons appointed under section 4 of the Coal Mines (Minimum Wage) Act, 1912,

Sir F Banbury contended that the general taxpayer ought not to be called upon to pay the expenses of the minimum wage arbitrations, but that they should be borne by the parties concerned in the dispute—the coalowners or the miners. By way of protest, he moved the reduction of the vote by £500.

Mr. J. Wason could not accept the contention that this expenditure arising out of an emergency Act passed to settle a labour dispute should, in whole or part, fall upon the miners of the country who did not ask for the Act, and which was forced upon them. As this Act was a great innovation in legislation and of intervention of Parliament in a labour dispute, it would be interesting and useful if the Board of Trade would express a view of the working of the Act.

Mr. J. M. Robertson could only say that in the opinion of the department the measure had given satisfaction to the parties affected. The President of the Board of Trade stated his opinion on April 1 that the arbitration expenses ought to be a national charge, and he believed the Prime Minister had, outside the House, expressed a similar view. The bulk of the money had been spent, but there would be some further payments for proceedings for supplementary awards and explanations of awards.

The Chancellor of the Exchequer said the Treasury were advised that if there were any savings the Board of Trade were entitled, under the general heading of the vote for that department, to use those savings for the payment of these expenses.

Mr. S. Walsh objected to the suggestion that the expenditure involved under the Act ought to be borne by the parties to an industrial dispute, seeing that the Act empowered the Board of Trade to compel people to administer an Act for which they had never asked, but which had been thrust upon them, and gave the department power to appoint independent chairmen whom the employers and workmen had to pay. He expressed wonder as to the source from which the Parliamentary Secretary of the Board of Trade obtained the information that the administration of the Act was giving general satisfaction. That day power had been given to a very large body of miners in Nottinghamshire—probably more than 1,000—to hand in their notices; in Northumberland and Durham there was intense dissatisfaction; and everybody knew that there was widespread dissatisfaction in South Wales, and that many of the pits in Staffordshire had been closed. In fact the working of the Act was causing general dissatisfaction.

The Chancellor of the Exchequer said there would be an opportunity for a debate on the subject on the second reading of the Appropriation Bill on Thursday.

Mr. W. E. Harvey said the men were not so much dissatisfied with the awards as with the way in which the employers were ignoring them. The men were not going to be put off with an Act of Parliament if it did not mean fair wages and agreements honourably carried out. They could not be fooled any longer. They meant to have a minimum wage, and that minimum wage must provide them with a living wage.

The vote was agreed to on a division.

July 31.

Rescue Work in Mines.

Mr. Harvey asked the Home Secretary if he would state what provision had been made for installing life-saving apparatus at each mine; would he state whether facilities were given to the workmen for training with the rescue apparatus that is now given to officials; and would he state if it was his intention to appoint inspectors to see that the said Act was carried out by special inspectors for this class of work.

Mr. McKenna has replied: An Order was made by me in April last under the Mines Accidents (Rescue and Aid) Act, which provides for the training of rescue brigades and the supply of breathing apparatus at coalmines. At the end of the year I propose to call for a return from each mine as to the provision made in pursuance of the Order. As regards the second paragraph of the question, the Order does not discriminate between officials and workmen, but requires that the persons trained for rescue work and in the use of breathing apparatus should be picked men, carefully selected on account of their coolness, powers of endurance and knowledge. It would be highly dangerous to allow either officials or workmen to be trained indiscriminately for this work. The Order will be enforced by the inspectors of mines, who are fully competent to do so. It would not be desirable to appoint special inspectors for the purpose.

Mr. Wm. Brown, late under-manager at Newburgh Colliery, one of the new sub-inspectors, has received a handsome testimonial at the hands of the officials and workmen, comprising a roll-top desk and silver-mounted umbrella.

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* "The Marine Beds in the Coal Measures of North Staffordshire." *Quart. Journ. Geol. Soc.*, vol. lxi., 1905, p. 495

THE COAL AND IRON TRADES.

THURSDAY, AUGUST 1.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week, 145,474 tons of coal and 2,394 tons of coke were despatched from Tyne Dock, a decrease of 6,687 tons of coal and an increase of 157 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 65,470 tons of coal and 2,089 tons of coke, a decrease of 254 tons of coal and an increase of 714 tons of coke. The Blyth shipments totalled 110,035 tons of coal and coke, a record week's shipment for the port and an increase of 7,931 tons when compared with the corresponding week of last year. The following considerable sales of gas coal have been reported during the week:—20,000 tons Wear specials for the Aarhuus Gasworks, delivery over the season, at slightly under 19s. per ton c.i.f.; a large quantity of New Pelton-Holmside quality, for shipment over 12 months, at 12s. f.o.b.; 100,000 tons best Durhams, for shipment over 12 months to the Naples Gasworks, at 12s. f.o.b.; 90,000 tons Durham bests, for shipment to Italian ports over 12 months, at about 12s.; 7,000 tons Ravensworth-Pelaw coal, for the Helsingborg Gasworks, at 18s. 10½d. c.i.f.; 150,000 tons best Durhams, for delivery over 12 months to the Wandsworth and Putney Gas Company, at from 11s. to 12s., f.o.b.; a quantity of best seconds for delivery over next year at 11s. 9d., f.o.b.: 250,000 tons Durhams for delivery to the Commercial Gas Company, London, over 12 months at from 11s. 3d. to 12s. 3d., f.o.b.; 3,000 tons Wear specials for the Kalmar gasworks at about 13s., f.o.b.; 30,000 tons good Durhams for shipment to Genoa from August to December at 22s. 6d., c.i.f. In addition, confirmation has been received of the Metropolitan Gas Company's contracts for about 1,000,000 tons of Durham coal for delivery up to the end of next March, at about 10s. 9d., f.o.b., for ordinaries, 11s. 3d. for bests, and 12s. for specials. The London Gas Light and Coke Company has also confirmed the news of its purchases of its annual requirements for which it has paid about 14s. 9d. per ton, c.i.f., for seconds and 15s. 4½d. for specials. The prices paid by the London gas companies show an advance of about 3s. per ton on the contract rates of last year. The circumstances that such a substantial advance had been wrested from such keen buyers is very significant, for it shows that these companies have not profited by deferring their contracts until so late in the year. It is likely to have a stimulating effect on smaller concerns which have hung back in the hope of lower prices. Steam coal contracts have been as follow:—30,000 tons best Durhams for the Finnish State Railways, for delivery at Hango and other ports at about 23s. per ton c.i.f. (the balance of the contract appears to have gone to Yorkshire, but details are lacking); a quantity of Blyth bests for September shipment at 13s. 7½d. per ton f.o.b., following which sale collieries have refused 14s. for August shipment; and a quantity of Blyth smalls for shipment over the remainder of the Baltic season at about 9s. 9d. f.o.b. Other contracts are as follow:—Quantities of blastfurnace coke for delivery at Middlesbrough over next year at 20s. per ton for ordinaries and 21s. 6d. for better sorts; quantities of foundry coke for export over next year at 22s. 6d. f.o.b.; two or three substantial parcels of best Tyne bunkers for delivery over next year at 12s. f.o.b.; a quantity of best Tyne bunkers for similar shipment at 13s.; and 150,000 tons of best Tyne coking coals for similar delivery at 12s. f.o.b. The Norwegian Trunk Railways invite immediate offers of 12,000 tons of South Hetton, Lambton or Kiveton Park steam coal for August-December delivery. With another interruption to business in shape of Bank holiday looming up, the enquiry for shipment this week is very active, and, with supplies scarce, prices are more than maintained. There is an excellent outlook for August. The rather better supply of tonnage recently has enabled shippers to fulfil their obligations more readily, and loading turns are now well filled for about a fortnight—and, in some cases, a month—ahead. F.o.b. quotations for prompt shipment are as follow:—Best steams, Blyths (D.C.B.), 14s. 6d. per ton, an advance of 1s. on the week; Tynes (Bowers, &c.), 13s. 6d., a rise of 6d.; seconds, Blyths, 12s. to 12s. 3d., 3d. up; Tynes (Hastings or West Hartleys), 12s. 6d, similarly increased; unscreened, 11s. 6d., 6d. dearer; smalls, Blyths, 10s. to 10s. 3d., 3d. more; Tynes, 9s. 3d. to 9s. 6d., from 3d. to 6d. higher; specials, 10s. 6d., 3d. up; smithies, 11s. 6d. to 12s., 6d. increased; gas bests (New Pelton or Holmside), 13s., 6d. up; seconds (Pelaw Main or similar), 12s. to 12s. 3d., from 6d. to 9d. up; specials, 13s. 6d. to 14s., from 6d. to 1s. advanced; unscreened bunkers, Durhams, 12s. to 12s. 6d., 1s. up; Northumbrians, 11s. 6d., stronger; coking coal, 11s. 6d. to 12s., 6d. to 9d. more; smalls, 11s. 6d., 9d. higher; households, 14s. 6d., steady; coke, foundry, 22s. 6d. to 23s. 6d., 1s. risen; blastfurnace, 20s., 6d. up; and gas coke, 19s., 3d. dearer.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 104,620 tons of coal and 1,025 tons of coke, as compared with 90,880 tons of coal and 555 tons of coke for the corresponding period of 1911, being an increase of 13,740 tons of coal and 470 tons of coke. The market is presently very firm for all classes of coal and coke, owing to the approaching holidays and more demand. Colliery turns are very congested for next week, and most of the collieries are well stemmed for well into August, and in one or two cases collieries have stems arranged for early September. Steam and gas coals are not so freely offering at the moment owing to collieries having plenty of trade, and all classes of coal are realising higher prices. Full prices for forward shipment have been obtained for all brands, and it is anticipated that prices will be maintained during the month of August. There is still a certain amount of contracting enquiry, more especially for contracts to the end of the year, or for the first half of next. Household coals are in very little demand, with practically no enquiry. In the bunker trade, the demand is exceptionally strong, and higher prices are being made for near shipment. Owing to a large amount of unscreened having been sold for August shipment to the coaling depots in the Mediterranean, there is a scarcity of unscreened bunkers. The Aarhuus Gasworks have contracted for about 20,000 tons of Wear specials through local merchants at slightly under 19s. per ton c.i.f. The Norresundby Cement Works have also contracted for about 30,000 tons of best Durhams at 14s., and the Aalborg Cement Works have paid the same price for a part of their 800,000-tons purchase, and for the balance of this parcel they have paid between 10s. 6d. and 11s. for second class. The South Metropolitan has paid 12s. for Wear specials, and the London Gas Light and Coke Company have paid 15s. 4½d., per ton c.i.f. for Wear specials. The latter prices are an increase of about 3s. per ton over the price paid last year for the same qualities. The fact that such an advance has been obtained from such large and keen buyers like the London gas companies, is acting as a stimulus to the forward market for Durham unscreened coal, and it is almost certain that small contractors who have yet to come into the market to buy, will have to pay still higher prices. For bunkers for forward business there is a very active enquiry, not only for this, but for next year, and the fact that contractors are prepared to operate for so far in advance of the new year, is regarded as a sure indication of strength. The following are market quotations:—Special Wear gas, 14s. to 14s. 3d.; seconds, 12s.; coking unscreened, 11s. 6d. to 12s.; smalls, 11s. 3d.; smithies, 13s. 6d. to 14s.; peas and nuts, 13s. to 14s.; household, ordinaries, 14s.; bests, 15s.; foundry coke, 22s. 6d. to 23s. 9d.; blastfurnace coke, 20s. 6d. to 21s.; gas house coke, 18s. 6d. to 19s. Bunker quotations are: Pease's, Framwellgate, South Derwent, 11s. 9d.; Priestman's, Consett, Burnhope, 12s.; Morrison's Marley Hill, 12s. 7½d.; South Hetton, 12s.; Ryhope, 12s. to 12s. 3d.—all f.o.b. South Dock. The freight market for all directions is decidedly easier owing to loading turns being difficult to arrange on account of collieries being well stemmed, and there is also a better supply of tonnage, and it is anticipated that the number of vessels which have been tied up in London for some weeks past will be liberated in the course of a few days. During the past week some higher rates have been paid to the Mediterranean and Baltic ports, but at time of writing merchants have secured vessels at a considerable discount on figures paid end of last week and early this week. Fixtures reported include the following:—Baltic: Cronstadt, 6s. 3d.; Stockholm, 9s. 6d., 2,700 tonner with 700 delivery, and 6s. 4,500 tonner with 700 delivery; Gefle, 7s. 7½d., 2,000 tonner, 350 delivery; Stettin, 6s.; Fairwater, 6s. Coasting: London, 3s. 4½d.; Havre, 4s. 6d.; Rouen, 5s. 4½d. Bay: Bordeaux, 7s.; Lisbon, 9s. 6d. Mediterranean: Genoa, 12s. 3d. and 12s.; Civita Vecchia, 12s. 4½d.; Naples, 12s. 9d. last week and 12s. 6d. this week; Oran, 10s. 10½d. last week and 10s. 9d. this week; Las Palmas, Teneriffe, 12s.; Port Said, 11s. 3d.

Middlesbrough-on-Tees.

COAL.

The end of the month finds the coal market steady and the enquiry improving, especially for bunkers, which realised 11s. 9d. for Durham ordinary. Best Durham households are 12s. 3d., and ordinary 11s. 6d. to 11s. 9d. There is a good enquiry for coke, and gas coal values are steadily maintained. Unscreened coking qualities are at 11s. 6d., and foundry coke 22s. to 24s. Blastfurnace coke realises 20s., and gas-house coke 19s.

IRON.

The buoyancy recently shown in the iron market continues a marked feature, and prospects are more encouraging than they have been for years. Values of No. 3 g.m.b. are about 9s. per ton higher than in January last, and the stocks held in Connal's stores continue to be drawn on to meet current needs. A total of 292,299 tons is now held—a decrease of about 20,000 tons this month. Cleveland No. 3 g.m.b. pig iron is in steady request at 59s. 3d., though early on Wednesday 3d. less was the quotation, whilst foundry No. 4 quality is also at 59s. 3d. per ton. For Cleveland warrants some transactions took place at 58s. 10d., and later at 1d. more—a rise of over 2s. per ton on the lowest quotation this month. Buyers of No. 1 have to give 64s. 3d., and No. 4 forge 59s., with mottled and white iron 58s. 6d. to 59s. per ton. East coast hæmatite realises 74s. for delivery during the next three months, and 1s. per ton more is asked for delivery to the year end. In finished iron and steel there is a large business doing, bars and plates especially showing improvement. The production of the last two months covered by the recent return of the North of England Manufactured Iron Trade shows the total output to be better than for almost two years, and the enhanced values testify to the genuineness of the boom. Steel hoops realise £7 15s., steel joists £6 17s. 6d., steel boiler plates £8 15s., common iron bars £8 5s., best best bolt bars £9, iron ship plates £7 10s., steel ship plates £8, iron and steel ship angles £9 and £7 12s. 9d. respectively—all less 2½ per cent. Heavy steel rails £6 7s. 6d., steel railway sleepers £7 net at works. Rubio ore 21s. 6d. to 22s. 6d. per ton. The clearances of iron and steel from the Tees during the month of July were up to expectations, and were the second best of this year. The daily average was 4,574 tons, the loadings for the month amounting to 123,498 tons, 111,848 tons of which went from Middlesbrough, and 11,650 tons from Skinningrove. In June the clearances reached 112,349 tons, and 88,055 tons in July of last year. Of the iron cleared at Skinningrove 11,105 tons went to Scotland, and 545 tons to Holland. Of the pig iron loaded at Middlesbrough last month 77,011 tons went to foreign ports, and 34,837 tons to coastwise customers. Scotland was once again the largest buyer, receiving 19,557 tons, whilst Italy imported 12,085 tons, Japan 11,051 tons, Germany 11,594 tons, France 10,489 tons, Wales 7,097 tons, Denmark 3,311 tons, and the United States 2,920 tons. Manufactured iron shipped from the Tees during the past month amounted to 14,277 tons, 11,945 tons of which went abroad, and 2,323 tons coastwise; and the steel cleared reached 51,234 tons, 47,521 tons going abroad and 3,713 tons coastwise. India was the largest receiver of both manufactured iron and steel, importing 9,188 tons of the former and 12,374 tons of the latter. Other large buyers of steel were:—Victoria 8,047 tons, Cape Colony 4,148 tons, Japan 3,219 tons, Argentine 2,863 tons, New South Wales 2,521 tons, South Australia 2,121 tons, and British East Africa 2,101 tons.

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South-West Lancashire.

COAL.

There will be the usual August stoppage of the pits in this district commencing on Friday night next, and lasting in most cases until Wednesday morning. In the household inland coal trade quietness is naturally the feature at this time of the year. There is no change in list prices. With regard to shipping, the demand for bunkering under contract is fairly good, though the effect of the recent stoppage at the docks is still felt to some extent, and outside enquiries are comparatively few. On the whole, shipments are hardly what might be expected in view of the holidays. Supplies of round steam coals are plentiful, and prices of screened Lancashire descriptions range as before, from 11s. 3d. f.o.b. and upwards. House coal shipments for the coastwise and cross-Channel trade keep up fairly well. Prices for best coal rule at 14s. 9d. to 15s. 3d., good seconds at 13s. 9d. to 13s. 9d. net f.o.b. Garston. Although the annual stoppages here and there in the manufacturing towns are liberating a little slack, there is no plethora on the market, and the stoppage at the collieries this week is making customers who will be working during this cessation of work urgent for deliveries. Prices are firm at from 9s. 9d. to 10s. for the best rough grades, 9s. to 9s. 3d, good medium qualities, and for the commoner and smaller sorts 8s. 6d. or thereabouts—all into wagons at the pit. Gas coal tenders are being adjudicated upon rather slowly, but acceptances are being made at from 2s. to 2s. 6d. per ton advance.

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South Lancashire and Cheshire.

COAL.

There was a moderate attendance on the Manchester Coal Exchange on Tuesday. There is no improvement to report in house coal. The list prices are firm—i.e., best coal 16s. to 16s. 9d., good medium qualities 14s. 6d. to 15s. 6d., and kitchen qualities 11s. 9d. to 12s. 9d.—all at the pit. Furnace coal is in good demand, the price being unchanged at 12s. 6d. per ton at the pit. The improvement in shipping coal is maintained, the prices being steady at about 12s. to 14s. f.o.b. Partington. Owing to the annual holidays in various quarters the demand for slack is not so keen as it was, but prices are firm at 9s. to 9s. 9d. for best, with seconds at 8s. to 8s. 6d., into wagons at the pit. Gas coal contracts are being placed in different directions at advances varying from 2s. to 2s. 6d. per ton over last year.

IRON.

The pig iron market continues firm and prices are well maintained. Forges are extremely busy and have officially advanced the price of bar iron 5s. per ton, making the price for Crown iron £8 5s., with second quality £7 15s., hoops £8 7s. 6d., sheets £9. Steelworks are also very busy on bars at £7 17s. 6d. to £8, less 2½ per cent.; billets, £5 17s. 9d. to £6 net. Wagon builders are very full of work. Engineers and ironfounders not too well off.

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Yorkshire and Derbyshire.

Leeds.

COAL.

A full average attendance, with a strong demand for all descriptions of steam coal, were the chief features of Tuesday's market. The pits have worked about five days this week, and stocks of house coal have not been materially increased. Fairly good consignments have been sent to London merchants and factors, although the higher-priced qualities have been neglected. Pit prices, both for current sales and for contract, are firmly held, and may be averaged as follow:—Haigh Moor selected, 14s.; Wallsend and London best, 13s.; Silkstone best, 13s. (special qualities, 13s. 6d. to 14s.); Silkstone house, 12s. to 12s. 6d.; house nuts, 10s. 6d. to 11s. 6d. It is reported that a fairly big contract for Silkstone best has been placed locally by a London firm at 12s. 9d. pit for the summer months and 13s. 9d. for the winter months. The coastwise trade keeps up fairly well, but the demand runs mainly on the cheaper sorts. Finer samples of Silkstone house coal sell readily at about 13s. 9d. to 14s. 3d. f.o.b. Hull, and good samples of large house nuts at from 12s. 6d. to 13s. 6d. f.o.b. Hull. In Leeds, Bradford and other industrial centres the retail trade is slow, and merchants have bought sparingly towards the month-end. Pit prices are officially unchanged, and may be averaged as under:—Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. to 16s.; Silkstone house, 14s. 6d. to 15s. 6d.; ordinary house coal, 14s. to 15s.; secondary sorts, 12s. to 13s. 6d. Great activity prevails in all qualities of manufacturing fuel, small slacks and nuts being very scarce. Current pit prices:—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slacks, 8s. to 9s.; small slacks, 7s. to 7s. 6d.; coking smalls, 6s. 6d. to 7s. Washed furnace coke remains steady at 16s. per ton at the ovens, and there are no stocks anywhere. A very large tonnage is leaving the district for Frodingham and the Midlands, and the demand from the Leeds district is also well above the average. There is very little change in the gas coal position. Prices are firm, especially for gas nuts, and current sales approximate very closely to forward contract prices. Quite a large number of small contracts have been settled this week, but the big gasworks still defer purchasing. It seems likely that contracts for coal will average 2s. per ton advance, and contracts for gas nuts quite 2s. 6d. Current quotations:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal 9s. to 10s. Exports of gas coal are heavy, and f.o.b. Hull prices range round the following f.o.b. figures:—Screened gas coal, 12s. 6d. to 13s. 3d.; gas nuts, 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d to 12s. 6d. The local pits will not be working on Bank holiday Monday and Tuesday.

Barnsley.

COAL.

Though the irregular arrival of tonnage at Hull has tended to somewhat slacken the export trade during the week, the general volume of business continues to be of a heavy character, and prices are fairly well sustained. The collieries have been working full time, and in view of the large tonnage which is required for shipment ahead there has been no difficulty in avoiding stocks at the collieries. The rush during the previous weeks had done something towards slightly congesting the railways, and the quieter state of things referred to is giving an opportunity for the tonnage in hand to be got away to the port. There is a strong enquiry for forward delivery, but coalowners are not disposed to enter into any large contracts beyond the near future, and are in a position to deal with the varying conditions of the market. The exceptionally active demand for all kinds of steam fuel by the large industrial concerns at home enables the colliery owners to deal with the position much to their own satisfaction. The price of the best large steams is well maintained at 11s. 6d. per ton, and sellers believe that still higher values will be obtained. In regard to the secondary sorts of Barnsley hards, the position, though hardly so strong, is also satisfactory from a seller's point of view, though prices are a little more variable, from 10s. 6d. to 11s. per ton being obtained. There is no change in regard to all kinds of smaller steam coal, and the demand is again well up to the output. This is particularly the case so far as relates to steam nuts, the best qualities of which are quoted from 10s. to 10s. 6d. per ton, and secondary sorts are from 6d. to 9d. per ton less. Slacks continue to make good prices, best sorts averaging about 8s. 6d. per ton and rougher sorts from 7s. to 7s. 6d. per ton. A better trade is reported in regard to house coal. With prices now regarded as on a settled basis, merchants in London and the south are buying more freely, and contracts continue to be fixed up at about 2s. per ton increase on last year. For current business the prices which have ruled of late are well maintained:—Best Silkstone, 13s. 6d. per ton; best Barnsley softs, 12s. 6d. per ton; secondary sorts, from 10s. 6d. to 11s. 6d. per ton. The position in regard to gas coal contracts is little altered, though new business is being taken at from 1s. 6d. to 2s. per ton advance. The demand for coke is of a remarkably strong character, and higher prices are readily obtained. For ordinary brands 16s. per ton is now obtained, and the prospects are in favour of the producers.

Chesterfield.

COAL.

The demand for house coal is very quiet at the moment, and prices are unchanged on the week. The renewal of contracts is not progressing as rapidly as was the case a week or two ago, and it remains to be seen whether the 2s. 6d. per ton on last year's contracts will be ultimately obtained all round. Up to now a great number of sales have been effected on this basis. Deliveries of coal for manufacturing purposes continue on an extensive scale, and they will almost certainly be maintained on a high level for some time to come. The exceptionally active condition of the steel trade of Sheffield and district calls for a heavy supply of cobbles and nuts for gas producers, and collieries are receiving pressing orders daily for these qualities. Prices are very firm. The market for slack for firing purposes maintains the strong position which has lately characterised it. The demand for small fuel for the Lancashire cotton mills is unusually heavy, and prices are steadily advancing. Old contracts are still being renewed at prices which mark a rise of 2s. per ton upon those ruling 12 months ago. In many cases, the production of slack for many months to come is now fully sold, and such collieries are now off the market. Stocks are lower than they have been for several years both at the pits and at consumers' works. There is an active demand for steam coal for locomotive use, and a large tonnage is going forward daily. Prices for railway contracts expiring at the end of September will be quoted at advanced figures. The export trade continues to improve. With a fuller supply of ships, matters wear a much brighter aspect, and business is likely to be brisk during the remainder of the shipping season. A good demand is experienced for hards, and prices for Derbyshire Top Hards are now up to 11s. per ton at the pit. Collieries being well sold under contract, have only a limited supply for disposal. Cobbles are in better request for near Continental ports, and some substantial shipments of this fuel are being made. Washed nuts and washed slack find a ready sale at firm prices. The coke market is strong, with a full demand for all qualities. For forward delivery prices have an upward tendency. Coking fuel continues scarce and dear. Quotations are as follow:—Best 13s. 6d., seconds 12s. 6d., cobbles 11s., nuts 10s., slack 8s.

IRON.

An active demand exists for pig iron, and prices remain firm at the recent high level. Stocks of all qualities are low. Manufactured iron is in excellent request. Orders are plentiful, and prices will probably be advanced at an early date. Engineers, ironfounders and wagon builders are extremely busy, and prospects are undoubtedly good.

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Nottingham.

COAL.

Very little improvement has taken place in the domestic fuel section of the coal trade in Nottinghamshire during the past week. The public are paying attention to holiday matters, and the present dull period will give local merchants a rest after the unusual activity which characterised this branch in the latter part of June and the early part of July. The tonnage which is being despatched to London and provincial centres is on a small scale, merchants purchasing sparingly in the hope that prices may become more favourable. However, owners are keeping rates firm, the ruling prices being:—12s. 6d. to 13s. 6d. per ton for hand-picked brights; good households, 10s. 6d. to 12s.; seconds, 10s. to 10s. 6d.; cheap kitchens, 7s. to 8s. 6d. The steam coal market retains its activity, the position being strengthened by the strong demand on export account, whilst industrials are in buoyant request in the home market. Best steams are making 11s. to 11s. 6d. per ton, seconds 9s. 3d. to 9s. 9d., and nuts 9s. to 10s. For slacks there is a steadier tendency, although prices are practically unchanged. Gas coal and coke are going out of hand steadily.

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Leicestershire.

COAL.

There is more quietness in business here in household coals. In none of the various qualities is there anything approaching pressure, and it appears likely that this may continue for a week or two. But there is a very fair demand for steam coals of most kinds. Cobbles and special slacks continue in good enquiry. The local merchants are doing less business, and no improvement is probable till some time after the holidays. The output is not quite so heavy, and stocks are accumulating considerably in some quarters. A good deal of forward buying is being done at full rates. Though the present condition of business is much flatter than it has been lately, there is no decline in market rates. The lately ruling prices are firmly held, and are the basis for current business.

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South Staffordshire, North Worcestershire and Warwickshire.

Hednosford.

COAL.

The condition of the coal trade throughout the Cannock Chase district is remarkably good for the time of the year. Prices are well maintained, and in many cases full time is being worked at the collieries. There will be a few days' stand next week for the August holidays, but after that a busy time is expected. There continues a satisfactory demand for most qualities of works fuel, and slack is in good request. The house coal trade is much the same as when last reported. Railway and canal sales are keeping up very well, but only a moderate business is being done at the landsale depots.

Birmingham.

COAL.

Although there is not much call for household coal for immediate use, merchants are buying for regular deliveries throughout the next three months, and those who can do so are taking advantage of the present low prices to lay in stocks in view of the autumn trade. Works coal continues in active demand. Among the contracts placed during the week was one by the Birmingham Gas Committee for the period to June 30, 1913; roughly about 600,000 tons are required, but last year the committee bought ahead on favourable terms, and the increased rates demanded for the current year's supplies apply, it is understood, only to something over 300,000 tons. The railway companies are large purchasers of locomotive coal.

IRON.

The attendance at the weekly meeting was suggestive of the holiday season, and the amount of business actually negotiated was, by comparison with recent weeks, of limited dimensions. Manufacturers have in the main made provision for immediate requirements, and enter upon the holiday period with easy minds on that score. The tone of the market, however, showed no falling away from the high standard which has existed for a month or two; on the contrary, it was stiffened by the Wages Board returns, which not only record a vastly increased output, but at a sufficiently higher price to warrant an advance in puddlers' wages of 3d. a ton in accordance with the sliding scale, making the rate 9s. 6d. per ton. In addition, from August 5 puddlers will receive a bonus of 6d. a ton, making the total puddling rate 10s., a figure which has not been reached for several years. The total output during May and June, the months under review, amounted to 43,494 tons, against 20,983 in the preceding two months, when, of course, the influence of the coal strike was felt. Smelters have practically no stocks of pig iron, and naturally show no disposition to ease prices, which were probably 6d. higher than a fortnight ago. For Northamptonshire the minimum quotation is 60s., ranging to 62s., and South Staffordshire forge cannot be purchased under 58s. a ton. In the bar trade conditions are satisfactory, and although no advance has been officially announced in standard qualities, makers are not accepting less than £9 10s. for future orders, and are getting that figure quite readily. The official announcement of an advance is now only a matter of time. Unmarked bars continue to strengthen in values, and £8 5s. to £8 7s. 6d. (delivered Birmingham) is now being asked The demand is unvaryingly steady, and the mills are operating full time. Lancashire bars remain nominally at £8, but new orders are only accepted at 2s. 6d. and 5s. above that figure. For puddled bars and billets used for rolling down into small iron, contracts are being renewed on the basis of £6, representing an increase of 2s. 6d. a ton. Galvanised sheets, though still an unsatisfactory feature, are a shade firmer at £12 to £12 5s.; but, with wages up and material dear, £12 10s. ought to be obtained to provide a reasonable profit. The Gas Strip Association anticipated the rise in wages a week ago by advancing prices 5s. a ton; for steel strip quotations range from £8 and £8 12s. 6d. for strong to £8 10s. for the fine qualities used for bedstead purposes. Iron hoops are £8 to £8 5s. The steel trade remains in an active state, and will receive a tremendous stimulant from the success of a West Bromwich and Darlaston firm in securing the contract to carry the Eastern Bengal State Railway over the Lower Ganges, as practically the whole of the steelwork will be British. Billets and sheet bars are quoted at £6, and 5s. more if wanted in a hurry. Sections, except joists, are advanced 5s. a ton, and the Small Bar Association have raised the minimum to £7 15s., representing an increase of 5s.

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Forest of Dean.

Lydney.

COAL.

No change of importance has occurred in this coalfield during the past week, and house coal prospects are somewhat unsettled. The majority of the collieries are playing at least two days this week in order to keep the supply proportionate to the demand and prevent an embarrassing number of loaded wagons. Still, what change there is, is in the direction of improvement, and it is thought merchants will soon begin to take in stocks for the cold season. Shipments have been good this week; the inland demand keeps about the same. Prices remain at block 15s. 6d., rubble 14s. 9d., nuts 13s. and rough slack 7s. 6d. at pit. The steam coal pits are still making good time and outputs are very satisfactory. Prices unchanged.

THE TIN-PLATE TRADE.

Liverpool.

Business has been quiet the last few days. Prices, however, are well maintained, works standing firmly to their quotations, which run:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 14s. 9d. per box; I C 28 × 20 (112 sh. 216 lb.), 29s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 1½d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. per box; I C 14 × 19¼ (120 sh. 110 lb.), 15s. per box; I C 20 × 10 (225 sh. 156 lb.), 21s. 6d. per box; I C squares and odd sizes, 15s. to 15s. 3d. basis. Ternes are steady at 26s. to 26s. 6d. for I C 28 × 20, and charcoal tins are firm at 17s. basis and upwards. Coke wasters are steady as follows:—C W 14 × 20, 13s. 9d. per box; C W 28 × 20, 28s. 3d. per box; C W 14 × 18¾, 13s. 9d. per box; C W 20 × 10, 20s. per box—all f.o.b. Wales, less 4 per cent.

THE BY-PRODUCTS TRADE.

Tar products:—The steady tone of the market of the past week or two has been emphasised in one or two cases. Pitch is nominally easier, but benzols are dearer, and the same applies to creosote and naphthas, particularly solvent. Carbolics keep firm and so does toluol. Nearest current values are:—

Benzole, 90's, 1s.; ditto 50's, 10d.; toluol, 10¼d.; carbolic acid, crude (60 per cent.), 2s. 6d. to 2s. 7d.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 1s. 1d., as in quality and package; crude ditto, 4¾d. in bulk; creosote, 3¼d. for ordinary qualities: pitch, 51s. 6d. to 52s. 6d. f.o.b. east coast; ditto, 51s. to 52s. f.a.s. west coast; ditto, 57s. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—The market is very quiet, and prices more or less nominal, especially in the forward position, regarding which producers adhere to their recent ideas as to prices. It is interesting to note the opening of Russia to the freer importation of sulphate, the duty having been more than halved. Closing prompt prices are:—

London (ordinary makes), £13 7s. 6d.; Beckton, £14; Liverpool, £14 5s.; Hull, £14 5s.; Scotch ports, £14 5s. to £14 6s. 3d.; nitrate of soda (ordinary), 11s. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

CONTINENTAL MINING NOTES.

Belgium.

It is stated that the Minister of Labour has prepared a Bill for the prevention of strikes and lock-outs, having discovered a system that has the merits of being simple and original, whilst it is anticipated that it will prove acceptable to all concerned. The tribunals will consist of magistrates, with representatives of the employers and workmen. No penalties are provided for the non-fulfilment of contracts, but the Bill will prohibit picketing on the part of strikers at the homes of workmen, the organisation of processions, and assistance from outside sources.

Information is now available as to the contracts of the State Railway authorities ratified on July 1. The total includes 665,500 tons of fuel, including 53,500 tons of small *demi-gras* (type III.), 235,500 tons of small *demi-gras* (type IV.), 70,000 tons of briquettes (type I.), and 288,500 tons of briquettes (type II.). The entire contract has been placed with Belgian firms at the following rates:—*Demi-gras* type III., 15·25 fr. to 15·50 fr.; ditto, type IV., 16·20 to 17·50 fr.; briquettes, type I., 21·75 fr. to 22 fr.; ditto, type II., 23·75 fr. to 24 fr. In the last-mentioned the Zeebrugge factory, which uses British coal, obtained the contract for 37,000 tons at the bottom price.

The following table shows the exports and imports of coal from and to Belgium during the first half of the present year:—

	Imports.		Exports.	
	1912. Tons.	1911. Tons.	1912. Tons.	1911. Tons.
Germany	2,254,475	2,071,400	121,985	133,248
Australia	—	—	5,420	3,800
Chile	—	—	1,560	1,600
China	89	—	1,300	540
Spain	—	—	28,466	1,660
United States	—	1	9,700	5,238
France	673,069	419,257	1,911,514	2,201,194
Luxembourg	180	120	52,691	56,024
Great Britain	726,189	1,019,547	56,631	5,314
Italy	—	—	22,505	920
Norway	—	—	5,854	810
Netherlands	230,830	186,241	120,354	126,991
Russia	—	—	5,170	1,620
Sweden	—	—	3,645	870
Switzerland	—	—	24,675	31,983
Other countries	19	15	81,483	14,071
Totals	3,884,851	3,696,581	2,452,953	2,585,883

In June 652,500 tons of coal were imported, as against 509,312 tons last year, and 399,920 tons exported, as against 367,266 tons. In the same month 63,833 tons of coke were imported (46,050 tons), and 77,690 tons exported (89,610 tons). The total imports of coke for the six months amounted to 454,372 tons (333,466 tons), and the exports to 463,406 tons (501,167 tons); 415,082 tons of German coke were imported, as against 308,065 tons.

Denmark.

A Note to Nos. 102 and 103 of the Danish Customs Tariff provides that duty will cease to be levied, after December 31, 1912, on certain articles—viz., coal, coke and cinders, and other combustibles, consisting in part of coal, coke or cinders. The Board of Trade are now informed, through the Foreign Office, that proposals which had been made in the Danish Legislature to supersede the provisions of this Note by maintaining in force the existing duties on the articles referred to have been rejected.

France.

It is feared that the demands of the miners in the North for increased wages may lead to trouble.

The three miners' unions in the Nord and Pas-de-Calais have repeated their demand for the unification of the wage basis for all companies in the district.

The cost of the new French Mining Regulations, which have now come into force, has been estimated by the Nord companies at 40 c. per ton produced.

A central generating station has been completed at Bruay. There are two turbo-alternators of 1,000 kw. each, three-phase current being generated at 5,000 volts.

At Marseilles during May, 87,901 tons of English coal were imported, as against 102,114 tons in May 1911; 22,200 tons of German coal (33,422 tons), and 3,563 tons of American coal (*nil*).

An important coking installation will shortly be lighted up at Crespin. The residual gases will be sold for lighting purposes to the local authorities and for heating Martin furnaces in the Blanc-Misseron Ironworks.

There has been a modification in the official quotation for coke, following upon a meeting of colliery owners and ironmasters in Paris on July 18. The price for the third quarter of the year has been fixed at 22·875 fr., as compared with 21·732 fr., the rate prevailing in the second quarter, and 21·437 fr., the price in the first quarter.

During the first half of the present year the collieries in the Nord and Pas-de-Calais basins produced 14,519,252 tons of coal and 1,210,964 tons of coke, increases of 853,159 tons and 75,950 tons respectively on the figures for the corresponding half of last year. The coal production of the Courrières Company was augmented by 152,056 tons, and that of the Liévin Company by 130,077 tons; other increases were, Bruay (94,739 tons), Marles (81,144 tons), Lens (78,745 tons), Dourges (72,120 tons), and Nœux (82,841 tons). At Anzin there was a decline of 59,127 tons. The coke production at Lens increased by 33,797 tons.

Germany.

A company has been formed at Herringen, near Hamm, under the title of the A. G. Stickstoffwerke, with a capital of a million marks, for the recovery of nitrogen from coke ovens. The first instalment will be at the mines of the Wendel Company. This latter firm are about to erect new batteries at Moyeuvre-Grande.

Coal Traffic in Ruhr Harbours, June.—The total supplies of fuel per rail were:—To Ruhrort, 1,123,591 tons; to Duisburg, 335,880 tons; to Hochfeld, 57,956 tons—or 1,517,427 tons in all. Shipments outward totalled:—To Coblenz and places higher up the river, 873,136 tons; to places below Coblenz, 13,318 tons; to Holland, 481,080 tons; to Belgium, 271,249 tons; to France, 37,310 tons; and other destinations, 37,432 tons. The aggregate shipments from the various ports were:—From Ruhrort, 1,070,741 tons; from Duisburg, 342,723 tons; from Hochfeld, 46,650 tons; from Rheinpreussen, 87,762 tons; from Schwelgern, 63,057 tons; and from Walsum, 72,595 tons—in all 1,713,528 tons.

Coal Syndicate Report, June.—The total output of coal in June amounted to 7,540,158 tons (6,732,315 tons in 1611), or 322,574 tons (288,013 tons) per working day. The calculated distribution was 6,183,325 tons (5,489,264 tons), being 264,527 tons (234,835 tons) per working day, or 100·75 per cent. (89·69 per cent.) of the participation The total distribution of coal from syndicated pits amounted to 7,615,864 tons (6,769,901 tons), or 325,812 tons (286,621 tons) per working day. Deliveries, including local sales, miners' house coal and supplies to pits' own ironworks: Coal, 5,006,754 tons (4,485,037 tons), or 214,193 tons (191,873 tons) per working day; coke, 1,527,164 tons (1,336,921 tons), or 50,905 tons (44,564 tons) per working day; briquettes, 334,047 tons (316,363 tons), or 14,291 tons (13,536 tons) per working day.

Coal Market in Upper Silesia.—There is still no sign of any falling off in the volume of trade, the iron industry taking its contracted quantities regularly, and the summer industries being good consumers, so that the output of the class of fuel they used can be disposed of as fast as raised. Coking coal is also in good request, and even gas coal is selling satisfactorily, the river being in good condition for traffic. House coal has, of course, to be stocked; but even here trade is beginning to revive, and cannot be considered bad for the time of year. Exports remain on a satisfactory level—Russian Poland, in particular, taking increased supplies. There is no change in the favourable condition of the coke market.

Coal Market in South Germany.—The tone of the market is thoroughly healthy. English coals are coming forward in fulfilment of old contracts, but for new business the prices and freights are so high that there is no advantage to buyers in comparison with Ruhr and Saar coals, and in view of the improbability of any change in rates, orders are being placed with home producers. House coal is in growing request, and gas coke is going off well, users of anthracite nuts and broken coke laying in their supplies of both at summer prices.

Ruhr Coal Market.—Owing to the holiday season there are few factors likely to effect any important change in the situation, which continues favourable so far as coal is concerned. That there is some difficulty in finding buyers for certain grades cannot be denied, but is of minor importance. At all events the iron industry is a very considerable consumer, whose requirements are growing; and a number of summer industries are now in full swing which take large quantities of fuel. There is little change in the export trade, Holland, Belgium and France continuing to take extensive consignments, and though English competition is growing in northern Germany, the Syndicate has been able to retain many important clients gained during the strike period. Owing to the favourable state of the Rhine, shipments to South Germany are large and stocks have been replenished, buyers being inclined to hold back now that there is little risk of scarcity of fuel. The coke market is unsatisfactory on account of the over-production, and stocks are, therefore, increasing again.

THE SCOTCH COAL AND IRON TRADES.

Thursday, August 1.

Glasgow and Lanarkshire.

COAL.

The coal trade in this locality, as well as throughout the mining districts generally, has not yet fully recovered from the effects of the holidays. The miners have been working irregularly in many places, and supplies of coal have not been got forward in sufficient quantity for loading vessels with the usual promptness. In addition to this, the shipping trade in coal has been hampered by a scarcity of vessels as well as by high freights. No doubt these drawbacks will soon be overcome, however, as it is admitted that orders are in most instances plentiful. The aggregate shipments of coal at Scottish ports in the past week amounted to 291,324 tons, an increase of 68,525 tons as compared with the preceding week, but 14,603 tons less than in the corresponding week of last year. The clearances at Glasgow have been, 37,981 tons foreign and 31,839 coastwise, the total of 69,720 tons comparing with 40,156 in the preceding week and 70,216 in the corresponding week of last year. There has been a good demand for steam coal, which is steady in price. The better qualities of house coal have also been selling well for export as well as for coastwise shipment. There is likewise an extensive enquiry for splint, nuts, and almost every description of manufacturing coals. Current f.o.b. prices at Glasgow are, for steam coal 11s. to 12s., ell 11s. 9d. to 12s., splint 12s. to 12s. 6d., treble nuts 12s. 3d. to 12s. 6d., double 12s. to 12s. 3d., and singles 11s. 6d. to 12s. per ton. The demand for coal for foundry, engineering, and manufacturing uses generally has been expanding, and while contract prices do not seem to have materially advanced, they are generally very firm. The coastwise trade is active, both to the home and Irish ports. The inland demand for house coal is about normal for the season of the year, and prices are without material alteration.

IRON.

There has been a strong business in the pig iron market since last report, and prices have again tended higher. While a fair cash business has been done, there has been a greater demand than usual for future delivery, extending over the next three months. Cleveland warrants have sold from 57s. 6½d. to 58s. 6d. cash, 58s. 1d. to 59s. 1d. one month, and 58s. 6d. to 59s. 6d. three months. Transactions have also been noted in Cleveland warrants at 58s. 4½d. for delivery in seven days, 58s. 9½d. September 17, and 58s. 10d. September 26. A quantity of Cumberland hematite warrants was purchased at 75s. 6d. for delivery in three months. Makers of Scotch hematite are quoting 79s. per ton for west of Scotland delivery. There are 86 furnaces in blast in Scotland, compared with 87 in the preceding week, and 79 at this time last year. The demand for Scotch pig iron continues active and one or two brands are practically out of the market, while prices are generally maintained. Govan and Monkland are quoted f.a.s. at Glasgow No. 1, 68s., No. 3, 66s. 6d.; Carnbroe, No. 1. 70s. 6d., No. 3, 66s. 6d.; Calder, No. 1 is not quoted, No. 3, 70s. 6d.; Clyde, Langloan and Summerlee, Nos. 1, 75s. 6d., Nos. 3, 70s. 6d.; Gartsherrie, No. 1, 76s., No. 3, 71s.; Coltness, No. 1, 91s. 6d., No. 3, 71s. 6d.; Eglinton at Ardrossan or Troon, No. 1, 67s. 6d., No. 3, 66s. 6d.; Glengarnock, at Ardrossan, No. 1, 76s., No. 3, 71s.; Dalmellington, at Ayr, No. 1, 69s., No. 3, 67s.; Shotts, at Leith, No. 1, 75s. 6d., No. 3, 70s. 6d.; Carron, at Grangemouth, No. 1, 76s., No. 3, 71s. per ton. The shipments of pig iron from Scotch ports in the past week were 2,539 tons foreign, and 1,794 coastwise, the total, 4,333 tons, showing an increase of 774 over the quantity despatched in the corresponding week of last year. The arrivals at Grangemouth of pig iron from Middlesbrough and district reached 11,852 tons, an increase of 3,242 compared with those of the corresponding week in 1611. Great activity characterises the various departments of the finished iron and steel trades. In the bar iron and tube trades the element of competition has been entirely eliminated by amalgamation of the producers. Tube makers are exceptionally busy, and steelmakers have great pressure put upon them for delivery of shipbuilding and boiler making material.

◆

Renfrew, Ayr and Dumbarton.

COAL.

There is a good business doing in the coal trade of this district, the shipments being mostly coastwise and to Irish ports. The quantity sent abroad in the past week was 2,627 tons, while the coastwise shipments amounted to 32,324 tons. At Bowling 318 tons were shipped, Greenock 511, Ardrossan 3,221, Irvine 1,270, Troon 6,701, Ayr 19,840—total 34,800 tons, compared with 32,464 in the preceding week and 38,767 in the corresponding week of last year. There is a very active demand for coal for manufacturing purposes. Prices are steady for all qualities. The home demand for household coal has shown a little more activity owing to unsettled weather.

◆

Stirling, the Lothians and Fife.

COAL.

Business has been fairly active in the coal trade of the Lothians, and at Firth of Forth ports the foreign shipments amounted to 65,972 tons, while 36,268 tons were despatched coastwise. The shipments to the Thames have now assumed something like normal proportions and a fair amount of business is being done with Continental and long-distance ports. At Granton 11,650 tons were despatched, Bo'ness 12,118, Leith 38,128, and Grangemouth 40,344—total 102,240 tons, compared with 101,829 in the preceding week, and 104,391 in the corresponding week of last year. Best screened steam coal is quoted at Leith 12s. to 12s. 6d., secondary qualities 11s. to 11s. 6d., treble nuts 12s. 6d. to 13s., and doubles and singles 12s. to 12s. 6d. per ton. There has been an improvement in the shipments at Fife ports, but shippers have not been quite satisfied with the amount of coal sent forward from the collieries. At the principal ports there has been a better supply of vessels, but loading has been slow owing to a scarcity of coal. This state of matters, however, is now being remedied. The clearances in the past week were at Methil 35,392 tons, Burntisland 42,650, Alloa 3,135, Dysart 1,471, Tayport 494, Charleston 500, Wemyss 462—total 84,404 tons, compared with 48,350 in the preceding week, and 62,503 in the corresponding week of last year. First-class screened navigation coal is quoted f.o.b. at Methil and Burntisland 15s. to 16s., unscreened 13s., first-class steam coal 12s. 6d. to 13s., third class 10s. 6d. to 11s., treble nuts 12s. 6d. to 13s. 6d., doubles 11s. 6d. to 12s., and singles 11s. 6d. per ton. House coal for home use is in fair request at steady prices.

Mining Institute of Scotland.—A general meeting of this institute will be held in the rooms of the institute, 39, Elmbank-crescent, Glasgow, on Saturday, August 10, at three o'clock. Mr. James Black's paper on "The Inglis Engine Controller," and Mr. Douglas Jackson's paper on "The Capping of Winding Ropes" will be discussed. The council have appointed a committee to make further experiments with the loop referred to in Mr. Briggs' paper on "Testing for Firedamp and Blackdamp by Means of a Safety Lamp," and, pending the report of the committee, the discussion on Mr. Briggs' paper is adjourned. Mr. David M. Mowat will read a paper on "Facts and Theories relating to Fans." Mr. James Martin, Coatbridge, will exhibit and describe a model of an "Automatic Stop Grip for Pit Cages."

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The Council do not bind themselves to accept the lowest or any tender.

Council Offices, Dartford,
27th July, 1912.

W. KAY,
Clerk to the Council.

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Commercial-street, Sheffield,
July 30th, 1912.

WM. HAMBY,
Secretary.

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*** *For other Miscellaneous Advertisements see Last White Page.*

Forthcoming Annual Meetings.

Institution of Mining Engineers—Provincial Meeting (Birmingham)	September 11, 12 & 13, 1912
North of England Institute of Mining and Mechanical Engineers ...	August 3, 1912
Midland Counties Institution of Engineers	Sept. 1912
Manchester Geological and Mining Society,	Oct. 8, 1912
North Staffordshire Institute of Mining and Mechanical Engineers ...	October 14, 1912
South Staffordshire and Warwickshire Institute of Mining Engineers ...	October 1912 (2nd week)
Iron and Steel Institute—Autumn Meeting ...	September 1912
Association of Mining Electrical Engineers—	October 4 & 5, 1912 (Provis.)

The Colliery Guardian.

LONDON, FRIDAY, AUGUST 2, 1912.

The summer conference of the Institution of Mechanical Engineers opened on Tuesday in Belfast.

The annual general meeting of the members of the North of England Institute of Mining and Mechanical Engineers will be held in the Wood Memorial Hall, Newcastle-upon-Tyne, at 2 o'clock to-morrow (Saturday). Mr. W. C. Blackett has been nominated as president.

On Saturday, at the Coal Trade Offices, Newcastle, the Northumberland owners met the Wages Board of the Miners' Association on the question of the reconstruction of the new Conciliation Board agreement.

The forty-first annual demonstration of the Durham miners was held on Saturday on the Durham racecourse. The financial statement of the Durham Miners' Association showed that the funds had depreciated by over £335,000 since a year ago.

At a meeting of the Industrial Council, on the 30th ult., under the presidency of Sir George R. Askwith (Chief Industrial Commissioner), the latter, in opening the proceedings, suggested that after that day they should adjourn until

Tuesday, October 15. In the meantime, the Government had decided to enquire into the working of the Industrial Disputes Investigation Act in Canada, and had requested him, as chairman of the Industrial Council, to go to Canada for the purpose of pursuing enquiries on the subject, and he had agreed to go.

It has been arranged by the officials of the Miners' Federation, in pursuance of a resolution adopted by the executive at their last meeting, that the special national conference of miners to consider the reports from the districts as to the working of the Minimum Wage Act shall be held at Blackpool on August 14 and 15 next.

A meeting of the executive council of the South Wales Miners' Federation was held at Cardiff on Friday, Mr. W. Brace, M.P., presiding. The question of applying to the South Wales coalowners for an advance in the general wage rate of the coalfield was discussed, and it was decided to apply for an increase of 6¼ per cent.

A meeting of the Scottish Coal Trade Conciliation Board has been summoned to take place in Glasgow to-day (Friday), for the purpose of dealing with the question of the weekly payment of miners' wages. The meeting is also to consider the question of medical attendance for the six months until the Insurance Act arrangement comes into operation.

The annual meeting of the Midland Institute of Mining, Civil and Mechanical Engineers was held in Sheffield on Tuesday. Prof. Hardwick was re-elected president. Mr. W. D. Lloyd read a paper on "Winding Ropes and Capels." A full report of the meeting will appear in next week's *Colliery Guardian*.

The Judicial Committee of the Privy Council issued an important judgment on Wednesday in an action referred to them from Ontario. The question concerned the identification of natural gas as a mineral, under the terms of a lease.

The Home Office have appointed Mr. R. A. S. Redmayne, C.B., H.M. chief inspector of mines, to conduct the enquiry into the Cadeby Colliery disaster. The enquiry will be held in Doncaster, and will commence on Monday next at the Guildhall at eleven o'clock.

An important case arising out of the death of a miner named Hudson, at the Chopwell Colliery, in May last, was heard at Gateshead County Police Court on the 25th ult, when Henry Marshall Imrie, manager, was summoned for a breach of the Coal Mines Act, inasmuch as a certain switchbox was not earthed in accordance with Rule 8 of the Act. The defence was that earthing was part of the constructional work, and was therefore covered by the exemption clause. Eventually the case was dismissed. Mr. Holmes, for the Home Office, asked the Bench to state a case.

The annual meeting of the Mining Institute of Scotland will be held in Glasgow on the 10th inst.

In the House of Commons, yesterday, Mr. Harvey called attention to certain grievances that had arisen in the working of the minimum wage, especially in regard to alleged attempts to contract out of the Act and to reduce the standard wage to the minimum. Mr. Buxton said he had no knowledge of these facts, but it was the intention that the minimum wage should be an implied term in every contract of employment, and that there should be no contracting-out. He advised application to a county court where such cases arise.

A memorandum has been prepared by the Home Office for the information and guidance of persons desiring to obtain certificates as firemen, examiners and deputies under section 15 of the Coal Mines Act, 1911.

The Eskmeals Experimental Station.

In last week's *Colliery Guardian* we were able to publish particulars of the general scheme which has been drawn up to govern the investigations at the Government station at Eskmeals. This week appears the first report of the Explosions in Mines Committee, who are in charge of the experiments.

Our readers will probably find the first of these documents the more interesting of the two. It shows that there is every intention to carry on in a practical way the work initiated by the Mining Association of Great Britain and recorded in the *Record of the First Series of Experiments.* In years to come it is possible that the collector of the scientific refuse of the past may look in vain for a record of the second series. To-day the circumstances that have supervened to interrupt the sequence are fairly well known. In taking upon themselves the burden of providing the expensive plant and the brains for the carrying out of this investigation, the members of the Mining Association never failed to press the view that they were doing work that should properly be done by the Government. In 1910 they offered their experimental plant and apparatus to the Government, who, somewhat tardily, were persuaded to undertake the investigation and to provide certain funds. It should be noted, however, that the Mining Association at a later date, on learning that the money placed at the disposal of the Committee did not include any available sum for housing, presented a further sum of £1,500 to be used in assisting to provide the necessary accommodation for the staff and experimenters.

Thus it comes that, strictly speaking, there will be no second series of the British coaldust experiments. This first report of the Government experiments does little more than detail the circumstances attending the change of venue and the disposition of the plant on the new site. The committee point out that it may be some time before they are able from their own experiments to recommend definite precautions; at present the bias is towards the fashionable preventative of stonedust. The Committee, however, consider that further experiments are necessary before any final judgment can be passed on this subject. For instance, to quote the report, "it has not yet been proved that a flame of coaldust that has attained full explosive violence in a mine will be extinguished on reaching a region where stonedust has been strewn over the coaldust, nor that an explosion of firedamp would not be 'extended' by a thin layer of coaldust deposited on stonedust."

In the meantime the Committee has taken advantage of an investigation that is now being carried out by Dr. Beattie, of Sheffield, into the liability of certain dusts to promote fibrosis, and he has carried out experiments which prove that convenient inert materials exist that can be safely used in the mine, thus setting at rest doubts that have possibly existed in the minds of some people.

As to the Committee's programme, it will be noted that the work is to be divided into two main branches, viz.:—(1) Problems affecting the initial ignition of coaldust and the prevention of that ignition; and (2) the experimental study of the nature of explosions resulting from such ignitions. These investigations will be carried on *pari passu.* For the more intricate details we must refer our readers to page 170 of our last issue, on which they are set forth.

It can scarcely be doubted that from such a programme handled by men of attainments so conspicuous as those possessed by the investigators engaged on this work, some valuable facts should be elucidated; in fact, the very diversity of the scheme and the very ability of the experimenters constitute perhaps the chief danger. The temptation to wander from the high road of fact into the unpractical, though attractive, by-paths of speculation, must be great. Both in France and the United States there has been a tendency to embark upon these excursions, and the *Record* of the Mining Association's experiments is not altogether free from suspicion in this respect. In investigations of this character, questions of the highest scientific interest must necessarily be evolved in the process of research, nor is it always a simple matter to determine their true relationship to the main issue. A certain latitude is desirable, and can best be satisfied, as we have already suggested, by some method of subdividing the enquiry on an international basis, and so to avoid the duplication of tests. In the abstract it would be an excellent thing if men of science were given a free hand to roam at will in these regions of research; in the concrete the Treasury has a way of suddenly bolting down its coffers, and it would be a matter for regret if this happened before something tangible emerged from the investigation to render the occupation of coalmining less jeopardous than it is.

Unemployment Insurance and the Coal Trade.

Part II. of the National Insurance Act deals with insurance against unemployment, the scheme being confined to about one-seventh of the number comprised in the larger scheme under Part I. dealing with insurance against sickness and disablement. Unemployment insurance, in other words, is confined to workmen employed in certain trades, a workman being any person of the age of 16 and upwards employed wholly or mainly by way of manual labour who has entered into or works under a contract of service with an employer, whether the contract is expressed or implied.

The seven trades known as insured trades to which Part II. is confined are as follow:—Building, construction of works, shipbuilding, mechanical engineering and ironfounding, construction of vehicles, and sawmilling. The Board of Trade have published lists of occupations which they consider to be included in the insured trades above specified. The important point, however, is that section 107 (2) provides that regard must be paid to the nature of the work in which the workman is engaged rather than to the business of the employer. Again, the Board of Trade may extend by special order the list of insurable trades; and further, section 104 enables the Board to exclude by special order (*a*) any occupation which appears to be common to insured and uninsured trades alike, and ancillary only to the purposes of an insured trade; or (*b*) any occupation which appears to be an occupation in a business which, though concerned with the making of parts or the preparation of materials for use in connection with an insured trade, is mainly carried on as a separate business, or in connection with trades other than insured trades.

It will be seen from the foregoing that an industry such as coalmining, though not specifically included in the Sixth Schedule (that in which the above-named trades are cited), may yet be brought within the purview of the Act Some cases may arise in which it is extremely difficult to decide whether a workman is insurable or not, and it is important to observe that, pursuant to paragraph (5) of the Unemployed Insurance (Umpire) Regulations, the

Board of Trade has published a number of decisions by the Umpire on questions whether contributions are payable. From these we gave some extracts in our issue of the 19th ult.

It is not too much to say that, as a whole, they are fairly bewildering, although the decisions in the case of colliery employees are by comparison simple. Thus, no contributions are payable in respect of underground miners, labourers, timbermen, pitmen, hauliers, trammers, and fillers, according to the decision of the umpire. Further, workmen at collieries engaged on electrical installations, sinkers, sawyers, carpenters, joiners, fitters, blacksmiths, masons, bricklayers, painters, plumbers and coke oven operatives, are also not insurable, but in order to secure immunity they must not be engaged in "engineering workshops" or in the "construction of buildings." Thus "workmen engaged in the construction, reconstruction, or alteration of coke ovens or by-product plant" are to be insured, but "workmen in the repairs of ovens for the manufacture of coke and of by-product plant (other than buildings or machinery)" are placed in the other category. It cannot be maintained that the system under which these distinctions are made is other than artificial and arbitrary; its natural consequence is to give rise to ludicrous but vexatious situations.

Mr. Justice Swinfen Eady on Wednesday was compelled to give a decision on another debatable point, evidently much against his inclination. It was the same point that has arisen under the Employers' and Workmen's Act, the Workmen's Compensation Act, the Trade Disputes Act and other Acts—namely, what is the meaning of the phrase "otherwise employed in manual labour." Mr. Justice Swinfen Eady's finding is ingenious. In his lordship's opinion, in the case of workmen, although they might perform manual labour, the question was whether that was the real substantial employment for which they were engaged, or whether it was not incidental or accessory to it. We doubt if anyone could do better, but there is still room for hesitation in many cases that spring to the mind. The trouble comes from setting up a standard, and then twisting and contorting every case in order to make it measurable by that standard.

Trade Summary.

The London coal trade continues very quiet, and orders are exceedingly slow. Only spot lots are being sold, and these are exclusively running into stock. Contract renewals are steadily coming in, but in very few cases has the full maximum 2s. 6d. been conceded. The bulk of the contracts settled are at advances ranging from 1s. 3d. to 2s. above last year. Small nuts and peas are weak, but the nutty and fine slacks have improved in demand. Manufacturing qualities are strong, but all house coal orders are slow. The seaborne market is more buoyant since the settlement of the dock strike.

The enquiry at Newcastle is very active, in contemplation of the Bank holiday. Supplies are scarce and prices firm. Gas coals and bunkers are strongly placed. House coals are steady. Coke has risen.

The Durham coal trade is exceptionally firm for all classes of coal and coke.

The Lancashire house coal trade is unchanged. The bunkering demand is fairly good, and furnace and manufacturing coals generally are in strong request.

Fair consignments of house coal have been despatched from West Yorkshire during the past week, and the demand for all classes of steam coal is inordinately strong.

The South Yorkshire coal trade continues active, although the non-arrival of tonnage in the Humber has had its effect upon the export branch. The home demand, however, is of a substantial character.

The demand for Derbyshire house coal is quiet. Deliveries of coal for manufacturing purposes continue on an extensive scale. Steam coal is strong, and the export trade continues to improve.

The market at Cardiff is firm, and steam coal is steady. Small coals continue scarce. Monmouthshire coals are steady. Bituminous coals are somewhat easier. Patent fuel remains firm.

The Scottish coal trade has not as yet fully recovered from the holidays, and work is intermittent. Tonnage also has been scarcer. Prices are steady.

LABOUR AND WAGES.

North of England.

The proxy voting amongst the miners' lodges in Northumberland on the question of withdrawing from the Miners' Federation of Great Britain, has now been completed, and the returns officially tabulated. The result is as follows:—For leaving the Federation, 3; against, 647. Only two collieries voted in favour of separation.

At Maryport on Monday a demonstration was held to celebrate the 40th anniversary of the foundation of the Cumberland Miners' Association. Mr. Andrew Sharp, agent, who presided, said the passing of the Minimum Wage Act was putting the cart before the horse; nationalisation of the mines should have preceded it, then the fat collieries would have helped the lean pits and permitted the payment of a living wage. Mr. Thomas Richardson, M.P., predicted storm and stress in the near future. Capital, he said, was becoming more relentless; it bought the best minds in the market, and labour was handicapped on entering the board room to negotiate. Labour should therefore develop the best minds in the movement, and then fight.

A conference between Northumberland miners' leaders and coalowners was held at Newcastle on Saturday to consider a proposal to revive the Wages Conciliation Board terminated by the miners last August owing to the owners' refusal to increase the base wage by 30 per cent. on the figure of 1879. The men now suggested that the board should be resuscitated if the owners would concede the new base rate and would take profits into consideration when settling wages rates, instead of going merely by the selling price of coal. The meeting was adjourned indefinitely to allow the owners to consider the demand.

The annual mass meeting of the Durham County Enginsmen's and Boilermakers' Association was held on Saturday in Durham. Mr. W. B. Charlton, the secretary, made his annual report on the position of the society. He said they commenced the year with £21,502 as their total worth, £16,197 14s. 8d. of which belonged to the Labour Fund. To this there was added at the half-year ended June 30 in contributions, entrance fees and interest and learning fees, &c., the sum of £1,582 16s. 5d., making a total of £18,500 11s. 1d. From that amount there had been paid to members in strike and rent allowance £5,650 11s., and in general management, ordinary out-of-work and retiring allowance to members £878 4s. 10d., leaving to the credit of the general fund at the end of last month a total of £11,971 14s. 7d. The membership had increased by 150 since the last gala day.

The annual gala of the Durham miners was held on Saturday in the Cathedral city, but, owing to the weather and other causes the attendance was unusually small. Some interesting figures were set out in the financial statement read from each of the two platforms, which showed the income and expenditure of the Durham Miners' Association for the year ended June 30 last, to have been as follows:—

Income.	£	s.	d.
Contributions	170,372	4	3
Entrance fees	583	18	1
Interest on investments	11,460	3	9
A Few Items of Expenditure.			
Sickness and accidents	99,526	6	6
Death benefits	8,449	16	6
Breakages of machinery	7,212	9	7
Strikes and lockouts	332,691	15	1
Sacrificed members	1,437	18	6
Relief to men out of employment	30,077	19	7
Arbitrations and awards	1,486	12	0
Grants to Bristol miners	1,120	16	8
Grant to "Titantic" sailors' fund	5	0	0
Levy for South Wales miners	4,925	0	0
Value of Fund, 1911 (less property)	448,859	0	8
Value of Fund, 1912 (less property)	113,043	11	3
Decrease in value	335,815	9	5

Membership.

Jan., 1912—111 940 full members and 20,074 half-members.
Jan., 1911—103,273 full members and 18,532 half-members.

Amongs the speakers were Alderman W. House, the president of the association, Messrs. T. H. Cann, Tom Mann, T. Richardson, M.P., Dr. John Wilson, M.P., Alderman S. Galbraith, Mr. George Lansbury, M.P., and Mr. Ramsay MacDonald, M.P.

The adjourned meeting between the Cleveland ironstone mineowners and the Cleveland ironstone miners' representatives was held at Middlesbrough this week, Mr. A. F. Pease presiding, when the question of wages to be paid to the miners during the current three months was further considered. After discussion, it was agreed that the advance should be 2·25 per cent.—the same amount as the blastfurnacemen recently received under the sliding scale.

The management of the Ashington Colliery, which employs about 5,000 men, put before their workpeople the following proposals with regard to the adoption of weekly pays:—

1. An intermediate pay on the baff Saturday consisting of full wages for the previous week to all datal men, and wages at the minimum rates for piecework, according to shifts worked.
2. The Minimum Wage Rule 5 with regard to a workman being idle one day per pay, should be underderstood to mean one day per week.
3. An itemised pay-check will be provided for each man showing individual off-takes instead of in sets as at present.
4. No person will be obliged to draw his pay weekly if he does not wish to do so.
5. Off-takes will be deducted fortnightly.

A meeting of about a thousand of the workers on Saturday treated the proposals with contumely, booing and shouting and declining to allow discussion. Even Mr. E, Edwards, one of their most advanced Socialistic leaders, was declined a hearing when he proposed to refer the matter to a committee, and the proposals of the manager were rejected by 309 votes to 63.

Federated Area.

The council of the Yorkshire Miners' Association met at Barnsley on the 30th ult. Lock-out pay was granted to a large number of men who had been stopped by the managers at various collieries under the umpire's minimum wage award. The council regretted to learn that in West Yorkshire some colliery owners were ignoring the award in many respects, and were stopping men because they refused to sign certificates of inefficiency under Rule 8. The council had instructed Mr. J. Wadsworth, the general secretary, to ask that the independent chairman should be called in at an early date, as they were willing to loyally carry out the award if the employers were prepared to do the same. If nothing could be done to bring about a more satisfactory state of things, Mr. H. Smith reported, the association must seriously consider the position and question of taking some action. Nor for some years had there been so many cases of notice being given to men, also of men being victimised, and so many applications being made for permission to give in notice as they had dealt with at the meeting. This seemed to prove that in West Yorkshire particularly the owners were determined not to carry out the award. The miners' officials could take no responsibility for whatever might be done if the coalowners were going to adopt such an attitude. Although the decision on the minimum wage was given in South Yorkshire on May 22, in West Yorkshire June 10, and the men had been working since the restart on April 11, arrears were still owing at many collieries up to date. Amongst the applications dealt with, the men at the Glass Houghton Colliery were granted permission to put their application before the district to take a ballot on the question of giving in notices. The request to ballot by the men at Topcliffe Colliery was left over, as the association was informed that the company had recently joined the Coalowners' Association, and they were asking that the matter should be dealt with by the committee under the umpire's award. The men at the Church-lane Colliery, Dodworth, were allowed to put their application for permission to ballot, before the district. The management, it was stated, although agreeing after the strike to start every man at work, had taken exception to some men, and the officials had hoped by now the colliery would have agreed to carry out their promise. The question of taking a ballot at the Cleckheaton Lodge Pit, where the question of a price list had been under discussion for some time, was sent to the branches to decide. The question of balloting at the Manton Colliery had been before the district, and a large majority had decided in favour of giving in notices. The question of taking a ballot at the Ackton Hall Colliery was considered. It is alleged men have been stopped without enquiry and a system had been practised of stopping a few men in one district on separate days with the object of evading the award. A deputation was appointed in the hope of effecting a settlement to avert the necessity of tendering notices. In regard to the Cadeby Main Explosion Fund, the council passed a resolution expressing the hope that the fund would contribute to the relief of the dependants of the three men who were killed in the Barnsley Main explosion. Mr. Smith explained that certain amounts were already in the hands of the association, and these would be banked separately until they were satisfied that representation to all sides would be given on the committee and on the trustees. They were glad to learn of the grants made by the Hulton and Micklefield explosion funds, but he thought there were large sums locked up in other funds which ought to be brought into requisition at such times as these for funds opened to grant similar relief. The council granted out-of-work pay under Rule 76 to members at Brincliffe, Snydale, West Silkstone, Allerton Silkstone, Cadeby Main, Waterloo, Gildersome, Millhridge and Orgreave collieries.

In an "unstarred" question in the House of Commons, Mr. Newdegate asked the President of the Board of Trade whether, at the meeting arranged to take place at an early date between the Joint District Board for Warwickshire, formed under the Coal Mines (Minimum Wage) Act, and the chairman of that Board Sir Walter Lawrence), for the purpose of considering the application of the North Warwickshire Miners' Association to receive adequate representation thereon, since on that Board at present they have no representation, arrangements will be made that representatives on the association shall be summoned to attend, in order that they may be enabled to state their case and communicate their claims for representation thereon.—Mr. Buxton (President of the Board of Trade) writes in reply: The secretary of the North Warwickshire Miners' Association has been informed of the meeting of the Joint Board in case the attendance of representatives should be required.

It is reported that during the past week a great deal of unrest has been caused among the men employed at the Nos. 7 and 9 pits, Langton Colliery, belonging to the Pinxton Coal Company, regarding alleged incivility by the under-manager to the men generally under his supervision. It was stated that the men resolved a few days ago not to work unless he was removed forthwith, but wiser counsel having prevailed, the men continued work pending negotiations with the general manager on the question. Negotiations, it appears, were taken up between the company and the officials with regard to the men's attitude on the question at once, the colliery company stating that they were prepared to receive and consider any specific charges the men might bring, and that they were at least entitled to an expression of opinion from the body of the men before acquiescing to the men's desires. The men, however, decided amongst themselves to take a ballot of the whole of the men as to who were in favour of the under-manager's immediate withdrawal or otherwise. The result is as follows:—For withdrawal, 670; against, 55. An appeal has been made to the Notts council for permission to hand in notices forthwith.

At a meeting of the council of the Derbyshire Miners' Association, on Saturday, the question of the Parliamentary representation of the Chesterfield division was again discussed, but a decision was postponed pending a definite statement by Mr. J. Haslam, the member for the constituency, as to what steps he was going to take. Mr. Haslam attended the meeting and made it quite clear that he had no intention whatever of resigning so long as he was able to continue to discharge the duties. The question of disputes under the Minimum Wage Act was discussed at great length, and the council decided to have prepared a detailed statement of all the points in dispute, for submission to the county Wages Board, and with a view to getting the differences finally adjusted. Mr. Frank Hall, the secretary for the men's representatives on the Board, was instructed to take steps to have the Wages Board called together at the earliest possible date. The council also expressed itself strongly in favour of a national Joint Conciliation Board meeting being convened to discuss a basis upon which increases and reductions should be arranged in the area governed by the Scottish, Welsh, and English Conciliation Boards; a copy of the resolution to be sent to Mr. Ashton, secretary to the Miners' Federation of Great Britain.

A meeting of the boys employed at the Treeton and Orgreave pits of the Rother Vale Collieries Limited was held at the Four Lane Ends, near Orgreave, on Sunday, when Mr. William Lidgett, checkweighman, read a letter from Mr. J. Dutson, agent to the colliery company, in which he offered that the pits should cease work at 10 o'clock for the afternoon shift, and also made several suggestions *re* the working of the two pits, which he asked the meeting to consider. After hearing Mr. Dutson's proposals, the meeting generally accepted them as favourable, and unanimously agreed to commence working on the new terms on Tuesday last, but not to sign the agreement until they had given it one month's trial.

The half-yearly report was presented by the agent. Mr. J. G. Hancock, M.P., at the council meeting of the Notts Miners' Association, on Saturday, July 27. It showed that the membership at the end of June was 42,381. The income had been exceptionally heavy in consequence of the strike, which cost the association a little over £100,000 in strike pay. The association was worth £120,000 at the end of the half-year; £2,746 had been paid to members in old-age pensions. There had been four fatalities, the victim in each case being a married man. A resolution was passed expressing deep and profound sympathy with the families and relatives of the unfortunate victims of the deplorable accident at the Cadeby Main Colliery, and also its appreciation of the services rendered by the search party. It was recommended that each lodge should send in a nomination for a representative on the local tribunal to be appointed under the Minimum Wage Act. In regard to the agreement entered into between the miners' and owners' associations as to bank-workers' wages in the Erewash Valley, it was stated that if the difficulties could not be settled at individual collieries, a conference would be called. The men employed at Langton Colliery, Pinxton, having balloted in favour of handing in notices in order to obtain redress of certain grievances, it was resolved that the matter should go before the branches for their decision thereon.

Scotland.

A demonstration of the miners of Lanarkshire was held at Hamilton on Saturday. Mr. J. W. Smith presided and submitted resolutions condemning the existing system of organisation as being detrimental to better conditions and higher wages for miners; demanding a reconstruction of the constitution of the Lanarkshire Miners' Union; condemning all legislation which had been brought in to deal with the wages and hours, and the actions of the leaders in forcing the hand of the Government on the Minimum Wage Bill; urging the formation of a strong trade union conducted on real, true and unselfish principles; and calling for the resignation of all the present agents of the Lanarkshire Miners' Union, and for the election by ballot of officials and trustees. The resolutions were carried unanimously, and a deputation was appointed to wait upon the executive of the Lanarkshire Miners' Union.

The Iron, Steel, and Engineering Trades.

The Board of Conciliation and Arbitration for the Manufactured Iron and Steel Trades of the North of England, in their official returns of the sale of manufactured iron during the months of May and June, certify the net selling price per ton to be £6 13s. 0·84d. This figure shows a marked increase over the previous two months, when the price was £6 7s. 6·25d., and the figure is also 5s. 1·61d. above that of January and February. With respect to wages, in which there was no increase for June and July, it is announced that, in accordance with the sliding-scale arrangement, there will be an advance of 3d. per ton on puddling, the rate for which will be 8s. 9d. per ton, and 2½ per cent. on all other forge and mill wages, taking effect from Monday last. The sales of rails, plates, bars and angles during May and June amounted to 12,543 tons.

The following intimation has been made to Messrs. James C. Bishop and James Gavin, joint secretaries of the Scottish Manufactured Iron Trade Conciliation and Arbitration Board, by Mr. John M. Macleod, C.A., Glasgow:—

> "In terms of the remit, I have examined the employers' books for May and June 1912, and I certify the average net selling price at works brought out is £6 10s. 3·64d. per ton."

This means an increase of 2½ per cent. in the wages of the workmen.

THE WELSH COAL AND IRON TRADES.

Thursday, August 1.

North Wales.

Ruabon.

COAL.

During the past week or so the collieries in this district have been adversely affected as a result of the labour troubles which have arisen among the dockers of the Mersey ports. The Liverpool men have resumed work, but the Birkenhead dockers are, at the time of writing, still out, though a considerable quantity of imported labourers have been able to deal with a considerable amount of traffic during the past few days. There are evident signs, however, that the end of the strike is near. This disturbance has made it impossible for the usual quantity of vessels to berth at the ports named; their destination has therefore been diverted to other places, where they have unloaded and taken on cargoes and fuel which has been obtained from collieries nearer to the loading ports than the collieries of North Wales. As a consequence, at many of the collieries there has been an accumulation of stocks in this quality of fuel, but it is hoped that next week things will have a turn for the better, and that there will be a greatly improved demand for bunkers. Steam coal for other purposes than the above has maintained a good demand, and large quantities have gone away against locomotive and other contracts. In the open market the existing stocks have had an effect on the price obtainable in the general market, which has been on an average about 11s. 6d. per ton. The output of gas coal has been readily disposed of, and the contracts for the renewal for the coming year of this class of coal are now practically completed. There are a few gas companies who are apparently backward in coming to a settlement, but these are not many, and it is difficult to find any contracts which have been settled at less than 2s. advance, and, indeed, in most cases the 2s. 6d. has been asked for and obtained. Apart from such contracts as gas coal and loco. contracts, which have to be made for a year, the colliery proprietors do not appear to be anxious to make contracts for a long period. It is the general opinion that coal is bound to be much dearer in a few months than it is at the present time, and merchants are getting rather anxious to close, if possible, at existing rates. Household coal is somewhat on the slump also—due, no doubt, to the approaching holiday and the summer weather. The average price quoted for this class of fuel is up to 16s. per ton for best large quality, and 14s. and 15s. for the cheaper sorts. The landsales are selling retail at from 18s. upwards at the wharf. Slack continues to be well sold at prices up to 7s. 6d. as quoted last week, and washed nuts have a big demand at about 11s. f.o.r. Gas companies are asking 15s. and upwards for their coke at works, and this figure seems to vary but very little.

* * *

Monmouthshire, South Wales, &c.

Newport.

COAL.

The amount of business passing in the steam coal trade is not actually of great volume just at present, being mainly comprised of small lots to complete cargoes of steamers which it is desired to sail before the holiday stoppage. There is, however, a much better feeling, with more real interest being taken in the course of business than has been apparent for some time. A fair enquiry prevails, while a better supply of tonnage for next week seems assured. So far there has been no increase in current quotations, but with collieries whose stems are satisfactory, sellers are distinctly firmer in tone. For next year's contracts there is now more disposition to negotiate, although as yet there has not been much placing of orders. At the moment smalls are a shade easier, while house coals and other qualities remain unchanged. Pitwood supplies are now rather more plentiful, good fir obtaining 25s. ex-ship. In the freight market, outward chartering is scarcely so active, rates for the Mediterranean ruling slightly easier, but being fully upheld for South American destinations. Latest approximate quotations may be taken as follow, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. to 15s. 6d.; western-valleys, 14s. 9d. to 14s. 9d.; eastern-valleys, best, 14s. to 14s. 3d.; other sorts, 13s. 6d. to 13s. 9d.; colliery smalls, best, 10s. to 10s. 3d.; seconds, 9s. 6d. to 9s. 9d.; inferiors, 9s. to 9s. 3d.; screenings, 10s. 3d.; through coals, 10s. 6d. to 10s. 9d.; nuts, best washed, 11s. to 11s. 3d.; house coals, best, 18s. to 18s. 6d.; seconds, 16s. 6d. to 17s.; patent fuel, 17s. 6d. to 18s. Coke: Furnace, 21s. to 23s.; foundry, 25s. to 27s. Pitwood: Best French fir, 25s. 9d. ex-ship.

IRON.

The iron and steel trades of the district show very little variance on the week, the general strong conditions being well maintained in all departments. Tin-plate bar and sheet-bar mills continue very busy, with good orders coming to hand. Prices are firm at £5 12s. 6d. to £5 15s. Bessemer, and £5 15s. to £5 17s. 6d. Siemens, for Welsh bars. A healthy tone continues apparent at the rail mills, where specifications are coming to hand well, and works are busily employed. Values remain firm and unchanged at £6 7s. 6d. to £6 10s. for heavy sections, with the usual extras for light sections. A very busy time is being experienced at local blast furnaces, and manufacturers cannot execute orders quickly enough to suit all buyers. Welsh hematite is now officially quoted 78s. 6d. to 79s., delivered to works in the district. The tin-plate market continues rather quiet. There is a fair demand for immediate delivery, but with the stop week so close at hand it is difficult to obtain quotations from manufacturers. Officially, however, they are unaltered on the basis of 14s. 9d. to 14s. 10½d. Bessemer, and 14s. 10½d. to 15s. Siemens, for I C 20 × 14, with other sizes and grades accordingly.

Cardiff.

COAL.

As is usually the case on the eve of the August Bank holiday, there has been a much better demand for coal, and the shipments for the week amounted to nearly 370,000 tons, or 182,000 tons more than in the corresponding week of last year. This quantity is likely even to be exceeded this week, for the number of vessels in port is more than 200, and there is plenty of coal available for all. Naturally charterings have begun to fall off, for no shipowner cares to run the risk of bringing a vessel to the port if there is a possibility that she may be unable to complete her loading before the commencement of the three days' holidays. The tonnage taken up last week only amounted to a little over 300,000 tons, or about 37,000 tons less than in the preceding six days. But though the quantity of tonnage in port when the week opened was greater than had been the case for some time, the output of coal was more than sufficient to meet all requirements, and there are consequently heavy stocks still standing on the various railway sidings. To this circumstance is attributed the fact that prices do not show the slightest upward movement. For prompt shipment best steam coals are still obtainable at from 17s. to 17s. 3d., and second Admiralties from 16s. to 16s. 6d. per ton, but for delivery after the holidays sellers hold out for rather higher prices. That they are justified in doing this is generally conceded, owing to the apparent eagerness with which some of the large contractors are now placing forward orders. A large quantity of second-class Admiralties have been sold over the year at 16s. 3d., or 1s. 1d. more than was paid for similar coals 12 months ago. The French Naval authorities who have lately been experimenting with Welsh steam coals, are evidently satisfied with the result, as compared with the propelling power obtained from the special type of smokeless briquettes which they formerly used, for they have invited tenders for the supply of from 40,000 to 45,000 tons of best steam large for delivery from August 15 to December 15. The coals specified are Ferndale, Nixon's and Cambrian Navigation, Ocean, Albion, Hood's and Naval Merthyr, and Penrikyber. Tenders are to reach the French consulate at Cardiff not later than the 3rd of this month, and are to be on the basis of f.o.b. Cardiff, Penarth, or Barry, or c.i.f. Toulon naval harbour. But the most important specification at present in the market is that from the White Star Steamship Company, who are asking for 240,000 tons of coals on the Admiralty list, for delivery over the ensuing 12 months. That the prices for 1913 will rule considerably higher than those at which many contracts were made 12 months ago is beginning to be very generally recognised. The miners' leaders admit that the award under the Minimum Wage Act will entail an additional burden of 2d. to 3d. in the cost of producing a ton of coal; but this by no means covers the whole increased cost to which coalowners will in future be subjected, for the Wages Act comes into operation simultaneously with the new Coal Mines Act and the Insurance Act. The notification that the executive council of the South Wales Miners' Federation have decided to apply to the coalowners for an increase of 6¼ per cent. in the general wage rate has also attracted considerable attention. The Irish railway companies have evidently been alive to the possibility of a substantial rise taking place in the quotations of coalowners for future deliveries of coal, and the Dublin and South-Eastern Railway Company are reported to have placed an order with the Ebbw Vale Iron and Coal Company for 20,000 tons of range coal at about 15s. per ton. The Griffin-Nantyglo Company have renewed their contract with the Midland and South-Western Railway Company of Ireland for the supply of 120,000 tons of coal over the next 12 months at about 14s. 9d. per ton, whilst the Great Northern Railways of Ireland, who were recently in the market for 80,000 tons of large coals, are reported to have placed an order for 30,000 tons with the United National Collieries for Monmouthshire coals at between 15s. 3d. and 15s. 6d. per ton. The balance of this contract is understood to have been placed with north-country coalowners, who last year captured the whole of the business. Very striking evidence has been furnished by the publication of the statistics of the German export trade for the six months ending June 30, and the very serious effect which the recent disastrous strike had on the coal trade of this country. Their exports had gone up from 12,614,952 tons in the first half of 1911 to 15,099,547 tons in the corresponding period of the present year. The exports of coal from the Welsh ports to foreign countries for the six months ending June 30 are given in the appended table. It will be seen that the largest decreases were to France, Italy, Egypt, South America, the Canary Islands, and Belgium:—

	Exports Jan. to June. Tons.	Increase. Tons.	Decrease. Tons.
Russia	127,838	21,728	—
Sweden	74,332	18,400	—
Norway	47,849	1,467	—
Denmark	16,476	2,170	—
Germany	105,022	—	20,680
Netherlands	57,240	—	16,580
Dutch possessions in Indian Seas	9,910	—	1,678
Belgium	112,218	—	146,038
France	2,382,756	—	375,271
Algeria	225,768	—	61,342
French Somaliland	16,018	2,066	—
Portugal	285,716	—	31,396
Azores	12,617	1,430	—
Madeira	50,258	14,730	—
Spain	466,489	141	—
Canary Islands	331,341	—	100,168
Italy	2,078,154	—	393,727
Italian East Africa	26,112	21,718	—
Austria-Hungary	42,332	—	41,652
Greece	111,643	—	35,791
Bulgaria	16,251	—	6,471
Roumania	41,164	—	6,451
Turkey (European)	41,963	—	27,308
„ (Asiatic)	52,793	—	22,953
Egypt	678,423	—	263,994
Tunis	45,604	—	3,579
China (exclusive of Hong Kong)	10,683	4,434	—
Japan	15,521	15,370	—
Mexico	11,451	—	2,812
Peru	6,550	1,435	—
Chili	291,268	30,561	—
Brazil	616,787	—	37,992
Uruguay	310,215	—	109,047
Argentine Republic	1,116,114	—	254,358
Channel Islands	32,925	—	1,196
Gibraltar	125,348	9,321	—
Malta	108,096	—	54,197
Cape of Good Hope	11,074	—	2 904
Mauritius	9,500	2,489	—
Aden	95,711	16,747	—
British India	31,953	—	28,253
Straits Settlements	6,861	—	3,921
Ceylon	107,134	—	29,944
Hong Kong	20,708	—	2,665
British West Indies	2,680	—	2,932
West Africa, French	41,888	106	—
„ Portuguese	131,736	—	15,516
„ British	46,425	—	7,680

Owing to the frequent stoppages that have recently taken place at the Welsh collieries, and through the inability of coalowners to release their wagons, there is still a great scarcity of small steam coal, and prices have undergone a further advance. Bunkerings are 11s. 3d. to 11s. 6d., best ordinaries 10s. 9d. to 11s., and cargo qualities 10s. to 10s. 6d. per ton. Best washed nuts are 14s. to 14s. 6d., seconds 12s. 3d. to 13s., best washed peas 12s. to 12s. 6d., seconds 10s. 6d. to 11s. Monmouthshire coals keep fairly steady, Black Veins being 15s. 3d. to 15s. 9d., western-valleys 14s. 6d. to 15s., and eastern-valleys (best) 14s. 3d. to 14s. 6d., seconds 13s. 9d. to 14s., in each case f.o.b. Cardiff. In bituminous coals there is rather an easier tendency. No. 3 Rhondda large is 16s. 9d. to 17s. 3d., through-and-through 14s. 6d. to 15s. 6d., and small 11s. 6d. to 12s. 3d.; No. 2 large 12s. to 12s. 3d., through-and-through 10s. to 10s. 6d., and small 8s. 9d. to 9s. 3d. Shipments of patent fuel for the week exceeded 30,000 tons, the Crown Fuel Company exporting 5,846 tons, other companies 10,030, Swansea 15,539, and Newport 250 tons. For prompt delivery crown brands continue firm at 19s., and for the second day of August 18s. 6d. per ton. Special foundry coke is 27s. to 29s., ordinary 22s. to 25s., and furnace coke 19s. to 21s. per ton. Pitwood is 26s. per ton.

IRON.

Never have the shipments of tinplates been so heavy as during the past week. They amounted to 260,584 boxes, or 66,000 boxes above the highest figures hitherto recorded. Receipts from works only amounted to 157,221 boxes, so that to complete the loadings of the vessels in port no less than 103,363 boxes had to be abstracted from stocks, which are now down to 365,624 boxes. Most works are well off for orders for two or three months, and therefore the greatness which at present characterises the demand has no perceptible effect on prices. Oil business, however, is so exceptionally dull that not more than 14s. 10½d. is obtainable for 14 × 18¾ sizes. The enquiry for steel bars is very active at from £5 15s. to £5 17s. 6d. for Siemens qualities, with the usual deduction for Bessemer. The negotiations for the erection of new steelworks at Aberavon are now practically completed. The scheme has been engineered by large tin-plate manufacturers, and the estimated cost is put down at £100,000. Three new furnaces are also about to be laid down at the Port Talbot Steelworks. Some good orders for galvanised sheets have been received from South America, but from India the demand continues quiet. Prices are steady on the basis of £11 15s. to £11 17s. 6d. for 24-gauge corrugateds. The rail mills are well employed. Messrs. Guest, Keen and Nettlefolds have secured an order for 12,000 tons for West Australia. Heavy sections are £6 7s. 6d. to £6 10s., light sections 2s. 6d. to 5s. more. Welsh pig iron is 77s. 6d. to 78s. f.o.t. Best rubio iron ore is offering at 19s. 6d., but buyers hesitate to pay the price; they are loth even to give 20s. 6d. for ore with 56 basis. A large quantity of iron ore briquettes is being shipped from Almeria at 18s. 6d. to 19s. c.i.f. New steel crop ends are offering at 61s. 6d. to 62s. f.o.t.

Swansea.

COAL.

During the past week the trade of the port was exceptionally good. At no period have the coal and patent fuel trades been so active. The combined shipments amounted to 131,750 tons. There was a good attendance on 'Change this morning, and the conditions prevailing on the anthracite coal market were unchanged. Swansea Valley large was steady at last figures. There was an improvement in the demand for Red Vein large, and prices were slightly advanced. Machine-made nuts and cobbles were fully up to last week's level, and both beans and peas were very firm. Rubbly culm was a little better, whilst duff continued strong. In the steam coal market there was very little demand for large, but small coals were scarce. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 16s. to 18s., less 2½ per cent.; Red Vein large, 12s. to 13s. 6d., less 2½ per cent.; machine-made cobbles, 22s. to 24s.; Paris, French, and German nuts, 23s. to 25s.; beans, 22s. to 23s. 6d.; machine-made large peas, 14s. to 15s.; ditto fine peas, 13s. to 14s., all net; rubbly culm, 7s. 3d. to 7s. 9d., less 2½ per cent.; duff, 4s. 6d. to 5s., net. Steam: Best large, 18s. 6d. to 18s. 9d.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s. 6d. to 11s. 6d.; small, 9s. 6d. to 10s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 18s. 6d.; through-and-through, 15s. 6d. to 16s. 6d.; small, 12s. 6d. to 13s. 3d., all less 2½ per cent. Patent fuel, 17s. 6d. to 18s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

Last week the iron and steel trades were again satisfactory. There was an average yield of pig iron, and the aggregate output of steel bars compared very favourably with any similar period this year, but several furnaces were let out for repairs on Saturday. Continued activity was seen at all the tin-plate and sheet-rolling mills, and the number of mills operating was four in excess of the preceding week. Employment in the galvanising and tin-house departments was good. The engineering works and foundries exhibited unusual activity. The shipments of tin-plates were 260,584 boxes, this being 66,000 boxes above the highest figures hitherto reached. The receipts from works were 157,221 boxes, and stocks in the dock warehouses and vans 365,624 boxes.

Llanelly.

COAL.

Quite a holiday feeling prevails in the local market, and there will be no change in the trade for the next two or three weeks. Collieries are now putting in better time owing to an improved supply of tonnage, and it is hoped that after the holidays of next week, when stocks will have an opportunity of being reduced, the market conditions will improve. It is fully expected by many that there will be an improvement towards the end of September, and that all coal will be firm. For the better class anthracite large there is a good enquiry, and prices are being maintained. The weakness at the moment is in the demand for cobbles and nuts, and prices for these are easier. Machine-made beans and peas have a strong enquiry, and very good prices are being received, quite 2s. 6d. per ton higher than for the corresponding period of last year. Culm and duff are also strong. Small steams are scarce, and prices are firm, but large and through coals are plentiful. This weeks' figures are:—Best malting large, 21s. to 23s.; second malting large, 20s. to 22s.; Big Vein large, 16s. 6d. to 18s. 6d.; Red Vein large, 13s. to 14s.; machine-made large cobbles, 21s. to 23s.; German nuts, 22s. to 23s.; French nuts, 22s. to 24s.; Paris nuts, 22s. to 24s.; machine-made large beans, 22s. to 24s.; ditto second quality, 20s. to 22s., machine-made large peas, 14s. to 15s.; rubbly culm, 8s. to 8s. 6d.; duff, 5s. to 5s. 6d.; large, 13s. to 14s.; through-and-through, 10s. 6d. to 11s.; small steam, 8s. 6d. to 9s. 6d.; bituminous small, 10s. 6d. to 11s.—all f.o.b.

THE IRISH COAL TRADE.

Thursday, August 1.

Dublin.

There has been no improvement in the coal trade during the week, business being about as dull as it possibly can be both in wholesale and retail directions, and very large quantities going into stock. City prices are unchanged, viz.:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 21s.; best Orrell slack, 21s. There is now a very fair supply of coke, the price of best qualities being 23s. per ton. The coaling vessels arriving during the week totalled 66, as compared with 48 the week previously, chiefly from West Bank, Burryport, Maryport, Garston, Newport, Cardiff, Troon, Girvan, Ayr, Point of Aira, Liverpool, Swansea, Glasgow, Campbeltown and Ardrossan. An application having an important bearing on the future of the coal industry in Ireland will be made to the Privy Council on Friday, when the proprietor of the Queen's County Coalmines will seek permission to construct a light railway from the collieries to Athy.

Belfast.

With the exception of house coal, which is only in very small demand, business is fairly active and prices are keeping firm, more particularly for Scotch coals of the various qualities. For forward delivery the prices quoted are considerably above those of last year. Prices in the city are:—Giant's Hall Arley coal, 25s. per ton; Hartley, 24s.; Orrell nuts, 24s.; Wigan, 23s.; Scotch, 21s.; Orrell slack, 21s. Current quotations ex quay:—Arley house coal, 21s. 4d. per ton; Scotch household, 18s.; Scotch steam coal, 15s. 6d. to 16s. 6d.; navigation steam, 15s. 6d. to 16s. 6d.; Welsh steam, 16s. 6d. to 17s 6d. per ton. Merchants' stocks have been accumulating for some time, and are now very large. Cargoes arriving during the week were chiefly from Girvan, Maryport, Ayr, Garston, Ardrossan, Troon, Sharpness, Workington, Llanelly, Manchester, Cardiff, Burryport, Swansea, Irvine, Neath Abbey and Ellesmere Port.

THE LONDON COAL TRADE.

Thursday, August 1.

The London coal trade for the past week has continued exceedingly quiet. Each market has opened with a very slight demand, and the absolute requirements are very few. The bulk of the coal bought has been put into stock, and naturally the buyer has been tempted by the special quotations offering—in fact, the whole of the trade has resolved itself into the "spot lots" quoted from time to time, and all the prices are merely nominal. Where the firm attitude has been adopted by the collieries, the wagons and orders have been somewhat ostentatiously withdrawn, as the bulk of the merchants seem to resent the present action of the collieries in maintaining such high prices during the summer months. This feeling runs rather high in some quarters, as it is fairly recognised that the winter's trade will show an improvement, but the present pit prices prevent the merchants making any profitable preparation for it, besides locking up a good deal of money by putting the coal into stock. The attendance on Monday last was fully up to the average, but on Wednesday the market was unusually thin. The last few days of each month is generally a very slow time for buying, and the closing days of July were no exception to the rule A few of the larger contracts have now been settled, and gradually the quantities are filling up. These for the most part are all fixed at prices somewhat lower than the recognised 2s. 6d. advance. Leicestershire has reaped the fullest harvest by closing early in the summer at 1s. 3d to 1s. 6d. above last year. Warwickshire and Cannock Chase have closed at an advance of 2s., and many of the Derbyshire and Notts districts have closed either on the modified sliding scale or at prices ranging from 1s. 6d. to 2s. above the preceding year. The merchants at present show no disposition to pay the full advance demanded by the owners, but a growing disposition is shown towards settling at a compromise, and this at what they consider a very substantial rise. So far also the factors have not in any way entered into the conflict, and seem very reluctant either to buy at the open market or to make any contracts for the coming year. On the other hand collieries have been very nervous in selling them any special quantities, particularly under the full list price, because any lower quotations would invariably filter through at once to the bulk of the smaller merchants, and even if no coal was bought, the quoted prices would damage the standard price. Peas and D.S. nuts are still selling freely, but prices are somewhat weaker. Fine slacks, however, and nutty slacks continue in good command. The somewhat easier tone of a few days ago has given way to a very pressing demand, now so many collieries are working short time with the large coal. Manufacturing qualities of hard steam coal are still moving freely, and prices are well maintained, although considerable difficulty is still experienced in moving the bargeloads up and down the river. Many of the loaded wagons at Chelsea, Poplar and Blackwall have now been standing some considerable time, and both the railway companies and the owners have been put to considerable cost over the delay. Strenuous efforts are now being made to get these unloaded into barges, and moved to their appointed wharf along the river side. Fortunately the men are returning to work now in large numbers at the various docks, and on Monday and Tuesday last the lightermen and the tug managers decided to return to work, so that it is hoped the waterside wharves will soon be in full swing. Unfortunately, the resumption of work at some of the docks has been accompanied by a good deal of rioting and bloodshed, but the bitter feeling will, it is hoped, soon die down when the work is more generally adopted. Until the dock strike is definitely settled all seaborne coals are seriously hampered. The nominal prices remain as before, viz., 20s. for Durham Wallsend and 19s. for seconds. On Monday 26 cargoes were reported in the River Thames, and 10 on Wednesday. The enquiries on Wednesday's market for seaborne house coal was distinctly brighter, and although no cargoes were offering and the close proximity of the holidays led to a belief that very little could come forward, yet the outlook was regarded much more favourably.

From Messrs. Dinham, Fawcus and Co.'s Report.

Wednesday, July 24.—The seaborne house coal market was quiet to-day, with no cargoes on offer. Best (Durham) 20s., seconds (Durham), 19s. Cargoes 9.

Friday, July 26.—The seaborne house coal market continued without alteration to-day. No cargo sales reported. Best (Durham) 20s., seconds (Durham) 19s. Cargoes 10.

Saturday, July 27.—The seaborne house coal market was quiet to-day. No Durham or Yorkshire cargoes on offer. Best (Durham), 20s., seconds (Durham) 19s. Cargoes 26.

Wednesday, July 31.—There was a slightly improved tone in the seaborne house coal market to-day, but no supplies available. Best (Durham) 20s., seconds (Durham), 19s. Cargoes 12.

Mr. Henry Fairclough, of the Mersey Mills, Warrington, and chairman and managing director of the Collins Green Colliery Company Limited, died on the 28th ult. at the age of 62. Mr. Fairclough was president of the South-west Lancashire Coalowners' Association, and was a member of the Coal Conciliation Board for the district.

Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

ANTHRACITE BRIQUETTES.

Sir,—I shall be glad if you or any of your readers would give me information as to the possibility of manufacturing briquettes from fine anthracite dust.

On pages 314 to 325 of Vol. 1 of "The Digest of Evidence Given before the Coal Commission on Coal Supplies," published by your journal, the evidence is emphatic against the practicability of making briquettes from anthracite dust, and the same opinion is expressed in a letter to me by an important engineering firm in South Wales, who have considerable experience in the manufacture of briquette machinery.

In your issues of October 13 and 20 last, you published a paper on "Anthracite Culm Briquettes," by Mr. C. Dorrance, but the process there described appears to be a very costly one, and I would like to know if there are any plants in Great Britain where anthracite briquettes are made by the above or any other method.

As a guide, I may mention that two classes of material require to be dealt with. One is the culm as produced by the colliery screening, and contains 18 to 20 per cent. of ash and 7 per cent. of volatile matter. This culm is again screened for peas, buckwheat, &c., and the resulting product is a fine dust containing 36 per cent. of ash.

Tientsin, May 15, 1912. Investigator.

NYSTAGMUS AND ELECTRIC LAMPS.

Sir,—With reference to the article on nystagmus in your issue of May 10, 1912, in which you refer to a report by Dr. Llewellyn, the writer observes that in this report appears the following:—

> Murton Colliery, Sunderland, is a very large colliery, and the only one in England where electric lamps have been extensively used for years. In reply to a letter of mine asking for information, Mr. Wood sent me the following: "Nystagmus. Our cases have been so few and far between that I have no information of value to give you." No comment is necessary.

The inference which may be drawn from this is that the anticipated increased light from the "electric lamps" has played an important part in the small number of cases of nystagmus reported at the pit.

It may not be out of place to say that a short time ago I made some enquiries, and find that they then had about 1,800 electric lamps, and about 1,100 oil lamps with *gauze to the bottom of the glass*, and about 100 Marsaut lamps with a clear glass, *i.e.*, without gauze to bottom of glass, at Murton Colliery. I was particularly impressed with the small amount of light given out by the electric lamp; and from previous experience I knew that the lamps with the gauze to the bottom of the glass would only give but a poor light. I was informed that the electric bulbs in use at this colliery are of the Ediswan type, carbon filament; the comparatively large batteries in the lamp being four volt in tin cases.

I have this week obtained from the makers of the bulbs some carbon filament lamps of identical pattern with those in use at Murton, and on testing the candle-power on *a large* 4-volt battery I find that the diffused candle-power given by the bulbs was as follows:—

	Candle-power.
First lamp	0·45
Second „	0·44
Third „	0·42
Fourth „	0·41
Fifth „	0·44
Sixth „	0·44

It will be observed that in each case the result shows less *than ½-candle power*, notwithstanding the fact that the bulbs were new and the battery fully charged the voltage of the battery at the lamp terminals being 4·1 volts; it might also be mentioned that to enable the lamps to give the best possible result the terminals of the lamp were soldered fast to the wires of the accumulator, thus eliminating resistance encountered with the usual spring pressed contacts. The above tests were carried out with white reflectors both above and below the bulb. The candle-power of electric bulbs, in constant use, quickly falls, and the probability is that the average candle-power of the lamps in daily use will not be more than about 0·3 to 0·4 candle-power.

We also tested the candle-power of oil lamps having ½ in. wide wick, and with *gauze to the bottom of the glass*, the lamps being quite new, and getting all possible benefits from reflection from the new brasswork; the tests showed that the candle-power was only 0·122 candle power (only a little over $\frac{1}{10}$-candle power). No doubt the lamps at Murton will give the same or less reading, seeing that apparently they are of the Routledge and Johnson type, and have a series of baffle plates inside, which may further curtail the supply of oxygen to the light, and correspondingly reduce same.

These figures seem to clearly show that if the Murton Colliery have only had few cases of nystagmus it cannot fairly be placed to the credit of the electric lamp, and on the other hand throws us back on the theory that the nystagmus may be more reasonably judged as being due to the "position" in which the miner works, and possibly also to the practically non-use of the long-range muscles of his eyes, and the consequent undue strain on the *short*-range muscles.

A doctor in conversation with the writer, regarding some eye trouble with the eyes of inhabitants of this town, remarked that he had noticed that in hilly towns, such as Morley, in which the hills are so choppy, and so placed that the inhabitants rarely have use for the long-range eye muscle, he found more cases of eye troubles, and it occurred to me that this might easily account for the trouble with the miners' eyes, as, generally speaking, miners have very little use for their long-range eye muscles.

In referring to this matter it has also been argued that the oil safety lamp had lived long beyond its proper time, but I contend that the facts show that this may be disputed. According to the report for the United Kingdom the number of safety lamps in use in 1910 was 706,000; if you multiply this by, say, 200 working days for the year, it shows that during the year there has actually been sent down the mines of this country equal to 141,200,000 lamps; and taking into consideration the indifferent treatment which safety lamps are subjected to by the lampmen and the miners, and the good, bad and indifferent pits into which they are sent, I submit, Sir, that the number of accidents, in which safety oil lamps are even remotely connected, are so exceedingly few, that it does not warrant the charge against the safety lamp, because it should be clear that if the safety lamp had not an *enormous margin of safety*, with such a vast quantity of lamps in use, and the lamps daily meeting abnormal conditions, that if your view be correct we ought to have had frequent explosions.

I hope shortly to publish some data regarding a series of tests I am carrying out, in which I hope to demonstrate the *astonishing safety margin possessed by a safety lamp*, and my contention is that, useful as the electric lamp may be to managers, rescue parties and for certain other work in the pit, a case has not yet been made out to show that the oil safety lamp should be kicked out, and an enormous expense entailed by colliery companies by installing electric lamps, when there are so many other things about the mine which, in the aggregate, yearly cause far more deaths than ever happen from explosions; and it would be better to spend the proposed money in dealing with such real dangers, especially when, on the other hand, there would, with the general adoption of electric lamps, be the temptation to neglect ventilation owing to the inability of the collier to check the conditions of the atmosphere, which they now can do with their oil lamps.

To answer that colliery inspectors or deputies would by their inspection prevent this, is I think unsatisfactory, as the condition, particularly at the coal face, of a mine, may easily vary between visits of the inspectors or deputies, and to those conversant with the working conditions of mines, know very well that even now when safety lamps are in use, officials in the mine do not often advertise the fact to the miner that gas is forming, or has formed in his working place; but with the continued use of oil lamps and the great amount of instruction which is now taking place in the various mining schools throughout the country regarding the proper manipulation of the lamp and gas caps, the miner will in future be less subject than ever to the possible bluff of officials; and I contend that to take this remedy out of the hands of the miner is a step in the wrong direction.

The writer has had a considerable experience in dealing with all kinds of lamps and with electricity, and knowing the prohibitive cost of electric lamps having primary batteries; and, on the other hand, the unsatisfactory nature of accumulators and the difficulties we have encountered in getting lampmen to devote proper attention to even a few accumulators, and the present indisputable fact that no satisfactory substitute has yet come forward for the comparatively heavy, messy and expensive, and, I might add, unreliable lead plate accumulator, I cannot help but think that to unduly boom the electric lamp at this stage will do it more harm than good, as false hopes are after one or two years dashed to the ground.

Our Scotch representative this week informed us that a manager of a colliery who had been using over 100 electric lamps for the last year or 18 months, had found the cost of upkeep so high that he intended to change back to the old lamps. We understand in this case the cost worked out 2d. per lamp per day, which, even for electric lamps, seems a heavy figure.

Our United States house report having received information that the Pittsburg Buffalo Company, Marianna Mine, tried a large quantity of electric lamps and discontinued using them, and went back to the use of their old lamps. At the Delaware, Lackawanna and Western Railway, Nanticoke, Pennsylvania, they replaced the electric lamps with our oil lamps. The Susqehanna Coal Company, Nanticoke, Pennsylvania, also threw out electric lamps, and the Philadelphia and Reading Coal Company, Pottsville, Pennsylvania, have also had an unsatisfactory experience with electric lamps. According to the report, these latter people particularly have gone to very great pains in giving the electric lamp an exhaustive trial.

Like many new things, electric lamps may seem nice for a time, but after a year or two of working, when the cells begin to fall to pieces and fail, and the novelty has worn off, it is found that the uncertainty and trouble incidental to their use more than counterbalances their expected advantages.

It may seem late in the day to be referring to an article published in May, but the writer, who has for some time been in Russia, only recently came across the article; hence delay in taking up the subject.

E. A. Hallwood,
Manager, Ackroyd and Best Limited.

Morley, near Leeds, July 26, 1912.

COLLIERY ACCIDENTS.

Harriseahead.

An inquest was conducted by Mr. Hugh W. Adams, coroner, at Harriseahead, recently, on the body of Arthur Swingwood, aged 23 years. The widow stated that her husband was a dataller, and was employed at the Steamhead Colliery, Harriseahead. He was brought home badly burned on Wednesday, June 12, at about 3.45 a.m. Death took place on the 23rd ult. On June 12 her husband said to her: "I had a candle in my left hand and was putting it up in the coal, about 4 ft. 6 in. from the ground. I was going to start work when a flame met me and knocked me down on my face. I felt my breath going, but had the presence of mind to run and get to where there was fresh air." Her husband had worked at that colliery for several years, and always with naked lights. He had never made any complaint. He always said what a comfortable place it was to work in.

Mr. Thomas Green, manager of the colliery, said the accident happened in a heading or old goaf in the Hardmine seam. Witness had known the seam ten years, during which period naked lights had always been used. The fireman had inspected the workings with a locked safety lamp during that period. They had never known of the presence of gas before. The place where the accident happened had not been worked for two years until recently, and they had seen no indication of gas. In his opinion he thought a pocket of gas had been liberated by the goaf "weighting." The size of the goaf was about 60 yards by 30 yards. There was some small coal about 3 in. thick about 15 yards away, and he thought the gas came suddenly from that coal. He did not think the gas came from the Hardmine seam. It came, in his opinion, from the 3 in. coal or from the roof.

Joseph Lawton, a dataller, said that on the day in question he was working with Swingwood. The accident occurred at 12.45 a.m. They had just got to the place. Witness was about 13 yards away in the air dip, and did not know what happened. When he became conscious he found he was at the bottom of the main dip. He could not remember any explosion or flame. The last thing he remembered was putting the candles on the coal.

James Whitehurst said he had been employed as a fireman for 11 years at that colliery, and had never met with any gas. Between 12 and 1 a.m. he had been just up to the edge of the goaf. He examined it with a lamp, which was not locked, but it was closed. There was no indication of gas. He thought the gas came from the small coal or from the roof, and not from the Hardmine seam. He did not go up into the goaf. He did not notice any gas where he went, but he did not try for gas.

The coroner had the colliery report book sent for, and he pointed out to the witness that in his report it was stated that he had examined for gas, and with a locked safety lamp. The coroner said that those reports were absolutely useless and misleading. No doubt as the management had not seen any gas for 11 years, the examination for gas, if any, had been very perfunctory.

The jury returned a verdict of "Accidental death."

Mansfield.

An inquest was conducted by Mr. H. Bradwell on June 27 with reference to the death of George William

Hind, aged 38, who was killed on the previous Tuesday afternoon whilst following his employment at the Sherwood Colliery.

Charles Rawson, catch knocker, said he was with the deceased, whose work was that of onsetter on the top deck of No. 1 shaft. What happened was that the front tub, which should partly go over the star catch at the bottom of the cage, failed to do so properly, and this necessitated some manipulation. The deceased, whose place was on the top deck, came down and assisted witness to push the full tubs back, so that they could get the catch to work properly. He (the deceased) was pushing with his back to the coal, and they had just got things right, and were about to get off the cage, when it started to go up the shaft. As soon as witness felt the chair move he jumped off, and fell on his knees, but managed to get clear. On gathering himself he saw Hind fall from the chair on to the sump boards. Deceased tried to get off the cage immediately it started, but was caught by the swing door on the top deck. Asked what was the proper thing to do when everything was ready for starting, witness said it would be Hind's duty to give the signal by ringing the bell, and this signal communicated both with the banksman and the engineman. On this occasion, however, no one gave the signal. Usually it took them about one minute to get things clear, but on this occasion delay was caused owing to some difficulty with the catch-stop and a defective tub, and also having to wait for the tubs to come on the bottom deck.

The engineman, William Bowmer, explaining the system of signalling, said a signal should be received from the bottom and also the top—one bell each—before starting to wind. Sometimes he received the top signal first, and sometimes the bottom one, but both bells were distinct in tone. On the "wind" in question he remembered receiving the signal from the top, and he started the engine straight away because he thought he had already received the one from the pit bottom. He thought so because the cage had been standing for two or three minutes.

The jury returned a verdict that deceased was accidentally killed, and that the engineman started the engine under a misapprehension.

Fenton.

An inquest was held recently by Mr. Hugh W. Adams at the Longton Court House on the body of James Joynson Peet, aged 38 years, foreman engineer, employed by the Worsley Mesnes Ironworks Company, Wigan, who have in hand the erection of a winding drum at the Fenton Colliery. It appeared from the evidence that the deceased was engaged in superintending the work. At about 9.25 p.m. on May 31 he and one of the men were putting a girder into position, when a link of the chain surrounding the top of the girder broke, presumably through the slipping of the bottom of the girder. The girder had been leaning in a vertical position against the wall of the engine house. Upon the chain breaking, deceased was pinned between the girder and the wall.

Mr. Allen Heath, manager of the colliery, stated that in the work of erecting the new winding drum, the contractors were using pulleys and chains belonging to the colliery. There was a large selection of chains, and deceased could have had any size he required. The chain which broke was composed of links of three-eighths of an inch in diameter, with a quarter-inch link at each end. The chain had been made like that for a specific purpose at the colliery. It was one of the quarter-inch links that broke. Taking a chain in the condition of the one produced, a quarter-inch chain would be all right for a ton, and a three-eighths chain would be safe with 24 or 25 cwt.

John Fairclough, fitter and erecter, said he thought the girder slipped at the foot, and that that caused the chain to break. He thought the chain was of the same strength all the way through. The broken link produced seemed to be a good link. When the chain broke, the girder had not been lifted from the floor, but only pulled out at the top from the wall. Deceased and himself thought the girder was about 22 cwt., but he now knew it was 27 cwt. They had already hoisted one girder of similar weight into position, and the chain had proved itself then.

A verdict of "Accidental death" was returned.

Burry Port.

At the inquest on William Richards, killed at the Crown Colliery, Pwll, recently, the jury returned a verdict of "Accidental death," found that the deceased was left behind in the pit after the others who were with him had ascended in the bowk (cage), and that this was due to one of the two already in the bowk giving the signal to ascend before he could reach the bowk. This unfortunate signal was given through misadventure and over-anxiety, but was not in any way criminal. They also found that the management were much to blame for not carrying out the regulations and for not keeping proper and efficient plans for shot-firing. They recommended the coroner to call the serious attention of the owner of the colliery to the fact that there was evidently great laxity of control and supervision there in the observance of the Government regulations *re* shot-firing, but there was no criminal neglect.

Evidence was given to the effect that deceased was in charge of the night shift in the South pit. A number of holes were bored for blasting, and charged, and he stated it would take 2½ minutes to run to the firing point. When preparations had been finished two of the men got into the bowk, and subsequently deceased and another man came towards the bowk. Deceased, however, found that there was a hole that had not been lighted, and he returned again, a distance of between two and three yards. After the fuse had been fired deceased came towards the bowk, but the cage was raised before he could enter.

Joseph Lewis, master sinker, gave evidence, from which it appeared that the old rules permitted "poker" shot-firing, but new rules came into force on July 1, and Lewis did not know them, else, he said, he would not have permitted the poker upon the present occasion.

Mr Thomas Arnold, agent and mining engineer (who said the colliery was owned by Mr. William Jones, Llanelly), admitted that he had not carried out the requirements of the regulations. The only excuse was that he was laid up a fortnight, and only came to the office on July 1. He did not know that the magnet of the battery was frequently out of order, and that the electric current was being tapped for shot-firing because the battery was out of order, nor was he aware that poker-firing was being resorted to.

Hindley

Mr. S. Brighouse, the county coroner, Hindley, recently held an enquiry into the circumstances of an accident which occurred at the Duke Pit, Hindley, belonging to Messrs. Crompton and Shawcross, on May 28. A very heavy fall of roof occurred whilst preparations were being made for the erection of a fan near the "pit eye," and three men were killed outright, their names being:—William Arthur Alker (37), a fireman, John Thompson (40), a fireman, and Robert Smith (45), a dataller.

George Thompson, chargeman, said a fan engine house was being constructed about 9 yards from the "pit eye," and the work he was engaged in was making a cavity in the roof 24 ft. square, for the purpose of putting in a ventilating fan. The method of procedure was to put up iron girders across the roof, resting on brickwork, and with wooden bars between the girders and the roof. On the night previous to the accident he was working in the place where the fall subsequently took place, and he and the fireman, Kennedy, examined the roof before they left work about six o'clock on Whit Tuesday morning. The height of the roof was 10 ft. at one place, 9 ft. at another, and 8 ft. at another. There had been a previous fall, and by putting haulks on some of the dirt they could reach the roof, which sounded all right. The only explanation that he could give for the fall was that the damp atmosphere of the mine had caused the roof to "fisker off." During the night shift he had drawn a stack which was up to the roof. The end of the stack was about 4 ft. from the derrick. The gablock and chain were used to pull down the stack and the bars above it, the object being to get the loose dirt down to provide more room. The fall of dirt that night was what they expected. The reason another girder was not put up in the 4 ft. space was because the walls were not built; there was room, but even that would not have prevented the accident. The sides were hanging over, and wanted cutting down before the brickwork could be put in. He agreed that "stretchers" or "runners" might have been put up to protect the men who were clearing away the fall.

William Cartwright, the under-manager, said that on several occasions he discussed with Thompson, the fireman, the question of taking down the stack. He told him he did not want it removed. Thompson asked on several occasions about it, and witness said it must not be taken out unless the sides got so strong that we should have to blow them out. He had a conversation with Thompson after the stack had been taken out. This was on the morning of the accident about seven o'clock. He examined the roof, and told Thompson that it seemed pretty good. The roof was too high on one side to be tested. Thompson agreed they would have to put another stack in to keep the girders on.

Mr. Mottram, H.M. inspector of mines, said he gathered from the evidence that the taking down of the stack was a mistake, and contrary to the wishes of the under-manager. In jobs of that kind there always was the risk. It was the safest plan, and one which he wished to emphasise, to proceed with the clearing up from the edge of the fall, rather than expose men under a roof that could not be examined. It was a matter of opinion as to whether the men were doing the right thing or not. They were using their own judgment to the best of their ability. He would say again, however, the safer plan was to begin to clear from the edge, with support, as the men went along. Unfortunately they had from time to time accidents of that kind, and it was the usual statement that the roof had been sounded and considered quite good. He always looked with suspicion on roofs of that kind.

The jury returned a verdict of "Accidental death," and expressed the opinion that the stack should not have been taken out until the sides had been squared and another girder put up.

MINING AND OTHER NOTES.

The directors of the North Eastern Railway Company have appointed the Right Hon. Lord Knaresborough, chairman of the company, in place of the late Right Hon. John Lloyd Wharton, and the Right Hon. Lord Joicey succeeds Lord Knaresborough as deputy-chairman. The directors have also elected the Right Hon. Viscount Helmsley, M.P., of Nawton Tower, Nawton, Yorkshire, a director of the company.

An alarming outbreak of fire occurred on the 25th ult at the No. 3 Nackerty Colliery, near Bellshill, belonging to the United Collieries Company. The large oil stores, which are situated in close vicinity to the pithead buildings, took fire and were almost totally destroyed. The damage done is considerable

A South Elmsall miner named Harry Hodgson was fined 40s. and costs at Pontefract on Saturday for having refused to obey the orders of a deputy at the Frickley Colliery. Mr. Gichard, who prosecuted, said the defendant had refused twice to remove timber from a gob simply to avoid losing time for actual coal-getting. If the miners in a district conspired to risk detection and habitually neglected to remove timber from their working places, sharing the fine if one of their number was detected, they might be a good deal in pocket, but it was a very dangerous practice, particularly in a fiery mine like that at Frickley.

The movement amongst working men in Yorkshire for the formation of coal associations through which they are enabled to make favourable contracts direct with coalowners is making rapid progress, and in the Bradford district alone twenty have been formed. The merchants are, of course, feeling the effects of the new competition thus set up, and to counteract the effect of these new organisations the merchants in the Bradford district are understood to be making arrangements for forming themselves into a combination. A number of informal meetings have been held at the Bradford Coal Exchange to discuss the proposal, but so far as can be ascertained, no definite plan has yet been agreed upon. The Bradford coal societies have formed themselves into a federation.

Mr. Noah Williams, B.Sc., a former student of the mining department, University College of South Wales and Monmouthshire, has been appointed head of the mining department in the University of Manchester.

The first instalment of the detailed abstracts of the Census returns of 1911 for England and Wales has been issued as a Blue Book [Cd. 6258]. It deals with population statistics in administrative areas, and is the first of a series of 13 subject volumes which will be issued, each dealing with the country as a whole, and containing information on certain subjects only. The rate of increase of 10·89 per cent. shown in the recent Census was the lowest recorded since the date of the Census in 1801. The rate in 1901 was 12·17. The completion of the tabulation of the occupational returns will probably throw further light on the causes of the general increase of population in rural districts in the last intercensal period. In the meantime, however, enquiries on the subject have been addressed to the local registration officers in the case of all rural parishes which showed large increases of population. The registrars were asked to state to what causes, in their opinion, the growth of population was due. The replies to these enquiries show that on an aggregate increase of population of 549,151, less than 1 per cent. is due to agricultural development, while 46 per cent. is due to mining and manufacturing development, 43 per cent. to residential development, owing to the proximity to large towns, increased travelling facilities, &c., and 8 per cent. to the erection of institutions in rural parishes.

The Republican minority of the Investigation Committee of the House of Representatives which was directed to enquire into the Steel Trust, has presented its report. It favours "legalisation and regulation of great industrial concerns," and advocates the creation of an inter-State commission on industry, with power to regulate and fix reasonable prices. The report would also require corporations capitalised at over 50,000,000 dols. to operate only under a United States charter when engaged in inter-State commerce. The Democratic majority report has not yet been published.

The United States House of Representatives on Monday passed a resolution "calling on the Secretary of Commerce and Labour to enquire into the different elements of cost and profit included in the present high price of anthracite." Mr. Diefenderfer (Pennsylvania) the author of the resolution, declared that a hard-coal Trust existed.

Mr. J. L. Clewes, inspector on the staff of the chief goods manager of the Midland Railway, Derby, has been appointed manager of the new Derwent Valley (Yorks.) Light Railway, which will be opened shortly. The line is 16 miles long, and has ten stations. It connects with the North-Eastern railway at both ends—in the north at York and in the south at Selby.

Mr. E. Craig, the new Member of Parliament for the Crewe division, is the second son of Mr. W. Y. Craig, the well-known owner of the Brynkinallt collieries in North Wales, who at one time represented North Staffordshire as a Liberal. He was born at Houghton-le-Spring, Durham, in 1859. After completing his apprenticeship at collieries in Yorkshire, Mr. E. Craig went (in 1880) to assist his father in the management of his collieries. In 1883 he visited Pennsylvania U.S.A., where he was engaged in collieries, and afterwards he resuscitated some silver-gold mines in New Mexico, which had been given up as profitless.

Owing to the inability of Scottish steelmakers to cope with the demand, extensions of existing plant are projected which will have the effect of materially increasing the output. In particular Messrs. David Colville and Sons are embarking upon a great extension of their works, which will involve an expenditure of £250,000, and provide Motherwell with the largest works of its kind in the country. Several other Lanarkshire iron and steel producing concerns are contemplating an increase of plant.

In consequence of the production of pig iron in the Cleveland district being insufficient to meet requirements, it was decided at Middlesbro' this week to put five other furnaces in blast, which will make the total number in operation very shortly 81. Two of the additional furnaces will produce Cleveland and three hæmatite pig iron. Messrs. Bell Bros. and Messrs. Pease and Partners will each increase the make of Cleveland, and Messrs. Mills and Co and Sir B. Samuelson and Co. the production of hæmatite.

The Medical Sociology section of the British Medical Association discussed the subject of malingering, which, according to Dr. Gordon Gullan, is "a growing evil" among wage earners, and one which, in his view and in that of the writers of other papers, Dr. Dewar and Dr Edgar Browne, has steadily grown since the passing of the Workmen's Compensation Act and kindred measures It was indicated that the Insurance Act was likely still further to increase the tendency towards malingering

On Saturday, in the Court of Appeal, before Lords Justices Fletcher Moulton and Buckley, the case of Dawson v. Wreford and Burr was heard on an appeal by the defendants from an interlocutory order of Mr. Justice Horridge, in Chambers, relating to discovery of documents. The action was brought against Mr. E. Wreford and Mr. Arthur Burr (managing director of the Kent Coal Concessions Limited) by Mr. William Stanley Vaughan Dawson, who, it was said, was formerly secretary of a company called Intermediate Equipments Limited. Plaintiff claims damages for alleged libel. The present appeal is by the defendants against an order of Mr. Justice Horridge, who, affirming an order of the Master, directed them to disclose to the plaintiff certain documents, which, however, the appellants claimed to be privileged. The documents were handed to their lordships, who, having perused them, declared that there was nothing in the reports which justified the order for production.

We are pleased to announce that W. J. Tatem, Esq., shipowner, Cardiff, has, in addition to becoming an annual subscriber to the Coal Trade Benevolent Association, promised to the Cardiff branch a donation of fifty guineas for the funds of this deserving charity, which on account of the increasing scope of its work stands much in need of support.

On behalf of the trustees of the Hulton Colliery Explosion Fund, an application was made in the Chancery Court, Liverpool, on the 29th ult., by Mr. Rutherford for the sanction of the Court to the diversion of a portion of that fund to the fund which has been raised for the relief of the sufferers by the explosion which took place recently at the Cadeby pit Counsel explained that the trust deed of the Hulton Colliery Fund contained a clause enabling such a transference of money to be made. There was, said counsel, a very considerable sum—upwards of £31,000—which was not required for the purpose of the Hulton Colliery sufferers. Forty-one out of the 47 constituting the general committee of the Hulton Colliery Fund supported the application, and one dissented from it. On July 10 last a meeting was held at Bolton at which it was resolved that, subject to the approval of the Court of Chancery, a sum of 1,000 guineas be taken from the Hulton Colliery Fund and placed to the fund raised for the sufferers from the Cadeby pit explosion. Mr. Courthorpe Wilson said the Attorney-General, whilst not opposing the application, was of opinion that although the fund for the Hulton Colliery sufferers showed an ample surplus, and was also for the benefit of sufferers in other coalfields, the Hulton Colliery would have a prior claim on it in the event of another accident happening there. The court granted the application.

The Birmingham Gas Committee on Monday considered the placing of coal contracts for the year ending June 30, 1913. The prices tendered showed a considerable advance on last year, but the committee had not to contract for the whole of the 600,000 tons required during the year. Last year they and their secretary had the foresight to buy ahead about half the quantity of coal required for the current year—foresight which will be appreciably reflected in the profit and loss account when the year's accounts come to be made up. The committee now placed contracts for the whole of the coal required. The increasing use made of oil has the effect of reducing the tonnage of coal contracted for.

Good progress is being made by the Baton Collieries Limited with the preparations for the sinking of two pits near Dullatur Station in the Kilsyth district. Two shafts are being sunk in the vicinity of the North British line in that neighbourhood.

Under the will of the late Sir James Inglis, a former president of the Institution of Civil Engineers, the institution has just received a legacy of £5,000, to be applied to its new building which is now in course of erection in Great George-street, Westminster This legacy testifies to the marked interest which Sir James Inglis took in the scheme for the rebuilding of the institution, towards the cost of which he had also, during his lifetime, contributed liberally, regarding the occasion as an opportunity to promote the centralisation, and thereby the strength, of civil engineering interests throughout the British Empire.

The Seaton Delaval Coal Company, who are the owners of the Delaval and Hartley collieries, in Northumberland, are contemplating sinking another shaft and establishing a new colliery within a short distance of New Hartley. It is also stated that the company contemplate the erection of several houses in which to accommodate the officials and workpeople who will find employment at the new colliery. An extensive royalty is understood to be leased for working by the coal company, the owner being Lord Hastings.

The Institution of Mining and Metallurgy announce that applications for post-graduate courses in various parts of the world, under the auspices of the institution, should be sent to the secretary not later than September 1 next. The courses are confined to selected graduates of the Royal School of Mines and other colleges (who, if they are not already students of the institution, must apply for admission immediately after their selection), who have obtained diplomas or degrees after taking a specialised course of not less than three years in mining or metallurgy and the allied sciences. Applications must be endorsed by the professors of mining or metallurgy under whom candidates have been trained, and full particulars of their age, general education, and training must be given. Selected candidates are required to pass a medical examination on behalf of the institution. The courses commence about the middle of December, and those selected are expected to sail in November. Graduates pay their own passage to the mines to which they are appointed, but receive from the mine-owners remuneration which varies in amount in different districts, but which, in all cases, is sufficient to cover the cost of living. The course is, in most cases, for one year, and during that time graduates are rotated through the various departments of the mine or works to which they are sent, at the discretion of the manager. The council of the institution are prepared to offer five scholarships for the current year (provided suitable candidates present themselves) of the value of £50 each, to assist graduates in mining or metallurgy to take a practical course in mines or works at home or abroad. These scholarships, although entirely distinct from the post-graduate courses above referred to, may be held by graduates selected for those courses. The scholarships will be awarded to graduates of the Royal School of Mines and other recognised British mining colleges or schools. Nomination forms may be obtained from the secretary.

The esteem in which the late Mr. W. H. Pickering was held was shown at a meeting of the South Yorkshire Coalfield Church Extension Committee, at Doncaster, of which his Majesty's late chief mining inspector for Yorkshire and the North Midland counties was a co-secretary. The Bishop of Sheffield presided, and the attendance included Viscount Halifax and the Earl of Scarborough. A resolution was carried placing upon record the committee's high appreciation of the life, labour and character of their late colleague, and deeply deploring his heroic death. It was stated Mr. Pickering's services to the committee were invaluable, and that the progress so far made in the church extension scheme was in no small measure due to the confidence felt in him and his work by everyone associated with mining.

Considerable satisfaction is felt at Thorne at indications of a probable recommencement of operations at the great colliery which Messrs. Pease and Partners are sinking at Thorne Moorends. It will be remembered work ceased several months ago owing to the enormous water difficulties encountered, and several hundred men were thrown out of employment. At the annual meeting of the company in June the chairman threw out a hint that if more favourable terms could be arranged with the royalty owners, in view of the great difficulties encountered, something might be done. Within the past few days a few men have been at work at the colliery. Thorne people are interpreting this as an indication that terms have been arrived at. It is possible that the next step may be of an exploratory character with regard to the strata yet to be encountered. It is generally thought the freezing process will be adopted, in which case sinking operations will be delayed for some considerable period. Anyhow, the people of Thorne are delighted at the prospect of something at length being done.

An application has been made to the Dartmouth Harbour Commissioners by the Grand Canary, Teneriffe, and Atlantic Coaling Company Limited, for berths for coal hulks in the harbour. The last application of a like character was made a considerable time ago by the Denaby and Cadeby Main Collieries Limited, and was refused on the ground of insufficient room for more hulks. The sequel to that refusal was the establishment of a coaling depot at Brixham.

Regret is expressed at Bentley, Doncaster, at the pending departure of Mr. Robert Clive, who has been manager of the colliery since its commencement, and who has now been promoted sub-agent to Mr J. W. Fryar, general manager and agent for Messrs Barber, Walker and Co. Mr. Clive is a member of the Bentley Urban District Council, and a member of the Dun Drainage Commission, and a churchwarden of Bentley Church He will be succeeded at Bentley by Mr. Donald Macgregor, manager of the Watnall and High Park Collieries, who is deservedly popular and greatly esteemed for his practical and reasonable views in all mining matters.

The members of the Scottish branches of the Association of Mining and Electrical Engineers and the National Association of Colliery Managers have arranged to have a joint pleasure excursion on Saturday, August 24. The venue of the outing is to be Ayr.

Messrs. Pooley and Austin, of 25, Victoria-street, London, S.W., inform us that they have just secured the contract for the supply and erection of electrical plant, comprising automatic reversible booster, switchboard, milking booster, automatic battery, regulating switch, and cables, from the Baltic Mercantile and Shipping Exchange Limited, St. Mary Axe.

Captain William Bealey Harrison, of Aldershawe, Lichfield, principal of William Harrison Limited, the Brownhills Collieries, and chairman of the Cannock and Rugeley Colliery Company, Hednesford, died on March 23, leaving an estate of £200,820 18s. 7d Subject to the trusts and provisions of his marriage settlement he appoints 200 ordinary shares in the Cannock and Rugeley Colliery Company to his son William Edward Harrison, and 1,000 preference shares to his daughter Gertrude Mary Harrison.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Abstracts of Contracts Open.

Banbury, August 20.—For supply of coal for period ending April 30, 1913, for the Education Committee—viz.: (1) Polesworth Birch Coppice cobbles; (2) Moira cobbles; (3) Baddesley cobbles.

Bangor (Ireland), August 5.—For supplying about 3,800 tons of the best screened gas coal, to be delivered and trimmed into coal stores at the gasworks, Bangor, for the Urban District Council.

Belfast, August 8.—For supply of 115,000 tons of best screened gas coal, to be delivered free and trimmed in barges at Belfast Harbour between October 1, 1912, and September 30, 1913, for the Gas Committee.

Blackrock, August 6.—For the supply of best Irish coal for house and steam purposes, best screened Wigan coal, best Welsh steam coal, and for coke, for one year, for the Urban District Council.

Bury St. Edmund's, September 1.—For the supply of coal and coke to the shire hall and police station at Bury St. Edmund's, amounting approximately to 50 tons of best cobbles at per ton, 30 tons of coke at per ton, for the West Suffolk County Council.

Chelmsford, August 8.—For the supply of coal and coke for nine calendar months from August 1, for the Chelmsford Joint Hospital Board

Doncaster, August 9.—For supply of 28,000 tons of best screened gas coal nuts during year ending June 30, 1913, for the Gas Committee.

Dronfield, August 10.—For supply of 500 tons each of best screened gas coal and nuts, for the Dronfield Gas Light and Coke Company, near Sheffield.

Greenock, August 6.—For the supply and delivery of 22,000 tons of steam coal (washed singles and pearls) during ensuing 12 months, for the Corporation.

Halifax, August 12.—For supply of coal required in the schools and offices during year ending August 31, 1913, for the Education Committee.

Haverfordwest, August 19.—For supply of about 2,000 tons of double-screened gas coal of the very best quality, for the Corporation of Haverfordwest.

Haverhill, August 5.—For supply of 600, 1,200, or 1,800 tons of best gas coal (screened or unscreened), for the Haverhill Urban District Council.

Hereford, August 10.—For 12,000 tons of gas coal, for the Corporation.

Hebden Bridge, August 5.—For supply of screened gas coal, to be delivered at the gasworks, Crow Nest, Hebden Bridge, for the Hebden Bridge and Mytholmroyd Gas Board. The probable quantity will be from 6,000 to 8,000 tons.

Keighley, August 5.—For coal, for the Keighley and Bingley Joint Hospital Board.

Letterkenny, August 10.—For supply of such quantities of gas coal as they may require for the financial year ending March 31, 1913, to be delivered at the gasworks, Letterkenny, for the Letterkenny Urban District Council.

Manchester, August 5.—For supply of best house and burgie coal to the town hall, city police courts, district halls, art gallery, libraries, parks, and police and fire stations until July 31, 1913, for the Town Hall Committee.

Oldham, August 6.—For gas coals, for the Gasworks Committee of the Corporation.

Plymouth, August 6.—For the supply of the following to the Plymouth Royal Eye Infirmary—viz.: (1) 30 tons of coal, (2) 15 tons of coke (broken), (3) 16 tons of anthracite.

Plympton (Devon) August 8.—For supplying the workhouse at Underwood, Plympton, for 12 months with double-screened coal (estimated quantity required from 250 to 300 tons) suitable for house and steam, for the Guardians of Plympton St. Mary Union.

Ramsgate, August 9.—For the following quantities of coal for the service of Ramsgate Harbour, for the Board of

Trade: 600 tons of steam coal of the following qualities the Board of Trade may select—Yorkshire, North Country. The coal to be delivered and stacked into store at Ramsgate Harbour to the satisfaction of the harbour master, free of all charges, including 6d. per ton on the vessel and 6d. per ton on the coal landed. The first cargo to be delivered not later than September 1, and as further required, in quantities of about 200 tons, on one month's notice being given. The whole to be delivered by April 1, 1913.

Redruth, August 15.—For supply of 120 tons of best Forest large house coal, delivered at the union workhouse (half-a-mile from rail and about three from Portreath), for the Guardians.

Rochester, September 3.—For coal, for the Corporation

Rothwell (Northants), August 12.—For the supply of about 2,000 tons of gas coal (screened coal, washed nuts, and peas), for the Gas Committee.

Salisbury, August 14.—For supply of 1,000 to 4,000 tons of gas coal, for the Salisbury Gas Light and Gas Company.

Swindon, August 17.—For supply and delivery of household coal during period ending March 31, 1913, for the Corporation.

Whitecroft (I.W.), August 6.—For the supply of house and steam coal and coke for 12 months ending July 31, 1913, to the Isle of Wight County Asylum.

Winsford, August 10.—For supply of cannel and best screened Welsh coal, for the Urban District Council. Probable quantities required will be about 400 tons of cannel and about 3,000 tons of gas coal.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Auckland, August 19.—*Screening Plant.*—For the manufacture, temporary erection at works and delivery in Auckland, three sets of screening plant with raking gears and a belt conveyor, with all appurtenances, for the Auckland and Suburban Drainage Board.

Barnstaple, August 15.—*Reservoir, &c.*—For works at Knowle, Braunton, including reinforced reservoir and about 4,500 ft. of 2 in. and 3 in. cast-iron water main, for the Barnstaple Rural Council.

Bombay.—*Steel Pipes.*—For supplying about 20 miles of steel pipes of about 46 in. diameter, for the Municipality of Bombay.

Bromley (Middlesex), August 13.—*Boiler, &c.*—For new hot-water boiler and works in connection therewith at the district sick asylum, Devon's-road, Bromley-by-Bow, London, E., for the Managers of the Poplar and Stepney Sick Asylum District.

Buenos Aires, August 19.—*Well-boring Machines.*—H.M. Minister at Buenos Aires reports that the Directorate-General of Railways invites tenders for the supply of two well-boring machines.

Burnham (Somerset), August 8.—*Borehole.*—For the construction of a borehole, 11¼ in. in diameter, at the waterworks, for the Burnham Urban District Council.

Cairo, September 1.—*Machines.*—H.H. consul at Cairo reports that tenders are invited by the Egyptian Ministry of Education for the supply of the following machines to the model workshops at Assiout—viz., a melting cupola and blowing fan, an overhead travelling crane, six foundry ladles, a self-delivering fixed pan, foundry sand and loam mill, and a face plate boring and surfacing lathe.

Dove Holes (Buxton), August 21.—*Reservoir.*—For the construction of a concrete reservoir at Dove Holes, near Buxton, together with all the necessary valves, fittings, &c., for the Chapel-en-le-Frith Rural District Council.

Dublin, August 7.—*Motors and Pumps.*—For supply and delivery of certain Oerlikon and Westinghouse electric motors and pumps at their Pigeon House Fort works, for the Electricity Supply Committee.

Dublin, August 7.—*Switchgear, &c.*—For supply and installation at their Pigeon House generating station of high-tension switchgear and accessories in extension of the existing "Ferranti" switchgear, for the Electricity Supply Committee.

Dublin, August 9.—*Laboratory Equipment.*—For the equipment of the new engineering laboratory at Bolton-street, for the Technical Education Committee.

Egremont (Cumberland), August 6.—*Mains Extension.*—For the several works in connection with the extension of their gas mains from the gasworks, Egremont, to John-street, Moor Row—viz., supplying and laying complete of about 306 yards of 9 in. British Mannesmann steel tubes, including all specials, also for supplying and laying complete of about 4,120 yards of 6 in. British Mannesmann steel tubes, including all specials, for the Egremont Urban District Council.

Gateshead, August 10.—*Electrical Plant.*—For the supply and erection at the new lunatic asylum in course of erection at Stannington, near Morpeth, of a complete installation of electrical plant, comprising engines, dynamos, battery, cables, wiring, lamps, and accessories, for the Visiting Committee of the Gateshead Borough Asylum.

Huntly (Aberdeen), August 12.—*Water Pipe.*—For supplying and laying about 690 lineal yards of 4 in. cast iron pipe, with all necessary connections, in Back-street, Huntly.

London, August 7.—*Stores.*—For the supply of (1) cast iron sleepers for 50 lb. rails, about 2,370 tons; (2) steel rails (50 lb. per yard bullhead and 41¼ lb. and 56 lb. per yard flat bottom) and fishplates, about 1,624 tons; (3) tiebars, gibs and cotters, about 290 tons; (4) coiled steel keys, No. 70,800, for 50 lb. rails—for the South Indian Railway Company Limited.

London, August 9.—*Stores.*—For the supply of (1) cast iron sleeper pots and fittings; (2) steel rails and fishplates; (3) dog spikes; (4) bearing plates, for the Bombay, Baroda and Central India Railway.

Lymm, August 7.—*Pipes.*—For the supply and delivery of 1,100 yards of 6 in. socket and spigot pipes, and 6 in. specials, coated with Dr. Angus Smith's composition, for the Lymm District Council.

Maldon, August 12.—*Well.*—For sinking and steining a further depth of 65 ft. the well at the Wantz-road pumping station, for the Town Council.

Rotherham, August 31.—*Unit.*—For erection of an extra unit at the destructor works in Rawmarsh-road, for the Corporation.

Shanghai, August 13.—*Switchgear.*—For the supply and delivery f.o.b. British port of the following, for the Municipal Council of Shanghai—viz.: high and low-tension three-phase switchgear for sub-stations.

Sofia (Bulgaria), August 17.—*Materials.*—For the supply of rails, fishplates, sole plates, bolts, cramps, switches and crossings, and tongues, the total cost of which is estimated at 681,185 fr. (about £27,250). Copies of the *cahier des charges*, designs, tender forms, &c., may be seen by British manufacturers at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C. Local representation is necessary.

Southampton, August 10.—*Pipes.*—For the supply and delivery of about 30 cwt. of 6 in. and 4 in. straight steel pipes and specials for superheated steam, for the Corporation.

Southampton, August 10.—*Superheaters.*—For the supply and delivery of superheaters to be fitted to Lancashire boilers, for the Corporation.

Sydney, October 2.—*Units.*—The *Australian Mining Standard* of June 13 notifies that tenders will be received at the office of the Chief Commissioner, New South Wales Government Railways, Sydney, up to noon on October 2, for the supply of six 1,000-kw. sub-station units.

Valencia (Alcantara), August 24.—*Water Pipes.*—For the laying of a water main, of which the upset price is put at 293,811 pesetas (about £10,900).

Wellington (N.Z.), August 8.—*Pumps.*—For the supply and delivery of two electrically-driven multi-stage centrifugal pumps for the Kelburne and Brooklyn waterworks.

THE FREIGHT MARKET.

The outward freight market has been only moderately active on the north-east coast, and rates have been easier for near ports, but well maintained for greater distances. At South Wales business has been active. Rates for prompt loading are steady. Forward positions are neglected. The River Plate is firm, but the Bay and coasting ports are weak. At the Clyde, business has been quiet at steady figures. The Humber has been normally busy, and rates are under the same influences as those at the north-east coast. Homeward chartering has been brisker. Eastern markets are steady, and the demand is improving. The Black Sea, Azof and Danube have an improved enquiry, and rates are firmer. The Mediterranean and ore trades are firm, as is also the Baltic. America is unaltered. The River Plate market is improving, as orders are steadily increasing and tonnage is only sparingly offered for all positions up to November.

Tyne to Arendal, 1,900, 6s. 6d.; Barcelona, 3,600, 12s. 6d.; 3,600, 12s. 6d., 400, from Dunston; Cadiz, 2,200, 11s. 6d.; Cronstadt, 3,300, 6s. 3d.; Civita Vecchia, 4,200, 12s. 7½d.; Genoa, 6,600, 11s. 6d.; 12s.; 7,000, 11s. 6d.; Gefle, 2,000, 8s.; Havre, 1,600, 4s. 6d.; Lisbon, 2,000, 9s. 6d., 300; 2,000, 9s. 9d.; 2,000, 10s.; Las Palmas, 2,200, 12s.; Marseilles, 3,600, 11s. 9d.; Naples, 3,200, 12s. 6d.; Oran, 3,000, 10s. 10½d.; Port Said, 11s. 6d., ppt., from Dunston; Rouen, 1,700, 5s. 4½d.; St. Petersburg, 2,000, 6s. 6d.; Stockholm, 2,800, 6s. 6d., 700; 2,000, 6s. 6d., 700; 2,000, 6s. 6d., 500; Teneriffe, 2,400, 12s.; Venice, 3,000, 12s.

Cardiff to Algiers, 3,000, 13 fr.; 6,500, 12¾ fr., August 6; Aden, 13s. 3d., free brokerage, August; 5,000, 13s. 9d., August; Alexandria, 6,800, 10s. 9d., with 700 or 11s. with 500, ppt.; 6,000, 11s., 700, August 14; Batavia, sail, 16s., August-September; sail, 18s., August; Buenos Ayres, 3,600, 24s., early August; 6,000, 23s.; 4,500, 25s., option 1,500 tons part cargo Puerto del Sauce, two ports, same rate, ppt.; Chantenay, 2,200, 7·37½ fr.; Civita Vecchia, 3,000, 12s. 9d.; 3,000, 12s., 400 ppt.; Cronstadt, 3,800, 7s. 6d., ppt.; Constantinople, 4,200, 12s., August 7; Colombo and Bombay, 6,200, 14s. 3d., Admiralty; Catania, 3,500, 12s., ppt.; Calais, 1,100, 5s.; 2,200, 4s. 9d.; 2,200, 4s. 6d.; Genoa, 2,500, 12s. 6d.; 5,200, 11s. 6d.; 5,000, 11s. 4½d., ppt.; 2,300, 11s. 9d., ppt.; 2,500, 11s. 7½d., early August; Havre, 1,450, 5s., 2,200, 4s. 6d.; Lisbon, 2,450, 8s. 3d.; 350, August 1; Leghorn, 4,000, 11s.; 800; Las Palmas, 5,700, 11s. 7½d.; 2,500, 12s., ppt.; 3,300, 12s.; 4,400, 11s. 6d.; 6,000, 11s. 6d., spot; 4,000, 11s. 6d., August 10; 5,700, 11s. 4½d., August 12; Malta, 2,500, 10s. 6d.; 3,000, 10s. 9d., ppt.; 2,600, 10s. 6d., early August; Monte Video, sail, 16s., August-September; sail, 18s., August; Madeira, 2,300, 12s., ppt.; Marseilles, 4,000, 13¾ fr., August 6; 4,600, 13½ fr.; Naples, 4,000, 11s., 800; Oporto, 1,100, 9s.; Passages, 1,750, 7s. 6d.; Piræus, 12s.; 500, July 29; Port Said, 4,700, 12s. 9d., August 6; 3,700, 11s. 9d., ppt.; 5,600, 11s. 6d., ppt.; 9,500, 10s. 9d., August; 4,600, 11s. 6d., August 6; 5,600, 11s., August 25; 5,200, 11s. 6d.; Rosario, 3,300, 23s., late August; Rouen, 2,000, 5s. 6d.; 1,800, 5s. 7½d.; Rio de Janeiro, sail, 16s., August-September; sail, 16s., August; River Plate, 5,000, 22s. 6d.; 7,000, 23s. 6d.; 6,000, 23s.; 4,600, 24s., August 10; 6,500, 23s. 6d., end August; St. Servan, 700, 5s. 3d.; Syra, 3,800, 12s.; ppt.; St. Nazaire, 1,700, 7¼ fr.; 2,000, 7¼ fr.; 3,800, 7 fr.; 1,800, 7 fr.; Savona, 2,500, 11s. 7½d., early August; 5,000, 11s. 6d.; 5,000, 11s. 4½d., ppt.; St. Malo, 1,900, 4s. 9d.; Tarragona, 2,600, 11s. 6d.; Teneriffe, 6,000, 11s. 6d., ppt.; 4,400, 11s. 6d.; 4,000, 11s. 6d., August 10; 5,700, 11s. 4½d., August 12; 5,000, 11s. 6d.; 5,700, 11s. 7½d.; Venice, 6,400, 12s.

Swansea to Marseilles, 2,300, 14½ fr.; 2,800, 14½ fr.; Rouen, 1,180, 6s.; 1,350, 5s. 9d.; 750, 6s.; 1,750, 5s. 9d.; Bayonne, 980, 10 fr.; St. Servan, 720, 5s. 3d.; Charente, 1,250, 8 fr.; Cherbourg, 700, 5s. 6d.; Rochefort, 1,400, 7½ fr.; Alicante, 2,700, 11s. 6d.; 1,100, 12s. 9d., ppt.

Thames to South Australia, sail, 16s., superphosphates.

Norway to Melbourne, sail, 60s.

Gefle to Hobart-Launceston, sail, 75s., August-September.

Newport to Bahia Blanca, 5,500, 23s., ppt.; Alexandria, 4,700, 11s., August 10; Caen, 900, 5s. 3d.; Marseilles, 4,600, 13¾ fr.; Genoa, 3,950, 11s. 9d.; Savona, 3,950, 11s. 9d.; Spezzia, 3,950, 11s. 9d.

Mersey to Genoa, about 11s. 6d., August.

Grimsby to Cronstadt, 1,500, 6s. 6d., August 6.

Partington to Naples, 3,000, 11s. 6d., August.

Hull to Helsingfors, 1,200, 8s. 3d.; Hasle, 700, 8s. 1½d., early August; Cronstadt, 2,700, 6s. 3d., ppt.; Parnau, 2,000, 6s. 6d.; Reval, 3,000, 6s. 7½d., early August; Bahia Blanca, 25s., August 3; Copenhagen, 2,200, 6s. 3d., mid-August; Ystadt, 1,450, 7s. 9d.; Dahlsbruck, 1,450, 6s.

Hartlepool to Mentone, 2,000, 14s. 6d.; Oran, 2,500, 10s. 9d., 400.

Wear to Bordeaux, 4,200, 7s. 6d.; Civita Vecchia, 4,200, 12s. 7½d.

Blyth to Libau, 3,000, 6s.; Riga, 1,800, 6s. 3d., part cargo; Skutskar, 3,500, 7s. 3d.

Ellesmere Port to Venice, 15s., 500-500, phosphate.

Grangemouth to Elsinore, 550, 8s. 6d., manufactured iron.

Middlesbrough to Aarhuus, 1,400, 7s. 6d., pig iron.

Glasgow to Copenhagen, 800, 8s.; Kotka, 1,100, 8s.

Burntisland to Syra, 3,400, 12s.; Piræus, 3,400, 12s.; Buenos Ayres, 24s., with 200, early August.

Fife port to Horsens, 1,400, 7s. 3d.; Porto Vecchia, 3,700, 13s. 3d.; Genoa, 3,700, 13s. 3d.

Forth to Copenhagen, 1,200, 7s. 3d.; Cronstadt, 3,900, 6s. 9d.

Methil to Genoa, 13s.

Goole to London, 1,400, 4s. 1½d., ppt.

Immingham Dock to Hamburg, 1,700, 3s. 9d., ppt; Bremen, 1,800, 4s. 3d., ppt.

Boston to Wyborg, 1,150, 7s. 6d., early August.

Rotterdam to Bordeaux, 3,400, 7s. 3d.; Chantenay, 1,600, 7s., ppt.; La Rochelle, 1,600, 7s., ppt.; Rochefort, 1,600, 7s., ppt.; Dieppe, 1,600, 5s. 6d., ppt.; Boulogne, 1,500, 5s. 6d., ppt.; St. Nazaire, 2,600, 6s. 10½d., ppt.; 3,900, 6s. 10½d., August 8; Porto Vecchio, 3,600, 12s. 3d., August 5; Libau, 2,000, 6·75 m., phosphate, ppt.; Bagnoli, 4,100, 11s. 6d., August 12; 5,700, ditto; Porto Ferrajo, 5,700, 11s. 6d., August 12.

Homeward charters:—Poti, 1,728 net, Antwerp, 14s. 3d., with 500-500, early August; 5,000, 14s. early August; 7,300, 14s., ppt.; Azof, 5,000, Manchester, 13s. 3d., ppt.; 4,600, Rotterdam, 13s. 1½d., August 5; 5,000, Rotterdam, 13s., Antwerp, Emden or Weser 13s. 3d., Hamburg 13s. 6d., August 5; Kurrachee, 2,650, Antwerp, 19s. 6d., September; 19s. 6d., net, August; 19s. 6d., less 2 per cent., September; 20s. 3d., United Kingdom-Continent, p.p., net terms, August, reported; 20s. 6d., net terms, August; 6,000, 10 per cent.; 21s. 6d., August; 1,711, 21s., net terms, August; 2,513 net, East Coast United Kingdom, two p.p., 21s. 6d., August 1-25; 7,000, United Kingdom-Continent, 21s. p.p., option Naples 23s., August; Buenos Ayres or La Plata, 6,000, 10 per cent., United Kingdom-Continent, 17s. 6d. o.c., less 6d., August 20-September 30; 7,200 d.w., 17s. 6d., September; 5,100, 10 per cent., 16s. o.c., August 1-15; 5,000, 10 per cent., 18s. 6d. o.c., less 6d., August; San Lorenzo, 4,500, 10 per cent., United Kingdom-Continent, 20s. 3d. o.c., less 6d., spot; 4,500, 10 per cent., 21s., less 6d., Sept. 15-Oct. 15; 4,500, 10 per cent., 18s. 6d. o.c., less 6d., November-December; 6,000, 10 per cent., 20s. 4½d. o.c., less 6d., August 10-September 10; 19s., less 6d., ppt.; 5,300, 10 per cent., 18s. o.c., less 6d., spot; 4,700, 10 per cent., 20s. 6d. o.c., less 6d., September 25-October 25; 5,500, 10 per cent., 20s. o.c., less 6d., August 25-September 26; Aguilas, 3,400, Rotterdam, 7s. 6d., ppt.; Philippines, lump sum equal to about 42s., Marseilles, United Kingdom-Continent, September; Calcutta, Rs. 9, Kurrachee, August 31 cancelling; Talanta Channel, 8s. 9d., Middlesbrough, ppt.; Pugwash, 52s. 6d., Manchester, August; Gulf timber port, 107s. 6d., Hull and Tyne, August 10 cancelling; Kherson, Nicolaieff or Odessa, 7,100, Rotterdam 11s. 3d., London or Hull 11s. 6d., Hamburg 12s., with 3d. less barley, if Hamburg, spot; Newcastle, N.S.W., 10s. 9d., Singapore, August; Buenos Ayres, 6,300, 10 per cent., United Kingdom-Continent, 16s. o.c., less 6d., August 5-31; Savannah, 2,296 net (130 ft.), 45s., United Kingdom-Continent, 21 running days, October; Bilbao, 3,200, Middlesbrough, 6s. 10½d., ppt.; 2,600, Glasgow, 6s. 6d., ppt.; 1,250, Britonferry, 6s. 6d., ppt.; Santander, 1,200, Rotterdam, 6s. 10½d., ppt.; 2,200, 7s., ppt.; Porman or Carthagena, 4,200, West Hartlepool, 6s., end August; Novorossisk, 3,800, Rotterdam, 11s. 6d., ppt.; West Australia, 4,200 loads, London, 50s., August; Port Pirie, 5,223 net, Antwerp, 30s., August; Rosario, 5,200, 10 per cent., Manchester, 18s. 3d., August; timecharter, delivery Singapore, re-delivery East, *via* Australia, about 5s. 4½d., one round; time charter, Brazil trade, two rounds, delivery Antwerp, re-delivery United Kingdom-Continent, 5s. 5d.; delivery United Kingdom-Continent, round trip, 5s.; 5s. 7d., one round trip, delivery and re-delivery, United Kingdom-Continent; time charter, Gulf to River Plate round, 6s., August; time charter, Transatlantic trade, three rounds, delivery and re-delivery United Kingdom-Continent, 5s. 3d. on the round; delivery Tyne, re-delivery United Kingdom-Continent, 5s. 6d., August 6-20; Gulf, 165s., Buenos Ayres or La Plata, August 15-31; 1,100 stds., River Plate, 162s. 6d., mid-August; Bombay, 24s. 6d., Middlesbrough, ore, August; time charter, Calcutta coal trade, delivery Calcutta, re-delivery India, 5s. 6d., six months; Nicolaieff, 4,300, Marseilles, 12¾ fr., ppt.; Novorossisk or Theodosia, 3,600, Rotterdam, 11s. 6d., ppt.; La Goulette, 3,100, West Hartlepool, 8s. 3d., f.d., August 10; Oporto, 1,600, Cardiff, 7s., ppt.; Puget Sound, sail, 41s. 3d., United Kingdom-Continent-December; Gulf port, sail, 16 dols., Monte Video or Buenos Ayres; Mobile, sail, 16 dols., Monte Video, October; time charter, American and Brazil, 5s. 3d., one round trip, delivery and redelivery United States; time charter, Baltic-European trade, 1,700, £80, four months; Newcastle, N.S.W., sail, 10s. 9d., Singapore; Azof, ex Temruik, 4,500 max., Rotterdam 13s. 9d., Emden or Weser 14s., August 25-September 25; 3,700, 14s. 6d. n.o. or any, 15s. Hamburg, August 10; Kherson, Nicolaieff or Odessa, 4,500, Rotterdam 12s. 3d., Hamburg 12s. 9d., August 10; Columbia River, sail, 65s., Valparaiso for orders, option New Zealand 62s. 6d.; time charter, Florida to United Kingdom-Continent, 7s.; Marmagoa, 26s. 6d., United Kingdom-Continent; one port Smyrna, 12s. Hull or Leith, 13s. both ports.

Presentation to a Yorkshire Coalowner.—At the annual meeting of the West Yorkshire Coalowners' Association, held on Wednesday, at the Hotel Metropole, Leeds, a handsome presentation of silver plate, in the "Adams" design of strikingly artistic pattern, was made to the chairman of the association, Mr. C. B. Crawshaw, of Rufford Lodge, Dewsbury. Mr. Crawshaw has officiated as vice-chairman and chairman of the association during the last ten years, having filled the position with complete satisfaction to the members, who took this opportunity for giving testimony of their appreciation of his valued services. The presentation was made on behalf of the members by Mr. W. E. Garforth, of Snydale Hall, near Pontefract, one of the originators of the association, who spoke of Mr. Crawshaw's leadership of the association's affairs in appropriate eulogistic terms.

COAL, IRON AND ENGINEERING COMPANIES.

Addie (Robert) and Sons' Collieries Limited.—The directors have called an extraordinary meeting to consider the proposed reduction of the capital from £205,000 to £190,000, consisting of 10,000 6 per cent cumulative preference shares of £5 10s. each and 15,000 ordinary shares of £9 each, such reduction being effected by the repayment of £1 10s. on each preference share. The termination of the financial year is to be changed to December 31.

Birmingham Railway Carriage and Wagon Company Limited—The directors have declared an interim dividend of 7½ per cent. per annum on the ordinary shares for the half-year ended June 30.

Brown Bayley's Steelworks Limited.—The directors announce an interim dividend at the rate of 10 per cent. per annum, free of income-tax, for the past half-year.

Brown, Paine and Dewland (Engineers) Limited.—This private company has been registered, with a capital of £1,000 in £10 shares, to carry on the business of engine makers and dealers, manufacturers of engineering and shipbuilding appliances, &c. First directors to be appointed by signatories.

Carnforth Hæmatite Company Limited.—After writing down investments the net profit is £13,398, making, with £4,548 brought forward, an available total of £17,946. Final dividend 6 per cent., making, with interim payments, 10 per cent. for the year, carrying forward £3,546.

Clarkson and Parsons Limited—This private company has been registered, with a capital of £500 in £1 shares, to carry on the business of coal, &c., merchants. First directors to be appointed by signatories. Secretary, A. T. Parsons. Registered office, 105, Kentish Town-road, N.W.

Clayton (Allen) Limited—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of dealers in tools and machinery, engineers, founders, &c. First directors, A. Clayton and J. W. Porter (both permanent). Registered office, 71-6, Charlotte-street, Birmingham.

Consett Iron Company Limited.—The annual report of the directors states that the balance sheet of the company made up to June 30 last, and the revenue account for the year ending that date exhibit a profit for the year of £427,007. The directors recommend that this amount be appropriated as follows:—In meeting the interim dividends paid on February 15 last of 4s. per share on the preference shares, £20,000; 15s. per share on the ordinary shares, £75,000; in extinguishing the special expenditure shown on the creditor side of the balance sheet, £4,887 10s. 8d.; in further providing for works reconstruction, £20,000; in further providing for writing down investments, £20,000; in paying on August 6 next, to the members registered in the company's books on August 3, dividends of 4s. per share on the preference shares, £20,000; 52s. 6d. per share on the ordinary shares, £262,500; in carrying forward an undivided profit of £4,619 9s. 4d., accounting for the above-named sum of £427,007. During the year the earnings of the company have been reduced owing to the railway strike of August 1911, and much more so by the national strike of miners during March and April 1912. Taking these interruptions into account, the directors consider the results of the year are satisfactory. The plant of the company has been well maintained. The fifty additional ovens erected at the by-product coke plant at Templetown, Consett, are completed and working. The crude benzol plant is also working. The extension in steel and ferro-concrete of the company's staiths at Derwenthaugh-on-the-Tyne is proceeding, and ought now to have been approaching completion. There has been, however, some unavoidable delay. The new Mines Act, which has recently come into operation, involves considerable outlay, as well as being a permanent addition on cost. The Minimum Wage for underground workers and the National Insurance Act mean a very serious annual charge.

Consett Spanish Ore Company Limited.—The net revenue for the year ending June 30, 1912, amounts to £34,882 18s. 8d. The directors advise that this amount be dealt with as follows:—In meeting the interim dividend of 3s. 6d. per share, paid on February 15 last, £9,680; in paying on August 6 next, to the members registered in the company's books on August 3, a dividend of 9s. per share, £24,840; in carrying forward an undivided profit of £382 18s. 8d. The undivided profit will then stand at £4,608 7s. 3d., and is the only amount undivided. The company being a distributing company only, it has no reserves.

Durham Collieries Electric Power Company Limited.—Application was made on the 26th ult. by Mr. Wright, before Mr. Justice Joyce in the Chancery Division, for the appointment of a receiver in the matter of the Durham Collieries Electric Power Company Limited—Poole and another against the company. Counsel said that the company was now in liquidation, and debentures had been issued to the amount of £193,218. The interest on the debentures was over £30,800, and the principal money on the debentures was now due. He applied for a receiver only, and not a manager. Mr. Tomlin, for the company, said he did not oppose the motion, and Mr. Wright having proposed the name of Mr. Hawkins as receiver, his lordship made an order accordingly.

Felber, Jucker and Co. Limited.—This private company has been registered, with a capital of £79,000 in £10 shares, to carry on the business of engineers, &c., to acquire the business carried on at 29, Peter-street, Manchester, as Felber, Jucker and Co., and to adopt an agreement with E. Hoyle, W. H. Whitby, and E. F. Jucker. Permanent governing director, E. F. Jucker (subject to holding 1,000 shares). Remuneration, £1,000 per annum. Registered office, 29, Peter-street, Manchester.

Fife Coal Company.—An interim dividend of 20 per cent. has been declared, free of tax.

French Shale Oil and Coal Company Limited.—This company has been registered, with a capital of £250,000 (100,000 preference and 145,000 ordinary of £1 and 100,000 deferred of 1s.), as workers, raisers, and refiners of and dealers in shale oil, coal, sulphate of ammonia and other by-products, ore, metals, minerals and other substances, &c.; to acquire and turn to account any mining rights, shale-bearing, coal-bearing, metalliferous, or other lands in France or elsewhere. First directors, Hon. A. G. Brand, J.P., 101, Mount-street, W.; C. N. Clarke, 45, Leadenhall-street, E.C.; and Sir Gordon B. Voules, Kt., Hemslade, Porchester-road Bournemouth. Remuneration (except managing director), £150 each per annum (chairman £200). Registered office, 65, Bishopsgate, E.C.

Gillespie (J. F. Lucey) and Co. Limited—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of manufacturers of and dealers in mining and boring plant, engines, boilers, rails, switches, tip wagons, turntables, tanks, drills, pumps, tubes and tools, &c. Table A mainly applies. Secretary, F. S. Gillespie. Registered office, 2, Whittington-avenue, E.C.

Great Western Colliery Company Limited.—The directors announce that an interim dividend of 5s. per share on the ordinary shares of class B for the half-year ended June 30 last will be paid, less income-tax, on the 15th inst.

Houston (J. and J.) and Kerr Limited—This private company has been registered in Edinburgh, with a capital of £5,000 in £1 shares, to acquire the business of J. and R. Houston Limited, Glenburn Engineering Works, Ingleston-street, Greenock. First directors: G. Kerr and J. Kerr. Qualification, 50 shares. Registered office, Upper Ingleston, Greenock.

Kirby (J.) and Co. (Leeds) Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to take over the business of an hydraulic and general engineer, carried on by J. Kirby at Vortex Works, Alpha-street, Leeds, as J. Kirby and Co. First directors, J. Kirby and W. R. Goss. Managing director, J. Kirby. Remuneration, £3 per week. Registered office, 36, Park-square, Leeds.

Kynoch Limited.—The trading profits for the year ended April 3 were £93,109, an increase of £20,062 compared with the previous 12 months, and £16,037 was brought forward. The directors recommend that a final dividend of 2½ per cent. be paid on the preference shares, making 5 per cent., free of income tax, for the year, writing £15,000 off capital expenditure, adding £3,009 to the reserve, and carrying forward £24,600. The board report that the increase in the business was again of a most satisfactory character. During the year Kynoch-Arklow Limited was formed with a capital of £100,000 in ordinary shares, and £210,000 in debentures. The consideration received by Kynoch Limited was the whole of the ordinary shares and £165,000 partly in cash and partly in debentures.

Lowood (J. Grayson) and Co. Limited.—The directors' report for the year ending June 30 last states that the year's working has resulted in a profit of £8,093, to which is added balance of profit brought forward from last year, making £8,132. From this has to be deducted interest on debentures £2,250, and amount written off for depreciation £2,277, leaving a balance of £3,604. Out of this sum it is now proposed to pay a dividend of £2 10s. per cent. free of income-tax on the paid-up capital of £47,952, absorbing £1,198. From the balance remaining it is proposed to transfer £2,000 towards the cost of electric plant, thus improving the financial position, and to carry forward £405 to the next account.

Main Colliery Company Limited.—A dividend is recommended of 6 per cent. for the year.

Miller (William) and Sons Limited.—This private company has been registered, with a capital of £20,000 in £1 shares (10,000 preference), to take over the business of bolt, nut and hurdle manufacturers carried on by William Miller and Sons at Stour Valley Works, Monmore Green, Wolverhampton, and to adopt an agreement with G. S. Miller, G. W. Miller, D. H. Miller and Rev. R. Gobbie. First directors, A. C. Hill (chairman), F. J. Annan (vice-chairman), G. S., W., G. W. and D. H. Miller and Rev. R. Gobbie. Qualification, £100.

Normanby Ironworks Company Limited.—The annual report, made up to June 30, states that interest received and other income amount to £10,655. Deducting debenture stock interest and directors' fees and general administration expenses (£3,448), there remains £7,206, and £1,858 was brought forward, making a total of £9,064, out of which has been appropriated £3,600 dividend on preference shares for the year, £700 has been transferred to sinking fund account, and £1,200 in payment of interim dividend on ordinary shares, leaving a balance of £3,564. The directors recommend that £1,484 be applied in writing off the balance of special expenditure, £530 in writing off the costs and charges relative to the sale of the business, and to pay a final dividend on the ordinary shares at the rate of 4 per cent. per annum, leaving £349 to carry forward. The directors report that the agreements between the company and Messrs. Pease and Partners Limited and between the company and their shareholders, have been completed, and the Normanby Ironworks are now under the control of Messrs. Pease and Partners Limited. Mr. Arthur F. Pease has resigned his seat on the board, and Mr. John H. Pease has been appointed chairman.

North's Navigation Collieries (1889) Limited.—The directors have decided to pay an interim dividend of 5s. per share on the preference and 4s. per share on the ordinary shares for the half-year ended June 29.

Otis Steel Company Limited.—An extraordinary general meeting was held on the 25th ult. at Winchester House, E.C., to wind up the company voluntarily, and to appoint liquidators and authorise them to divide among the contributories in specie, in proportion to their rights and interests in the assets, the company's holding of preferred and common stock of the Otis Steel Company (of Ohio). Mr. T. Frame Thomson, who presided, stated that the meeting had been called on the requisition of some of the principal shareholders. The policy of retaining the English company as a holding company was adopted, but there seemed to be a universal feeling amongst the shareholders that they would prefer to have the American shares distributed. The transfer of the property to the American company had been carried out, and the arrangements for getting rid of the debenture stock had also been practically given effect to. The first financial year of the new company would terminate on December 31, and in future it was proposed to pay the dividend on the 7 per cent preferred stock half-yearly at the end of March and September. The resolutions were unanimously adopted, Mr. W. Sandford Poole and Mr. A. C. Whitmee being appointed joint liquidators.

Palmers' Shipbuilding and Iron Company Limited.—The secretary has issued a circular to the shareholders, debenture stock holders, and debenture holders, to the effect that, as the subscriptions from the shareholders, debenture stock holders, and debenture holders of the company are insufficient to enable the scheme of improvements and extensions to be proceeded with in its entirety, the board have decided to return the amounts subscribed, and not to proceed for the present with the issue of the new debentures. Notwithstanding this decision, the directors see their way to acquire the control of the Hebburn property and plant by means of the Palmers' Hebburn Company Limited.

Pioneer Pump Patents Limited.—This private company has been registered, with a capital of £100 in £1 shares, to carry on the business of engineers, &c. First directors: G. H. Smart and W. M. Molmore. Registered office, 48, Tottenham-street, W.

Seager and Hall Limited.—This private company has been registered, with a capital of £500 in £1 shares (100 6 per cent. preference), to take over the business of a file manufacturer carried on by T. Hall at Nevada Works, Leicester-street, Sheffield, as Seager and Hall. First directors: T. Hall (permanent) and J. Brooke. Qualification, 25 shares. Registered office, Nevada Works, Leicester-street, Sheffield.

Walker (C. and W.) Limited.—The directors announce a dividend of 1s. per share, tax free, on the ordinary shares for the half-year.

Walker, MacEwen and Co. Limited.—This private company has been registered, with a capital of £100 in £1 shares, to carry on the business of electrical engineers and contractors, suppliers of electricity, manufacturers of electrical and other apparatus, &c., and to adopt an agreement with D. Walker and G. MacEwen. First directors, Capt. G. Walker, G. L. MacEwen, H. Leitner, R. W. Liddell and F. J. B. Collis. Registered by Cox and Lafone, 17, Tower Royal, Cannon-street, E.C.

Western Wagon and Property Company Limited.—An interim dividend has been declared at the usual rate of 10 per cent. per annum for the half-year ended June 30.

Wilsons and Union Tube Company Limited—Mr. Thomas Gavie presided at an extraordinary meeting on the 26th ult., at which a resolution was passed confirming the absorption of the company in the new tube combine. It was stated that the combine was working in harmony with Messrs. Stewarts and Lloyds. Competition was being averted, and they were making better profits than they had done before. The chairman stated that the preference and the ordinary shareholders would get face value for their shares in Wilsons and Union, the former obtaining about £10 and the latter £8 per share.

"Strike" Coal.—At Hanley County Court recently, before his Honour Judge Ruegg, K.C., an important case was heard which arose out of the getting of coal at Cobridge by men on strike during the coal trouble. Mr. Christopher Jackson and Mr. Reginald Gibbons Birks, as trustees under an indenture of settlement dated August 14, 1871, brought the action claiming from Henry Sowter, coal dealer, Newcastle and Leek, an account of all coal purchased by the defendant during the months of March and April 1912. In opening the case Mr. Poyser stated that on the land at Cobridge there was an outcrop of coal. During the recent strike this land was invaded by a gang of men, of from 50 to 60 strong, who began to work this outcrop of coal. A large quantity of the mineral so obtained was bought by the defendant, and was disposed of by him. When it came to the ears of one of the trustees that these men were getting the coal steps were taken to stop them. The police went down, but as soon as they had gone away the men came back, and everything the police could do to stop the getting of coal, was done. Altogether it was alleged that 150 loads were taken. The only question of importance, said counsel, would be as to whether defendant bought the coal *bonâ fide* or *malâ fide*. On that point he referred to the correspondence, in which defendant replied that he had not bought any coal from Cobridge. The trustees desired him to state that these proceedings were not taken because a few men during a time of poverty got coal off the surface for domestic purposes, but because defendant organised, or was responsible for the organisation of, a systematic working of a seam, and sold the coal, not for domestic purposes, but for trade purposes. Defendant, on oath, said that while at Cobridge during the strike he was accosted by a stranger, who asked him if he was buying coal. Witness replied in the affirmative, and the stranger said he had some on the Sneyd ground which some men had got. They proceeded up Sneyd-street, and witness saw about 50 men occupied in getting what he thought was slack. Over the fence, on the other side, were other men getting coal. He was told the land was Mr. Noden's, and that he had given the colliers permission to get the coal. Defendant added that he never went to the scene of operations, and he did not know whether coal supplied him came from over the fence (plaintiff's land) or not. The coal was of such a quality that he did not think the plaintiffs could have got labour to work it. Mr. J. Heath, mining engineer, said he had seen the quality of the coal, and in his opinion the cost of raising that coal, in ordinary times, would be about 7s. per ton. William Jones, a collier, who worked on the waste ground at Cobridge, said some of the slack came over the fence from the Sneyd estate. His Honour said he had come to the conclusion that he could let defendant off without any aspersion on his character. He thought he did very foolishly, having regard to the state of things which existed. As to the question of permission, it was quite possible that a mistake was made. His Honour criticised defendant's reply to the letter referred to, in which he said he never had any coal. That gave him (the judge) the idea that at that time defendant was not quite fair. However, he would give judgment for plaintiff for the sum lost, 20 guineas and costs.

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MONTHLY LIST OF RECENT COAL LITERATURE

The following is a list of abbreviations used below :—

AEG-Ztg. = AEG Zeitung.
Allg. Oesterr. Chem. Ztg. = Allgemeine Oesterreichische Chemiker- und Techniker-Zeitung.
Ann. Mines = Annales des Mines.
Ann. Soc. Geol. du Nord = Annales de Société Géologique du Nord.
Bd. Trade Lab. Gaz. = Board of Trade Labour Gazette.
Brit. Columb. Min. Rec. = British Columbia Mining Record.
Bull. U.S. Bureau of Mines = Bulletin of the United States Bureau of Mines.
Canad. Min. Jl. = Canadian Mining Journal.
Colliery Guard. = Colliery Guardian.
Comp. Air Mag. = Compressed Air Magazine.
Compt. Rendus Soc. Ind. Min. St. Etienne = Comptes Rendus de la Société de l'Industrie Minérale de St. Etienne.
D Bergwerksztg. = Deutsche Bergwerkszeitung.
D. Ind. Beamten-Ztg. = Deutsche Industrie Beamten-Zeitung.
D. Chem. Ztg. = Deutsche Chemiker Zeitung.
Eisenztg. = Eisenzeitung.
El. Jl. = Electrical Journal.
Engin. Mag. = Engineering Magazine.
Engin. Min. Jl. = Engineering and Mining Journal.
Engin. Rev. = Engineering Review.
Incorp. Accts. Jl. = Incorporated Accountants' Journal.
Iron Coal Trades Rev. = Iron and Coal Trades Review.
Jl. Gas Light. = Journal of Gas Lighting.
Jl. Ind. Engin. Chem. = Journal of Industrial and Engineering Chemistry.
Kohle Erz = Kohle und Erz.
Min Sci. = Mining Science.
Montan. Rdsch. = Montanistische Rundschau.
Oesterr. Z. Berg- Huttenwes. = Oesterreichische Zeitschrift fur Berg- und Hüttenwesen.
Oriental Rev. = Oriental Review.
Railw. News = Railway News.
Rev. Noire = Revue Noire.
S. Afric. Inst. Engin. = South African Institute of Engineers.
S. Afric. Min. Jl. = South African Mining Journal.
Soz. Rdsch. = Soziale Rundschau.
S. Staffs. Inst Min. Engin. = South Staffordshire Institute of Mining Engineers.
Stein-Braunkohle = Stein und Braunkohle.
S. Wales Inst. Engin = South Wales Institute of Engineers.
Techn. Bl. = Technische Blatter.
Technique Mod. = Technique Moderne.
Techn. Mitt. Nachr. = Technische Mitteilungen und Nachrichten.
Techn. World Mag. = Technical World Magazine.
Tekn. Tidskr. = Teknisk Tidskrift.
Trans. Inst. Surveyors = Transactions of the Institute of Surveyors.
Volksw. Bl. = Volkswirtschaftliche Blatter.
Wasser-Wageban-Z. = Wasser- und Wagebau-Zeitschrift.
Z. Oberschles. Berg- Hütten- Ver. = Zeitschrift der Oberschlesischen Berg- und Hüttenmannischen Vereins.
Z. Ver. D. Ing. = Zeitschrift der Vereins Deutscher Ingenieure.

⁂ We shall be glad to obtain for readers, where possible, copies of the papers referred to at the prices named, which are inclusive of postage.

I.—General

Coal Catechism. W. J. Nicolls. Fifth edition, 16 mo. Phil. : Jacobs, 1912. 2 dols.

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The Federal Valley Field in Ohio. A. J. Shurick. "Coal Age," vol. 1, 38, p. 1236-8; 3 fig. (A description of the working of a seam which occurs under conditions especially favourable to economical mining.) 1s. 3d.

Alaskan Coal Problems. (U.S. Interior Dep. Mines Bur.), 1912, 32 p.; map. 1s. 3d.

Germany's Coalfields and Visible Coal Supply : A Review of Recent Researches and Experiences. (Deutschlands Steinkohlenfelder u. Steinkohlenvorraete : Ein kurzgefasster Ueberblick der neuesten Erfahrgen.) F. Frech. Lex. 8vo, 165 p., 18 ill., 7 maps. Stuttgart : E. Schweizerbart. 1912. 19s.

Japan's Mining Industry. R. W. Raymond. "Oriental Rev.," vol. 2, 5. p. 278-83. 3s.

Reports of the Mineowners' Association of Austria for 1911. (Bericht des Vorstandes des Zentralvereines der Bergwerksbesitzer Oesterreichs.) "Montan. Rdsch.," 1912. p. 501-16. (Statistics of coal, coke, lignite and briquette production, imports and exports.) 1s. 4d.

Mining Accounts. E. Elliott. "Incorp. Accts. Jl.," 1912, 6, p. 247-52.

Coal and the London Coal Trade. H. B. Dale. 8vo. London : Author, 1912. 6s.

Why Your Coal Bill is so High. G. H. Cushing. "Techn. World Mag.," vol. 17, 1, p. 62-71.

The Fuel Trade in France in 1911. (Le Commerce des Combustibles en France en 1911). E. Didier. "Rev. Noire," 15, 1912, 385, p. 120-1; 389, p. 169-71. 2s.

The Grouping of the Coal Dealers' Unions according to the Centres of Production. (Zur Gruppierung der Kohlenhaendlervereine nach den hauptsaechlichsten Bezugsrevieren.) O. Polster. "Volksw. Bl.," 1912, 8, p. 104-5. 2s. 6d.

The English Coal Strike. (Den engilskak kolstreiken). "Tekn. Tidskr.," 1912, 37, p. 153-5; 4 fig. (Output of Coal Production Sweden Import. Proposed means for becoming independent of the English Coal Trade.) 2s.

Nine Years of the Anthracite Conciliation Board. S. M. Harrison. "Surveyor," vol. 28, 3. p. 143-51.

The Police in the Service of the Mining Capitalists. (Die Polizei im Solde des Grubenkapitals.) E. Kuttner. "D. Ind. Beamten-Ztg.," 1912, 13, p. 133-5. 1s. 6d.

Miners' Strike in the Ruhr District in the Spring, 1912. (Bergarbeiter-Streik im Ruhrgebiet im Fruehjahr, 1912). Heinr. Imbusch. 8vo, 77, p. "Cöln. Christl. Gewerkschaftsverlag," 1912. 1 sh.

Joint Meeting of Scientific, Mining, and Engineering Societies in Cornwall. "Colliery Guard.," vol. 104, 2691. Suppl.; 8 figs. 6d.

Coalmining in New Zealand. "Colliery Guard.," vol. 103, 2687. p. 1293; vol. 104, 2688, p. 16; 2689, p. 72; 1 fig. (Report of Royal Commission.) 1s. 6d.

Miners' Wages in Prussia, 1911. "Colliery Guard.," vol. 104, 2688, p. 20; 2 figs. 6d.

III.—Geology.

The Roslyn, Washington, Coalfield. J. Daniels. "Coal Age," vol. 1, 33, p. 1064-6; 7 fig. 1s. 3d.

Upper Skeena, B.C., Coal Resources: Mining Developments around Hazelton. "Brit. Columb. Min. Rec.," vol. 17. 9, p. 278-9; 14 fig., 1 map.

The Formation of the Brown Coal Deposits between Altenburg and Weissenfels. (Die Entstehung der Braunkohlenlager zwischen Altenburg und Weissenfels.) F. Raefler. "Braunkohle," vol. 11, 7, 1912, p. 99-102; 2 ill. 8d.

The Subsudetic Brown Coal Formation in the River Basin of the Middle Course of the Glatzer Neisse. (Die subsudetische Braunkohlenformation in Flussgebiet des Mittellaufes der Glatzer Neisse.) F. Friedensburg. Dissertation. 8vo, 60 p. Breslau.

The Ore and Coal Bearing Formation of the Yukon. "Canad. Min. Jl.," vol. 33, 12. p. 407-8; 1 tab. 1s. 6d.

Variations in Coal Composition in Certain Seams in the Aniche District, North of France. (Les Variations de Composition du Charbon dans certaines Veines d'Aniche.) Ch. Barrois. "Ann. Soc. Geol. du Nord," vol. 40, p. 177-86.

Geography in the Development of the Alaska Coal Deposits." A. H. Brooks. "Ann. Assoc. Am. Geogr.," vol. 1, p. 85-94. (Discussion on the dominant position of Alaska to supply the Pacific coast coal markets.)

Geological Research in the Coalfields. "Colliery Guard.," vol. 104, 2690, p. 120; 2691, p. 172. (From the *Summary of Progress.*) 1s.

IV.—Mine Surveying.

Surveyor's Backsight Sconce. F. L. Fischer. "Engin. Min. Jl.," vol. 93, 23, p. 1125: 3 fig. (The sconce described was designed to throw a light on the backsight in order that the plumb line might readily be seen through the instrument when surveying underground.) 1s. 6d.

V.—Mining Technology.

Mine Accidents and their Prevention. J. Dague and S. J. Phillips. 8vo., 69 p.; 200 ill. Scranton, Pa. : D.L. and W.R.R. Co, 1912. 2s. 3d.

West Virginia Mining Accidents. F. C. Cornet. "Coal Age," vol. 1, 35, p. 1132-4. (Some comprehensive data regarding accidents in the West Virginia mines; the author takes the view that safety can only be obtained by constant and close supervision. As compared with the Belgian mines he considers the West Virginian the safer.) 1s. 3d.

Coalmine Accidents in West Virginia. D. Victor. "Coal Age," vol. 1, 36, p. 1176. (The accidents from mine cars are largely due to the lack of clearance between the sideboards and the rib More than half the coal in West Virginia was extracted from mines where no fatalities occurred.) 1s. 3d.

Experiments and Improvements in Mining in Prussia during 1910. (Versuche und Verbesserungen beim Bergwerksbetriebe in Preussen waehrend des Jahres 1910.) "Kohle Erz.," 1912. 20, p. 498-506, 4 fig.; 21, p. 535-44, 10 fig. 2s.

Hailwood's Patent Collier's Check or Tally Box. "Colliery Guard.," vol. 104, 2690, p. 122; 2 fig. 6d.

VI.—Working of Minerals

A Comparison between Portable Electric Drills and Portable Air Drills. A. G. Popeke. "El. Jl.," vol. 9, 6, p. 535-9; 6 fig., 2 tab. 2s.

Testing Air Consumption of Drills. "Comp. Air Mag.," vol. 17, 6. p. 6454-5; 1 fig., 1 tab. 1s.

Design and Maintenance of Rock-drill Bits. W. Blackburn. "Comp. Air Mag.," vol. 17. 6, p. 6451-4; 2 fig. 1s.

Electric Rock Hammer Drill built by Otto Püschel in Grosslichterfelde, near Berlin. (Elektrischer Gesteinbohrhammer der Maschinenfabrik Otto Pueschel in Grosslichterfelde, near Berlin.) "Z. Ver D. Ing.," 1912, 19, p. 773-4; 1 fig, 2 ill. 2s. 6d.

The Roslyn Coalfield, Washington. J. Daniels. "Coal Age," vol. 1, 35, p. 1130-2; 3 fig., 1 pl. (The article discusses the method of working; the room-and-pillar system is used exclusivly, and the coal is handled in the rooms by both chutes and gravity planes; some notes on costs are added.) 1s. 3d.

Why Leave Shaft Pillars? W. H. and B. H. Pickering. "Colliery Guard.," vol. 104, 2691, p. 169. (Authors' reply to discussion.) 6d.

VII.—Boring, Shaft Sinking, and Tunnelling.

On a Few Novel Shaft-sinking Methods. (Einiges ueber neuere Schachtabteufmethoden.) "Wasser-Wegebau-Z.," vol. 10, 1912, 4, p. 43. (The Kind-Chaudron process; petrification process.)

Sapphire Cutting Tools. H. L. Thompson. "Engin. Mag.," vol. 43, 1, p. 105-6. (The application of this medium in place of diamond for abrasives.) 1s. 8d.

Proving Coal in Boreholes. (Die Nachweisung von Steinkohlen-Vorkommen in Bohrloechern.) Herm. Cramer. "Kohle Erz," 17, 1912, p. 386-90. 2s.

Churn Drilling for Great Depths. (Ueber stoessendes Tiefbohren auf grosse Teufen.) V. Gebhardt. "Kohle Erz.," 1912, p. 555. 2s.

Difficulties in Shaft Sinking. (Schwierigkeiten beim Schachtabteufen.) Diancourt. "Bergbau," vol. 25, 17, p. 237-40. 2s.

Shaft-sinking by the Petrification Process. (Schachtabteufen nach dem Versteinerungsverfahren.) "Allg. oesterr. Chem. Ztg.," vol. 30, 9, p. 103-4. 1s. 10d.

Comparison between the Most Important Methods of Shaft-sinking. (Die wichtigsten Schachtabteufungsverfahren im Vergleich miteinander.) Stegemann. "Techn. Bl.," 1912, p. 169, 40 o. 1s. 10d.

VIII.—Explosives, Blasting.

On Electric Blasting. (Ueber das elektrische Schiessen.) P. Humann. "Kali," vol. 6, 10, May 15, 1912, p. 221-6; 3 fig., 4 ill. 1s. 3d.

The Electric Ignition in Shaft-sinking. (Die elektrische Zuendung beim Schachtabteufen.) Liese. "Glückauf," vol. 48, 12, p. 748-50; 2 ill., 3 fig. 2s. 9d.

The Dangerous Influence of Electric Mine Locomotive Working on Blasting with Electric Ignition. (Gefaehrdung der Schiessarbeit mit elektrischer Zuendung durch den elektrischen Grubenlokomotivbetrieb.) "Glückauf," vol. 48, 21, p. 821-3; 5 fig. 2s. 9d.

List of Powders and Explosives on the Market for Use in Mines. (Liste des Poudres et Explosifs Mis en Vente pour Servir aux Usages des Mines.) "Ann. Mines," vol. 1, 1912, 4, p. 246-47.

Water-soluble Explosives. (Wasserloesliche Schiesspulver.) F. Raschig. "D. Chem. Ztg.," 1912, p. 632. 1s. 6d.

"Midriankit," a Substitute for Dynamite: An Important Advance in the Field of Explosives. ("Midriankit," ein Ersatz für Dynamit: Ein bedeutungsvoller Fortschritt auf dem Gebiete der Sprengstofftechnik.) Eheling. "Z. Oberschles. Berg-Hutten Ver," vol. 51, May 1912, p. 197-214; 5 fig. 2s. 6d.

A New Shot-firing Appliance. "Colliery Guard.," vol. 104, 2689, p. 71. (Price and Pryse appliance.) 6d.

IX.—Timbering, Packing, &c.

Notes on Stope Timbering and Hand Stoping on the Rand. "S. Afric. Min. Jl.," vol. 10, 484, p. 583-4; 3 fig. 2s.

Improved Ferro-Concrete Shaft Lining. C. Meuckens. "Iron Coal Trades Rev.," vol. 85, 2314, p. 5; 9 fig. 1s.

Hydraulic Stowages at Dalzell and Broomside Colliery. "Colliery Guard.," vol. 104, 2690, p. 122. 6d.

X.—Surface Arrangements.

Developments at Cortonwood Colliery. "Iron Coal Trade Rev.," vol. 84, 2307, p. 833-5; 8 fig. (A colliery with an output of 1,500 tons a day is described, its plan, arrangement of coke ovens, by-product plant, screens and washery, with coal and coke handling appliances.) 1s.

XI.—Winding and Haulage.

Gasoline Motors in Coalmines. A. J. King. "Coal Age," vol. 1, 37, p. 1217-8. (Where gasoline is used, increased ventilation is recommended. It effects economy by making a power plant unnecessary, but the formation of carbon monoxide and the danger of premature explosion of gasoline are objections.) 1s. 3d.

The Margin of Safety Required for Man Haulage at Great Depths. R. B. Greer. "S. Afric. Inst. Engin.," vol. 10, 10, p. 281-4.

Economic Haulage from Great Depths. (Wirtschaftliche Schachtfoerderung aus grossen Teufen.) "Dissertation," 4to, 38 p.; ill. Aacher.

Mine Hoisting Systems Compared. B. V. Nordberg. "Engin. Min. Jl.," vol. 93, 21, p. 1035-8; 3 tab. 1s. 6d.

The Safety of Haulage Ropes. (Die Sicherheit der der Foerderseile.) Speer. "Glückauf," vol. 48, 19, p. 737-47; 4 ill., 2 fig.; 21, p. 824-9; 3 ill., 3 fig. (Results of bending and elongation tests.) 2s. 9d.

The Calibration of Winding Cages. (Die Eichung der Foerdergefaesse im Bergwerksbetriebe). Koehrich. "Glückauf," vol. 48, 17, p. 667-76. (Former conditions, mining laws and future conditions.) 2s. 9d.

Electric Mine Locomotives. (Elektrische Grubenlokomotiven.) W. Ohl. "AEG. Ztg.," 1912, 11, p. 1-5; 9 ill. (Description of types built by the A.E.G. Locomotives for overhead current supply and accumulator locomotives.)

Design of Mine Trolley Lines. E. L. Cole. "Coal Age," vol. 1, 38, p. 1239-41; 6 fig. (When care is taken in aligning trolley wires a large saving in trolley wheels and time is effected. The article gives special attention to the attaching and adjusting the hangers of a trolley line.) 1s. 3d.

Colliery Mine Car Construction. A. J. Shurick. "Coal Age," vol. 1, 31, p. 1008-9; 12 fig. 1s. 3d.

The New Century Mine Locomotives. "Motor Traction," vol. 14, 381, p. 583-5; 8 fig. (A specially designed locomotive for underground haulage. Notes of work performed in a Cumberland lead mine.) 6d.

Electric Mine Locomotives. W. Ohl. "Railw. News," vol. 97, 2529, p. 1300-1; 3 fig. 1s.

Three-phase Hauling Machines with Resistance Control. (Drehstrom-Foerdermaschinen mit Widerstands-Regelung.) Published by the Siemens-Schuckert Company. (Driving by asynchronous motors. Safety devices; list of plants erected.)

Electric Winding Plant with Flywheel Storage. "Engin. Rev.," vol. 25, 12, p. 487-93; 22 fig. 3 tab. (A description, and comparison with the balancing obtained by buffer batteries.) 1s. 9d.

Electric Haulage. (Elektrische Foerdermaschinen.) Pamphlet published by the Siemens Schuckert Company. 5 ill., 7 fig.

The Economy and Utility of the Inclined Plane and Pulley Transport in Westphalian Coalmining. (Die Wirtschaftlichkeit und Zweckmaessigkeit des Unterwerksbaues u. Oberwerksbaues im rheinisch-westfaelischen Steinkohlenbergbau.) Westermann. "Glückauf," vol. 48, 16, p. 623-35; 8 fig. 2s. 9d.

The "Profile" Controller and Overwind Preventor. "Colliery Guard.," vol. 101, 2690, p. 119; 3 fig. (Thornewill and Warham apparatus.) 6d.

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French Employment of Acetylene Lamps in Mines. "Acetylene," vol. 9, 104, p. 140. (The method of use and management of the 12,000 lamps used in 51 mines of the French Lorraine iron district.) 9d.

Tombelaine Safety Lamp. (Lampe de sureté Tombelaine.) E. Hauser. "Compt. rendus Soc. Ind. Min. St. Etienne," vol. 1, 1912, 4, p. 164-68; 1 fig. (Detailed description.)

The Safety Lamp. (Die Sicherheitslampe.) A. Rzehulka. "Kohleninteressent" 1912, p. 123. 2s.

Flameproof Electric Lamp. (Schlagwettersichere Gluehlichtarmatur). Brunnenlusch. "Glückauf," 1912, p. 879. 2s. 9d.

The "Photos" Miner's Electric Lamp. "Colliery Guard.," vol. 104, 2689, p. 74; 1 fig. 6d.

Hailwood's Patent Electric Miners' Lamp. "Colliery Guard," vol. 104, 2691, p. 171; 4 figs. 6d.

XIV.—Ventilation

A Ventilating System Without Doors. H. J. Nelms, "Coal Age," vol. 1, 35, p. 1138. (The substitution of overcasts for doors in modern mines. Some unique and economical features are embodied in the system described, which is designed to accomplish this.) 1s. 3d.

Points in Mine Ventilation. J. T. Beard. "Coal Age," vol. 1, 35, p. 1135-7. (The article deals with the multiplicity of theories, involving some popular fallacies, in mining textbooks. Misconceptions as regards the diffusion of gases, the limit of their diffusion, the detection of carbon monoxide in mines not made by observing the lamp flame. Mistaken relation of pressure and power by early writers, manometric efficiency of fans.) 1s. 3d.

Quality and Quantity of Mine Air. K. F. Schoew. "Coal Age," vol. 1, 36, p. 1177-8; 1 fig. (The article points out that coaldust is precipitated and carbon dioxide dissolved by moist air, and the air thereby purified; air need not be fully saturated to part with its moisture; brattice cloth absorbs water at 94 per per cent. of humidity, and at 96 per cent. is rendered wet to the touch.) 1s. 3d.

Researches on Ventilation by Means of Air-Tubes. (Untersuchungen ueber Wetterfuehrung mittels Lutten). Willy Arlt. Lex. 8vo, 57, p. ill. Berlin: J. Springer, 1912. 3s.

Modern Ventilating Machines. Charlton. "Colliery Guard., vol. 104, 2688, p. 11; 4 fig. (Abstract paper and discussion, S. Staffs. Inst. Min. Engin.) 6d.

XV.—Mine Gases, Testing.

On the Meteorology of the Pit. (Zur Meteorologie der Kohlengrube.) "Gluckauf," vol. 48, 18, p. 714-7. 2s. 9d.

Ignition of Gases by Electric Lamps. (Entzuendung von Gasen durch elektrische Lampen.) T. Hortens. "Zts. Zentr. Bergh. Betrbsl. Oest.," 1912, p. 336. (Tests on the supposed inflammability of firedamp on exposure to the incandescent filaments of broken electric lamps.) 2s.

Detection of Gases in Mines. G. J. Rollandot. "Min. Sci.," vol. 65, 1688, p. 471-2; 3 fig.

Notes on the Analyses of Mine Air Conducted at the Lewis Merthyr Consolidated Collieries Limited, Trehafod. J. W. Hutchinson and E. C. Evans. "Colliery Guard.," vol. 104, 2690, p. 117; 3 figs. (Abstract paper read before S. Wales Inst. Engin.) Discussion, *ibid.*, 2691, p. 174 1s.

XVI.—Coaldust.

Means for Overcoming the Coaldust Danger. (Mittel zur Bekaempfung der Kohlenstaubgefahr.) "Stein-Braunkohle," vol. 4, 10, p. 115-7. (The successful means for overcoming the coaldust is an artificial systematic watering.) 1s. 6d.

Austrian Coaldust Experiments. Czapliuski and Jicinsky. "Colliery Guard.," vol. 104, 2688, p. 17; 3 fig. (From Oestorr. Z. Berg-Huttenwes.) 6d.

The British Coaldust Experiments. "Colliery Guard.," vol. 104, 2691, p. 170. (Scheme of investigation.) 6d.

XVIII.—Mine Fires.

Spontaneous Combustion of Coal Cargoes. "Colliery Guard.," vol. 104, 2691, p. 175. (Report by Lloyd's Register.) 6d.

XXI.—Preparation.

Dortmund Washery at the Holbrook Colliery. "Iron Coal Trades Rev." vol. 85, 2314, p. 1-2; 4 fig., 1 dble. pl. 1s.

XXII.—Briquettes.

Agglomeration of Fine Materials for Commercial Use. W. S. Landis. "Min. Sci.," vol. 65, 1689, p. 489-90.

XXIII.—Coke Ovens

The Examination of Coke for Metallurgical Purposes. (Die Untersuchung von Giessereikoks.) "Eisenztg.," vol. 33, 18, p. 311-8, 19, p. 331-3. 2s.

Coke, its Production and Application. (Koks, seine Darstellung und Verwendung.) "Eisenztg.," vol. 33, 12, p. 201-2. (Methods of production. How to judge its quality.) 2s.

On Coking Plants and their By-Products. (Ueber Kokereien und Gewinnung der Nebenprodukte.) Kuehl. "Techn. Mitt. Nachr.," 1912, 11, p. 271-5; 6 fig. 1s. 6d.

XXIV.—Fuels, Testing, &c.

The Determination of Moisture in Coals. E. H. Archibald and J. N. Lawrence. Jl. Ind. Engin. Chem.," vol. 4, 4, p. 258-62; 2 fig. 3s. 6d.

The X-Ray Examination of Coal. H. Couriot. "Colliery Guard," vol. 104, 2688, p. 15-16; 19 fig. 6d.

Deterioration of Coal in Storage. A. Bement. "Power," vol. 35, 26, p. 896-7; 2 charts, 5 tab. 1s. 3d.

The Spontaneous Ignition of Coal. (Die Selbstentzuendung der Kohle.) Schorrig. "Kohle Erz," 1912, 19, p. 454-8. 2s.

Technical Fuel Tests. (Essai Industriel des Combustibles.) J. Izart. "Technique Mod.," vol. 4, 1912, 8, p. 312-3; 1 fig.

Notes on the Impurities in Coal. F. R. Wadleigh. "Coal Age," vol. 1, 37, p. 1206-9; 4 tab. 1s. 3d.

Smoke: A Study of Town Air. J. B. Cohen and A. G. Ruston. 8vo., 96 p. London: E. Arnold, 1912. 5s.

Coal Analysis. "Jl. Gas Light.," vol. 118, 2563, p. 977-82; 2 fig., 4 tab. 1s.

The Steaming Value of Coal. "Colliery Guard.," vol. 104, 2689, p. 71; 1 fig. (From Bull. 23 U.S. Bureau of Mines.) 6d.

Spitzbergen Coal. W. H. Patterson. "Colliery Guard.," vol. 104, 2688, p. 31. 6d.

XXV.—Steam Engines and Boilers.

Automatic Stoking in the Boiler House of the Mines de Dourges Company, France. "Iron Coal Trades Rev.," vol. 85, 2314, p. 4-5; 5 fig. 1s.

Fuel Economy of Colliery Boiler Plants. M. A. Walker. "Coal Age," vol. 1, 37, p. 1202-5; 7 fig. (A method of stoking is described by which coal, smaller than any commercial grade, can be used, and still develop 60 per cent. over the rated capacities of the boilers.) 1s. 3d.

Propositions for the Improvement of Step-Grate Furnaces. (Vorschlaege zur Verbesserung der Treppenrostfeuerung). Hempel. "Stein Braunkohle," vol. 4, 9, p. 105-7; 3 fig. 1s. 6d.

XXVII.—Electricity.

Central Station Power for Coal Mines. G. Bright. "Coal Age," vol. 1, 35, p. 1139-42; 8 tab. 1s. 3d.

XXVIII.—Surface Transport.

Aerial Ropeway at the Blaydon Burn Pits of the Priestman Collieries Limited. "Iron Coal Trades Rev.," vol. 84, 2313, p. 1037; 6 fig. 1s.

Rochdale Coal Store and Gantry. "Archit. Build. Jl.," vol. 35, 909, p. 643-5; 7 fig. (Details of construction of reinforced concrete auxiliaries to an installation of vertical retorts at the Rochdale Corporation Gasworks.) 1s.

XXIX.—Sanitation, Diseases.

Miners' Phthisis and Alcohol. Dr. V. Horsley and Dr. Raw. "S. Afric. Min. Jl.," vol. 10, 481, p. 467 and 474. (The predisposition to disease caused by drink, especially as related to miners' phthisis, pneumonia and consumption, or tuberculosis.) 2s.

The High Temperatures on the Comstock Lode and their Influence on the Miners. (Die hohen Temperaturen auf dem Comstock Lode und ihre Einwirkung auf die Bergleute.) Dietz. "Kohle Erz," 1912, 19, p. 458-66. 2s.

The Damage Liability for the Discharge of Mine Waters into Public Streams. (Die Verschuldenfrage bei der Ableitung von Grubenwaessern in oeffentliche Fluesse.) "D. Bergwerksztg.," 1912, June 8, section 4, p. 1, 1s. 8d.

Ankylostomiasis. Dr. Joth. "Coal Age," vol. 1, 36, p. 1191. 1s. 3d.

The Discharge of Mine and Industrial Waters into Streams according to the New Draft of the Prussian Water Law. (Die Einleitung von Grubenwasser und anderen gewerblichen Abwaessern in Wasserlaeufe nach dem neuen Entwurf eines Preussischen Wassergesetzes.) Dr. Bartmann. "D. Bergwerksztg.," 1912, June 8, p. 3. 1s. 8d.

XXX.—Mining Laws, Royalties

The Principles of Expropriation according to General Mining Laws. (Die Grundlagen der Enteignung nach dem allgemeinen Berggesetz.) H. Gottschulk. "Glückauf," vol. 48, 19, p. 750-54. 2s. 9d.

Awards under the Coal Mines Minimum Wage Act, 1912. "Bd. Trade Lab. Gaz.," 1912, 5, p. 166-70.

The Minimum Wage in British Coalmining. (Der Mindestlohn im britischen Steinkohlenbergbau.) Juengst. "Glückauf," vol. 48, 19, p. 759-64. 2s. 9d.

The English Minimum Wages Act for Coalminers. (Englisches Gesetz betr. Minimallohn beim Kohlenbergbau.) "Soz. Rdsch.," 1912, II., 4, 159-65. 1s. 10d.

The New French Coalmines Regulations. "Colliery Guard.," vol. 104, 2691, p. 173. 6d.

The Views of Workmen. "Colliery Guard.," vol. 104, 2689, p. 70. (New Order under the Coal Mines Act.) 6d.

Awards under the Minimum Wage Act. "Colliery Guard.," vol. 104, 2689, p. 69; 2690, p. 138; 2691, p. 187. (South Wales and Monmouthshire; Shropshire; Forest of Dean; South Derbyshire.) 1s. 6d.

LIQUID FUEL FOR THE NAVY.

The Royal Commission.

The King has been pleased to approve of the appointment of a Royal Commission to investigate and report on the supply of oil fuel for the Navy.

The terms of reference are as follow:—

To report on the means of supply and storage of liquid fuel in peace and war and its applications to warship engines, whether indirectly or by internal combustion.

The following will be the members of the Commission:—Admiral of the Fleet the Lord Fisher of Kilverstone, G.C.B., O.M., G.C.V.O. (chairman); the Right Hon. George Lambert, M.P.; Sir Boverton Redwood, Bt.; Sir Philip Watts, K.C.B., F.R.S.; Engineer Vice-Admiral Sir Henry John Oram, K.C.B., F.R.S.; Vice-Admiral Sir John Rushworth Jellicoe, K.C.B., K.C.V.O.; Sir William Matthews, K.C.M.G.; Sir Thomas Henry Holland, K.C.I.E., F.R.S.; Sir Thomas Edward Thorpe, C.B., F.R.S.; Alexander Gracie, Esq., M.V.O.; Humphrey Owen Jones, Esq., M.A.; and Alfred Fernandez Yarrow, Esq.; Capt. Philip Wylie Dumas, C.V.O., R.N.; Engineer-Lieutenant Charles John Hawkes, R.N.; and John Harper Narbeth, Esq., M.V.O., Royal Corps of Naval Constructors (joint secretaries).

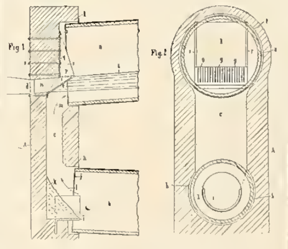
Mr. Churchill in his speech on the Navy Estimates on March 18 said:—

"The adoption and supply of oil as a motive power raises anxious and perplexing problems. In fact, I think they are among the most difficult with which the Admiralty have ever been confronted. Oil as a fuel offers enormous advantages to ships of all kinds, and particularly to the smallest kind. In speed, convenience, cleanliness, economy, and in the reduction of *personnel* oil is incontestably superior to coal, and if internal combustion engines of sufficient power to drive warships could be perfected, as may be hoped for within a very reasonable time, all these advantages of oil will be multiplied, and some of them will be multiplied three or four times over. But, on the other hand, can we make sure of obtaining full supplies of oil at reasonable prices in time of peace and without restriction or interference in time of war? Can we accumulate and store a sufficient reserve of oil to meet our ever-growing requirements, and can we make that reserve properly protected against attack either by aeroplanes or *sabotage*? All these matters are receiving continuous attention."

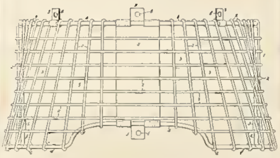
Insurance Act Effects.—An indirect effect of the Insurance Act was brought to the notice of the board of management of the Midland District Miners' Fatal Accident Relief Society at their one hundred and seventeenth quarterly meeting at Derby on Tuesday. Some of the colliery owners who had hitherto been in the habit of deducting from the earnings of employees the amount of their weekly contributions to the society and handing it over in a lump sum had, upon the Insurance Act coming into operation with its compulsory provisions, notified that they would discontinue the practice. Although assurances were offered to the contrary in a few instances, the board feared that in others this course would result in many men allowing their membership of the society to lapse. It was accordingly decided to approach the owners in question with a request to reconsider their position, and to retain the custom in the event of a sufficient number of their men desiring to remain members. Another outcome of the Act to which attention was directed was the winding up of a number of small colliery clubs, from which, together with the Midland Miners' Permanent Relief Society, which was also ceasing to exist, in some measure in consequence of the insurance scheme, it was anticipated there would be a considerable accession to the strength of this society. Members of the board undertook to visit the localities affected with the object of persuading the men to become members. The quarterly report showed a membership of 42,256, as compared with 41,816 a year ago. Sixteen men died during the quarter, an increase of 10, and the widows and children who thereby became entitled to benefit numbered 11 and 15 respectively. There were now 271 widows and 338 children on the funds, being increases of seven and three. Owing to full working in the collieries not having been resumed after the strike until the third week in April, the members' contributions for the quarter amounted to only £1,994, as against £2,191 in the same period of last year. Funeral allowances absorbed £157, and annuities £1,423. The balance carried to the credit of the benefit fund was £416, as against £740. Instructions were given for the investment of £3,500 in Lancashire and Yorkshire Railway 3 per cent. preference stock.—Mr. A. G. Barnes was re-elected as chairman of the board, and Mr. R. E. Martin was appointed as vice-chairman in succession to Mr. J. A. Longden resigned.

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

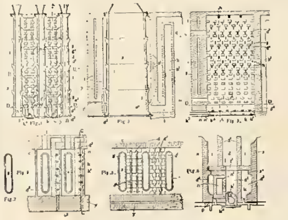
2503 (1912). *Improvement in Gaseous or Pulverulent Fuel Fittings for Calcining Furnaces.* G. Bierbals, of 85B, Lutzowstrasse, Berlin, W., Germany.—This invention relates to a nozzle for calcining furnaces, which furnaces consist of two nearly parallel rotary drums, one serving for calcining or burning materials (lime, for instance) and the other for cooling the calcined or burnt materials, the air required for the combustion in the calcining or burning drum being first drawn through the cooling drum and therein preliminarily heated by the cooling of the materials. The nozzle, according to the invention, differs from the ordinary tubular nozzles in that it consists of a plate adapted to close a rectangular opening, and provided with a series of parallel narrow slits, through which a current of gaseous or powdery combustible is forced, so that this current is divided into a number of parallel thin layers or jets, and the air preliminarily heated in the cooling drum is passed partly through the narrow spaces between the said thin layers or jets, so that in this manner a most intimate mixing of the current of combustible with the preliminarily heated air is already produced in close proximity to the plate-nozzle, and consequently a short hot flame is obtained. Fig. 1 is a vertical longitudinal section through one end of a calcining furnace or the like—that is, through a brick wall encircling the ends of two superposed rotary drums and containing a flue and the novel nozzle; and fig. 2 is a vertical cross section through this furnace—that is, through the said flue and the ends of the two drums. (Three claims.)



9488 (1912). *Guard to Protect the Eyes of Pit Horses.* D. J. Davies, of Brynawel, R. Davies, of Cefn-y-meusydd, and T. Davies, of Maesyderi, all of Abercrave, Swansea Valley.—This invention relates to a guard which shall be readily capable of application to the bridles of horses which work in collieries, mines or quarries, in a minute or two, by the workmen themselves without requiring the assistance of any skilled man or saddler for the purpose. The application relates to improvements in that class of guards for horses which are composed of a reticulated surface or shield mounted on a wire frame provided with means for securing the guard in position on the bridle fitted to the horse's head, and it consists in shaping such reticuled surface and the frame on which same is mounted so as to fit over the portion of the horse's head in which the eyes are situated while leaving a clearance over the eyes themselves, and being open at the base or under part to permit of a perfectly unobstructed view in a downward direction. The top of the wire frame on which the shield is mounted is shaped to fit the contour of the front and sides of the horse's head, and at the sides and base is made of the required curvature which it is desired to impart to these parts of the shield, and the means for securing the guard to the horse's bridle are applied to said frame so that the shield may be fitted thereto either by sewing, tying, riveting or buckling. The accompanying drawing is a front elevation of the improved guard. (Two claims.)



13125 (1911). *Improvements relating to Apparatus for the Destructive Distillation of Coal.* H. Clarke, of 3, London Wall-buildings, E.C., and J. A. Campbell, of 23, Eton-road, Ilford.—This invention relates to apparatus for the destructive distillation of coal or other carbonaceous substances, and more especially to an apparatus in which a number of retorts are mounted in a furnace setting having heating chambers provided between the respective retorts such chambers being formed by two perforated walls distanced apart and provided with projecting baffle bricks to form extensive heating surfaces, some of the baffle bricks serving to tie the walls together, and wherein the heating of the retorts is effected by the combustion of gas or vapour and air in combustion chambers disposed beneath the heating chambers from which the gases pass upwardly and laterally through perforated walls into contact with the retorts, finally escaping to a central flue whence they pass out through a chimney. According to the invention the gas is supplied to burners arranged in the combustion chambers, and the air introduced into the said chambers is pre-heated, being passed under control through air passages around the waste gas discharge outlets or passages to air chambers from which it comes into the combustion chambers and is uniformly distributed with the gas therein. According to the invention also, in the outer brickwork surrounding the retorts and the heating chambers there are provided cavities or spaces filled with non-conducting material so that radiation of heat outwards from the retorts is minimised or prevented in a great degree. Fig. 1 is a cross-sectional elevation of the retorts and retort setting taken on the line A A of fig. 3; fig. 2 is a cross-sectional elevation of the retorts and retort setting taken at right angles to fig. 1 on the line B B of that figure; fig. 3 is a sectional elevation of the retort setting, showing one of the walls of a heating chamber, and the corresponding combustion chamber taken on the line C C of figs. 1 and 4; fig. 4 is a sectional plan of the retorts and retort setting taken on the line D D of figs. 1 and 3; fig. 5 is a sectional plan taken on the line E E of fig. 1; fig. 6 is a sectional elevation to an enlarged scale of one of the combustion chambers with burner and air chamber; fig. 7 is a sectional plan view of a retort with corrugated exterior surface. (Four claims.)



15093 (1911). *Improvements in and relating to Metallic Sheet Piling.* J. S. Owens, 47, Victoria-street, Westminster, London.—This invention has reference to metallic piling for cofferdams and other constructional purposes, and the chief object is to provide an improved system of metallic piling the individual members of which shall not have an excessive width when considered from the point of view of rolling, and which, when assembled or driven edge to edge shall give the greatest resistance to lateral bending with the least weight of metal. With this end in view, the improved system comprises metallic piles the individual members of which are approximately Z-shaped in cross-section and

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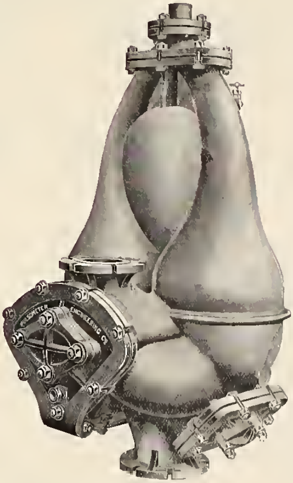
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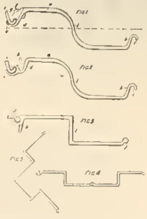
provided with means whereby the longitudinal edges of the piles may be joined in such a manner that the piles do not overlap each other but form when driven a continuous line of piling of but a single thickness of metal, the arrangement being such that when the piles are driven edge to edge each forms with the two adjoining piles two troughs in cross-section, the mouths or openings of which face in opposite directions while the joints between the piles are alternately on each side of the centre line of the piling. Fig. 1 illustrates in cross-section one form of sheet metal pile constructed in accordance with the invention, and fig. 2 is a similar view of a slightly modified form; fig. 3 is a cross-section of a still further modified construction; and figs. 4 and 5 show piles in accordance with this invention assembled to form a line of piling and a corner respectively. (Three claims.)



NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

16991. Shotfiring or other portable cables. H. J. Fisher and R. R. Barkes, jun.
17014. Tempering steel. F. O. Bynoe and H. Edwards.
17020. Apparatus for operating on cargo in bulk. W. G. Read.
17028. Band conveyors. A. G. Bristow and R. Boby Limited.
17088. Wire-drawing, and apparatus therefor. G. Watson and W. D. Houghton and Co. Limited.
17120. Worm-gearing and the like. R. S. Brown.
17128. Apparatus for ascertaining and indicating the presence of gases other than those ordinarily contained in the atmosphere for use in mines or other like purposes. A. E. Culley and A. Barry.
17131. Regenerative furnace with removable head. H. Rehmann.
17159. Apparatus for distributing fuel and other materials. J. R. Williams, A. Thornely, and E. W. Thornely.
17163. Hand-operated overhead travelling cranes. Steel Nut and Joseph Hampton Limited and M. M. Merrell.
17193. Apparatus for the adjustment of the gauge of rails on railways. L. W. Williams.
17204. Guard for the eyes for ponies or other animals. W. J. Fletcher.
17226. Recording instruments and the like. Evershed and Vignoles Limited and G. W. Binstead.
17227. Casting iron and other metals. I. E. Lester.
17229. Tube-cleaning or the like apparatus. H. S. B. Brindley and Boiler Scalers Limited.
17268. Coupling device for colliery tubs and the like. J. R. Manley.
17279. Means of carrying ambulance stretchers in mines and the like. J. J. Hibberd.
17313. Axle-guards or horn-plates for railway rolling stock and the like. T. F. Craddock.
17326. Transport of coal and merchandise, and means therefor. F. M. Smith.
17331. Pneumatic-power hammers. E. Lelong.
17343. Devices for igniting fuses. A. Lohmeyer.
17344 Building-bricks and brickwork structures. J. Bühler.
17349. Loading device, especially for operation on harbours. W. E. Evans.
17366. Manufacture of cold-pressed nut blanks. H. Lench.
17393. Elevator for coal and like substances. P. H. Suisted.
17398. Continuous process for treating organic matter in moist condition, and converting such matter into fuel of high calorific value. J. Anderson and J. Hippius.
17399. Flues of Lancashire and other boilers. A. B. Lennox, S. T. Taylor and E. Taylor.
17400. Bolts and nuts. A. Kokkelkoren and D. Linet.
17426 Drying and heating of wet carbonised peat. T. Rigby and Wetcarbonizing Limited.
17427. Treatment of peat. T. Rigby and Wetcarbonizing Limited.
17428. Utilisation of peat. T. Rigby and Wetcarbonizing Limited.
17469. Arrangement of superheaters for water-tube boilers. Fried. Krupp Akt.-Ges. Germaniawerft.
17475. Catches for tip wagons. W. S. Hudson and R. A. Hudson.
17477. Chucks for percussive drills and the like. J. Drinnan.
17478. Superheaters. T. Sugden.
17494. Frictional ignition devices. L. Russbacher.
17504. Couplings for colliery trams or corves. Hugo Lester.

Complete Specifications Accepted.

To be published on August 15.

1911.

12683. Railway and like vehicles. Houldcroft, and Leeds Forge Company.
16825. Method of and means for heating vertical gas retorts. Robert Dempster and Sons Limited, and Toogood.
16893. Brick for building kilns and ovens. Thynne and Pulling.
17048. Method of getting clay, chalk or the like, applicable also to the working of mines or making of railway cuttings. Lucas.
17066. Kilns. Shaw.
17294. Supports for electrical conductors. Callender's Cable and Construction Company, and Kay.
17347. Earthing or bonding devices for electric conductors. W. T. Henley's Telegraph Works Company, and Bishop.
18185. Furnaces of steam generators. Dean.
18219. Apparatus for softening and purifying water. Anderson.
18672. Motors actuated by the heat of the sun or by the radiant heat of daylight. Bennett.
19320. Draught regulator for boiler furnaces and the like. Robinet.
21015. Magneto-electric machines for ignition purposes. Brooks and Alston.
21940. Driving and conveyor belts. Watkinson.
22484. Weight-recording devices for weighing-machines. Denison.
22535. Tubes. Yorkshire Copper Works Limited, and Fraser.
23565. Supports for electrical conductors. Callenders Cable and Construction Company, and Kay.
23566. Means for suspending electric conductors. Callenders Cable and Construction Company, and Kay.
23803. Hydraulic press tools. Hele-Shaw and Martineau.
24657. Manufacture of ammonia. Badische Anilin and Soda Fabrik.
24819. Process and apparatus for pressing materials containing liquid, for example peat and the like. Franke.
27183. Pit cages. Brown.
27555. Furnaces or kilns for the reheating of ingots for rolling mills or the like. George-Marien-Bergswerks und Hutten-Verein Akt.-Ges.
28113. Sleepers for mine rails. Leyshon and Leyshon.

1912.

2408. Pneumatic conveying apparatus. Babcock and Wilcox Limited.
3041. Furnace-charging apparatus. Ges fur Gasfeuerungs-Technik (Kerpely-Patente).
6136. Economisers or feed-water heaters and steam superheaters for Lancashire and other boilers. Green.
8425. Method of and means for protecting firebars and other parts of travelling furnace grates. Franke.
11209. Means for utilising the residual heat of coke produced in vertical gas-retorts. R. Dempster and Sons Limited and Toogood.
12304. Steam superheaters. Marshall.

Complete Specifications open to Public Inspection before Acceptance.

1912.

16226. Regenerative coking ovens and the like. Soc. Anon. Burkbeiser-Eloy.
16340. Compressed-air hauling winche. Rud Meyer Akt.-Ges. für Maschinen- und Bergbau.
16710. Steam turbine plant for working with live and exhaust steam. Vereinigte Dampfturbinen Ges.

Rescue Work in North Staffordshire.—Members of the North Staffordshire Mining Institute had the opportunity of witnessing a demonstration of rescue work at the Berryhill Collieries, Stoke-on-Trent, on Monday. It is here that the North Staffordshire Coalowners' Association have established a temporary rescue station for the North Staffordshire coalfield, and the instruction given during the past 12 months has already been put to practical test at Jammage, Birchenwood and Norton in North Staffordshire, and at Cannock Chase in the south of the county. The station is equipped with the Siebe Gorman "Proto" apparatus, whilst immediately adjoining is a small gallery where practical instruction can be given under conditions approximating closely to those found in the pit. Teams of picked men, who are subjected to a strict medical test, come from the various collieries of the district to Berryhill for training, and the work is being carried on every week day. Already some 180 men trained at this station have qualified for certificate. The instructor, Mr. Walter Clifford, possesses two medals for conspicuous bravery in connection with the Hamstead disaster in 1908. The training is a rigorous one. After donning the apparatus the men pass into the special chamber, which is then filled with sulphur dioxide, and undergo the full two hours test. They spend the time in timbering, putting up brattices, and doing other work which falls to their lot after an explosion. By means of observation windows the company were enabled to watch the operations. Mr. G. H. Greatbatch, manager of the Berryhill Collieries, briefly explained the apparatus. The Berryhill collieries, where the station is situated, form one of the oldest mining properties in North Staffordshire. For the past 70 years they have been actively working the upper series of the North Staffordshire coalseams, but the firm is being reconstructed and arrangements have been completed to put down almost immediately new shafts with modern plant to recover the deep coals. The deepest of the four shafts at present worked is 600 yards. In course of time these will be superseded by two shafts of 900 yards depth and 20ft. in diameter. The firm owns the whole of the minerals under 900 acres, and it is computed that the new shafts will recover about 60 million tons of coal, at the rate of 1 million tons per year. The seams which will be tapped are the Ten-feet, Bowling Alley, Holly Lane, Coxhead, Hard Mine, and Banbury. The alterations will make the undertaking one of the most important colliery properties in North Staffordshire, and will increase the number of employees from about 1,500 to over 3,900.

GOVERNMENT PUBLICATIONS.

⁂ Any of the following publications may be obtained on application to this office at the price named post free.

National Insurance Act: Regulations as to Payment and Collection of Contributions in Scotland (221), 3½d.; Proceedings of Committees, Welsh (117-18), 1d.; Regulations under Section 47, Welsh (117-23), 1d.; Special Customs Provisional Order, Scotland (117-21), 1d.; Welsh Regulations as to Contributions to be Paid in Respect of Outworkers (230), 2d.; Irish Regulations as to Inspectors' Certificates of Appointments (251), 1d.; Inspectors' Unemployment Insurance Regulations, July 10, 1912 (113-9), 1d.; Representations by the British Medical Association Regarding Medical Benefit and the Reply of the Joint Committee, 2d.; Regulations for Seamen, &c. (238), 1d.; Provisional Special Order for Persons Employed by the Crown (248), 1½d.; Table H, Males or Females, 1d.; Regulations—Scottish Election of Medical Representatives (662), 1½d.; Advisory Committee Order, Ireland (784), 1½d.; Preliminary Expenses Order, Ireland (765), 1½d; Constitution of District Insurance Committees, Scotland (664), 1½d.; Census of Production Rules (786), 1½d.; Order under Section 78, Ireland (6294), 1d.; ditto (6293), 1d.; Special Order *re* Fishermen (117-22), 1d.; Provisional Regulations, July 11, *re* Contributions for Outworkers (223), 2d.; Special Order *re* Outworkers who are Married Women (117-20), 1d.; Regulations for Control and Management of Some Person other than their Immediate Employer (113), 1d.; Regulations as to Inspectors' Certificates of Appointment (249). 1d.; Special Order for Insurance Commissioners (246), 1d; Rules and Orders—Regulations for Commissioners, 1½d.; ditto in respect of Seamen and Soldiers, 1½d.; ditto in respect of Employer of a Contributor Employed by more than One Person in a Week, 1½d.; ditto for Scottish Commissioners, 1½d.; ditto for Control and Management some Person other than their Immediate Employers, 1½d. ditto as to Notices by Employers, 1½d.; Draft Regulations as to Employed Contributors, Welsh, 1½d.; ditto as to the Manner of Calculating the Average Amount of Arrears, 1½d.

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Census of England and Wales: Vol. 1, 5s. 11d.; Vol. 2, 4s.

Index to Special Reports on Explosives, 1876-1910, 6½d.

Consular Reports: Swatow, 4d.; Sao Paulo, 5½d.; German South-West Africa, 4½d.; Java, Sumatra, 8½d.; Pernambuco, 5d.; Calais, 5d.; Amoy, 3½d.

Wayleave Rents Return, 1½d.

MINES AND QUARRIES: REPORT FOR MANCHESTER AND IRELAND FOR 1911, 6d.

PUBLICATIONS RECEIVED.

Wigan and District Mining and Technical College Calendar. Fifty-sixth Session, 1912-1913. Wigan: Thos. Wall and Sons Limited. Price 2d., by post 6d.

The Daily Wages Calculator. London: McCorquodale and Co. Limited. Price 3s. net.

Description du Porte Central de Secours de Lievin, 1912. By M. J. Taffanel et W. E. Feuzy.

Les Catastrophies du Puits West Stanley (16 Fevrier, 1909) et du Puits Pretoria (21 Decembre, 1910). By M. J. Taffanel. Paris. H. Dunod et E. Pinat.

"Technische Auskunft Supplement," June; "Trade of the Union of South Africa, Southern and North-west Rhodesia, and British South Africa for the month of May"; "The Broadway House List of Forthcoming and Recent Publications," July; "The Port of Grimsby and Immingham Annual, 1912," price 6d.; "New South Wales Department of Mines, Geological Survey," Mineral Resources, No. 15, "The Tungsten Mining Industry in New South Wales," by J. E. Crane; "Bulletin of the Imperial Institute" (Vol. 10, No. 2), July, price 2s. 6d.; "The University of Leeds, Eighth Report, 1910-11"; "Statistics of the American and Foreign Iron Trades, Part 1 of the Annual Report for 1911 of the American Iron and Steel Association"; "One and All Gardening Books" (No. 40), "Indoor Gardens," by T. W. Sanders, price 1d.; "Cassier's Magazine" (Vol. 42, No. 1), price 1s.; "Queensland Government Mining Journal (Vol. 13, No. 144), May, price 6d.; "The Journal of the Franklin Institute," (Vol. 174, No. 1) July, price 50 c.; "Mine and Quarry" (Vol. 6, No. 4), June; "The Journal of the Chemical, Metallurgical and Mining Society of South Africa" (Vol. 12, No. 11), May, price 3s.; "Zeitschrift für das Berg- Hutten- u. Salinen Wesen" (Band 60, 2 Heft and Band 60, 1: Statistische Lieferung); "Peru To-day" (Vol. 4, No. 2), May, price 5d.; "Bulletin de la Société d'Encouragement pour l'Industrie Nationale" (Tome 117, No. 6) Juin; "The Journal of the South African Institution of Engineers" (Vol. 10, No. 11), June, price 2s.; "The Resources of Tennessee" (Vol. 2, No. 7), July; "University of Illinois" (Bul. No. 58): "A New Analysis of the Cylinder Performances of Reciprocating Engines," by J. P. Clayton; (Bul. 59): "The Effects of Cold Weather upon Train Resistance and Tonnage Rating," by E. C. Schmidt and F. W. Marquis; "Transactions of the Institution of Mining Engineers" (Vol. 43, Part 3).

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Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

Air Compressors
Bailey, W. H., and Co. Ld., Salford, Manchester
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co., St. Helens, Lancashire
Davis, John, and Son (Derby) Ld., Derby
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
International Channelling Machines Ld., Sheffield
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Mining Engineering Co. Ld., (The), Sheffield
Nuneaton Engineering Co. Ld., Nuneaton
Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., F. Department, Ipswich
Robey and Co. Ld., Globe Works, Lincoln
United States Metallic Packing Co. Ld., Bradford
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Air Pipes
Allen, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Son, Thompson-street, Bilston
British Mannesmann Tube Co. Ld., London Wall
Lewis, William, and Son, Bilston
Mining Engineering Co. Ld., Sheffield
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C., Ld., Dudley

Air Pumps.
Bailey, W. H., and Co. Ld., Salford, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Wood, John, and Sons Ld., Wigan

Alternators
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Mavor & Coulson Ld., 47, Broad-street, Glasgow

Ambulance Stretchers
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley

Anchors
Wright, Joseph, and Co., Tipton

Anemometers
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Humble, Stephen, 9, Victoria-st., London, S.W.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Angles and Sections (Steel)
Firth, Wm., Ld., Water-lane, Leeds

Anthracite Breaking, Sizing and Washing Plant
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Sheppard and Sons Ld., Bridgend
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Anti-Corrosive Compositions
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

Anti-Friction Metal
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

Anvils
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Asbestos
Asbestos and General Paint Co. Ld., Birmingham

Axle Greasers
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Barrows (Ore)
Bagnall, W. G., Ld., Stafford
Haslam and Schontheil Ld., Cardiff
Heenan and Froude Ld., Worcester
Theedam, E. C., Ld., Dudley

Bars (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mining Engineering Co. Ld., Sheffield

Bars (Screen)
Firth, Wm., Ld., Water-lane, Leeds
Head, Wrightson and Co. Ld., Stockton-on-Tees
Benton, B. M., and Co., Sheffield
Wood, John, and Sons Ld., Wigan

Bearings
Bridge, David, & Co. Ld., Castleton, Manchester
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham

Bellows
Hardy Patent Pick Co. Ld., Sheffield
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Bells (Signal)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Humble, Stephen, 9, Victoria-st., London, S.W.
Theedam, E. C., Ld., Dudley

Belt Fasteners
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Belt Food

Belting
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Frost, Albert, and Co., Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Sutcliffe, B., Horbury, near Wakefield
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Belts (Chain)
Ewart's Chain Co., Derby, England
Heenan and Froude Ld., Worcester
Wright, Joseph, and Co., Tipton

Benzol Plants
Coke Oven Construction Co. Ld., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Bitumastic Solution
Wailes, Dove & Co., Ld., Newcastle-on-Tyne

Blasting Apparatus
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Reavell and Co. Ld., Ipswich
Theedam, E. C., Ld., Dudley

Blowers
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Tickle Brothers, Vulcan Ironworks, Wigan

Boiler (Cleaning Apparatus)
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Boiler and Steam Pipe Covering
Asbestos and General Paint Co. Ld., Birmingham
Kenyon, W., & Sons Ld., Dukinfield, Manchester

Boiler Feeders
Foot, H. G., & Co., 11, Queen Victoria-street, E.C.
Tangyes Ld., Cornwall Works, Birmingham

Boiler Merchants
Stringer, John, and Son, Blackburn

Boiler Mountings
Bailey, W. H., and Co. Ld., Salford, Manchester
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Stringer, John, and Son, Dept. 11, Blackburn
Wellington Tube Works Ld., Great Bridge, Tipton

Boiler Removers
Stringer, John, and Son, Blackburn

Boiler Tubes
Lewis, Edwin, and Sons, Wolverhampton
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Gt. Bridge, Tipton

Boilers
Avonside Engine Co. Ld., Bristol
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs, E.C.
Heenan and Froude Ld., Worcester
Horsfield, J. and J., Ld., Dewsbury
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Peckett & Sons, Atlas Locomotive Works, Bristol
Robey and Co. Ld., Globe Works, Lincoln
Spurr, Inman and Co. Ld., Wakefield
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Uskside Engineering Co. Ld., Newport, Mon.
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Boiler Co. Ld., Bradford

Bolts, Nuts, &c.
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Bute Docks, Cardiff
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Jardine, John, Deering-street, Nottingham
Mining Engineering Co. Ld. (The), Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, & Sons Ld., Darlington
Theedam, E. C., Ld., Dudley
Ward, Thos. W., Ld., Albion Works, Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Books on Mining
Colliery Guardian Co. Ld., 30 & 31, Furnival-st., Holborn, E.C.
Griffin, Charles, and Co. Ld., Exeter-st., Strand
South Wales Institute of Engineers, Cardiff
Southern, T. A., Universal Mining School, Cardiff

Boring Contractors
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-rd., Lambeth, S.E.
Davidson, J. S., & Son, St. Bees, Cumberland
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Lancaster and Tonge Ld., Pendleton, Manchester.
New Calyx Drill and Boring Co. Ld., Millwall, E.
Thomson Bros. (Dunfermline) Ld., Glasgow
Trefor Boring and Mining Co. Ld., 41, rue Royale Brussels
Vivian's Boring & Exploration Co. Ld., Parkside, Cleator Moor, Cumberland

Boring Machines
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln
Spencer, Matthias, and Sons, Sheffield

Boring (Prospecting) Plants and Tools
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford st., York-road, Lambeth, S.E.
Hardy Patent Pick Co. Ld., Sheffield
New Calyx Drill and Boring Co. Ld., 120, East Ferry-rd., Millwall, E.

Brake (Winding Engine)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Thornewill and Warham Ld., Burton-on-Trent
Wood, John, and Sons Ld., Wigan

Brassfounders
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, John, and Son (Derby) Ld., Derby
Lancaster and Tonge Ld., Pendleton, Manchester
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Railway and General Engineering Co. Ld., Notts
Russell, John, and Co. Ld., Alma Works, Walsall

Brattice Cloth
Davis, John, and Son (Derby) Ld., Derby
Evans, D. Llewellin, 120, Bute-street, Cardiff
Moritz, George, Ld., Clayton, Manchester

Breathing Apparatus
Siebe, Gorman and Co. Ld., Westminster, S.E.

Brick Machine Merchants
Stringer, John, and Son, Blackburn

Brickmaking Machinery
Bradley & Craven Ld., Wakefield
Fraser & Chalmers Ld., 3, London Wall Bldgs, E.C.
Nuneaton Engineering Co. Ld., Nuneaton
Thompson and Southwick Ld., Tamworth
Ward, Thos. W., Limited, Albion Works, Sheffield
Whittaker, C., and Co. Ld., Accrington
Wootton Bros. Ld., Coalville, near Leicester

Bricks
Witton Firebrick Co. Ld., near Darlington

Bridges
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Newton Heath, Manchester
Isca Foundry Co., Newport, Mon.
Norton's (Tividale) Ld., Tipton

Briquette Machinery
Bradley & Craven Ld., Wakefield
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Brushes (Lamp and Colliery)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley

Buckets and Baskets
Baker, John, and Son, Bilston, Staffs
Frost, Albert, and Co., Sheffield
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

Buffers
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.

Buffers (Self-contained)
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.

Buyers of any kind of Plant (Large or Small)
Stringer, John, and Son, Blackburn

By-Product Recovery Plant
Coke Oven Construction Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Koppers, Coke Oven & Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Cable Connectors
Haslam and Schontheil Ld., Cardiff

Cables
British Insulated and Helsby Cables Ld., Prescot
Diamond Coal-Cutter Co., Wakefield
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-street, Glasgow

Cables (Shot-Firing)
British Insulated and Helsby Cables Ld., Prescot
Curtis's & Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Haslam and Schontheil Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

Cages (Pit)
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bentham, D., 45, Bank-street, Sheffield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Humble, Stephen, 9, Victoria-st., London, S.W.
Norton's (Tividale) Ld., Tipton
Ormerod, Edward, Atherton, near Manchester
Thornewill and Warham Ld., Burton-on-Trent
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

"Camel Hair" Belting
Reddaway, F., & Co. Ld., Pendleton, Manchester

Canvas Fire Hose
Jacobson, Rd., 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester

Capstans (Electric)
Bridge, David, & Co. Ld., Castleton, Manchester
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Carrying and Conveying Belts
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Coulson, M., and Co. Ld., Spennymoor
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Reddaway, F., & Co. Ld., Pendleton, Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Sheppard and Sons Ld., Bridgend, South Wales
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, H., Horbury, near Wakefield
Walker Bros. (Wigan) Ld., Wigan.
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Castings (Brass or White Metal)
British Wagon Co. Ld., Rotherham
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, John, and Son (Derby) Ld., Derby
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Castings (Iron and Steel)
British Wagon Co. Ld., Rotherham
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Isca Foundry Co., Newport, Mon.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Nuneaton Engineering Co. Ld., Nuneaton
Railway and General Engineering Co. Ld., Notts
Stewarts and Lloyds Ld., Birmingham & Glasgow
Summerson, Thomas, and Sons Ld., Darlington
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Castings (Malleable)

Cement
Earle, G. & T., Ld., Wilmington, Hull
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Cement-Making Machinery

Cement Manufacturers
Earle, G. & T., Ld., Wilmington, Hull

Centrifugal Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson & Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Waddle Patent Fan and Engineering Co., Llanelly
Walker Bros. (Wigan) Ld., Wigan

Centrifugal Pumps
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey & Co. Ld., Sun Foundry, Leeds
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Tangyes Ld., Cornwall Works, Birmingham

Channels (Steel)
Scott, Walter, Ld., Leeds Steel Works, Leeds

Chains
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Firth, William, Ld., Leeds
Haggie Brothers Ld., Gateshead-on-Tyne
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

Chains for Driving and Power Transmission
Renold, Hans, Ld., Brook-street, Manchester

Cling Surface (for Belts and Ropes)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Clip Pulleys
Deutsche Maschinenfabrik A.G., Duisburg, Germany

Clips (Haulage)
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bradley & Craven Ld., Wakefield
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Humble, Stephen, 9, Victoria-st., London, S.W.
Smallman, J. W., Nuneaton
Theedam, E. C., Ld., Dudley

Coal Bunkers
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Coke Oven Construction Co. Ld., Sheffield
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Koppers Coke Oven & Bye-Product Co., Sheffield
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Coal Carrying Belts
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Cort, Arthur, & Co., 303½, Camberwell Rd., London
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
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"Scandinavia" Belting Co. Ld., 59, Southwark street, S.E.
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, B., Horbury, near Wakefield
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Coal Compressing Machinery
Coke Oven Construction Co. Ld., Sheffield
Koppers Coke Oven & Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

Coal Crushing Plant
Coke Oven Construction Co. Ld., Sheffield
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Head, Wrightson and Co. Ld., Stockton-on-Tees
Simon-Carves Ld., 20, Mount-st., Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
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Wright, Joseph, and Co., Tipton

Coal-Cutting Machinery
Davis, John, and Son (Derby) Ld., Derby
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Diamond Coal-Cutter Co., Wakefield
Gillott, John, & Son, Lancaster Works, Barnsley
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
International Channelling Machines Ld., 327, Penistone-road, Sheffield
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

Coal Drills
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Spencer, Matthias, and Sons, Sheffield

Coal Dryers

Coal Handling Plant
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.
Coke Oven Construction Co. Ld., Sheffield
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Gt. Central Railway, 216, Marylebone-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Simon-Carves Ld., 20, Mount-st., Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Coal Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

Coal-Picking Belts
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Fraser & Chalmers Ld., 3, London Wall Bldgs, E.C.
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
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Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, B., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton

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Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Cousland, Alex., and Son, 3, Mitchell-st., Glasgow
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Loampit Vale, Lewisham
Haslam and Schontheil Ld., Cardiff
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Lührig Coal and Ore-Dressing Appliances Ld., 32, Victoria-street, London, S.W.
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Sheppard and Sons Ld., Bridgend, South Wales
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
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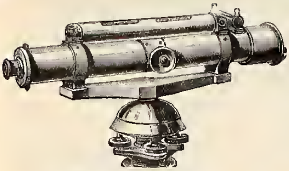

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Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens. Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, B. H., and Co. Ld., Wakefield

Engines (Hauling and Winding)—continued.
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Nott
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, R., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

Engines (Locomotive)
Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)
Mather and Platt Ld., Manchester

Engine Merchants
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

Engines (Oil)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping) (See Pumps)

Engines (Rolling Mill)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany

Engines (Steam)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Exhaust Turbine Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Files
Hardy Patent Pick Co. Ld., Sheffield
Spencer, Matthias, and Sons, Sheffield
Waterfall, B. & B., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

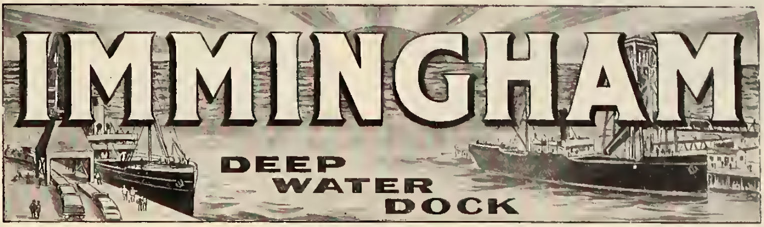
Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

Fire Appliances
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

The NEW COAL PORT



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SAM FAY, General Manager.

Purchasers' Guide to Advertisers' Specialities.—(continued).

Firelighter Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Fishplates
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

Fittings (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

Forced Draught
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

Forges
Hardy Patent Pick Co. Ld., Sheffield

Forgings
Bagnall, W. G., Ld., Stafford
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Renton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld. Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Fuel Economisers
Pillatt and Co., Stapleford, Nottingham
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld., Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Hammerton-st., Burnley
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall

Fuses (Safety)
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Bricks

Gas Engines
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Glover, M., and Co., Holbeck-lane, Leeds
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Gas Exhausters
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Gas Plant
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Tipton

Gas Valves
Haslam and Schonthell Ld., Bristol

Gauge Glasses
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley
Treasure, J. S., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Jacobson, Richard, 70, Shoe-lane, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gears (Special for Motor Lorries Cars &c.)
Brown, David, & Sons (Hudd.) Ld., Huddersfield

Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroen, Andre, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Nuneaton Engineering Co. Ld., Nuneaton.
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Rods Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Gutta Percha
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, B., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan

Heapsteads—continued
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Hoists
Bleichert, A., and Co., 99-100, Palmerston House Bishopsgate-street Within, 90, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Hooks or Links (Safety)
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Harvey, G. A., and Co., Loampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. G., Ld., Dudley
Wright, Joseph, and Co., Tipton

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

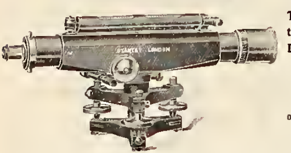
Hydro Electric Plants
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Hydraulic Jacks
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Ryland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hydrometers
Davis, John, and Son (Derby) Ld., Derby



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A GUIDE TO THE PURCHASE OF COAL.

— COMPILED BY —

ALLAN GREENWELL, F.G.S., A.M.Inst.C.E., M.Inst.M.E.,

AND

J. V. ELSDEN, F.G.S., D.Sc.(Lond.).

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30 & 31, Furnival Street, Holborn, London, E.C.

Purchasers' Guide to Advertisers' Specialities—(continued).

Incline Rollers
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Cords
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Reddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Bednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Perth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crowe
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
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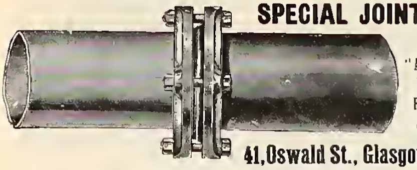

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Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Thornam, E. C., Ld., Dudley

Rail Sawing Machines
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Youngs, Ryland-street Works, Birmingham

Rails (Iron and Steel)
Bagnall, W. G., Ld., Stafford
Bute Works Supply Co. Ld., Cardiff
Firth, William, Ld., Leeds
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

Railway Carriages and Wagons
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
Bristol and South Wales Railway Wagon Co. Ld., Bristol
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester
Lancashire and Yorks. Wagon Co. Ld., Heywood
Lincoln Wagon and Engine Co. Ld., Lincoln
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld. Midland Works Birmingham
Moy, Thomas, Ld., Railway Works, Peterboro'
Rigby, Wm., Bulwell, Nottingham
Rolling Stock Co., Darlington
Wigan Wagon Co. Ld., Springs Branch, Wigan

Railway Plant
Avonside Engine Co. Ld., Bristol
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Bute Docks. Cardiff
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Firth, William, Ld., Leeds
Gt. Central Railway, 216, Marylebone rd., London
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester
Isca Foundry and Engineering Co., Newport, Mon.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld. Midland Works Birmingham
Renton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Ryland-street Works, Birmingham

Railway Plant (Electrical)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester

Railway Wagon Association
Association of Private Owners of Railway Rolling Stock, Clarence Chambers, Gloucester
Chorley Railway Wagon Co. Ld., Chorley, Lancs.

Railway Wagon Financiers
Bristol and South Wales Railway Wagon Co. Ld., Bristol
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lincoln Wagon and Engine Co. Ld., Lincoln

Railway Wagon Repairers
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, near Birmingham
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Heenan & Froude Ld., Worcester
Lancashire and Yorkshire Wagon Co. Ld., Heywood, near Manchester
Lincoln Wagon and Engine Co. Ld., 11, St Mary-street, Lincoln
Moy, Thomas, Ld., Railway Works, Peterboro'
Rigley, Wm., Forest Wagon Works, Bulwell, Nottingham

Railway Wagons (Tipping)
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester

Rakes (Pit)
Baker, John, and Son, Bilston, Staffs
Hardy Patent Pick Co. Ld., Sheffield

Reducing Gear
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, and Sons (Huddersfield) Ld., Park Gear Works, Lockwood, Huddersfield

Reducing Valves (Full Bore and Standard)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield

Refrigerators
Pulsometer Engineering Co. Ld., Reading

Refuse Destructors
Heenan & Froude Ld., Manchester

Regulating Valves (Full Bore)
Auld, D., and Sons, Whitevale Foundry, Glasgow

Rescue Apparatus
British Oxygen Co. Ld., Elverton-st., Westminster
Davis, E., 2, Aire-street, Leeds
Jacobson, R., 70, Shoe-lane, London, E.C.
Knowles Oxygen Co. Ld., Wolverhampton
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., 187, Westminster bridge-road, S.E.

Respirators
British Oxygen Co. Ld., Elverton-st., Westminster
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., Westminster

Rivets
Baker, John, and Son, Bilston, Staffs
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Renton, B. M., and Co., Sheffield
Thornam, E. C., Ld., Dudley
Ward, Thos. W., Limited, Albion Works, Sheffield

Rock Drills
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Spencer, Matthias, and Sons, Sheffield
Stephens, B., and Son, Carn Brea, Cornwall

Rollers and Pulleys (Haulage)
Bagnall, W. G., Ld., Stafford
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Renton, B. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Roofs and Outdoor Buildings
Heenan & Froude Ld., Newton Heath, Manchester
Isca Foundry & Engineering Co., Newport, Mon
Norton's (Tividale) Ld., Tipton
Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton

Ropes (Cotton Driving)
Kenyon, Wm., & Sons Ld., Dukinfield
Wright, J. and E., Ld., Birmingham

Ropes (Driving)
Kenyon, W., & Sons Ld., Dukinfield Manchester

Ropes (Hemp and Manilla
Wright, J. and E., Ld., Birmingham

Rope Preservative
Wright, J. and E., Ld., Birmingham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Ropes (Wire)
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Cooke, William and Co. Ld., Tinsley, Sheffield
Elliot, George, and Co. Ld., 16, Great George-st. Westminster, S.W.
Glover, Wm. Jas., and Co., St. Helens, Lancs.
Haggie Brothers Ld., Gateshead-on-Tyne
Latch and Batchelor Ld., Hay Mills, Birmingham
Thompson and Co., Wigan
Wright, John & Edwin, Ld., Garrison st., B'ham

Ropeways
Bleichert, Adolf, and Co., 99-100, Palmerston House, Bishopsgate-st. Within, E.C.
Tickle Brothers, Vulcan Ironworks, Wigan

Rubber-Covered Rollers
Beddaway, F., & Co. Ld., Pendleton, Manchester

Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster and Tonge Ld., Pendleton, Manchester

Saws and Sawing Appliances
Appleby, R. G., and Co., 10, Victoria-street, Westminster
Glover, M., and Co., Holbeck-lane, Leeds

Screening for Coal and Coke
Baker, John, and Son, Bilston
Hardy Patent Pick Co. Ld., Sheffield
Thornam, E. C., Ld., Dudley

Screening
Barns, W., and Son, Globe Works, Holloway, N
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Screening Plant
Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Screwing Machines
Frost, Albert, and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Screws (Stretching)
Youngs, Ryland-street Works, Birmingham

Sewage Treatment Plant
Mather and Platt Ld., Manchester

Shafting
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Entreprise Générale de Fonçage de Puits, 5, Rue de Suréne, Paris
Hardy Patent Pick Co. Ld., Sheffield
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Phillips, C. D., Newport, Mon.
Spencer and Co. Ld., Melksham, Wilts
Uskside Eng. Co. Ld., Newport Mon.
Wright, Joseph, and Co., Tipton

Shaft Sinkers
Trefor Boring and Mining Co. Ld., 31, rue Royal Brussels

Sheet Iron
Firth, Wm., Ld., Water-lane, Leeds
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Lewis, Wm., and Son, Bilston, Staffs.
Thornam, E. C., Ld., Dudley

Sheet Metal Works (for Cylinder Casings
Baker, John, and Son, Bilston
Kenyon, Wm., & Sons, Ld., Dukinfield
Valor Co. Ld., Rocky-lane, Aston Cross, B'ingham

Shipping
Gt. Central Railway, 216, Marylebone road, N.W.

Shot-Firing Batteries and Cables
British Explosives Syndicate Ld., Glasgow
British Insulated and Helsby Cables Ld., Lancs.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Haslam and Schonthell Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

Shovels and Shovel Trees
Baker, John, and Son, Bilston Staffs
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Sheffield
Thornam, E. C., Ld., Dudley

Sidings
Bagnall, W. G., Ld., Stafford
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, & Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

Purchasers' Guide to Advertisers' Specialities.—(continued).

SLEEPERS (IRON AND STEEL)
Allen, W. G., & Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
Baird, J. W., and Co., West Hartlepool
Bute Works Supply Co. Ld., Cardiff
Firth, Wm., Ld., Water-lane, Leeds
Renton, B. M., and Co., Midland Works, Sheffield

SMITHS' TOOLS
Hardy Patent Pick Co. Ld., Sheffield

SMITH WORK
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Wright, Joseph, and Co., Tipton

SMOKE HELMETS
Siebe, Gorman and Co. Ld., Westminster, S.E.

SPEED-REDUCING GEARS
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

SPNINOTER GRIP ARMOURED HOSE
Beddsway, F., & Co. Ld., Pendleton, Manchester

SPRINGS
British Wagon Co. Ld., Rotherham
Lancaster and Tonge Ld., Pendleton, Manchester
Skinner, J. P. and Co. Ld., Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

STAMPINGS
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

STEAM EXPERTS
Tickle Brothers, Vulcan Ironworks, Wigan

STEAM FITTINGS
British Mannesmann Tube Co. Ld., London Wall
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Hussell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staffs.

STEAM MAINS AND PIPE INSTALLATIONS
Stewarts and Lloyds Ld., Birmingham & Glasgow
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

STEAM-SAVING APPLIANCES
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Burnley
Yorkshire Boiler Co. Ld., Bradford

STEAM TRAPS
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster & Tonge Ld., Pendleton, Manchester
Stewarts & Lloyds Ld., Birmingham and Glasgow
United States Metallic Packing Co. Ld., Soho Works, Bradford
Wright, Joseph, and Co., Tipton

STEAM WINDERS
Bridge, David, & Co. Ld., Castleton, Manchester
Clarke, Chapman & Co. Ld., Gateshead on Tyne
Phillips, C. D., Newport, Mon.
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

STEEL
Cooke, William, and Co. Ld., Tinsley, Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Latch and Batchelor Ld., Hay Mills, nr. B'ham
Mining Engineering Co. Ld. (The), Sheffield
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Spencer, Matthias, and Sons, Sheffield
Stewarts & Lloyds Ld., Birmingham and Glasgow
Thompson and Co., Wigan
Waterfall, H. & R., & Barber, Bridge-st., Sheffield

STEEL BLOOMS BILLETS
Renton, B. M., and Co., Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

STEEL FLATS AND ROUNDS
Scott, Walter, Ld., Leeds Steel Works, Leeds

STEEL TINBARS
Scott, Walter, Ld., Leeds Steel Works, Leeds

STONE BREAKERS
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln

STRUCTURAL STEEL WORK
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Wright, Joseph, and Co., Tipton

SULPHATE OF AMMONIA PLANT
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

SULPHUR RECOVERY PLANT
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

SUPERHEATERS
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
Pulsometer Engineering Co. Ld., Reading
Stringer, John, and Son, Dept. 11, Blackburn

SURGICAL APPLIANCES
White & Wright, 93, Renshaw Street, Liverpool

SURPLUS STEAM VALVES (FULL BORE)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Hopkinson, J., and Co. Ld., Huddersfield

SURVEYING (BOOKS ON)
Thomas, Wm., Cambrian Mining School, Porth

SURVEYING (INSTRUCTION)
Thomas, Wm., Cambrian Mining School, Porth

SURVEYING INSTRUMENT MAKERS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavement, London
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

SWITCH BOARDS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

SWITCH GEAR
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

SWIVELS (BALL-BEARING)
Bridge, David & Co., Ld., Castleton, Manchester
Youngs, Hyland-street Works, Birmingham

TAMPING PLUGS

TANKS
Bagnall, W. G., Ld., Stafford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Harvey, G. A., and Co. Loampit Vale, Lewisham
Isca Foundry & Engineering Co., Newport, Mon.
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Valor Co. Ld., Rocky-lane, Aston Cross, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

TANKS (FERRO-CONCRETE)

TAR DISTILLING PLANT
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

TECHNICAL EDUCATION
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

TELEPHONES
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

TIMBER (COLLIERY)
Baird, J. W., and Co., West Hartlepool
Gebeck and Co., Newcastle-on-Tyne

TIPPLERS.
Bagnall, W. G., Ld., Stafford
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Spencer and Co. Ld., Melksham, Wilts
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

TOOLS
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

TRAM AND WAGON CORNER PLATES
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Theedam, E. C., Ld., Dudley

TRANSFORMERS (ELECTRICAL)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

TRANSPORT PLANT
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

TROMMELS
Barns, W., and Son, Globe Works, Holloway
Heenan & Froude Ld., Worcester and Manchester
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts

TRUCK SHUNTING PLANTS
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

TUBBING AND WELL CYLINDERS
Head, Wrightson and Co. Ld., Stockton-on-Tees
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

TUB DRAWBARS
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Ormerod, Edward, Atherton, near Manchester
Renton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

TUBE EXPANDERS
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Hyland-street Works, Birmingham

TUBE FITTINGS
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Wednesbury
Stewarts & Lloyds Ld., Birmingham and Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

TUBES (IRON AND STEEL)
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Lewis, William, and Son, Bilston
Hussell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

TUB GREASERS AND CONTROLLERS
Theedam, E. C., Ld., Dudley

TUBS (COLLIERY)
Allen, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Humble, Stephen, 9, Victoria-st., London, S.W.
Longbotham, H. H., and Co. Ld., Wakefield
Theedam, E. C., Ld., Dudley
Wigan Wagon Co. Ld., Springs Branch, Wigan
Wright, Joseph, and Co., Tipton

TUNNEL SEGMENTS
Railway and General Engineering Co. Ld., Notts
Tickle Brothers, Vulcan Ironworks, Wigan

TURBINES
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester

TURBINES (EXHAUST)
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

TURBO COMPRESSORS
Tickle Brothers, Vulcan Ironworks, Wigan

TURNTABLES
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Isca Foundry & Engineering Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

TUYERES
Baker, John, and Son, Bilston, Staffs
Railway and General Engineering Co. Ld., Notts
Russell, John, and Co. Ld., Walsall
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C. Ld. Dudley

VALUERS
Radford, H. H., Son, and Squire, Sheffield
Stringer, John, and Son, Blackburn

VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Green and Boulding Ld., 28, New Bridge-st., E.C.
Haslam and Schonthail Ld., Cardiff
Hopkinson, J., and Co. Ld., Huddersfield
Mather and Platt Ld., Manchester
Hussell, John, & Co. Ld., Alma Tube Works, Walsall

VICES
Frost, Albert, and Co., Sheffield
Glover, M., and Co., Holbeck-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley
Youngs, Hyland-street Works, Birmingham

VULCANISED FIBRE
Cort, Arthur, & Co., 303½, Camberwell-rd., London

WASHERS
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Jardine, John, Deering-street, Nottingham

WASHERS—continued.
Renton, B. M., and Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

WATER REDUCING VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow

WATER FILTERS
Pulsometer Engineering Co. Ld., Reading
Wright, Joseph, and Co., Tipton

WATER SOFTENING AND PURIFYING
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Wright, Joseph, and Co., Tipton

WATER TUBE BOILERS
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.

WATER WHEELS

WELDING APPARATUS

WELL TUBES
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Russell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Wellington, Staffs.

WEIGHING MACHINERY
Thompson and Co., Wigan

WHEELBARROWS
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Son, Thompson-street, Bilston
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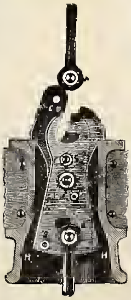

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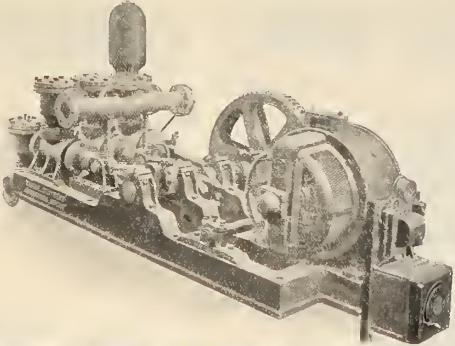

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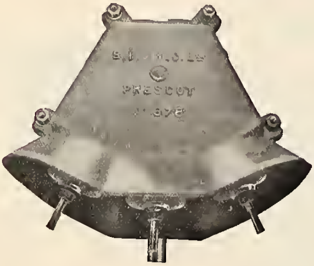

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New Forms, &c., recently issued under the Coal Mines Acts.

This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c., as issued.

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Registered No. Please quote when ordering.	NEW FORMS, &c., RECENTLY ISSUED.	
	Statutory Rules and Orders, &c.	
H.O., 228	Qualifications of Surveyors (February 27, 1912): Coal Mines Act, 1911	1d. each. By post 1½d.
H.O., 347*	Rescue and Aid Order, 1912. Memorandum, May 4, 1912 ...	1d. each. By post 1½d.
H.O., 450	Form of Certificate of Qualification of Fireman, Examiner, or Deputy (May 2, 1912): Coal Mines Act, 1911	1d. each. By post 1½d.
H.O., 497	Testing Horses for Glanders Order of 17th May, 1912... ...	1d. each. By post 1½d.
H.O., 510	Search of Workmen for Prohibited Articles Order of 21st May, 1912	1d. each. By post 1½d.
H.O., 511	Explosives in Coal Mines Order of 21st May, 1912 (revoking all previous "Explosives" Orders)	4d. each. By post 5d.
H.O., 34	The same in Sheet Form (without Schedules), for posting ...	1d. each. By post 1½d.
H.O., 634	Procedure for Ascertaining and Certifying the Views of Workmen. Order dated 22nd June, 1912	1d. each. By post 1½d.
☞ Cd. 6307.	Explosions in Mines Committee. First Report	11½d. each. By post 1s.
C.G., E.	Special Rules for the Installation and Use of Electricity in Mines.	
	Sheet Form (H.O., 12)	3d. each. By post 3½d.
	Pamphlet Form (H.O., 11)	2d. each. By post 3d.
C.G., K.	Electricity Rules: Daily Log Sheet (H.O.. 11a)	1s. 6d. per 100
C.G., 65.	Do. Do. Book (H.O., 11b)	4s. each. By post 4s. 8d.
C.G., 68.	Do. Notice to Inspector of the District under Rule 2 (ii.) (H.O., 11c)	1d. each. By post 1½d.
C.G., 67.	Do. Notice to Inspector of the District under Rule 2 (iii.) (H.O., 11d)	1d. each. By post 1½d.
C.G., 66.	Coal Mines Act, 1911. Pamphlet Form	9d. By post 11d.
C.G., L.	Coal Mines Act, 1911, Abstract. Sheet (26 in. by 34 in.) (H.O., 2)...	3d. each. By post 4d.
C.G., L. (Abs)	Coal Mines (Minimum Wage) Act, 1912. Pamphlet Form ...	1½d. By post 2d.
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Cd. 6237	Scotland District (No. 1), by W. Walker	Price 1s. 6d. By post 1s. 9d.
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	FORMS.	
H.O., 20	Form of Register of Boys, Girls and Women Employed—Section 94	4d. each, postage extra
H.O., 36	Form of Report Book for Inspection on behalf of Workmen—Section 16 ..	9d. each do.
H.O., 37	Form of Book for Record of Measurements of Air Currents—Section 29 (2) ..	7d. each, do.
H.O., 38	Form of Book for Daily Record of Damage to Safety Lamps—Section 34 (1) (ii)	1s. 6d. each do.
H.O., 39	Form of Report of Thorough Examination of Steam Boiler—Section 56 ..	1d. each do.
H.O., 40	Form of Book for Report on Quarterly Internal Examination of Steam Boilers—Section 56 (1) (*c*) and (3)	6d. each do.
H.O., 41	Form of Book for Daily Report on Condition of Roads as to Coal Dust—Section 62 (5)	1s. 3d. each do.
H.O., 42	Form of Report Book for Firemen, Examiners or Deputies—sections 64 and 65..	1s. each do.
H.O., 43	Form of Book for Daily Report of Examination of External Parts of Winding Machinery, Guides, &c.—section 66 (*a*)	1s. 6d. each do.
H.O., 44	Form of Book for Weekly Report of Machinery, Gear and other Appliances (other than Winding Machinery, Gear, &c.)—Section 66 (*b*)	1s. 3d. each do.

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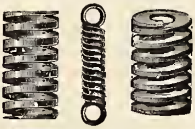

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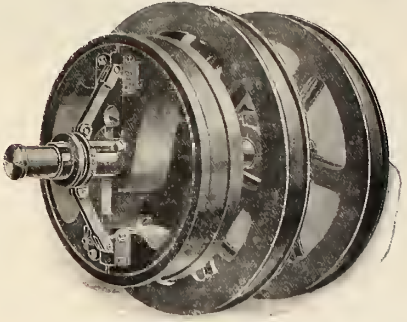

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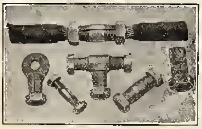

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Continued from Page 258.

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H.O., 51	Form of Annual Return of Horses Used Underground in the Mine—Schedule III. (16)	1d. each	do.
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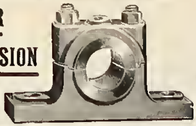

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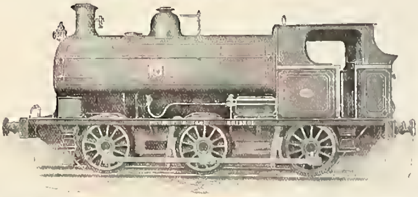

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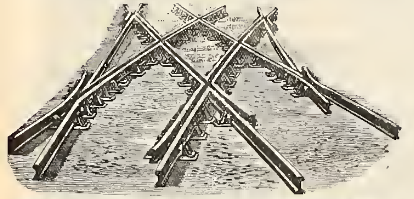

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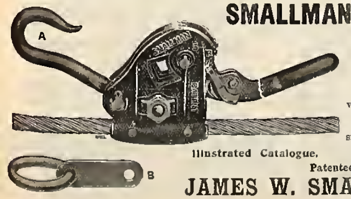

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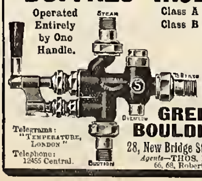

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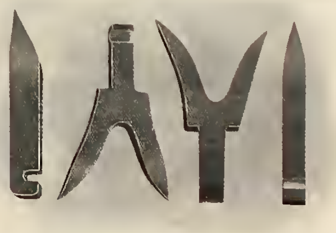

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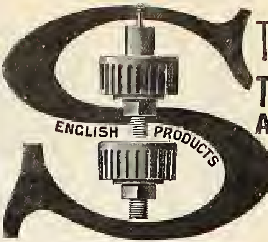

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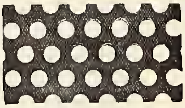

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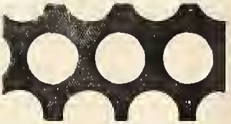

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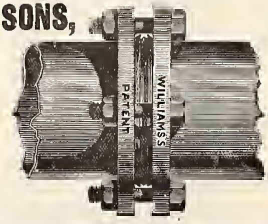

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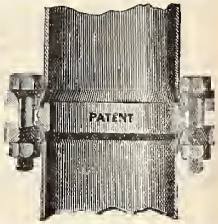

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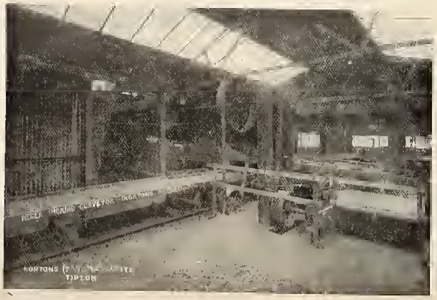

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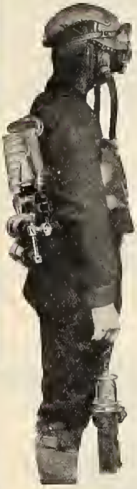

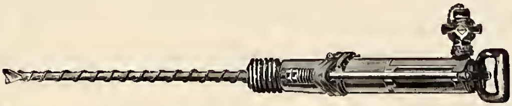

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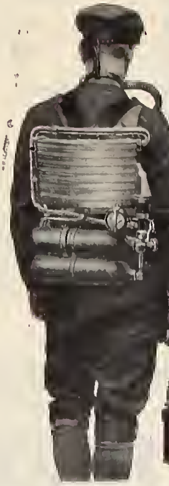

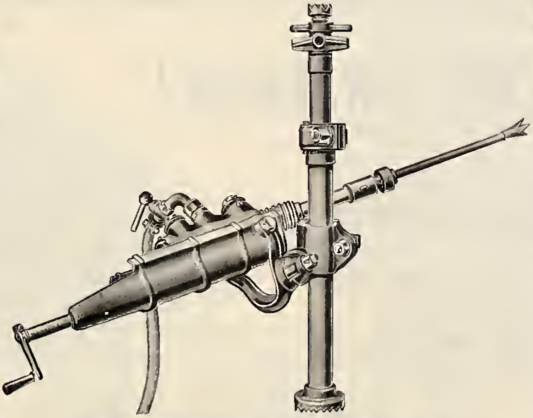

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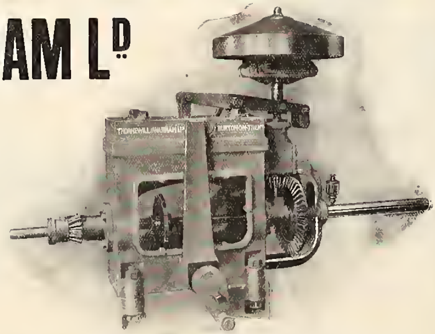

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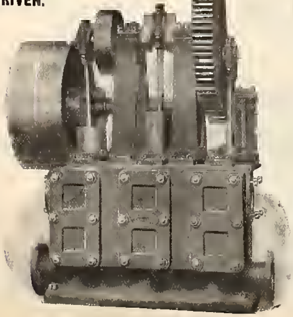

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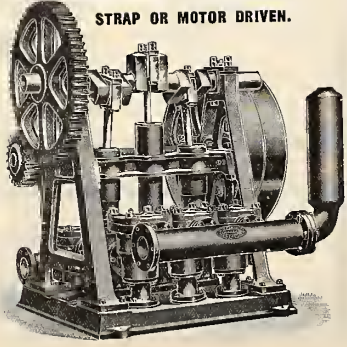

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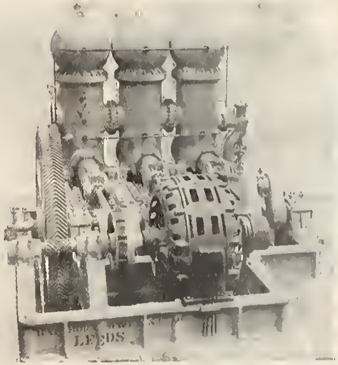

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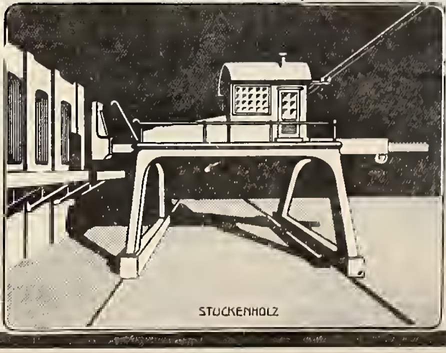

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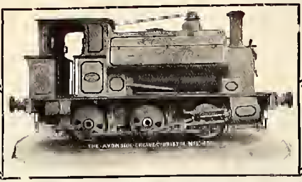

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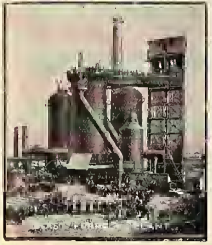

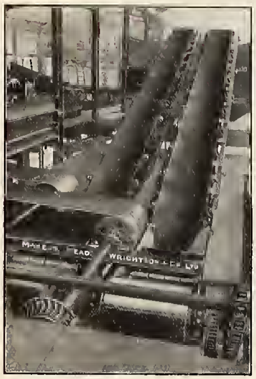

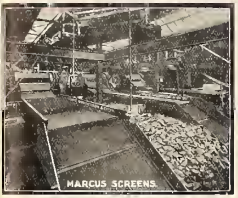

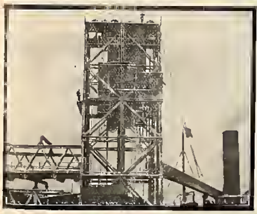

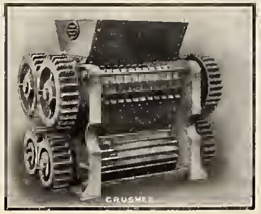

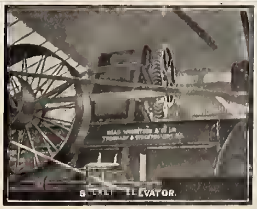

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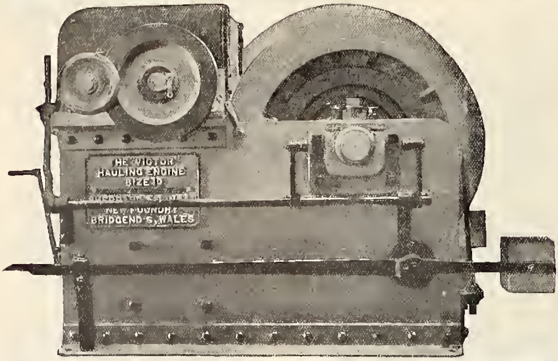
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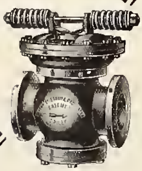

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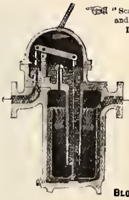

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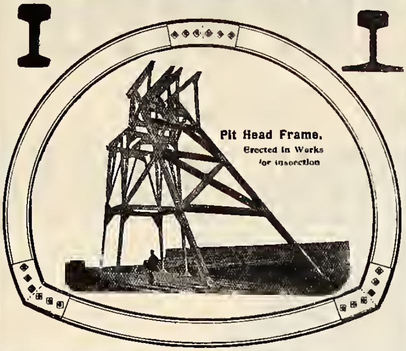
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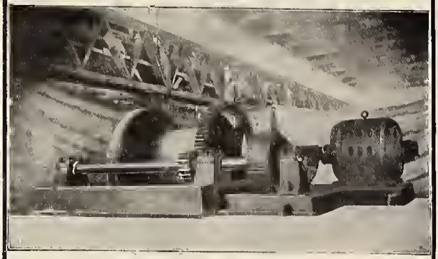

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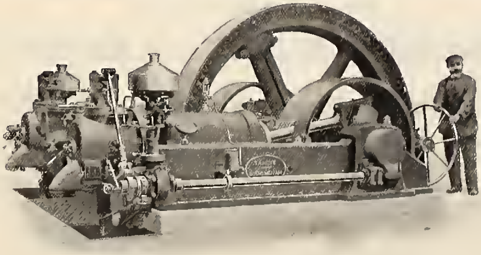

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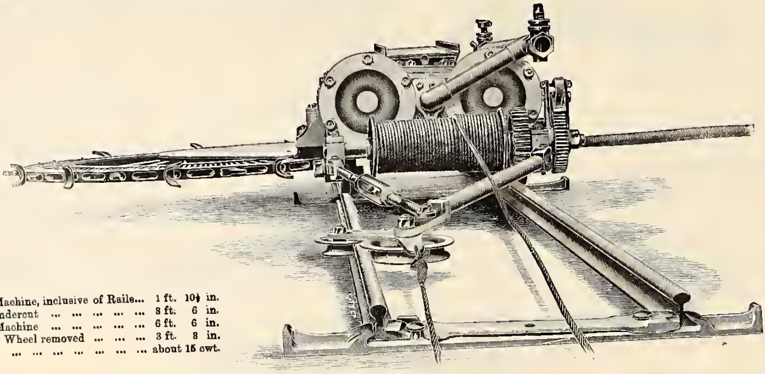

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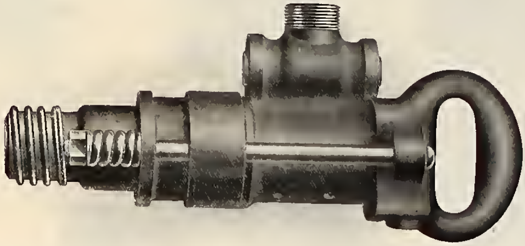

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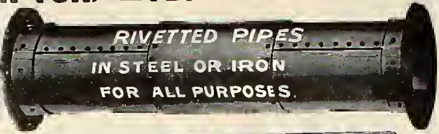

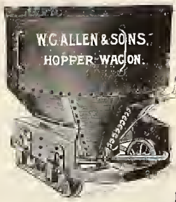

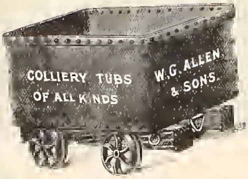

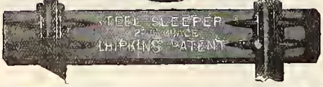

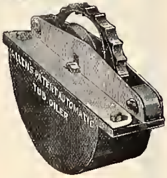

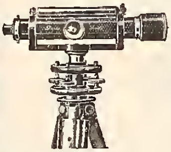

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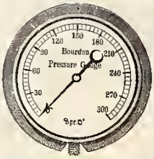

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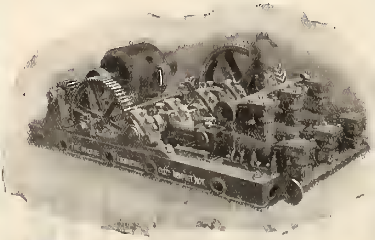

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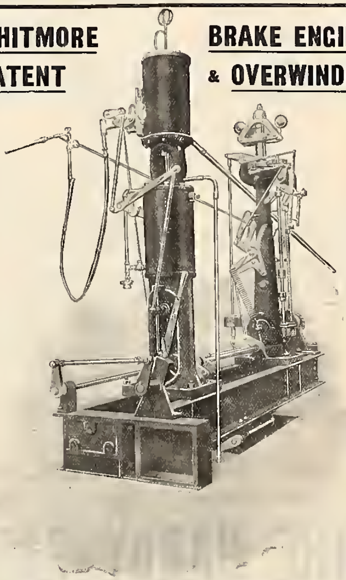

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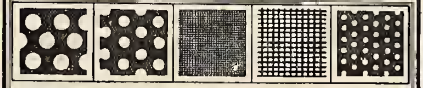

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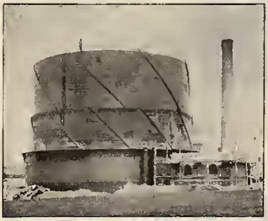

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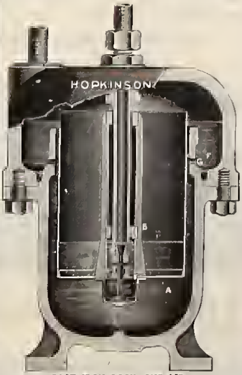

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The valve remains on its seat until the float has sunk low enough to touch the collar on valve; it then immediately begins to discharge.

The Gallery or Water Pocket F is an important feature, as it fills with water when the float is at rest; when the float begins to rise from its lowest position, the water thus collected flows through the hole G into the body A, thus ensuring a rapid elevation of the Float independent of a small amount of water passing into the trap. The valve is not rigidly connected with the bucket, and it is therefore held on to its seat until the Float acts on the Valve. This device is, therefore, most valuable under all conditions of working, but more especially when the volume of water entering the trap is small. Its lifting effect on the Float is indicated by the sharpness with which the water discharge is cut off.

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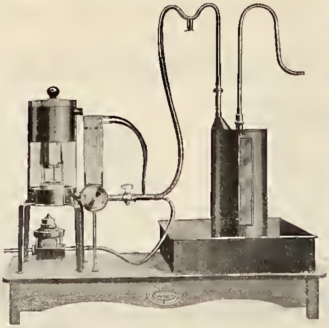

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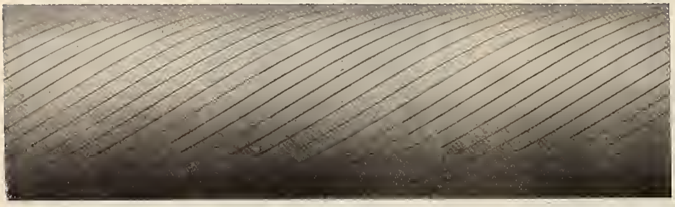

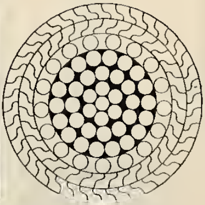

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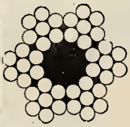

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THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CIV. FRIDAY, AUGUST 9, 1912. No. 2693.

MIDLAND INSTITUTE OF MINING, CIVIL AND MECHANICAL ENGINEERS.

Annual Meeting at Sheffield.

Professor HARDWICK, of Sheffield University, presided on Tuesday, July 30, at a meeting of the Midland Institute of Mining, Civil and Mechanical Engineers, held at the rooms of the Sheffield Literary and Philosophical Society. The attendance of members was not large.

The PRESIDENT, in commencing the proceedings, said they met that day under somewhat sad circumstances and with feelings of deep regret at the loss of three of their members in the recent accident at Cadeby Main Colliery. Their sympathy also went out to those who had lost friends and relatives in this terrible explosion. A vote of sympathy and condolence had already been passed by the council, but it was thought the members would like to join in this expression, and he therefore moved, "That the council and members of the Midland Institute of Mining, Civil and Mechanical Engineers desire to offer their sincere sympathy and condolence with the relatives of Mr. W. H. Pickering, Mr. H. R. Hewitt, Mr. G. Y. Tickle, Mr. C. Bury, and Mr. D. Chambers, and desire to place on record their appreciation of the interest taken in the Midland Institute by the late Mr. W. H. Pickering."

The resolution was carried, the members standing.

The PRESIDENT next moved that "The council and members of the Midland Institute of Mining, Civil and Mechanical Engineers offer their sympathy and condolence with the relatives of all those who lost their lives in the Cadeby Colliery disaster, and also desire to express their sympathy with Mr. W. H. Chambers and the Denaby and Cadeby Main Colliery Company."

This was adopted unanimously.

The PRESIDENT said as all the members knew, the late Mr. Pickering had been a member of the Midland Institute for some years. He came into the South Yorkshire district as chief inspector in 1901, and joined the institute in 1902. He was held in the highest esteem and regard by all who knew him. He was deeply interested in all matters connected with the mining profession and the mining community generally, taking an active part in the work of that institute, and being a regular attendant at the meetings. He read several papers and frequently took part in their discussions. For many years he was a member of the council and a vice-president.

Annual Report and Election of Officers.

Mr. M. H. HABERSHON read the annual report of the council. Mr. G. Blake Walker, the secretary, had not yet returned from his visit to Australia. The report stated that a number of new members had been admitted during the year, and at the close the number was 382. The report gave an account of the numerous interesting papers read at the meetings of the institute during the year. The balance-sheet also showed the institute to be in a satisfactory financial condition.

The report and accounts were adopted.

The PRESIDENT announced that at a degree congregation, held on Saturday, July 6, Mr. W. E. Garforth, a past-president of the institute, was presented by the University of Birmingham with the honorary degree of Doctor of Laws. On the motion of the President, a resolution was adopted congratulating Mr. Garforth on the honour conferred upon him.

A vote had been taken for president, vice-presidents, 12 members of the council, and eight representatives on the council of the Institution of Mining Engineers. The result was as follows:—

President: Prof. F. W. Hardwick (re-elected). Vice-presidents: Messrs. W. Hargreaves, J. Elce, and J. E. Chambers.

Members of council: Prof. L. T. O'Shea, Messrs. C. Snow, J. Gill, J. Mellors, E. W. Thirkell, T. Gill, H. Rhodes, J. R. Wilkinson, T. Stubbs, T. Beech, T. P. Greaves and J. H. Ashton.

Representatives on council of Institution of Mining Engineers: Messrs. W. H. Chambers, W. E. Garforth, M. H. Habershon, W. Hargreaves, T. W. H. Mitchell, J. R. R. Wilson, J. E. Chambers, and J. Elce. There was a tie in the voting between Mr. J. Elce and Mr. P. C. Greaves, and the president gave his casting vote for the former, who was elected.

Winding Ropes and Capels.

Mr. W. D. Lloyd had prepared a paper on "Some Experiences with Winding Ropes and Capels." The author, however, was, unfortunately, ill, and the paper was read by Mr. MERIVALE.

At the outset of his paper Mr. Lloyd said his notes referred chiefly to the working of one of the principal winding shafts at the Altofts Collieries. At these collieries the winding is done by a pair of vertical engines, having cylinders 40 in. in diameter with a 6 ft. stroke. The steam pressure at the boilers is 70 lb. per square inch. The drum is parallel, 18 ft. in diameter, and is lagged with steel plates. The headgear pulleys are 16 ft. in diameter. The horizontal distance between the drum and the pulley centres is 93 ft., and the vertical height of the pulley centres above the drum is 43 ft. The over rope therefore bends over the pulleys at an angle of 65 degs. 40 mins., and the under rope at an angle of 55 degs. 15 mins. The lateral angle traversed by the ropes on the pulleys during the wind is slightly under 2 degs. The cages have four decks, and two tubs are carried on each deck; the conductors are of pitchpine, and are fixed at the ends of the cages. There are rubbing-shoes on each deck and also at the top of the cage. The shaft is 12 ft. in diameter, and there are only 2 in. of clearance between the cages, except at the meeting where the guides are widened to give a clearance of $4\frac{3}{4}$ in. The weight of one cage, including the bridle-chains and detaching hook, is 2 tons 15 cwt. The weight of eight empty tubs is 1 ton 12 cwt. The average weight of coal raised per wind is 3 tons 6 cwt., but was formerly 3 tons 12 cwt. The cages are loaded at the pit bottom by means of a balance-table. The bottom deck is changed first, and the cage is then lowered by means of the brake which controls the balance-table, and the other decks are loaded in turn. At the same time, the cage at the surface is unloaded one deck at a time, the top deck being changed first. This system, which has been found entirely satisfactory in other ways, has one serious drawback—namely, if the work of unloading is carried out faster than the work of loading, the rope and chains attached to the bottom cage become very slack, and it is no uncommon thing for the detaching hook, and even the capel, to rest on the cage-top. When the Eight Hours Act came into force, it became necessary to speed up the winding, and this was achieved by unloading two decks at the same time. This tends to increase the amount of slack rope, as the cage is still loaded one deck at a time. The winding ropes are $4\frac{1}{2}$ in. in circumference, composed of six compound strands (Lang's lay) on a hempen core. Each strand has eight outer wires 0·135 in. in diameter, laid over a core composed of seven wires 0·076 in. in diameter.

Capels.

Forty-five years ago the rope-ends were prepared for capelling by turning back the wires on a binding of copper wire of No. 12 standard wire gauge, and lapping the cone so formed with a tarred band $\frac{5}{16}$ in. in diameter. The capels were at first fastened to the rope by six rivets, each $\frac{1}{2}$ in. in diameter; but hoops were gradually substituted for rivets, and for 28 years the employment of four hoops, with one rivet through the capel and rope under the bottom hoop, was the method adopted, with quite satisfactory results. Rivets have not been used for this purpose since 1899. During the period from 1866 to 1905 the ropes were never recapelled from the time when they were put on until the time when they were taken off, except on one or two occasions when the capel had been partly drawn owing to the cage catching obstructions; and although about 1,000 tons of coal were drawn daily from a depth of 1,260 ft., and some of the ropes worked for over four years, there was no failure of any sort.

About the year 1905 there was considerable discussion in mining circles as to the best method of capelling ropes. To ascertain the holding power of the capels in use at the Altofts Collieries, one of the capels was cut off from a worn winding-rope and tested at Sheffield. The rope commenced to pull out of the capel with a load of 24·2 tons. The rope having drawn to the extent of 4·25 in., the load rose to 31 tons and fell gradually to 22 tons, then rose slowly to 31·5 tons and fell to 15 tons, the rope gradually pulling out of the capel. At this point the wires bulged out of the body of the capel between the top and the second hoop, and the load rose to 34 tons, after which it gradually decreased until the top hoop pulled off and the rope slipped through. A length of the same rope was tested, and broke with a load of 84 tons, proving that the holding power of this capel was only equal to about 40 per cent. of the breaking-strain of the rope. This was considered unsatisfactory, and while it was not thought advisable to adopt the white-metal method, experiments were made to ascertain whether the existing capels could be improved in other ways.

A steel cone 14 in. long, 3 in. in diameter at the larger end, and $1\frac{1}{2}$ in. in diameter at the smaller end, was bored out to fit on the rope, and the rope was then opened out and the wires turned back over the cone. Copper wire of No. 12 standard wire gauge was used for binding the rope, and also for binding the turned-back wires. A capel was altered to suit the bulb thus made on the rope-end, and provided with four hoops. After the capel had been put on and the hoops driven down, a tapered iron peg, 7 in. long and tapering from a point to 1 in. in diameter, was driven up inside the steel cone. A capel put on in this way was tested, with the following results:—The rope began to move in the capel with a load of 15 tons; at 20 tons the movement was 0·45 in.; at 30 tons, 1·50 in.; and at 60 tons, 2·40 in.; at this load the first wire broke. Under a load of 77·70 tons, the rope broke at the point where the wires were turned over the cone, the rope having drawn 5 in. up into the capel. A length of the same rope was tested, and broke with a load of 88·6 tons, giving the ratio of the holding power of the capel to the breaking-load of the rope as 87·7 per cent. This result was considered satisfactory, although the fact that the rope broke at the point where the wires were turned over the cone was significant of a defect, to which reference will be made later. From 1905 to 1908 the ropes at all the principal shafts at the Altofts Collieries were capelled in this way, with satisfactory results, and a system of recapelling every six months was introduced.

During this period the question of using white metal was further discussed; and, after much consideration, although the fact that there must be a definite point of "arrested vibration" at the upper end of the capel with this system was not overlooked, the method seemed to have considerable advantages, and was so strongly recommended that it was finally decided to adopt it. Capels were supplied, and put on by a well-known firm of rope-makers to two ropes at one of the main winding shafts, in the summer of 1908; and, as these seemed satisfactory, on October 24, 1908, a new top rope at the shaft (described at the beginning of this paper) was fitted with a white-metal capel, which was put on by the colliery blacksmiths under the supervision of a foreman from the firm who supplied the capel and white metal. On February 25, 1909, after having been in use for only four months, this rope broke at the top end of the capel when the load (a full cage) was 180 ft. from the surface. After this accident, all the white-metal capels at the various pits were replaced by the former method before any more coal was wound.

It is interesting to record that the cages are fitted with an arrangement of levers, to which the bridle-chains are attached, designed to cause the weight of the cage to force a pair of jaws into the sides of the conductors if an accident of this sort were to occur. Although this appliance has held a much lighter cage, and would probably prevent a cage from falling when men are riding, on this occasion it failed to hold a loaded cage weighing about 8 tons, but added very considerably to the damage done to the conductors.

The capel which failed was divided in a planing machine, in order to ascertain the condition of its interior. The capel was found to have been properly put on, except that the white metal had not quite reached the upper end, which was probably accounted for by the fact that the capel itself was not sufficiently warmed before the white metal was run in. The majority of the wires were broken straight across just inside the top end of the capel, only a few, which must have held the load up to the last moment, showing signs of elongation. How long the wires had been breaking will never be known; that none of them were detected before the accident is explained by the fact that all the breakages would be either well inside the capel or under the lapping wire. The reason why the rope broke was undoubtedly that all vibration was arrested at the end of the white metal, and the wires becoming unduly fatigued at that point, gradually gave way, until only a few were left, and these were unable to bear the load. The fact has already been mentioned that, owing to the use of a balance-table at the shaft bottom, the rope becomes very slack, and this would cause a considerable amount of bending of the rope at the top end of the capel, and may have contributed to its failure. The temperature at which the white metal was run in would not exceed 150 degs. Fahr., and can have had no effect on the wires. The fact that a white metal capel, which had been in use at another pit for nearly six months doing similar work, withstood a load of 9¼ tons and then broke the gear of the testing machine, does not alter this opinion, but goes to confirm an opinion that the behaviour of a fatigued rope in a testing machine is of very little value in trying to ascertain how much the rope is fatigued.

No fault was found with the winding rope: it was recapelled twice, and continued in use for one year and four months, at the end of which time, although it was still apparently in good order, the decision was taken to replace it. The new rope was capelled in the way previously described, a tapered steel cone on which to turn back the wires being used. This method had proved satisfactory on four ropes for four and a-half years; but, on August 27, 1910, after this rope had been in use for only six weeks, the enginewright, when making his usual daily examination after coal winding had finished for the day, noticed that the rope had moved in the capel. The capel was at once cut off before any further winding was done, and it was found, on removing the capel from the rope-end, that 44 outer and 18 inner wires had broken at the point where they were turned over the cone. The failure of this capel was undoubtedly due to the same cause as the failure of the white-metal capel—that is to say, the vibration of the rope was arrested at a definite point, and the wires broke from fatigue at that point. The tapered cone was in one piece, and there was no grip on the rope inside the cone. The capel might have been improved by cutting the cone lengthways and allowing sufficient clearance, so that it would have been forced against the rope when driving down the hoops; but it was considered inadvisable to do this, as the sides might slip upwards and so spoil the cone, although this might be prevented by locking the two sides together with a dovetail, as is done with the wedges in the "Becker" or "Reliance" capel.

After this second failure it was decided, after much careful consideration, to adopt the advice of one of the leading ropemakers in the country, and return to the old method of turning the wires back on the rope itself, without using any cone or ring to enlarge the bulb, the chief alteration being made in the capels themselves, which were carefully forged on a turned mandril, tapering from 1⅝ in. to 2¼ in. in a length of 2 ft. 4 in. The hoops, four in number, were very carefully fitted, and the points to which they could be driven down with the mandril inside the capel were carefully marked, so as to ascertain whether they were driven to the same position when the capel was put on the rope. A strand of soft iron wire of No. 12 standard wire gauge, and composed of seven wires of No. 19 standard wire gauge, was used for lapping the rope, and a soft iron wire of No. 16 standard wire gauge was used for lapping the turned-back wires. At the same time, the bow of the capel was made rather lighter in section, namely, 2¼ in. instead of 2¾ in. in diameter, as there was some difficulty with the heavier capel in driving the hoops down, although the bow was, as is usual with this type of capel, made hot before driving down the hoops.

The reason why the former capels had been made so heavy, and out of all proportion to the load which they had to carry, was that 18 months previously, and only two months after the failure of the white-metal capel, a loaded cage weighing eight tons was brought to bank at another pit by a capel, one side of which had snapped and opened out ⅝ in. As the capel was made of best Yorkshire iron, and had only been in use for two months after being annealed, the cause of its failure could only be attributed to the inferior quality of the metal.

It was not expected that this new capel would hold more than about 50 per cent. of the breaking strain of the rope; but on testing one after it had been in use for six months, although the rope started to move at 31 tons, it required a load of 54·68 tons to keep the rope moving after it had pulled up 10 in. into the capel. The rope finally pulled out with a gradually decreasing load, but it was noticeable that, even up to the moment when the rope-end passed the top hoop, the load was about equal to the dead weight of a loaded cage. This test was confirmed by another, which gave practically similar results, and these were considered satisfactory.

It is questionable whether it is advisable in the interests of safety to have a capel which will break the rope before it draws even a fraction of an inch. A capel such as that described above will draw a couple of feet and still hold the load. Up to a certain point, the strain which is necessary to draw it increases with every inch of travel, and this should have a useful retarding effect on the masses in motion. In this case the capel has a factor of safety of fully 5 to 1. This factor must not be compared with a factor of safety of 8 to 1, or even 10 to 1, which is usually considered necessary for winding ropes, as these have to withstand fatigue and wear, and possibly corrosion, to which a capel of this sort is not subjected; and, moreover, the capel is changed every six months, whereas the rope may have a life of 3½ years.

Whilst the tests of these capels were being made, it was noticed that the turned-back wires did not maintain their position with regard to the rope. The rope drew out faster than the turned-back wires, with the result that the position of the bend in each wire was constantly altering. The iron lapping-wire gradually broke up into short pieces, so that, with the exception of a certain number of broken wires, the rope when finally drawn out of the capel presented much the same appearance as it did when the wires were opened out and cut off ready for turning back. This led to experiments being made, with a view to stopping the movement of the turned-back wires. As obviously the best way was to fasten the bend with white metal, a rope-end was prepared for capelling by binding the rope with iron wire in the usual way; but before the wires were turned back they were thoroughly cleaned, and instead of being bent back at the end of the lapping, the wires were left about 10 in. longer than usual, and the bends made 10 in. from the end of the lapping, the hempen core being cut off close up to the lapping. The capel was then put on and the hoops driven down lightly; the capel was then placed in a vertical position, and, after the openings on each side had been luted with clay, suitable white metal was poured into the large end. After cooling the capel was removed, and it was found that the white metal had made a solid cone of the lower 10 in., while the remaining 18 in. of the capel were in the ordinary condition. The capel was put on and the hoops driven home, and on testing the rope broke with a load of 90·75 tons at a point inside the capel about half-way between the white metal and the top end. The rope moved slightly in the capel with a load of 40 tons; with a load of 60 tons it moved 0·25 in., and with 80 tons 0·80 in. This form of capel is really a combination of the old method with the white-metal method; and, while it has the advantage over the latter of being stronger than the rope, it greatly modifies the objection to the white-metal method in that there is no definite point of "arrested vibration." A rope capelled in this way was used for four months, and, so far as could be ascertained by taking the rope-end to pieces wire by wire, the rope and capel were still in excellent condition when taken off; but, for the reasons given above, this method has not been generally adopted.

Ropes.

For 33 years coal was wound at the shaft referred to from a depth of 1,260 ft., an output of rather less than 1,000 tons per day being drawn. Since 1880 the ropes have been mostly supplied by one maker. The ropes have been 4¾ in. in circumference, and constructed of six compound strands (Lang's lay) on a ¾ in. hempen core, each strand being composed of eight wires 0·135 in. in diameter laid over a core of six wires 0·076 in. in diameter on one wire of the same section; 15 wires form each strand, and 90 wires and the hempen core form the rope. The wire is drawn from steel made from Swedish charcoal iron, and during the period referred to was probably drawn up to 105 to 110 tons per square inch breaking strain, although, as it is only within the last 10 or 12 years that reliable testing machines have been in use, there is some doubt as to how near the wires actually were to this specification. The results given by these ropes were very satisfactory. Towards the end of the period the average life was fully three and a-half years, and the last pair of ropes worked for over four years. The only noticeable defect, if it can be so called, was that the wires frequently gave way at the brazings. The over ropes had, as a rule, a longer life than the under ropes, but not to any marked extent.

An interesting departure from the usual practice was made to overcome the difficulty of the ropes not lapping evenly across the drum, the cause being that the headgear pulleys could not be placed in a correct line with the drum. By making the top rope, which travelled from right to left across the drum, with a left-hand lay instead of the usual right-hand lay, this defect was entirely remedied.

Since the year 1901, the shaft having been sunk to a lower seam, coal has been wound from a depth of 1,500 ft. The lower seam is thinner than the upper one, and the tubs, which are taken along the face to be filled, hold rather less coal. For four or five years, while the seam was being developed, the daily output did not reach 1,000 tons, and there was no noticeable decrease in the life of the ropes; but from 1905 the output has been increased considerably, and, despite the limited period allowed for winding under the Eight Hours Act, an average output of 1,100 tons per day is being drawn from a depth of 1,500 ft. in less time than an average output of 950 tons was formerly drawn from a depth of 1,260 ft. The reduction in the actual hours of coal winding is 40 minutes — that is, from 8 hours 40 minutes to 8 hours. At first sight the extra work of drawing 150 tons more per day from an increased depth of 240 ft. would not appear to be very great, and the management were rather at a loss to account for the reason that the life of the winding ropes was being very materially decreased; but, on looking closely into the matter, a remarkable and interesting fact was disclosed.

An output of 950 tons per day of 8 hours 40 minutes is equal to an average of 110 tons per hour, and an output of 1,100 tons in 8 hours is equal to an average of 137 tons per hour. The weights of the cages and tubs in each case are practically the same, namely:—Cages, 2 tons 15 cwt.; tubs, 1 ton 12 cwt.; the weight of the rope in the shaft in the first case was 2 tons 1 cwt.; in the second case, 2 tons 9 cwt.; but, owing to the seam being thinner, only 3 tons 6 cwt. of coal are now raised per wind as against 3 tons 12 cwt. formerly. To raise 110 tons of coal per hour at 3 tons 12 cwt. per draw requires 30 draws per hour. To raise 137 tons of coal per hour at 3 tons 6 cwt. per draw requires 41 draws per hour. The dead load, apart from coal, and allowing half the weight of the rope in the shaft, was 5 tons 7½ cwt. formerly, and is now 5 tons 11½ cwt. The work done per hour in each case is as follows:—

1. Coal, 110 tons + deadweight (30 × 5·375 = 161 tons), or 271 tons raised 1,260 ft. = 341,960 foot-tons per hour.

2. Coal, 137 tons + deadweight (41 × 5·575 = 228 tons), or 365 tons lifted 1,500 ft. = 547,500 foot-tons per hour.

It therefore appears that the ropes are now doing 60 per cent. more work per hour, and the extra fatigue caused thereby no doubt largely accounts for the fact that their life has decreased from an average of three and a-half to only one and a-half years. This is perhaps an exceptional case; but it indicates a detail which was doubtless overlooked by those responsible for the Eight Hours Bill, and probably by many mining engineers—namely, that if the same output is to be drawn in less time, the ropes must suffer; indeed, in some cases their life will be reduced to an almost unbelievable extent on account of the extra fatigue, and unless this fact is taken into account serious accidents may happen.

Testing of Worn Ropes.

A few months ago the under rope, which had been in use for only one year four and a-half months, and during that time had been twice recapelled, was again cut for recapelling; in the length of rope (about 2 ft.) which was opened out to prepare the wires for turning back, three outer wires and two inner wires were found broken. The rope up to that time had been considered to be in good condition, as, although it was beginning to show signs of wear, by external examination, only some 10 broken wires had been found distributed through the whole length; and, as the majority of these breakages were at points where the wires had been joined by brazing, no particular importance was attached to them. The length of rope (about 12 ft.) which had been cut off with the old capel was carefully examined. In the whole length of 12 ft., 27 breakages were found in three strands, and although no breaks were found in the other three strands, the fact that two strands out of six were practically broken was sufficiently alarming, and orders were given to recapel the rope again at once. In doing this work, and in the 14 ft. of rope cut off, nine more outer wires were found broken, making in all 41 breakages found in about 30 ft., besides a considerable number of broken inner wires in the second piece, which were not counted. A very marked crushing-line was found wherever the strands rested on each other, and the breaks appeared to be nearly all at points where the wires were crushed. It was evident that the rope was much fatigued, and, as it was decided not to run any risk by continuing to use it, a new rope was put on at once.

As it was decided to have tests made of the worn rope, a length of 10 ft. from the capel end was reserved for testing as a whole; a further length of 40 ft. was then cut off, together with a sample from the middle of the rope and a length off the drum end, that had done no work, and these were sent to the makers for testing. The following table shows the comparison between one strand taken from the drum end (new rope) and one strand from the capel end (worn and fatigued rope). Each wire was taken separately, and the figures are the average of the eight outer and seven inner wires in each case:—

OUTER WIRES, 0·135 IN. IN DIAMETER.

	Drum end.	Capel end.
Torsion in 3 in.	10·87	10·25
Bends at right angle, 7·5 mm. in radius	7·5	7·87
Breaking strain, in pounds	3,887	3,828

INNER WIRES, 0·076 IN. IN DIAMETER.

	Drum end.	Capel end.
Torsion in 3 in.	15·28	15·28
Bends at right angle, 5 mm. in radius	8·28	7·7
Breaking strain, in pounds	1,224	1,180

The aggregate breaking strain for the new strand was 39,670, and for the worn strand 38,890 pounds.

The conclusions drawn from these tests are that the outer wires only show a decrease of 1·5 and the inner wires of 3·5 per cent. in breaking strain. The mechanical tests of the worn wire are strikingly similar to those of the wire which had never been used. The total loss in breaking strain for the one strand is only 780 lb., or, if spread over the whole rope, 35 cwt. This difference under test would probably be entirely accounted for by the loss in sectional area due to wear. The 40 ft. length of rope was taken to pieces, and although only two outer wires were found broken in two separate strands, 17 breakages were found in 11 of the inner wires, but these were distributed over the whole length; it would appear that at this distance (78 ft. from the capel) the rope was much less fatigued, and if it had been possible to cut off this length of rope, the remainder might have been safely worked for a further period.

As before mentioned, there was very considerable internal bruising, and with the view of ascertaining what effect this had had on the rope, and also of confirming the foregoing tests, the following additional tests were made:—Lengths of two strands from near the capel were taken, one from a strand which showed no broken wires, and the other from close to where several wires had been broken at the same place. These two samples were each cut into two pieces, one to be tested whole, and the other for each individual wire to be tested separately in long lengths, to include two bruises and two points of external wear.

The aggregate breaking strain of all the wires in the first strand was 38,180 lb., and the strand as a whole broke with a load of 38,227 lb.; the aggregate breaking strain of the wires of the second strand was 38,380 lb., and the strand broke with a load of 38,247 lb. The average torsion of the outer wires was 10·4 and 10·25 and the average bends 7 and 7·37 respectively. On short lengths free of bruises and wear the aggregate of the outer wires was 30,480 as against 29,370 lb. for the longer lengths in the first strand, and 30,570 as against 29,560 lb. in the second strand. The comparative figures from the two previous tests were 31,100 for new outer wires and 30,630 lb. for worn outer wires. Finally, the rope as a whole was tested on the piece cut from 30 ft. above the original capel, and broke at 90·8 tons.

The conclusions drawn from these tests are as follow:—

1. The aggregate of the worn strands shows a decrease in breaking strain of only some 3½ per cent.

2. The short lengths of outer wires show a decrease of only 1·6 per cent., although the longer lengths, including bruises, show a decrease of 5 per cent.

3. The loss in breaking strain owing to the cutting or bruising is far less than one would expect from visual examination; probably the actual section is less disturbed than appears, owing to the steel flowing somewhat.

4. The similarity of the breaking-strain of the strands and the aggregate breaking-strain of their individual wires is remarkable; contrary to expectation, the strands broke at practically the same load as the aggregate of their individual wires.

5. Taking the actual breaking strain of one strand, the total for the rope should be 102 tons, whereas it broke under test at 90·8 tons, or a difference of 11 per cent.

6. Tests of this sort, although indicating remarkable accuracy of the machines used and uniformity of the wire, give absolutely no guidance as to the deterioration of the strength of a rope for working purposes. This experience may impress a fact which, although it is fairly well known, may be new to some members—that steel wire, however much it is fatigued, will hold its full load up to the moment when it parts, the only factors which appear to make any difference being actual loss of sectional area by friction or corrosion.

The main factor which determines the life of a winding-rope is fatigue. The actual loss of strength caused by wear due to friction is usually comparatively slight, except perhaps in exceptional cases or with badly-designed plant. Loss of strength by corrosion should not occur at the majority of pits if the ropes are properly lubricated from the day that they are put on. Fatigue is not caused altogether by the actual lifting of the weight, and imparting to it the required acceleration, but principally by vibration; this may be increased by numerous causes, among which may be mentioned uneven coiling of the rope, flats on wooden-lagged drums, variations in the diameter of conical drums, uneven running of engines, valves hanging or sticking, vibrations of the cage due to the conductors (particularly where wooden guides are used), and last, but not least, want of care by the engineman in the handling of his engines. It should be remembered that vibration set up in a rope travels in waves, which must act in the same way as all other waves—that is, that at any point where they are arrested they are reversed and travel back for a certain distance in the opposite direction. In a steel wire rope the points where the waves are reversed, and where they meet each other when travelling in opposite directions, are the points where the wire will be most quickly fatigued. This is the reason why a rope generally shows signs of wear in lengths between the pulley and the drum at the start of the wind, and between the capel and the pulley at the end of the wind, particularly in the latter, because the waves of vibration of the rope in the shaft as the cage is brought to bank are held up in a rapidly decreasing length, which at the pit referred to is reduced at the end of the wind to 7 ft.

It is well known that the best steel wire may be drawn down until it is capable of withstanding a very high tensile strain, but that the higher the breaking strain of the wire the less able it is to stand fatigue and bending. In making enquiry into the life of the winding ropes referred to in this paper, it was thought that the cause of the unsatisfactory working of the ropes might be, at any rate, partly due to the wire having been been drawn to too high a tensile strain. On looking into the matter, it was found that until the last few years, owing to the difficulty of obtaining accurate testing machines, the tests of wire used were unreliable; but the following figures for the last few ropes are interesting, and confirm this opinion:—

Year.	Breaking strain of wire in tons per square inch.	Torsions in 8 in.
1904	110	—
1905	113	28
1907	114	26
1909	118¼	23

In conclusion, the writer is of opinion:—

1. That neither the rope nor the capel that yield the best results in the testing machine will necessarily give the best results for actual work.

2. That, in order to obtain good results, even the best quality steel should not be drawn for winding purposes to more than 105 to 110 tons per square inch breaking strain; that wire of a diameter of 0·135 in (or No. 9½ standard wire gauge) is the very largest size that can be drawn satisfactorily to over 110 tons per square inch; and that better results and greater safety will be obtained by using more wires of a slightly smaller diameter, made of the best material, but not drawn over 105 to 110 tons per square inch, even if the factor of safety is nominally decreased to 8 to 1, than to have the wire drawn to 115 to 120 tons per square inch in order to obtain a so-called "factor of safety" of 9 or 10 to 1.

3. That in testing fatigued ropes the tensile test is of little use, except that probably some information may be gained by observing the modulus of elasticity as this decreases with fatigue; or, in other words, fatigued wire will generally give a short fracture, while new wire will show a certain amount of elongation at the point of fracture. Of the mechanical tests, bending will give some information when the rope is much fatigued, and is probably more reliable than the torsion test, which is often upset by the wires having lost their uniform section by wear, by corrosion, or by crushing. None of these tests will give any really useful information as to the load which a fatigued rope is fit to carry. By comparing properly-prepared specimens of steel wire under the microscope, a practised observer can detect signs of fatigue by the alteration in the structure of the steel; but it is doubtful whether such examination could be employed by a colliery manager in determining the safe life for a winding rope.

As regards capels, the writer maintains that the old form of capel, though old-fashioned, if properly put on, is still the safest; and that, in addition to recapelling ropes every six months, the rope-ends cut off should be carefully taken to pieces and examined for corrosion and internal broken wires.

Discussion.

Mr. Chadwith, of Messrs. Charlesworth's Collieries, forwarded a contribution to the discussion in which he referred to a failure of the white metal capel at Newmarket Silkstone Colliery. The breaking strain was 76 tons. After being in use four months the rope broke 2 in. inside the white metal capel. The capping had been examined only a few hours before the accident. The wires broke from fatigue at the point where they were fastened with the white metal.

Mr. Merivale remarked that at Middleton they had a similar experience.

The President referred to Mr. Lloyd's paper as an exceedingly useful contribution to the papers of the institute. It carried forward a series of papers which had been contributed to the *Transactions* of the institute at various times, notably by Mr. Mitchell when he was president. The paper proved that there were various things to be taken into account which could not be brought out by simple tests on a testing machine, such as the important point of vibration and the strain on the rope and the capel, and the effect from the rope having to be raised with the chains slack. Previous papers dealt extensively with this subject from the point of view of tests made on a testing machine. These were valuable, but Mr. Lloyd's paper showed clearly that other factors came in which could not be disclosed on any testing machine.

Mr. M. H. Habershon, in moving a vote of thanks to Mr. Lloyd for his paper, remarked that this series of papers dated back to 1905, and he remembered at the time, when mining engineers began to doubt the reliability of the old type of capel, a number of them were sufficiently interested in the matter to have tests made, and it was found that the type of capel then in use did not give results as satisfactory as they would like. He then called attention to a type of capel which had not been adopted to any large extent in this part of the country, but which was largely used in South Wales. He had always had some doubt in regard to the superiority claimed by many mining engineers for the white metal capel. He thought any capel formed by turning wires back was not satisfactory. He believed the best type of capel was one in which the wires were not turned back, but where the strands were opened out and laid over, maintaining an exact lay of the original rope, the space between the various strands being filled in with a short piece of rope. In that way a tapered cone was produced which was inserted into the capel, and after being secured by bands they got a solid cone which could not be pulled out of the capel. This was in use in many pits in South Wales, and experts there would certainly not abandon it for any capel made with white metal. As to testing ropes he thought what they wanted was a more systematic test carried out at an independent laboratory. It would be most valuable if they could have these tests made at some institution where not only the means were to hand, but where suitable men accustomed to investigations of this sort could give close attention to the subject. They did hope that the technical department of Sheffield University might have been able to do something in this direction, but it was not so easy a matter as it appeared to be.

Mr. G. H. Winstanley contended that experiments with working models were misleading. They could not reproduce or throw much light on the conditions met with in actual working. He was strongly of opinion that the use of clay in this work was not only unsuitable, but highly dangerous. Steam might be generated which would not only prevent the white metal properly fulfilling its function, but would also lay the best possible foundation for corrosion at this unfortunate point in the rope. Instead of clay a wrapping of asbestos yarn held in position with soft iron wire was quite sufficient. The ideal capel was, of course, one which would begin to draw with a serious excess of load, and would continue to draw with increasing resistance until finally attaining the strength of the rope, but without risk of parting with it. He referred to the misleading nature of mere tensile tests—the main factor was fatigue. There was, he believed, a machine which made the fatigue test, and it was on this that the life of the rope depended.

Thanks to Mr. Lloyd were adopted, and Mr. Merivale was also thanked for reading the paper.

Ventilating Machines.

A discussion took place on a paper on "Modern Forms of Ventilating Machines," read by Mr. W. Charlton at a meeting of the South Staffordshire Institute.

The President remarked that perhaps the most interesting part of the paper was that which dealt with the arrangement for reversing the air current. The paper, as far as he could make out, dealt more particularly with methods of reversing at the fan itself, and did not deal with special arrangements in the pit. This matter was important, for if they reversed the air current in the mine there was the question of the separation doors.

Mr. W. P. Abell said he had been struck with the fact that Mr. Charlton ignored the wonderful improvements which had been made in the older type of fans, such as the Guibal and Waddle machines. The author had also overlooked the fact that in the most recent modernised fans other recognised types of speed-reducing gear were employed than ropes, promoting efficiency and lessening the risks of breakdowns and fire. In considering the life of a fan they should not neglect the insidious corrosive effect of mine air on short blades arranged at the circumference. Undoubtedly the effect would be a disastrous burst, because the short blades moved so rapidly out of the line of vision as to render it impossible to detect corrosion. Mr. Abell referred to his experience with hydro-extractors as supporting his views on this point. Mr. Charlton did not say anything as to the reduction of inlet into these modern fans, so that they were unable to tolerate any resistance. The size of inlet into the old type offers for a given quantity of air was nearly double that now used in the short-bladed fans for the same quantity of air.

Mr. J. Gill said they had had a fan running for 40 years. As far as the new regulations went he did not know any fan that could not be made to meet them.

Mr. Winstanley, speaking of high speed centrifugal machines, alluded to the steam turbine and turbo-compressor. He was inclined to think that in condemning the new type of machines Mr. Abell had forgotten this remarkable development.

Mr. Abell said he had not. In a steam turbine and turbo-compressor they had a non-corrosive fan. They also had an instance where everything was so enclosed that in case of an explosion little or no damage was done. But in a colliery everything was totally different, and they would be certain to have serious results if to gain anything they even sacrificed efficiency.

Mr. T. Stubbs said his experience was that the corrosion trouble was quite a negligible quantity.

Thanks to Prof. Hardwick for presiding concluded the meeting.

Mr. John Chear, of 57, Stanley-street, Tunstall, Staffordshire, secretary of the Chatterley Whitfield Collieries Limited, and a former president of the North Staffordshire Colliery Owners' Association, who died on May 10 last, aged 49 years, left estate of the gross value of £5,229, of which £5,193 is net personalty.

THE NEW "HARDY-SIMPLEX" HAMMER DRILL.

The "Hardy-Simplex" rock drill, manufactured by Messrs. the Hardy Patent Pick Company Limited, of Sheffield, has proved in practice a highly successful machine, and large numbers are at the present time in operation at collieries for driving stone drifts and ripping, for which work its durability and high speed specially commend it.

It is therefore a matter of no little interest to record the introduction by the makers of a new model, embodying very substantial improvements upon the earlier types. In the patent "Hardy Simplex" hammer drill, B6, the valve action is in principle that of the "Hardy-Simplex," *i.e.*, air pressure is suddenly reduced at one end of the valve when the piston uncovers the main exhaust ports, and the full pressure acting on the opposite end causes the valve to travel to the other side of the valve box, and thereby change the direction of the motive fluid and reverse the piston or hammer. The valve does not depend on compression set up by the piston in order to accomplish its reversal, and, therefore, is not like other types, dependent on a tight piston and cylinder. In addition, although there is a movement of only $\frac{1}{64}$ in. in order to cut off the main air supply, there is a further considerable travel before readmitting air. Therefore on the one hand all valve losses are practically eliminated, and on the other hand the delay in readmitting air in quantity for the reversal of the piston diminishes internal resistance, and gives a very powerful blow, with an air consumption reduced to a point beyond which it is difficult to believe that any material economy can be effected. As a matter of fact, this B6 machine uses 40 per cent. less air than the original "Hardy-Simplex" (which, we believe we are right in saying, has never been equalled for speed of boring by any other maker), and has a higher boring speed than the original "Simplex" by some 10 to 15 per cent. This goes to substantiate the claim of the makers that the new valve action has given the most economical and powerful hammer drill of its weight (27 lb.) ever placed on the market.

In previous types of the "Hardy-Simplex" the valve piston was semi-cylindric, the unbalanced exhaust area compensating wear to valve and valve seat—a most valuable feature in comparison with the ordinary round piston valve, so subject to rapid wear and consequent heavy leakages with reduced boring speed. It was the great freedom of the "Simplex" from these defects that gave it pre-eminence amongst rotary hammer drills, and in the new type it has been found possible, by providing end contact joints instead of surface joints, to preserve the feature of great durability possessed by the "Simplex," without the disadvantage of the slight friction on the valve seating, caused by the unbalanced exhaust area. In other words, the new valve will preserve its fluid tightness indefinitely, whilst at the same time it is perfectly balanced, and so light as to have a speed hitherto thought absolutely unattainable. These points will at once commend themselves to the experienced user of hammer drills, and reference to the section of the machine, fig. 2, will show at a glance the arrangement of the valve box and parts. This is even more clearly shown in the section of the valve box, fig. 3. The photograph, fig. 1, gives a general view of the drill.

The cylinder and valve box are forged together in one piece of special steel, bored, and case-hardened to a glass hardness, and then accurately ground to the thousandth part of an inch by special machinery. These cylinders are practically unwearable, nothing but high-speed emery wheels having any effect on the surface. This is, or should be, the most expensive part of a drill, and the makers have succeeded in providing a cylinder, probably more adequate to sustaining the terrific strain of hammer drill work than is to be found in any other machine on the market. The cylinder examined by us is a model of high quality in material and workmanship.

The valve and valve bush are both manufactured from special alloy steels, carefully chosen on the advice of experienced metallurgists, and with a full knowledge of the requirements of hammer drill service. Both parts are hardened to suit the demands made on them, and lengthy tests have shown wear to be inappreciable, whilst such slight wear as may eventually take place has no apparent influence on the working of the drill as regards rapidity or economy. The valve moves with practically no shock, and is provided with efficient buffering devices. It will be observed that the valve is of about the same length as diameter, thereby ensuring steadiness of working and immunity from any tendency to wedge itself or assume an oblique position, such as may be the case with disc or plate valves.

The rotation is effected, as in the earlier type of "Simplex" drills, by means of rifle bar and ratchet wheel situated at the rear of the machine, in combination with a number of straight grooves cut in the piston or

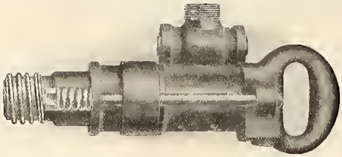


FIG. 1.—THE NEW "HARDY-SIMPLEX" HAMMER DRILL, B6.

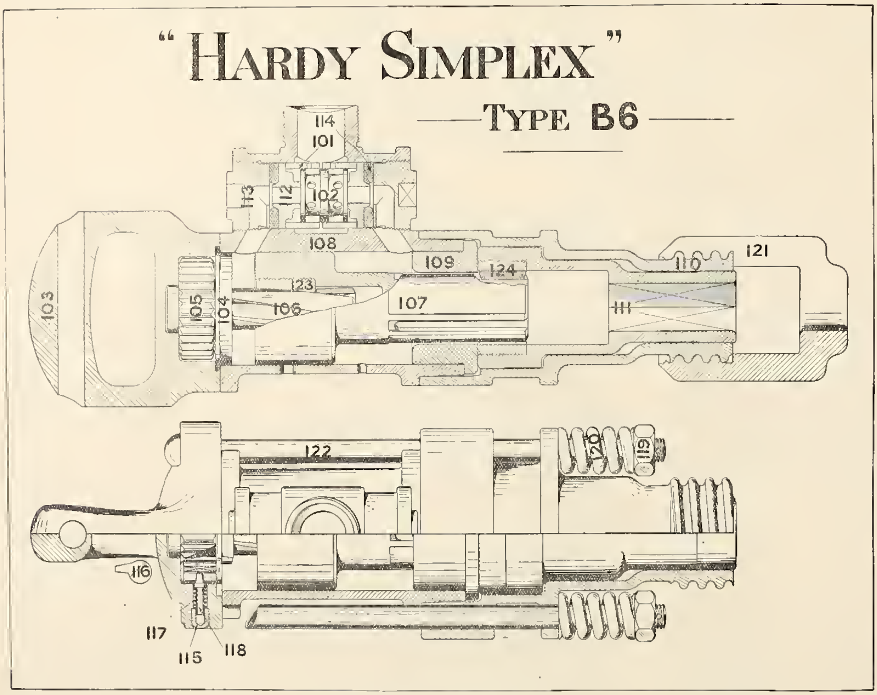


FIG. 2.—SECTION AND PLAN OF DRILL.

hammer working through a steel guide nut situated in the chuck or drill holder. All parts of the rotation device are of hardened steel and readily renewable, no phosphor bronze being employed anywhere in the machine. The speed of rotation has been carefully studied to give the best results as regards the evacuation of the boring detritus in all classes of rocks.

The piston or hammer is specially heat treated and hardened to give maximum life without danger of breakage. It is as light as experience has shown permissible with regard to effective blow, and its proportions enable a maximum number of blows being imparted without sacrificing the weight of blow necessary to chip the hardest rocks. The piston is some degrees less hard than the cylinder, as of course it should be, to lessen risk of breakage and restrict repairs, as between cylinder and piston, to the part which is less expensive and more easily replaced.

The drills are retained by means of a cap, which is provided with a round thread of great strength, screwing over the front of the drilling machine and embracing the collar on the drill shank. The cap is slotted to its full length, thereby enabling the machine at once to be disengaged from the drill steel, should this for any reason become necessary. This cap is a far more rigid and convenient attachment than many of the ordinary spring devices employed in rock drills, and is a great time saver.

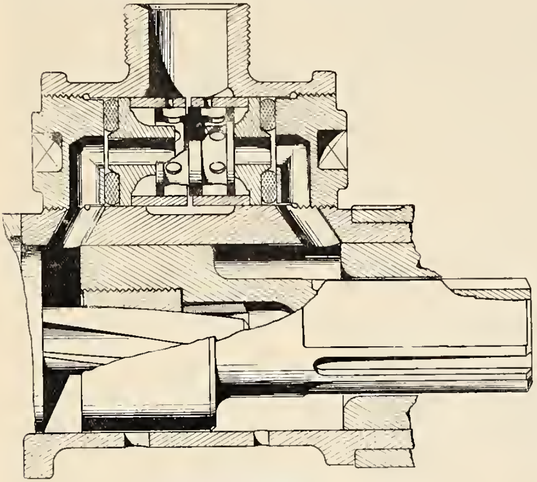
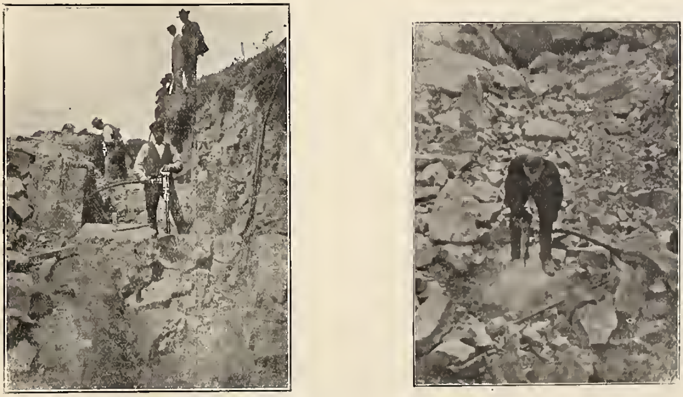


Fig. 3.—Enlarged Section of Valve Box.

A most important feature of the new design is its great rigidity, ensuring the constant alignment of the machine, and thereby giving a maximum output in spite of wear and tear. It will be observed that the whole of the parts are enclosed, and that from the front of the cylinder there is only one joint of large diameter, whereas the usual practice is to have at least two joints of small diameter, which may cause bending and straining of the various parts of the machine, especially when working in difficult ground. In the new "Hardy-Simplex," on the contrary, the front parts are all enclosed in one solid cover of large diameter, which fits over the cylinder and is absolutely immovable through side strains. Consequently the machine, in addition to being extraordinarily rigid, must be in perfect alignment, and if properly lubricated, must continue to give smooth easy running under all circumstances.

To dismantle the cylinder and component parts it is only necessary to unscrew two nuts.

The "Hardy-Simplex," B6, will bore holes easily up to 12 ft. in depth where necessary. The best air pressure to employ is from 40 lb. to 75 lb. per square inch. The same machine is equally suitable for solid, hollow, or spiral drills, as exhaust air only is used for blowing out the dust. The complete drill, with 50 ft. hose, inlet cock and couplings, and one set of hollow or twist drills to 6 ft. in depth, costs £28 Figs. 4 and 5 show the drill at work in a quarry.


Figs. 4 and 5.—The "Hardy-Simplex" Drill at Work in a Quarry.

NORTH OF ENGLAND INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

Mr. M. W. Parrington, retiring president, occupied the chair at the annual meeting of the members of the North of England Institute of Mining and Mechanical Engineers, held in the Wood Memorial Hall, Newcastle-upon-Tyne, last Saturday afternoon.

At the outset of the proceedings, votes of condolence with the relatives and friends of the late Mr. W. H. Pickering, H M. inspector of mines, and of the late Mr. T. W Benson, were moved by the President, and unanimously agreed to.

Mr. Parrington referred to the devotion to duty which resulted in Mr. Pickering's sudden death, and to the fact that Mr. Benson was one of the oldest members of the institute.

The council reported that a portrait of the late Mr. Cuthbert Berkley had been presented to the institute by Mr. Fredk. Berkley Matthews, and added to the portrait gallery. The council had awarded a prize to Dr. Frederic Chas. Garrett, M.I.M E., and Mr. R. C. Burton, for their paper on "The Use of X Rays in the Examination of Coal," and one to Mr. Geo. J. Ralph for his paper on "The Holmes-Ralph Gas-detecting Portable Electric Lamp." An old Davy lamp had been presented by Mr. J. A. Dixon, of Shilbottle, towards the new collection of safety lamps which the institute was forming to replace those lost in the Brussels Exhibition fire.

The following gentlemen were admitted into the institute:—Members: Mr. Jas. Wilfred Burford, mechanical and electrical engineer, c/o Sir Boverton Redwood, Bart., 4, Bishopsgate-street Within, London, E.C.; Mr. John Eskdale, engineer, Ashington Colliery, Morpeth; and Mr. Thos. Welsh, engineer, West Stanley, county Durham. Associate member: Mr. Carl Cooper, 104, Lauderdale-mansions, London, W. Student: Mr. Thos. Arthur Saint, mining student, Heatherlea, Choppington, Northumberland.

Annual Report.

The council's annual report stated that the total membership now was 1,298, as compared with 1,342 in 1911, 1,361 in 1910, 1,358 in 1909, 1,358 in 1908, 1,307 in 1907, and 1,349 in 1906. The somewhat large decrease in the membership was a matter for regret, and was due to the exceptional number of deaths and resignations. The additions to the register numbered 61, and the losses by death, resignation, &c., 105. The resignations numbered 55.

The library had been maintained in an efficient condition during the year, and now contained about 13,599 volumes and 443 unbound pamphlets.

The three years course of lectures for colliery engineers, enginewrights, and apprentice mechanics had been continued at Armstrong College, Newcastle, on Saturday afternoons. Several colliery owners had paid the fees (£1 10s. per annum) and railway expenses of pupils attending the classes from their collieries. During the past year, the lectures of the Michaelmas term on "Transmission of Power" were attended by 32 students, and on "Pumping and Ventilation" by 33 students, 31 of whom sat for examination, 22 passing; and during the Epiphany term, the lectures on the "Metallurgy of Iron and Steel" were attended by 30 students, and on "Mining Machinery" by 32 students. 28 of whom sat for examination, and 21 passed. Certificates had been awarded to the following students, who had completed the three years course:—Messrs. G. W. Bell, R. O. Carr, W. Grey, E. T. Hardy, and J. J. B Jefferson. The first and second prizes for the 1911-12 session had been awarded to Mr. E. J. Hardy and Mr. F. Scott respectively.

Mr. Thos. Douglas continued to represent the institute as a governor of Armstrong College, Mr. T. E. Jobling upon the board of directors of the institute and Coal Trade Chambers Company Limited, and the president continued a representative governor upon the court of governors of the University of Durham College of Medicine during his term of office. Mr. J. H. Merivale and the president represented the institute on the council of Armstrong College. Prof. G. A. L. Lebour would represent the institute at the British Association conference, to be held in Dundee, commencing on September 5 next. The president and hon. secretary represented the institute on the provisional committee for the proposed exhibition to be held in Newcastle in 1914.

No application for the Daglish Fellowship—founded by funds willed to Armstrong College by the late Mr. John Daglish for founding a Travelling Fellowship, candidates for which must be nominated by the institute —had been made for the current year.

The committee appointed (with Mr. Stanley Smith as secretary) to report upon the carboniferous limestone formation of the north of England, with special reference to its coal resources, had completed its investigations, and the report would be published during the course of next month. The supplementary volume to "An Account of the Strata of Northumberland and Durham, as Proved by Borings and Sinkings," having completed that work, the council was inviting members and others to contribute sections of strata in the counties of Cumberland and Lancashire, with a view to their being published at some future date.

The report was adopted on the motion of Mr. Parrington, seconded by Mr. J. H. Merivale.

Mr. Reginald Guthrie presented the report of the finance committee for the year ended June 30 last. This showed that the total receipts were £2,877 0s. 2d. and the expenditure £2,534 7s. 9d. From these figures it would be seen that the balance of income over expenditure was £342 12s. 5d. Adding to that the amount of £31 10s. 6d. brought forward from the previous year, there was a credit balance of £374 2s. 11d.

Mr. Merivale moved the adoption of the statement and said that, as it showed over £300 to the good, it seemed to be fairly satisfactory. On the other hand, they must not forget that the bulk of the cost of the report of the carboniferous limestone committee would fall on the current year's accounts.—Mr. Weeks seconded and the motion was agreed to.

The following gentlemen were elected to represent the institute on the council of the Institution of Mining Engineers:—Messrs. R S. Anderson, J. B. Atkinson, W. C. Blackett, W. Cochran Carr, Benj. Dodd, J. W. Fryar, T. Y. Greener, Reginald Guthrie, Samuel Hare, T. E. Jobling, J. P. Kirkup, Philip Kirkup, C. C. Leach, Henry Louis, J. H. Merivale, W. O. Mountain, A. D. Nicholson, J. H. Nicholson, R. E. Ornsby, C. B. Palmer, Walter Rowley, F R. Simpson, J. G. Weeks, W. B. Wilson and E Seymour Wood.

The X-Ray Examination of Coal.

Messrs. Garrett and Burton's paper on "The Use of X-Rays in the Examination of Coal" was open for further discussion.

Prof. Henry Stroud, of the Armstrong College, wrote saying that he was pleased to read the interesting results obtained by the authors. There was no mention in the paper of their use of the ordinary X ray screen, but no doubt they had made use of one. A preliminary examination of the specimen of coal by the use of the screen would enable a general idea of the different shadow pictures to be obtained, so as to determine the best position in which to place the coal on the photographic plate in order to get the sharpest radiograph of particular impurities. It would thus appear that, in some cases, it might be desirable not only to take the radiographs in two planes at right angles, but also from opposite sides. The experiments seemed to give promise of yielding much important detail.

There was no further discussion.

Votes of Thanks.

Votes of thanks to the officers of the institute for their services during the past year were cordially carried.

Mr. C. B. Palmer, who moved the vote of thanks to the president, vice-presidents, councillors, and officers, said it was a matter of surprise to him that, at the present time, they could get mining engineers and managers to devote sufficient time to scientific research, in view of the Minimum Wage and other Acts, and the legislation which compelled them to occupy their time with the farcical process of signing their names 200 or 300 times a day under the new Mines Act. It was, therefore, all the more creditable that the annual report had been so satisfactory, and that the institute had been carried on so exceedingly well.

Mr. Parrington, responding, thanked the members for the great honour they had done him in putting up with him as president for the last two years. He had not been able to devote that time to the interests of the institute that he would like to have devoted. He thought he had some little excuse for that, however. The last two years had been a period in which the duties of those connected with collieries had been more strenuous than, possibly, in any prior period. Parliament had been very busy with them. Beginning with the Eight Hours Act, then came the Minimum Wage Act, the new Mines Act, and last, but not least, the National Insurance Act. On the top of all that, it was public knowledge that he had had very great anxiety in connection with the collieries which he managed. Under these circumstances he hoped they would forgive any delinquency on his part as president.

Mr. C. H. Steavenson, moving a vote of thanks to the representatives on the council of the Institution of Mining Engineers, said it was almost more surprising that gentlemen could find time to attend to the business of that institution, the meetings of which were held, in many instances, at considerable distances from that locality.

The New President.

The election of officers for the ensuing year resulted:—President, Mr. W. C. Blackett; new vice-presidents, Messrs. R. D. Bain, Frank Coulson, T. Y. Greener, C. C. Leach, F R. Simpson, and John Simpson; members of council, Messrs. R. S. Anderson, W. C. Mountain, Samuel Hare, W. C. Carr, Benj. Dodd, Mark Ford, Philip Kirkup, A. M. Hedley, T. E. Jobling, Henry Louis, A. D. Nicholson, J. H. Nicholson, E. S. Wood, A. C. Kayle, Austin Kirkup, C. B. Palmer, and J. J. Prest.

Mr. Blackett thanked the members for having so honoured him He remarked that anyone who had dipped into the history of that institute and looked over the *Transactions* and who glanced at the portraits of all the past presidents would realise very deeply indeed what an honour it was to be elected president of what was probably one of the oldest institutes in the world. The speeches of Mr. Palmer and Mr. Parrington brought into his mind what an extreme difference there was in the outlook of the mining engineer now as compared with 60 years ago. At that time, he had time actually to dispose of and to devote to the real object of his profession. He could study and devise means whereby disasters and accidents could be avoided, but, nowadays, he did not seem to have that opportunity. Reason, apparently, once governed the rules, but now it looked very largely as though the rules were going to govern their reason. To-day, the mining engineer of the North of England and elsewhere in the kingdom was spending the most strenuous moments of his life in devising ways and means of meeting all those Acts of Parliament and all those Orders in Council, and it would leave him, he feared, very little time to indulge in scientific pursuits. Notwithstanding that, he hoped the aim of the institute would continue to be steady, that it would go on in its path, and that its members would strive to improve, as far as possible, the conditions of mining, despite the rules and regulations.

The meeting soon afterwards ended.

The annual conference of the British Foundrymen's Association opened its sittings at Cardiff, on Tuesday, under the presidency of Mr. C. Jones, of the Ninian Foundry, Cardiff Mr. P. Longmuir, B.Met., Stocksbridge, Sheffield, the retiring president, welcomed the members, and proposed the election of Mr. Jones, which was unanimously carried. The membership now stands at 900. Mr. R. H. Greaves, Cardiff, read a paper on the coking practice in South Wales.

COMMERCIAL UTILISATION OF PEAT FOR POWER PURPOSES.*

By Mr. H. V. Pegg.

The question of the utilisation of peat fuel for power purposes has received a large amount of attention from engineers for many years past. Efforts in this direction have mostly taken the shape of some form of preparation of peat fuel in order primarily to get rid of the superabundant moisture in the fuel. Very large sums of money have been spent on peat-preparing machinery with generally very inadequate results; hence it has always appeared to the author that, in order to bring the utilisation of peat to a commercial level, the first consideration would be the utilisation of the peat as far as possible in the condition in which it leaves the boglands without any preliminary and expensive machine treatment.

The author had the opportunity, about seven years ago, of experimenting with air-dried, hand-cut peat fired into a special form of gas-producer. With all gas-producers using bituminous fuel, the main trouble is to get rid of the tarry by-product. In this instance the gas-producer was arranged to work intermittently, there being periods of "blowing" during which the fuel in the producer was urged to incandescence, and periods of gasmaking during which the tarry by-products were passed through the incandescent fuel, where they were split up into gas. The chief difficulty experienced with this plant was the high thermal value of the gas generated, about 330 B.T.U. Owing to the high and varying percentage of hydrogen in the gas, it proved unsuitable for use in the works gas engine; and although the plant was running more or less continuously for ten days driving the whole works, very considerable trouble was experienced, not only in the engine, but also in the plant, owing to the varying moisture content of the peat, the producer plant being decidedly sensitive in regard to this latter point.

From the experience then gained it appeared evident that it would be wiser to extract the tar from the gas rather than to try to utilise the same by converting it into gas, and, further, that the producer must be comparatively non-sensitive to the amount of moisture in the peat fuel. Some two years ago the author discussed the question of the utilisation of air-dried peat fuel with Mr. Hamilton Robb, of Portadown, who, having large supplies of such fuel convenient to his factory at Portadown, was strongly of opinion that it should be possible to utilise such fuel in order to generate the power required in the factory. As the result of various tests run with an experimental plant at the works of Messrs. Crossley Brothers, Openshaw, a special plant was eventually manufactured by them under their designs and patents and to the author's specification. This plant, which has been running since last September, has been so often dealt with in the daily and technical Press that there is no need for the author to dwell upon the details of the plant, but he proposes to make a few remarks in regard to the difficulties experienced.

Air-dried peat is not a very convenient fuel to fire into the producer, and as it was uncertain whether it would be possible to burn the fuel direct in the form in which it came from the boglands, provision was originally made in the plant to deal with peat fuel prepared by being reduced in size to blocks of about 5 in. cube, but it was found possible to dispense with the preliminary treatment, and the construction of the plant was thereby considerably simplified.

As regards the general running of the plant, last October it was subjected to a test run of six hours' duration with a load of 250 b.h.p., the peat consumption per b.h.p.-hour averaging 2·55 lb., the peat fuel containing 18·98 per cent. of water; this was with both producers running, although the load was considerably below the total capacity of the plant. When necessary it has been found that the above load can be safely carried with either producer working singly, and the plant has run under these conditions for several days.

It will be noted that the percentage of moisture in the fuel during the above test was unusually low. This was owing to the unusually dry summer of 1911. During November, and especially December last, the fuel fed to the plant was extremely wet, as the rainfall in those months was very heavy, and the fuel supply was and is entirely exposed to the weather. The plant, however, worked just as well with sodden peat as it did with the drier peat, the only difference being the amount of fuel consumed The amount of water in this "sodden peat" varied considerably from day to day, and the exact percentage was not arrived at; as near as could be estimated it was at least 70 per cent.

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* A paper read at the Belfast meeting of the Institution of Mechanical Engineers, July 1912.

The separation of the tar from the gas was the chief difficulty to be overcome; it was found far better to rely on an ample water spray through which the gas passed rather than any form of a coke-scrubber, as the coke rapidly became clogged with tar. The main portion of the tar was thrown out into a tar sump by a centrifugal tar extractor; but unless the gases were subjected to a thorough washing and cooling by the water-spray above referred to, it was found that a certain proportion of tar got past the extractor, collected in the gas mains and finally found its way into the gas engines. It was a matter of experiment as to the precise amount of water sprayed into the cooler which was necessary in order to insure that the tar vapour should be sufficiently condensed before reaching the centrifugal extractor, so as to enable the extractor to effect the needful separation. As now arranged, the proportion of tar in the gas after passing the extractor is small, and the engine valves do not want cleaning out more than once a week.

When first started, the plant generally, and especially the producers, required a thorough cleaning once a week; at the present date the plant can be run, if necessary, for three weeks without cleaning, though the weekly cleaning generally takes place as a matter of policy. This result has been obtained owing to the increased amount of washing water used, which now amounts to about 7 gallons per b.h.p. per hour. The proportion of tar recovered is about 5 per cent. of the weight of fuel consumed, and during the initial stages of the running of the plant a certain amount of this tar was sold to tar-felt manufacturers at a price of 35s. per ton, but sales in this direction ceased owing to an, at present, ineradicable pyroligneous odour which persistently clings not only to the tar itself, but to all the various oils distilled therefrom.

Experiments have also been made with the tar in oil-burning boilers, but owing to the very high percentage of water in the tar—up to 50 per cent.—and the large quantity of solid matter also present, a very large amount of preliminary treatment is necessary. For a considerable period the tar at Portadown was used mixed with coal and burnt under a Stirling boiler; the precise heating value of the tar so consumed has not, however, been ascertained. At the present time the whole factory at Portadown is run entirely on peat fuel, the consumption being about 44 tons per week, of which the producer plant takes about 22 tons. The nature of the peat varies considerably; with good black heavy peat the weekly consumption for all purposes drops as low as 35 tons; and with light top peat from the surface of the boglands the consumption rises to 54 tons. It is also interesting to note that the quality of the peat is reflected in the carrying capacity of the barges, which bring a load of 35 tons with heavy peat and 24 tons light peat. The peat is unloaded from the barges and conveyed to the producer platform and boiler house by a transporter. Clinker troubles are not often experienced, and only when burning the inferior grade of peat, the presence of sand in the fuel causing the trouble.

The author is indebted to Mr. W. A. Mullen, manager at the factory of Messrs. Hamilton Robb Limited, for the following figures in regard to the cost of fuel, these figures being given on June 12 last:—

Cost of running factory on coal per week:—

	£	s.	d.
8¾ tons of anthracite at 35s.	14	17	6
19 tons of steam coal at 17s	16	3	0
	£31	0	6

Cost of running factory on peat per week:—

	£	s.	d.
Say up to 50 tons of peat at 6s.......	15	0	0
Weekly saving............	£16	0	6

Allowing for 15s. for extra labour, the net weekly saving figures out at £15 5s. 6d.

The author would here refer to the letter in *Engineering* of January 26 last, in which the general manager of the Power Gas Corporation Limited gives some very interesting particulars in regard to peat plants, more especially an ammonia recovery plant working in the south of England. It would be of great interest if some figures as to the working costs of this plant could be laid before this meeting. It will be noted that plant is worked with ammonia recovery, which would mean a very much larger plant than that at Portadown. The amount of the nitrogen in the south of England peat is apparently high, and would appear to be considerably more than in the peat used at Portadown, analysis of which is appended hereto, together with analysis of the refuse tar and gas from the producer.

Much frothing occurred until the water was distilled off. Towards the end the temperature went higher than a mercury thermometer will record (360 degs. Cent.). The different fractions obtained were as follow:—

(1) Water, faintly acid to litmus. Phenol could not be detected.

ANALYSIS OF TAR MADE BY MESSRS. OTTON AND HAWTHORNE

Sample of Tar No. 2.

The sample was grey when received, but very quickly turned black. On distillation it yielded:—

	Per cent.
1. Water	37·2
2. Light oils (distilling below 230 degs. Cent.)	5·8
3. Middle oils (distilling at 230-270 degs. Cent.)	8·3
4. Heavy oils (distilling above 270 degs.)	23·2
5. Coke	17·8
6. Loss	7·7
	100·0

ANALYSIS OF SAMPLE OF PEAT.

(Received on September 14 from Mr. Hamilton Robb, Portadown.)

Proximate Analysis.

	Per cent
Water..................	18·98
Volatile matter	55·17
Fixed carbon..........	24·75
Ash	1·10
	100·00

Ultimate Analysis.

	Per cent.
Carbon	44·60
Hydrogen	5·42
Nitrogen	0·97
Ash	1·10
Moisture	18·98
Oxygen (by difference)	28·93
	100·00

ANALYSIS OF AVERAGE SAMPLE OF GAS DURING A 10 HOURS' TRIAL.

Moisture in Fuel 26 per cent.

CO_2	10·6
CO	21·0
H_2	13·0
CH_4	3·7
Total combustible	37·7 per cent.
Calorific value (calculated from analysis)	144·0 B.T.U.

(2) Light oils (below 230 degs. Cent.) become rapidly dark red in colour. Specific gravity of crude liquid 0·930.

(3) Middle oils (230-270 degs. Cent.) became dark red. Specific gravity of crude liquid 0·941.

(4) Heavy oils (above 270 degs. Cent.) on standing, crystals of paraffin wax separated out to the extent of 5·42 per cent. of the fraction (= 1·26 per cent. of the original tar). The specific gravity of the liquid portion of this fraction was 0·906.

OBITUARY.

The death occurred at his residence at Turner-street, Redcar, on the night of the 1st inst., of Mr. Henry Simpson, who was a well-known figure on the Middlesbrough iron market. Mr. Simpson had been in indifferent health for some years, suffering from heart weakness. On July 22 he had a severe attack of angina pectoris, but made an apparently good recovery, and was able to go out a little at the seaside resort. He was, however, unable to continue his work, and on Thursday night a stroke supervened and he died shortly afterwards. The deceased gentleman was 65 years of age. His wife died in 1896. He was born at Redcar and lived there all his life. In July 1870 he entered the office of the late Mr. John Jones, who was secretary of the Iron and Steel Institute and the Middlesbrough Chamber of Commerce. On the death of Mr. Jones, Mr. Simpson succeeded him. He leaves two sons and one daughter.

The death occurred at Bath House, Bishop Auckland, on Saturday of Mr. J. Plummer, aged 70 years, for 21 years H.M. inspector of mines in that district. Mr. Plummer, who was born in Somersetshire, started work at the Hetton collieries when only 15 years of age. For some time he worked in the mine, and there gained a thoroughly practical knowledge of the working of a colliery, both under and above ground. Subsequently Mr. Plummer was appointed to be assistant Government inspector of mines, and he took up his residence in Bishop Auckland 20 years ago. During his years of service Mr. Plummer had two explosions in his district. The first was the Elemore Colliery (the Hettons) in 1886; the second was the Brancepeth explosion, when 20 were killed. Mr. Plummer went down with the rescuing party on both occasions.

The death is announced of Herr Paul Randebrock, general manager of the Gelsenkirchen Bergwerks A. G., chairman of the Association for the Protection of Mining Interests in the Dortmund District, and an active member of the Westphalian Coal Syndicate and various other bodies.

The death is announced of Mr. Robert H. Wharrier, up till recently under-manager of the Bedlington Coal Company's Barrington Colliery. Mr. Wharrier had held that position for 25 years, having risen from being a coal hewer and a sinker to the responsible position which he held on his retirement at the end of last year. Mr. Wharrier was the last of the original 24 pioneers of co-operation in Northumberland, and was intensely interested in educational work. He was for many years a member of the Morpeth Board of Guardians.

Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

ANTHRACITE BRIQUETTES.

SIR,—In answer to the letter appearing in your issue of August 2 from "Investigator," if he will communicate with us we think we shall be able to give him the required information how to satisfactorily convert his small anthracite into briquettes.

We recently erected the largest coal-briquette plant working in Scotland, and in this plant satisfactory briquettes suitable for marine and locomotive consumption are being produced from anthracite mixed with a certain proportion of bituminous coal. We have at present in hand a repeat order for the same firm.

YEADON, SON AND CO.,
Leeds, August 6, 1912. Briquette Engineers

NYSTAGMUS AND SAFETY LAMPS IN MINES.

SIR,—I have read with much interest Mr. Hailwood's remarks on "Nystagmus and Electric Lamps in Mines" in your last week's issue, and I was particularly interested in his remarks *re* the lamps at Murton Colliery. I happened to be in charge of the lamp rooms at that colliery when the Sussmann lamp was introduced. I held that position for over 18 years, 12 of which the electric lamp was in use with great success. Whether or no it was due to the use of the electric lamps and the extra light, during that time I never heard of a single case of nystagmus.

I cannot quite understand Mr. Hailwood's observations as regards the small amount of light given by the electric lamp, as the increased light and the increased safety of this lamp were the objects in view when they were introduced, both of which were much appreciated by the miners who had the use of the lamps, evidenced by the fact that in less than 10 years the number of electric lamps increased from 400 to 1,800, replacing Donald, Marsaut and Routledge and Johnson lamps.

The light from the Routledge and Johnson lamp, with the gauze to the bottom, is only small, I admit, but this was a sacrifice in order to obtain the increased safety attending that arrangement. A Marsaut lamp was not allowed to go to the coal face on any account at Murton. There is a real danger with a lamp without a gauze to the bottom. Lamp glasses frequently get broken without extinguishing the light, which makes a naked light of a Marsaut lamp.

Then, again, only pure colza oil was used in the lamps there. Mineral colza oil, such as is used in the lamp advocated by Mr. Hailwood, owing to the high temperature of the mine in places, was totally unsuitable for the lamps there. It was properly demonstrated that this oil gave off more vapour than could be dealt with by the ordinary flame when taken into the mine where the temperature was high.

Mr. Hailwood has a good deal to say about the advantages of the oil lamp in diagnosing the conditions of the atmosphere, but in the article referred to by him on miners' nystagmus we read that Dr. Snell's opinion is that those suffering from this complaint are not able to detect the cap formed by gas on the light of such a lamp, and we also read that Dr. Court said there are hundreds of men earning full wages who are affected with nystagmus to a much greater degree than many of those drawing compensation or working on the pit bank through this complaint, so that in these cases the advantages claimed by Mr. Hailwood disappear and something more suitable needs to be introduced to meet these cases.

I might say here that the Murton lamp was the Sussmann lamp, and was a 4-volt lamp, the electric bulb being of the carbon filament type, with a candle-power less than one. This type of lamp, however, is now out of date, and we have at the present time 2-volt lamps on the market and in use, giving up to 1½-candle power and more, according to requirements. If the infrequency of nystagmus at Murton can be attributed to the better light of the old type of Sussmann lamp, surely, with the improved light of the newer lamps, better results should be obtained.

The writer, like Mr. Hailwood, has had considerable experience in dealing with all kinds of lamps, having had the experience of working both oil and electric lamps in conjunction, and has been able to compare the cost of upkeep for the different classes; instead of finding the cost of the electric lamp prohibitive, as Mr. Hailwood tells us, I find it to compare favourably with the oil lamp. The cost of maintenance, during my experience, did not exceed 4½d. per lamp per week, and in this figure all labour charges are included. The improved lamp is much simplified compared with the old form of Sussmann lamp, and lends itself to a much cheaper maintenance.

The day of the oil lamp is not as yet gone by, it being a necessity for examination purposes; but its days as a lamp for work at the coal face ought to be numbered, in face of the extra advantages to gain by the introduction of the electric lamp. The difficulties encountered with electric lamps are very much exaggerated by Mr. Hailwood. John Shaw.

High-street, Eldon-lane, Bishop Auckland,
August 5, 1912.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Curious Point under Statutory Award—How the Strikes have Destroyed Earnings—A Million Tons Loss at Cardiff. Hundreds of Thousands of Tons Elsewhere — Lord Bute Foregoes Royalties to Maintain Dock Dividend — Tin-platers' Annual Holiday: 30,000 Idle—Increase of Ironworkers' Wages—What is the "Net Cost" of Explosives?—Another "One-man" Strike — Miners' Agent Testifies to Advantages under Minimum Wage Act.

A joint sub-committee of the statutory District Board met on Friday in Cardiff, some disagreement having arisen as to the interpretation of points in Lord St. Aldwyn's award under the Minimum Wage Act. One of the difficulties discussed was the award of 3s. 2d. as the standard day rate for labourers. Whilst the workmen contend that this award extinguishes any existing lower rate, the employers argue that it is subject to conditions similar to those applying to piece-workers, and that payment of the minimum is dependent upon the labourers complying with the rule as to working five-sixths of the time.—The joint sub-committee, over which Mr. Stewart (Abertillery) presided for the owners and Mr. Watts Morgan for the men, failed to agree, and Lord St. Aldwyn has been asked to meet the committee to-day (Friday) in order that they may have the benefit of his judgment.

At shareholders' meetings of the South Wales railway and dock companies, which are largely dependent upon the coal trade, striking proof has been furnished of the evil effect of labour disputes. Cardiff Company report the loss during the half-year of nearly a million tons of traffic, with the result that no dividend is paid on the ordinary stock, and payment of dividend on the "preferred ordinary" has become practicable only by Lord Bute foregoing dock royalties (about £17,000) due to him.—Barry Company, whilst paying 4 per cent. on the preferred ordinary stock, make no distribution of dividend upon the "deferred." Receipts from mineral traffic were less by £15,654, from shipping £4,004, and from dock dues £7,679. The new Insurance Act would cost £3,000 per annum.—At Newport, the Alexandra Company report a loss of 600,000 tons in coal shipments as compared with the corresponding period, and serious diminution in imports of pitwood and iron ore. This does not represent all the loss, for there was an increase anticipated of at least 100,000 tons, and the company have made vast expenditure in order to deal with the increasing traffic.—Neath and Brecon Company had their earnings reduced by no less than 13 per cent. in respect of minerals, and other companies report similar heavy decrease.—It will be noted that the Great Western line, which carries a great quantity of South Wales coal, has a reduced dividend of 1 per cent.

This week the employees in the tin-plate trade are taking their annual holiday, no fewer than 30,000 being idle. The arrangement is made between the Masters' Association and the six or seven trade unions of the men engaged in the industry. Because of the compulsory stoppage during the coal strike, a suggestion was made that the men should this year forego the usual period; but to this they would not consent. What they rather desire is that, in addition to the full week, they shall have the preceding Saturday, and thus be able to get away before Sunday.

A section of the ironworkers in South Wales have their wage rate determined by the Midland Wages Board; and the report of the accountants, just issued, warrants a substantial increase in wages. It is shown that the output has increased by 3,000 tons during May and June, as compared with the corresponding period of last year (in the works of the 17 selected firms). The average net selling price has also risen materially. Consequently the wages for puddling are to be increased, in accordance with the sliding-scale arrangement, by 3d. per ton for puddling, making them 9s. 6d.; and other mill and forge wages are to be advanced 2½ per cent. As the puddlers receive also a bonus of 6d. per ton, their wage rate is now 10s. per ton—higher than it has been for some years past.

When the Miners' Federation of Great Britain meets for its annual conference in Swansea during September, the very important question dealt with at the northern miners' recent meeting will come up for discussion in its application to the whole of the United Kingdom. Euphemistically stated, this is a general endeavour to expedite the operation of conciliation procedure. Really, it appears to be rather the establishment of a method of making sudden strikes practicable, and some of those who advocate the change do not take any trouble to conceal that intention. Two points are clearly in view: (1) abandonment of the one month or similar period of notice, and substitution of only 24 hours' notice, and (2) that all local agreements shall be so modified as to permit of contracts beginning and terminating simultaneously. South Wales is alleged to be particularly a stumbling block, at present, in respect of the latter point.

What seems to be overlooked is that any such rule has the tendency of working both ways; and that far more frequent stoppages for temporary causes may arise, to the detriment of the total sum receivable on pay-day, if there be general institution of a system of day-to-day contracts. Where there is a real serious grievance, such as leads to a general strike, it is not the month's notice that hinders a stoppage, though it may give time for more adequate consideration on both sides.

A meeting of about 50 delegates, representing 14,000 anthracite miners, took place in Swansea on Saturday. It was resolved that a test action should be instituted in order to determine the meaning of "net cost" of explosives, as referred to in Clause 61 of the Coal Mines Act. According to the men's contention, "net cost" does not mean anything more than price of explosives plus cost of delivery; but, it was stated, colliery owners maintained that the cost of storage and distribution should be added.

At a meeting of the Rhondda district of miners, Mr. Watts Morgan, the agent, urged the men not to allow any of the customs at the collieries to be taken away from them. He said it depended largely upon the stand they made in this respect what form the minimum wage award would take in practice, and what advantage the employers would take out of it. Under the Act of Parliament, nothing could be clearer than that there was to be no reduction in wages, and that existing customs were to be continued. If there were rates higher than those in the schedule, the employers had no right to infringe upon them in any way.

The Western district of miners, at the monthly meeting in Swansea, on Saturday, unanimously decided that in future no recognition or sanction should be given to any price-list which did not provide for payment at the rate of six turns for five afternoon or night shifts.

Natural colliery gas has been made available for the Rhondda mining class, held at the Cymmer Workmen's Institute, Porth, for the purpose of instructing firemen to meet the provisions of the new new Mines Act. This is an advantage which is probably not shared by any other class in the Principality. Instead of using for experimental purposes gas from the local gasworks, they are able to experiment with the natural colliery gas conveyed direct from a blower in the Cymmer Colliery by means of a length of pipe laid down by the management for their benefit.

To Mr. Edward Lake, who for several years occupied the position of general manager of the Barry Railway and Docks, a presentation of silver, &c., has been made by the Bristol Channel Dockowners' Association. Mr. Beasley, of the Taff Vale Railway Company, expressed the regret with which his colleagues in that organisation parted from Mr. Lake upon his retirement from Barry; and Mr. Law (Swansea), Mr. Downing (Barry), Mr. Corbett (Cardiff), Mr. Macaulay (Newport), Mr. Ingledew (Taff Vale), with other representative gentlemen (from Port Talbot, Gloucester and elsewhere), endorsed what Mr. Beasley said. Mr. Lake is very well known on the east coast, where he was engaged for a number of years before accepting service under the Barry Company.

Six or seven hundred men have been idle during several days at Ebbw Vale, owing to the dismissal of a haulier who was deemed to have been negligent in charge of his horse, whereby it sustained injury and had to be shot. A mass meeting of the men decided to seek an interview with Mr. Falcon, on behalf of the management; but that gentleman refused to meet them until the men had returned to work. Suggestion of general stoppage throughout the whole of the collieries was made; but an amendment to the effect that the men should return to work was moved, and this was carried by a large majority. A deputation, it was decided, should be sent to the management. Without a doubt, if the more reasonable and businesslike of the men took the trouble to attend the meetings and to exercise their influence, extreme measures would become rarer, and the pecuniary penalties under which extremists lay their fellows through senseless stoppages would be materially lessened.

At Swansea, last week, one of the steamships of the Holt line loaded a cargo of no less than 9,170 tons of coal, the largest cargo ever shipped at that port. This total includes bunkers.

Among the most progressive districts of South Wales, the Amman Valley area occupies a leading place; and one of the latest evidences of progress is the report that it is likely a new patent fuel works will be erected at Ammanford.

A singular claim was heard during two days' sitting of the Aberavon Court. Workmen under the Garw Valley Colliery Company claimed £150 for wages due in lieu of notice, their case being that after termination of the strike they signed a contract book which stipulated that fourteen days' notice should be given of termination. But on July 12 notice was posted at the pithead that 24 hours' notice would be given, and men were dismissed. Owing to the illness of the manager, a director was called to give evidence for the company; but, on being handed the contract book, he was so evidently unfamiliar with it, that a magistrate remarked, "He knows nothing about that book!" and, in cross-examination, the witness said that he had heard of the contract book for the first time that day. For defendants, it was submitted that the employers gave a guarantee that the wages would be paid on condition that the old agreement was nullified. The Bench gave judgment for the men, assessed the costs at £12 12s., and allowed each plaintiff his expenses, as well as granting the advocate's fee.

In the course of an address at Garndiffaeth, Mr. Winstone, miners' agent, referring to the Minimum Wage Act, said that there were hundreds of thousands of men in the South Wales coalfield who would benefit very considerably by the award of Lord St. Aldwyn. He had been informed that some of the employers were endeavouring to induce the men to contract out of the Act; but he would warn employers that it would be dangerous for them if they accomplished their purpose.

Winding Enginemen's Hours—Mr. J. Duncan Miller, M.P. for North-east Lanarkshire, has been in communication with the Home Office on the subject of the regulations contemplated by section 57 (3) of the Coal Mines Act, 1911, dealing with the eight hours' shift for winding enginemen, and has received the following letter from the Under-Secretary to the Home Office on the subject of the regulations:—

"Home Office, Whitehall, S.W., July 19, 1912.

"Dear Mr. Duncan Millar,—With reference to your enquiry as to when the regulations contemplated by section 57 (3) of the Coal Mines Act, 1911, are likely to be made and as to the probable extent of their application, I am now in a position to give you a somewhat fuller answer in the matter. The regulations will be general regulations under section 86 of the Act, and will make provision for those classes of cases—brought to the notice of the Home Office very largely by the representatives of the winding enginemen's associations—in which the requirement of a rigid eight hours day would be impracticable. We hope to be able to issue these regulations, along with other general regulations required to be made under the Act, in draft, early in the autumn. I may, perhaps, point out that in section 57 (3) special provision is made for fixing the date on which the section should come into force. It is to come into force on the *prescribed date*, i.e. the date prescribed by the Secretary of State (see section 122). It was recognised from the outset that it would probably be impracticable to bring these regulations into force by July 1.—Yours sincerely, (signed) Ellis Griffith.

"J. Duncan Millar, Esq., M.P.

THE COAL AND IRON TRADES.

Thursday, August 8.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week, 147,312 tons of coal and 216 tons of coke were despatched from Tyne Dock, a decrease of 14,763 tons of coal and 1,462 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 58,262 tons of coal and 2,957 tons of coke, a decrease of 5,561 tons of coal and an increase of 467 tons of coke. The Blyth shipments amounted to 110,943 tons of coal and coke—another record for the port—an increase of 15,377 tons. It is noteworthy that the July shipments of coal and coke from Blyth—449,187 tons—set up a record also. The following important coal sales have been reported during the week—10,000 tons of Durham good ordinary unscreened bunkers for delivery up to the end of the year at 12s. per ton f.o.b., and further quantities of similar fuel for next year's shipment at 11s. 6d. to 12s.; 30,000 tons of Durham coking smalls for shipment to Italy over the remainder of the year at from 11s. to 12s., a contract arranged through Cardiff merchants; a large quantity of Whorlton partially-screened bunkers for delivery over 12 months commencing next March at 14s.; and 100,000 tons of Durham unscreened coking coal for shipment to stipulated Italian ports over next year at from 11s. 6d. to 11s. 9d. German coke is being offered for delivery in Middlesbrough at 19s. per ton, and on the West Coast at 23s. 6d. per ton, prices below those of Durham coke. It is stated that two consignments of German blastfurnace coke have been bought for early delivery at Middlesbrough. The local coal market is in a very healthy condition. For delivery over the next fortnight, collieries are well booked and high prices have to be paid for completion lots. Wherever possible, merchants are holding off, but the enquiry over the rest of the year is very promising. Durham collieries which have sold unscreened coking coal for next year's delivery at from 11s. 6d. to 12s. per ton are stated to have closed their books at these prices, and to want more money. Similarly in the case of Tyne gas primes, 13s. is now quoted for further business after recent sales at 12s. Quotations for prompt shipment are as follow:—Best steams, Blyths (D.C.B.), 14s. 6d. to 15s. per ton, f.o.b., an advance of 6d. on the week; Tynes (Bowers, &c.), 14s., a similar increase; seconds, Blyths, 12s. 6d., from 3d. to 6d. dearer; Tynes (Hastings or West Hartleys), 13s. to 13s. 6d., from 6d. to 1s. dearer; unscreened, 11s. 6d. to 12s., 6d. up; smalls, Blyths, 10s., 3d. down; Tynes, 9s. to 9s. 3d., 3d. cheaper; specials, 10s. 6d., unaltered; smithies, 12s. to 12s. 6d., a rise of 6d.; gas bests (New Pelton or Holmside), 13s. to 13s. 3d., an improvement of 3d.; seconds (Pelaw Main or similar), 12s. to 12s. 6d., 3d. higher; specials, 13s. 6d. to 14s., no change; unscreened bunkers, Durhams, 12s. to 12s. 9d., 3d. more; Northumbrians, 12s., 6d. increased; coking coal, 12s. to 12s. 6d., 6d. dearer; smalls, 12s., similarly advanced; households, 14s. 6d., steady; coke, foundry, 23s. 6d. to 25s., a rise of from 1s. to 1s. 6d.; blastfurnace, 21s. to 22s., from 1s. to 2s. advanced; and gas coke, 19s., steady.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 106,625 tons of coal and 945 tons of coke as compared with 91,240 tons of coal and 490 tons of coke for the corresponding period of 1911, being an increase of 15,385 tons of coal and 455 tons of coke. The market still remains very firm for all classes of coal and coke, and there is plenty of enquiry. Owing to Bank holiday, which has interfered to a certain extent with collieries' working arrangements, long loading turns are operating to check business for the moment both in the coal and freight market. The collieries' position here continues very strong, and prices are firmly maintained at the late advances. Prospects for the month of August are exceedingly good. Household coals are still in little demand with practically no enquiry, as merchants do not care to contract at present prices. As regards forward contract business, there has not been very much done during the last week, but we understand the Kalmar Gasworks have contracted for 3,000 tons of Wear specials at 13s. per ton f.o.b. We learn that about 100,000 tons of Durham coking coals have been sold to Italy over next year at 11s. 6d. per ton f.o.b., and that 11s. 9d. per ton f.o.b. has also been paid for a slightly superior quality. Some contracts have been made during last week for small parcels of unscreened bunkers at 12s. 6d. f.o.b. South Dock, Sunderland, shipment September-December. As regards chartering, there is very little doing owing to loading turns which are very congested, being so exceedingly difficult to arrange. For bunkers prices are well maintained, and owing to the strong demand, in all probability same will go higher. The following are market quotations:—Special Wear gas, 14s. to 14s. 3d.; seconds, 12s. to 12s. 3d.; coking unscreened, 12s. 3d.; smalls, 11s. 6d. to 11s. 9d.; smithies, 13s. 9d. to 14s.; peas and nuts, 13s. to 14s.; household, ordinaries, 14s. to 14s. 6d. bests, 15s. to 15s. 6d.; foundry coke, 23s.; blastfurnace coke, 21s.; gas house coke, 19s. 6d. Bunker quotations are: Pease's, South Derwent, Framwellgate, 12s. 3d.; Priestman's, Consett, Burnhope, 12s. 6d.; Morrison's Marley Hill, 12s. 10½d.; South Hetton, 12s. 3d.; Ryhope, 12s. 3d. to 12s. 6d.—all f.o.b. South Dock. The freight market for all directions, and more especially for coast and Baltic, is easier, owing to loading stems being so congested, and also to a better supply of tonnage. Fixtures reported within the last few days include the following:—Baltic: Cronstadt 6s. 6d., Sundsvaal 7s. 9d., Libau 7s. Coast: Havre 4s. 6d., Nantes 7s. 1d., London 3s. 3d. Bay: Bordeaux 7s. 3d., Oporto 10s. 9d., Lisbon 10s. Mediterranean: Palermo 12s. 6d., Constantinople 12s., Port Said 11s. 3d., Algiers 10s. 6d., Porto Vecchio 11s. 9d.

Middlesbrough-on-Tees.

COAL.

Fuel of all kinds is as firm as ever. The excellent demand is met by a full supply, and a large volume of trade is going on. Deliveries of gas coal are heavy for this season of the year, and best kinds are 13s., with seconds at 12s. 6d. The pressure in the demand for bunker coal is seen in holders asking up to 12s. 9d. f.o.b. for ordinary kinds. Forward there is an increasing interest in the purchasing of supplies of steam coal over next year, but the high range of prices named keeps buyers off. Coking coal is steady and in good request at about 11s. 6d. for smalls. There is a very active demand for coke, and with supplies scarce prices are very strong. Foundry coke for shipment ranges from 22s. 9d. to 23s. 6d. f.o.b. Average qualities of blast-furnace coke realise 21s. 6d. delivered at Tees-side works, and some sellers endeavour to fix the price at 22s.

IRON.

Speculative operations in Middlesbrough warrants are causing fluctuations in prices of Cleveland pig iron. The gamble is said to be checking to some extent legitimate trade, but a very large volume of genuine business is going on, and the general state of the staple industry is most healthy. Deliveries of all kinds of pig iron are heavy, but they still fall short of requirements, and there are numerous complaints of inadequate supply. Up to 61s. has been paid this week for prompt f.o.b. delivery of No. 3 g.m.b. Cleveland pig iron, which is the highest quotation since June 1907. The ruling quality now stands at 60s. 9d., and No. 4 foundry, which is reported very scarce, is about the same price as No. 3. There is also a continued scarcity of No. 1, the price of which is fully 65s. 9d. All the foregoing quotations are for early delivery, rather higher rates being named on forward account. Good enquiries for east coast hæmatite pig are reported. Merchants put the price of Nos. 1, 2, and 3 at 74s. for delivery to the end of September, but makers ask more. One firm of producers report a substantial sale at 75s., but do not state the delivery. Foreign ore, though inactive, is firm, and sales are not pressed. Market rates are based on 22s. ex ship Tees for best rubio. Freights Bilbao-Middlesbrough are firm at 6s. 10½d. Manufactured iron and steel producers are working at full pressure. They have excellent order books—some firms, in fact, having so much work on hand that they cannot enter into contracts to guarantee delivery before 1914. Common iron bars are £8 5s., best bars £8 12s. 6d., best best bars £9, packing iron £6 5s., iron ship plates £7 17s. 6d., iron ship angles £8 5s., iron ship rivets £9 10s., steel ship plates £8, steel ship angles £7 7s. 6d., steel strip £7 7s. 6d., steel hoops £7 15s., steel joists £6 17s. 6d., cast iron railway chairs £3 17s. 6d., light iron rails £9 15s., heavy steel rails £6 7s. 6d., and steel railway sleepers £7—railway material net, and all other descriptions less 2½ per cent.

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South-West Lancashire.

COAL.

Work at the pits recommenced in this district on Wednesday, but in a good many cases it was with a large absentee list. The household trade, owing to the very unsettled weather, is a slightly improving one. There is no change to report in prices. There is little to report as regards shipping, owing to the holidays. Supplies accumulated beforehand have, on the whole, been more than sufficient for all purposes. Here and there small advances have been obtained for prompt delivery, but prices generally remain as before. The coastwise and cross-Channel trade for house fuel still keeps up. Best coal prices are, however, 15s. to 15s. 6d., with the medium grades at about 13s. 9d. to 14s. 3d. Slacks continue very firm in price, and not too abundant in quantity. List prices for rough slack are at from 9s. 9d. to 10s., good medium qualities 9s. to 9s. 3d., and for the commoner and smaller sorts 8s. 6d. or thereabouts, all into wagons at the pit.

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South Lancashire and Cheshire.

COAL.

Owing to holidays there was a very poor attendance on the Manchester Coal Exchange on Tuesday, and very little business was done. House coal moves very slowly, and the same remark equally applies at the moment to furnace coal and shipping coal. Owing to stoppage of the pits there is some scarcity of slack. There is no change to report in prices.

IRON.

There was only a moderate attendance on 'Change in Manchester on Tuesday, and little business doing, owing to holidays. Prices remain firm, with no alterations to report.

Yorkshire and Derbyshire.

Leeds.

COAL.

The market on Tuesday was thinly attended, and business was quiet, although there was a firm tone about prices generally. The house coal pits have worked about four days this week, Monday and Tuesday being generally observed as holidays. Stocks of house coal are rather less than last week, as the inclement weather has kept up the retail trade to a fair degree of activity. London factors and merchants have sent good supplies of their own trucks, and in addition a fair number of orders for best coal. During the holidays a few additional contracts have been booked for the London district at quite 2s. per ton advance over the figures of 12 months ago. One such is said to concern a big tonnage of Haigh Moor best at 14s. pit for the summer months and 15s. pit for the winter months. Another contract for Silkstone best is reported to have realised 12s. 6d. summer and 13s. 6d. winter. Current pit prices for London and the southern and eastern counties are strongly held, and average about as follow:—Haigh Moor selected, 14s.; Wallsend and London best, 13s.; Silkstone best, 13s. (special qualities, 13s. 9d. to 14s.); Silkstone house, 12s. to 12s. 6d.; house nuts, 10s. 9d. to 11s. 6d. The settlement of the Thames strike has improved the coastwise trade considerably. A fair number of cargoes have already been shipped into the river from both Hull, Goole and Grimsby. For prompt shipment the following figures represent f.o.b. prices at Hull:—Haigh Moor best, 15s. 3d. to 16s.; Silkstone best, 14s. 6d. to 15s. 3d.; Silkstone house, 13s. 9d. to 14s. 3d.; large house nuts, 12s. 6d. to 13s. 9d. In Leeds, Bradford, Halifax, Huddersfield and the heavy woollen district reports from the depots indicate a fairly good retail trade—especially in the cheap grades of house coals. Current pit prices are steady as follow:—Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. 6d. to 16s.; Silkstone house, 14s. 6d. to 15s. 6d.; ordinary house coal, 14s. to 15s.; secondary sorts, 12s. to 13s. 9d. There is considerable scarcity of manufacturing fuel, particularly of the smaller qualities such as pea nuts, small slacks and coking smalls. All descriptions are firm in price, and quoted about as follow:—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small nuts, 9s. to 10s.; washed samples, 9d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slacks, 8s. to 9s.; small slacks, 7s. to 7s. 6d.; coking smalls, 6s. 6d. to 7s. The great activity in the iron and steel trades has caused an exceptionally strong demand for washed furnace coke. The entire production of the ovens moves away readily, and makers are able to realise 16s. per ton at the ovens without much difficulty. The bulk of the local coke is being taken to Frodingham, the Midlands, and the iron and steel works in the Leeds district. There are no stocks anywhere. There is little new to report in the gas coal trade. The pits are busy, any surplus tonnage finding a ready market for export. A few fresh contracts are reported at the official advance of 2s. to 2s. 6d. per ton, the latter figure governing new business in gas nuts, which are somewhat scarce. Current pit prices:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal 9s. to 10s. Exports of gas coal are heavy, and the following f.o.b. prices are realised for prompt shipment:—Screened gas coal, 12s. 6d. to 13s. 6d.; gas nuts, 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d. to 12s. 9d.

Barnsley.

COAL.

A very firm market continues to prevail in regard to all classes of steam coal, and buyers are realising now more generally the strong position of sellers, both for current business and forward deliveries. The spasmodic turn which the export trade is taking does not encourage much activity in the making of contracts, and for all practical purposes arrangements between buyers and sellers, particularly on the part of the latter, are only to cover a brief period. The export trade from Hull has been somewhat interfered with owing to the Bank holiday, which had a very varying effect on the district. Whilst the collieries in this particular locality were at work in accordance with the usual custom, disregarding the national holiday, the railway arrangements were somewhat curtailed and work at the port was practically at a standstill. Such is the marked activity of trade at the present time, that already there is considerable congestion of traffic, but the greater trouble exists owing to the difficulty of boats obtaining berths at the port side. The disorganisation assists, along with the well-maintained enquiry, to give prices a firmer tone, and with the prospects of local holidays now weekly affecting the working of collieries, exporters are very anxious to make their arrangements to the end of September, but colliery owners are not disposed to commit themselves so far ahead, and for current business this week's prices have increased from 3d. to 6d. per ton for large steam coal. The best quality of Barnsley hards are now making from 11s. 6d. to 12s. per ton, the higher figure being reported to be held out for in several cases. Secondary sorts have been affected in a similar way, and from 10s. 9d. to 11s. per ton is now demanded, and notwithstanding the regular working of the collieries buyers find there is not a great deal of surplus tonnage on offer. The position in regard to smaller fuel used for steam purposes is unaltered, prices maintaining a very firm tone. The best washed nuts are quoted up to 10s. 6d. per ton, and secondary sorts from 9s. 9d. to 10s. per ton. Slacks continue to be in strong demand, and though the trade is somewhat affected by the succession of weekly holidays in the Lancashire cotton districts, prices are well held up by sellers. Best quality slack makes from 7s. 9d. to 8s. per ton, and secondary sorts from 6s. 6d. to 7s. per ton, the greater bulk of the latter class of fuel being consumed at home for cokemaking purposes. The position in regard to gas coal contracts is also little changed, though just now a larger number of enquiries are being made by the gas companies. The fact that something like a year's tonnage will have to be delivered during 10 or 11 months enters into the question, and though the coalowners continue to adopt a very firm attitude, renewals of contracts are being obtained on the basis of 1s. 6d. to 2s. per ton. The variable weather continues to benefit the house coal trade, and the business at the present time is more than an average one. This enables prices to be maintained at something like late quotations—Silkstone best up to 13s. 6d. per ton, Barnsley best 12s. 6d. per ton, seconds 10s. 6d. to 11s. 6d. per ton, house nuts 9s. 6d. to 10s. 6d. per ton. The stronger demand for coke again prevails, and the output is well cleared, with prices firm at about 16s. per ton at the ovens.

Chesterfield.

COAL.

The demand for house coal is quiet, without any change in values. The majority of contracts have been renewed at 2s. 6d. per ton advance. Stocks are lower than usual for the time of year. A brisk business is doing in fuel for manufacturing purposes, and heavy deliveries of cobbles and nuts suitable for gas producers continue to be made to the large steelworks of Sheffield and district. In many cases collieries are now unable to add to their commitments for these qualities. Prices remain very firm. A strong demand is experienced for slack for steam-raising purposes. The supply, however, is still much below the needs of the market. The price of this fuel is higher than it has been for several years past. The requirements of slack for the Lancashire cotton mills are exceptionally heavy. Most of the contracts which recently expired have now been renewed at an average advance of 2s. per ton. Stocks are practically exhausted. Steam coal for locomotive use is in active demand, and large deliveries are going forward daily. Prices are hardening, and it is pretty clear that an advanced figure will be quoted for contracts expiring at the end of September. The export trade has improved substantially during the last few weeks. Vessels are more plentiful, and this fact has quickened the demand for steam coal, the value of which has appreciated fully 1s. per ton during the past month. To-day's price for Derbyshire Top Hards is 11s. 3d. per ton at the pit. Supplies are difficult to secure even at this figure. There is a better demand for cobbles and nuts for near Continental ports, and slack is in improved request. Washed nuts and washed slack continue to find a ready sale at prices that have a hardening tendency. Supplies of this class of fuel are not by any means plentiful. On the one hand more of these classes of small coal is coming into requisition, while, on the other, collieries themselves need a larger quantity for use at the various by-product plants that are springing up all round. The coke market is in a remarkably strong position, the demand for all qualities being of a brisk character. Coking fuel is dear. Quoted prices are as follow:—Best 13s. 6d., seconds 12s., cobbles 11s., nuts 10s., slack 8s.

IRON.

There is a cheerful market all round. An excellent demand is experienced for pig iron at prices that are higher than any that have ruled for several years. Finished iron is also in active request at improved prices. It is a long time since the iron trade of this district passed through such a period of activity as that which it is now enjoying.

Nottingham.

COAL.

The normal course of the coal trade in Nottinghamshire has been interrupted during the past week in consequence of the holidays. In the house coal section business has been very slow, and this despite the weather, which has been favourable to the sale of this class of fuel, but it may have a helpful tendency later on, as the public have had to resort to fires in their homes on account of the cold and rainy weather, which is remarkable for August. With business being sluggish, and merchants declining to purchase only in small quantities, prices are not quite so firm. Quotations generally are from 12s. to 12s. 6d. per ton for hand-picked brights, 10s. 6d. to 11s. 6d. for good households, 9s. 6d. to 10s. for seconds, and 6s. 6d. to 8s. for cheap kitchens. The steam coal section retains its active tone, both in regard to exports and home demands, industrials being especially in brisk request. Consequently, values are showing no disposition to fall, and collieries are working nearly full time to supply the demand. Best hards are quoted at from 11s. to 11s. 6d. per ton, seconds 9s. 3d. to 9s. 9d., and nuts from 9s. to 9s. 6d. Slacks of nearly every description are selling well. Gas fuel is in moderate request, but coke is having a better sale.

Leicestershire.

COAL.

There is not much to say about business this week. Since last writing the holidays have rendered the pits idle and working was not recommenced till yesterday. The prospects are generally cheerful, and there is a fair amount on hand for immediate delivery. Household coals are dull, and will be this month, but there is a good demand for steam coals of all sorts. This branch of business may be said to be busy, and is likely to so continue. Local merchants have had a quiet time since the end of last week, and are not likely to be doing much till next week. Market rates are firm, and any weakness does not appear probable.

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South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL.

There is no change of importance to report this week in connection with the coal trade of the Cannock Chase district. Most of the collieries are standing the first three days of the week, and the men, who have had a busier time than usual this summer, appear to be glad to have a few days' rest. There is a fairly satisfactory enquiry all round, and most of the collieries are expecting to be kept busy for some time. For manufacturing sorts there is a brisk demand, and the house coal trade is picking up.

Birmingham.

COAL.

The past week has been a blank in the coal trade. Some of the pits resumed on Thursday and Friday, but only in preparation for beginning full operations next week. The household trade has eased off for the time being, but there is a steady call for all kinds of works fuel.

IRON.

The attendance at the weekly market was influenced by the holidays, and the amount of business transacted was limited. But the bulk of work in hand is as much as the capacity of the district can conveniently cope with, and the holiday break was curtailed owing to pressure for deliveries. Where possible, operations were resumed on Wednesday. So far as a holiday market can supply a test, no falling off was discernible from the recent healthy conditions. The notification on Monday of an advance of 10s. a ton on the basis price of marked bars, making it £9 10s., was the natural corollary to the increased wages, which came into operation the same day, and the improvement in conditions generally. The advance had been anticipated for at least a month, orders having been booked at the higher figure during that period. Not since January 1901 have marked bars been so high. The demand for good second-class bar iron is active at £8 2s. 6d. to £8 5s. delivered, and common bars for nuts and bolts sell freely at £7 15s. to £8 delivered Darlaston and Wednesbury. Recently there has been more Continental competition in this class of iron, and also in small rounds, squares, and flats, though the quantities coming to hand have been inadequate, and transit difficulties have caused delay. Gas-strip makers report favourably of the conditions in their industry. Many contracts taken at the old price are, of course, still in progress, but a goodly number of new orders are being booked at the higher figure of £8 5s., delivered in lots of 25 tons and upwards. The galvanised sheet branch continues to lag. Work is plentiful enough, but there are many makers after it, and prices are difficult to move. They vary from £12, which is the general figure, to £12 5s. (delivered Liverpool), and at these rates yield practically no profit. The supply of largets and billets is certainly more abundant, but the prices are out of proportion to those obtained for sheets. Local makers require £8 a ton for Bessemer qualities of largets, and 2s. 6d. to 5s. more for Siemens. Comparatively small quantities only of Continental material are available. The output of pig iron in the district is by no means in excess of the very active demand which prevails. Prices are very firm at quoted rates. Cold-blast pig, which moves automatically with marked bars, is up 5s. to 125s. Steelmakers are in full activity, with work going into the first quarter of next year. Following the rise in angles, channels and tees, joists have gone up 5s. a ton to £7 5s. There is a great demand for half finished steel.

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Forest of Dean.

Lydney.

COAL.

For the period of the year the house coal trade of this district continues to occupy a fairly satisfactory position. The wet weather and chilly winds are responsible for a pretty steady demand, and the collieries are managing up to four days in the week. There are good stocks to be noticed, but this is usual in early August. Merchants will probably be ordering for stocking between now and the end of the month in order to take advantage of the present summer prices. Shipments have been good during the past week or so, but the railborne demand does not show any improvement. Prices continue on the basis of—block 15s. 6d. at pit and 17s. 3d. f.o.b. Lydney or Sharpness. The steam coal demand is well maintained and most of the pits are on full time.

THE SCOTCH COAL AND IRON TRADES.

Thursday, August 8.

Glasgow and Lanarkshire.

COAL.

The volume of business in the coal trade shows a considerable increase. As the holiday season is now practically at an end, full supplies of coal are available for all departments of the trade. The supply of vessels has been much more satisfactory, and the clearances at the ports are heavy, with a prospect of a continuance of good business. The aggregate shipments at the Scotch ports in the last week amounted to 357,246 tons, an increase of 65,922 tons as compared with the preceding week, and 28,312 tons more than in the corresponding week of last year. At Glasgow 41,682 tons were sent abroad and 38,868 coastwise, the total of 80,550 tons comparing with 69,720 in the preceding week, and 77,280 in the corresponding week of 1911. There has been a good demand for Mediterranean ports, notwithstanding the current high freights. Steam coal has been more in request and a brisk enquiry exists for splint, the better qualities of house coal and nuts. The f.o.b. prices at Glasgow are for steam coal 11s. 6d. to 12s., splint 12s. to 12s. 6d., ell 11s. 6d. to 12s. 3d., treble nuts 12s. 6d. to 12s. 9d., doubles 12s. 6d. to 12s. 9d., and singles 11s. 6d. to 12s. per ton. There is a hardening tendency in the prices of some qualities of coal. In several directions increases of 6d. to 9d. per ton were announced to take place for supplies during the present month. The efforts to enforce these advances appear to have been only partly successful; but if the present active demand should continue, a general increase is not unlikely to be obtained. Good household coal is delivered in Glasgow at 15s. 9d. to 16s. 9d., and treble nuts 15s. 10d. to 16s. per ton. The household demand has been more active owing to colder weather. Consumption is now very heavy at iron and steel works, foundries and industrial works generally.

IRON.

The Glasgow iron market was closed on Monday owing to the Bank holiday. Towards the end of last week there was a strong demand for pig iron, and prices of Cleveland warrants showed the very decided advance of 1s. 6d. per ton on the week. Further advances have occurred this week, and since last report Cleveland warrants have sold from 59s. 1d. to 60s. 11d. cash, 59s. 3d. to 61s. one month, and 59s. 10d. to 61s. 6d. three months. Transactions have also taken place from 60s. to 61s. 3d. for delivery during October. Trade conditions generally support and encourage the upward movement. Advices from the Continent indicate continued activity, and the American reports are decidedly stronger with advancing prices. Merchants report that within the last few days consumers have manifested unusual anxiety to obtain supplies of pig iron, and large purchases have been made for delivery over the next two or three months. Cleveland warrants have been bought up to 60s. 2d. for two months' delivery, and at 60s. for October. The market for Scotch pig iron has also been strong, in sympathy with warrants. Govan and Monkland, Nos. 1, are quoted 69s., Nos. 3, 67s. 6d.; Carnbroe, No. 1, 72s., No. 3, 68s.; Clyde, Langloan, Summerlee, and Calder, Nos. 1, 75s. 6d., Nos. 3, 70s. 6d.; Gartsherrie, No. 1, 76s., No. 3, 71s.; Coltness, No. 1, 92s., No. 3, 72s.; Eglinton at Ardrossan or Troon, No. 1, 67s. 6d., No. 3, 66s. 6d.; Glengarnock, at Ardrossan, No. 1, 76s., No. 3, 71s.; Dalmellington, at Ayr, No. 1, 68s. 6d., No. 3, 66s. 6d.; Shotts, at Leith, No. 1, 75s. 6d., No. 3, 70s. 6d.; Carron, at Grangemouth, No. 1, 76s., No. 3, 71s. per ton. There are 88 furnaces in blast in Scotland, compared with 86 last week, and 83 at this time last year. The two additional furnaces have been lighted to produce hæmatite pig iron, for which the demand has been increasing, and the price of which has been raised to 80s. for west of Scotland delivery. Current shipments of Scotch pig iron have been smaller than in the preceding week. They embraced 1,465 tons foreign and 2,227 tons coastwise, the total of 3,692 tons comparing with 5,729 in the corresponding week. The arrivals of pig iron at Grangemouth from Middlesbrough and district were 8,604 tons, showing an increase of 1,212 tons. Owing to the continued advance in the price of pig iron the values of manufactured articles are increasing. The Scotch steelmakers have advanced their prices 5s. all round, and now quote angles £7 15s., ship plates £8 2s. 6d., bars £8 5s., and boiler plates £8 17s. 6d. per ton. The finished iron and steel works are very busy, and in both departments additional plant is being provided to overtake the work in hand.

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Renfrew, Ayr and Dumbarton.

COAL.

The coal trade has been active in this district, and supplies are now more regularly available, although the shipments have not been quite up to those of the preceding week. A falling off to the extent of about 3,000 tons, however, may be fully accounted for by delays occasioned through stormy weather at sea. The shipments amounted to 5,327 tons foreign, and 26,214 tons coastwise. From Bowling 85 tons were despatched, Irvine 1,127, Troon 5,270, Greenock 4,507, Ardrossan 5,625, and Ayr 14,933—total 31,547 tons, compared with 34,800 in the preceding week, and 31,960 in the corresponding week of last year. The prices of coal are generally well maintained, and in the retail trade an advance of 1d. per cwt. has been intimated in some districts. A very large business is being done in coal for manufacturing purposes.

◆

Stirling, the Lothians and Fife.

COAL.

There has been increased activity in the coal trade of the Lothians, and the shipments from Firth of Forth ports are 16,000 tons better than in the previous week, 96,739 tons having been despatched abroad and 22,143 tons coastwise. At Granton 8,245 tons were cleared, Bo'ness 17,440, Leith 40,590, and Grangemouth 52,607—total 118,882 tons, against 102,240 in the preceding week and 100,135 in the corresponding week of last year. Prices of coal in this district have an upward tendency. Best screened steam coal is quoted at Leith 12s. 6d. to 13s., secondary qualities 11s. 6d. to 12s., treble nuts 13s. 6d. to 14s., doubles 12s. 6d. to 13s., and singles 12s. 3d. to 12s. 9d. per ton. There has been a very decided improvement in the Fife coal trade since last report. Supplies obtained from the collieries have greatly increased, and a much larger number of vessels is available for cargoes. At Methil 58,534 tons were shipped, Burntisland 60,200, Alloa 3,292, Dysart 1,960, Wemyss 1,515, Tayport 543, Charleston 222—total 126,266 tons, compared with 84,404 in the preceding week, and 119,558 in the corresponding week of last year. First-class screened navigation coal is quoted at Methil and Burntisland 15s. to 16s., unscreened 13s., first-class steam coal 12s. 6d. to 13s., third qualities 10s. 6d. to 11s., treble nuts 13s. to 14s., doubles 12s. to 12s. 6d., and singles 11s. 3d. to 12s. per ton. The inland demand for coal has been more active, and business all round is in a healthy condition.

THE WELSH COAL AND IRON TRADES.

Thursday, August 8.

North Wales.

Ruabon.

COAL.

The continued strike of dock workers at the Birkenhead docks continues to affect the output of coal from North Wales in an adverse manner. A few lots have been sent for shipment at Garston, but the tonnage thus disposed of has not been large, nor has a great quantity been shipped by Ellesmere Port. As a consequence of this labour trouble, most of the collieries of Denbighshire and Flintshire have had to work short time during some part of the past week. Several of the ironworks have had to put their men on short time, as a result of their being unable to get their traffic handled at the port of Birkenhead. On the resumption of work after August Bank holiday, however, things looked brighter. The imported labourers resumed their work, and a large number of craft were dealt with, without any interruption on the part of the men who are on strike. It is now expected that the Birkenhead trouble will quickly fizzle out. Several of the collieries have accumulated some little stock, and are quoting special prices with a view to clearing same. Spot lots of steam coal are being offered and disposed of at 11s. per ton f.o.r. As much as possible is also being sent away against contracts, and there is a good demand for gas coal, in connection with which fuel the new contracts are now coming into operation, and the collieries should feel some benefit of the advance which has been secured. There is no doubt that there will be a considerable proportion of this advance swallowed up in increased cost of production, due to the recent legislation, but, notwithstanding this, the colliery companies should benefit to some extent through the 2s. to 2s. 6d. advance which has been obtained. There is not a very large demand for household coal, but enterprising merchants have been able to buy spot lots at low prices, good quality coal being sold at about 14s. and upwards. Landsale business has been very small, and there has been no variation in the prices during the past week. Nuts have a good sale and maintain their figure of 11s., and slack is in good demand, the average figure obtainable for rough quality being about 7s. f.o.r. Gas coke is fairly well sold at the same figure as quoted in last week's report.

Monmouthshire, South Wales, &c.

Newport.

COAL.

There is a healthy tone about the numerous enquiries on the steam coal market that augurs well for the trade of the next few months. Up to to-day practically nothing has been done at the pits, but every indication points to the demand pressing for a big output as soon as collieries get going again. Stocks are yet plentiful, but will be further depleted to a considerable extent before pits regain their normal rate of production. The one unfavourable element is the continued scarcity of tonnage. There is a fair quantity due to arrive, but at the moment handy bottoms are not so numerous as shippers would like to have, but chartering has been fairly active, so the supply should improve. So far as can be ascertained, large coals maintain their last quoted values firmly, while smalls, which were expected to weaken a little, have not done so. Pitwood continues firm and in good demand. Other quarters of the market show little variation. Latest approximate ruling prices may be taken as follow, coal quotations f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. to 15s. 6d.; western-valleys, ordinaries 14s. 6d. to 14s. 9d.; eastern-valleys, best, 14s. to 14s. 3d.; other sorts, 13s. 6d. to 13s. 9d.; colliery smalls, best, 9s. 6d. to 9s. 9d.; seconds, 9s. 3d. to 9s. 6d.; inferiors, 8s. 6d. to 8s. 9d.; through coals, 10s. 6d. to 10s. 9d.; nuts, best washed, 11s. to 11s. 3d.; house coals, best, 18s. to 18s. 6d.; seconds, 16s. 6d. to 17s. 6d.; patent fuel, 17s. 6d. to 18s. Coke: Furnace, 21s. to 23s.; foundry, 25s. to 27s. Pitwood: Best French fir, 24s. to 26s. ex-ship.

IRON.

Matters for the moment are, owing to the holidays, rather quiet in the iron and steel trades of the district, but the improved strong conditions recently reported are well maintained, and works generally are fully engaged and well booked with orders for some time to come. Tin-plate bar and sheet bar mills are very busy with current orders, values remaining firm at £5 12s. 6d. to £5 15s. Bessemer and £5 15s. to £5 17s. 6d. Siemens for Welsh bars. At rail mills, specifications are coming to hand well, and makers have plenty of work in hand for this month. Prices here continue strong at £6 7s. 6d. to £6 10s. for heavy sections, with the usual extra for light ditto. At local blast furnaces there has been no check in the pressure of business, and manufacturers cannot keep pace with the orders which flow in. Welsh hæmatite is again quoted 78s. 6d. to 79s. delivered in the district. The tin-plate market rules quiet, many works being stopped for the whole of holiday week. Official quotations remain as last figured, being upon the basis of 14s. 9d. to 14s. 10½d. Bessemer, and 14s. 10½d. to 15s. Siemens, for I C 20 × 14 × 112, other sizes and grades according.

Cardiff.

COAL.

With a large amount of tonnage to hand, and an abundance of available coal, the shipments last week were heavier than they had been for several years—if, indeed, they did not form an actual record. From Cardiff, Penarth and Barry they amounted to over 500,000 tons, whilst from Newport, Port Talbot, Briton Ferry and Swansea they reached a total of nearly 214,000 tons, making the aggregate quantity from the Channel close upon 714,000 tons. Needless to say, this had a great effect on the stocks of coal standing on the various railway sidings; some hundreds of wagons were released, and though up to the commencement of the holidays prices showed no material change, sellers were undoubtedly placed in a much better position to meet the "bearing" tactics of buyers. Officially the holidays this week extended over the first three days, but the August Bank holiday, on account of its being the last break in the working days prior to Christmas, is usually much more protracted than any other similar festivity. Whether this week will have proved an exception to the rule, it was impossible, at the time of writing, to forecast, but there is no doubt that the torrential rains which prevailed, to say nothing of the phenomenally cold weather, would exercise a powerful influence on the minds of the colliers, and induce numbers of them to go back to work much sooner than they intended. Still, nobody is optimistic enough to believe that they will altogether forego their usual seven or 14 days' relaxation; they will probably claim their holiday when climatic conditions are more favourable, and therefore the view held by most of the colliery managers is that until the end of the month, if not well into September, there will be greatly reduced outputs of coal. What little business has been done this week has been on the basis of 17s. to 17s. 3d. for best steam coals, 16s. to 16s. 6d. for Admiralty seconds, and 15s. 3d. to 15s. 9d. for ordinary qualities. These figures were for shipment within a few days. For later loadings, sellers are asking rather higher prices, but they fail to find any response on the part of buyers, who seem to have decided on a waiting policy. As to contract business for 1913, it seems for the moment to be held up, but it is significant that on the part of many buyers there is no attempt to controvert the opinion of sellers that the prices for coal over next year will have to be substantially higher than those paid last autumn, in order to meet the increased cost of production resulting from recent legislation. In a number of cases an advance of 1s. per ton has already been paid for deliveries from January to June, and judging from the expansion of trade that is going on all over the world, and particularly in the shipbuilding industry, it is not at all improbable that for more extended contracts a still higher figure will have to be conceded. An examination of the shipping returns for the last few weeks show most conclusively that the Welsh coalowners are beginning to get back a good deal of the trade which they lost during the recent strike. This has apparently been noticed by many consumers, who seem to be displaying considerable anxiety as to their own future supplies, and at present, for so early a period of the season, there is an exceptionally large number of buyers in the market seeking to cover their requirements over at least a portion of next year. Their action is pretty certain to prove contagious, and it will be interesting to watch what effect the pressure which is undoubtedly setting in will have on both current and future values. At present, colliery sale agents do not appear to be at all eager to enter into transactions until they are able to form something like a reliable estimate of the increased cost to which collieries will be subjected by the operation of the Minimum Wage Act and other measures which have been enacted for the amelioration of the lot of the miners, and nobody can blame them for their apparent indifference, especially with the improving prospects before them. Notwithstanding the recent heavy exportations of coal, when the present week opened there were no less than between 170 and 180 vessels in dock, and as the tonnage taken up last week, despite the impending holidays, was close upon 300,000 tons, it is anticipated that a busy period will be experienced for some little time to come. There is considerable pressure for small coal, not only for bunkering purposes, but for manufactories, and best qualities command from 11s. 3d. to 11s. 6d., seconds 10s. 6d. to 11s., and cargo qualities 10s. to 10s. 6d. per ton. Best washed nuts are 14s. to 14s. 6d., seconds 12s. 3d. to 13s., best washed peas are 12s. to 12s. 6d., seconds 10s. 6d. to 11s. In Monmouthshire coals there is no appreciable change. Black Veins are 15s. 6d. to 15s. 9d., western-valleys 14s. 6d. to 15s., and eastern-valleys (best) 14s. to 14s. 3d., other sorts 13s. 6d. to 13s. 9d., in each case f.o.b. Cardiff. There is rather more enquiry for house coals on account of the inclement weather that has prevailed, but prices remain about the same. Fancy quotations are 18s., No. 3 Rhondda bituminous large 17s. to 17s. 3d., through-and-through 14s. 9d. to 15s. 6d., and small 12s. to 12s. 6d.; No. 2 large 12s. 6d. to 12s. 9d., through-and-through 10s. to 10s. 6d., and small 9s. to 9s. 6d. per ton. The quantity of coal shipped coastwise during the month of June was 354,625 tons, being a decrease of 904 tons as compared with the corresponding month of last year. Cardiff's proportion was 215,400 tons, of which Portland took 30,630 tons, Liverpool 29,510, Southampton 20,800, Bristol 18,220, Devonport 16,200, London 15,100, and Portsmouth 12,000 tons. The shipments from Newport were 56,368 tons, Swansea 17,760, Port Talbot 11,280, and Briton Ferry 12,717 tons. Patent fuel continues firm at 19s. for prompt shipment, and 18s. 6d. for loading in the latter half of this month. Special foundry coke is 28s. to 30s., ordinary quality 23s. to 25s., and furnace coke 19s. to 21s. per ton. Pitwood is 24s. to 24s. 6d.

IRON.

Shipments of tin-plates and receipts from works were last week pretty evenly balanced, so that stocks, which are 369,192 boxes only show an increase of between 3,000 and 4,000 boxes. This week the whole of the tin-plate workers, in pursuance of the agreement made last year, took a week's holiday. They number nearly 30,000 and the production of tin-plates will be reduced by about 400,000 boxes. Weekly pays have now been introduced at several of the largest tin-plate works in the Llanelly district, much to the satisfaction of the men, who have been agitating for this reform for several years. Mr. W. Gilbertson, of Pontardawe, made a request to his steel smelters to work on Bank holiday, as that day was not a recognised holiday by the Steel Makers' Association, but the men refused to comply with the request. Advantage was taken of the stoppage at the tin-plate mills to carry out improvements and alterations to machinery by which the production will be increased. Business this week is practically at a standstill, but the undertone of the market is very firm. During the late coal strike American tin-plate manufacturers strengthened their footing in the export markets, it being reported that in May there was an increase in their exports of over 200,000 boxes as compared with the corresponding month of last year. There is no change in steel bars, which remain at from £5 15s. to £5 17s. 6d. for Siemens, and £5 12s. 6d. to £5 15s. for Bessemer tin bars. Imports of foreign bars, billets and blooms for the past week amounted to between 11,000 and 12,000 tons. Following an increased demand from India, galvanised sheets are rather firmer, but competition is still very keen, and 24-gauge corrugateds continue to be accepted at £11 17s. 6d. per ton. Welsh pig iron is firm at 78s. f.o.t.

Swansea.

COAL.

The trade of the port was again highly satisfactory during the past week. The coal and patent fuel trades continued active, the shipments amounting to 102,860 tons. There was a very poor attendance on 'Change this morning, and there was practically no business doing. Colliery offices closed early owing to the pits being idle. Prices generally were without material alteration, and were approximately:—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 16s. to 18s., less 2½ per cent.; Red Vein large, 12s. to 13s. 6d., less 2½ per cent.; machine-made cobbles, 22s. to 24s.; Paris, French, and German nuts, 23s. to 25s.; beans, 22s. to 23s. 6d.; machine-made large peas, 14s. to 15s.; ditto fine peas, 13s. to 14s., all net; rubbly culm, 7s. 3d. to 7s. 9d., less 2½ per cent.; duff, 4s. 6d. to 5s., net. Steam: Best large, 18s. 6d. to 18s. 9d.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s. 6d. to 11s. 6d.; small, 9s. 6d. to 10s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 18s. 6d.; through-and-through, 15s. 6d. to 16s. 6d.; small, 12s. 6d. to 13s. 3d., all less 2½ per cent. Patent fuel, 17s. 6d. to 18s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

Last week the iron and steel trades were brisk, the blast furnace was fully operating, and good yields were registered. The steel-smelting furnaces were actively engaged. Steel bars were a very active market, and prices were well maintained. The tin-plate works were busy up to Saturday, when the workmen commenced their annual holiday. The shipments of tin-plates last week were 135,782 boxes, receipts from works 138,350, and stocks remaining in the dock warehouses and vans 368,193 boxes.

Llanelly.

COAL.

There has been very little doing in the coal trade this week, and the market has been controlled almost entirely by a holiday spirit. The pits were idle the first three days, but outputs were quite below the average the remaining days. Everything points to a satisfactory market during the next few weeks, and there is every likelihood of prices advancing. For anthracite coals quotations are already up 1s. to 1s. 6d. for large, but cobbles and nuts are still a bit easy. Culm and duff and the other machine-made kinds are going well at firm prices. Steam smalls have a strong market, but large and through are weak. Quotations this week are:—Best malting large, 21s. to 23s.; second malting large, 20s. to 22s.; Big Vein large, 16s. 6d. to 18s. 6d.; Red Vein large, 13s. to 14s.; machine-made large cobbles, 21s. to 23s.; German nuts, 22s. to 23s.; French nuts, 22s. to 24s.; Paris nuts, 22s. to 24s.; machine-made large beans, 22s. to 24s.; ditto second quality, 20s. to 22s.; machine-made large peas, 14s. to 15s.; rubbly culm, 8s. to 8s. 6d.; duff, 5s. to 5s. 6d.; large, 13s. to 14s.; through-and-through, 10s. 6d. to 11s.; small steam, 8s. 6d. to 9s. 6d.; bituminous small, 10s. 6d. to 11s.—all f.o.b.

THE TIN-PLATE TRADE.

Liverpool.

The market is quiet, but there is a good undertone, and works are standing firm to their quotations, which may be called:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 14s. 7½d. to 14s. 9d. per box; I C 28 × 20 (112 sh. 216 lb.), 29s. 3d. to 29s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 1½d. to 15s. 3d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. per box; I C 14 × 19¼ (120 sh. 110 lb.), 15s. per box; I C 20 × 10 (225 sh. 156 lb.), 21s. 6d. per box; I C squares and odd sizes, 15s. basis for approved specifications and shipment over next six months. Charcoal tins are firm at 17s. basis and upwards. Finished blackplate is steady and in fair demand at £10 17s. 6d. to £11 per ton basis. Coke wasters are steady as follow:—C W 14 × 20, 13s. 9d. per box; C W 28 × 20, 28s. 1½d. per box; C W 14 × 18¾, 13s. 9d. per box; C W 20 × 10, 20s. per box; C W 14 × 19¼, 14s. per box—all f.o.b. Wales, less 4 per cent.

THE BY-PRODUCTS TRADE.

Tar products:—The market has been very quiet, but prices remain steady. Benzols are firm. Pitch and carbolics keep about the same. Creosote is very firm. Naphthas also keep in favour of sellers, who are not burdened with any over-anxiety as to sales. Nearest closing values are:—

Benzols, 90's, 11½d.; ditto 50's, 9½d.; toluol, 9½d.; carbolic acid, crude (60 per cent.), 2s. 6d. to 2s. 7d.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 1s. 1d., as in quality and package; crude ditto, 4½d. in bulk; creosote, 3½d. for ordinary qualities; pitch, 51s. 6d. to 52s. f.o.b. east coast; ditto, 51s. to 52s. f.a.s. west coast; ditto, 57s. 6d. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—The market is firm, and though the holiday break has naturally interfered with business, prices have not fallen, even nominally, as much as might have been expected. Generally speaking the forward outlook is too impregnable to make "bear" tactics worth exercising on prompt quotations, as they do not have the same reflex action on futures as they did in times past. Closing prompt prices are:—

London (ordinary makes), £13 8s. 9d.; Beckton, £14 to £14 1s. 3d.; Liverpool, £14 5s.; Hull, £14 5s.; Scotch ports, £14 2s. 6d. to £14 5s.; nitrate of soda (ordinary), 11s. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

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*** *For other Miscellaneous Advertisements see Last White Page.*

Forthcoming Annual Meetings.

Institution of Mining Engineers—Provincial Meeting (Birmingham)	September 11, 12 & 13, 1912
Midland Counties Institution of Engineers	Sept. 1912
Manchester Geological and Mining Society,	Oct. 8, 1912
North Staffordshire Institute of Mining and Mechanical Engineers	October 14, 1912
South Staffordshire and Warwickshire Institute of Mining Engineers ...	October 1912 (2nd week)
Iron and Steel Institute—Autumn Meeting	September 1912
Association of Mining Electrical Engineers—	October 4 & 5, 1912 (Provis.)

The Colliery Guardian.

LONDON, FRIDAY, AUGUST 9, 1912.

The annual general meeting of the North of England Institute of Mining and Mechanical Engineers was held on Saturday in the Wood Memorial Hall, Newcastle. Mr. W. C. Blackett was elected president.

The Home Secretary gives notice that he has approved certain additional mining schools and authorities for the purpose of granting certificates to firemen, examiners, and deputies under the provisions of Section 15 (1) (*b*) of the Coal Mines Act, 1911.

A memorandum has been prepared by the Home Office for the information and guidance of persons desiring to obtain certificates as firemen, examiners, and deputies under section 15 of the Coal Mines Act, 1911.

The Home Secretary has appointed a Committee to enquire into the circumstances in which spontaneous combustion of coal occurs in mines, its causes, and the means of preventing it or of dealing with it when it has arisen. The Committee consists of:—Mr. R. A. S. Redmayne, C.B., H.M. Chief Inspector of Mines (chairman), Sir Arthur Markham, Bt., M.P., Mr. C. E. Rhodes, Mr. Frank Rigby, and Mr. Herbert Smith.

In the House of Commons the Trade Unions Bill on Tuesday was read a second time by a majority of 100, and was sent to a Committee of the whole House.

Our attention has been drawn to the fact that in the first report of the Explosions in Mines Committee, a liberal abstract of which appeared in last week's *Colliery Guardian*, the name of Mr. J. T. Forgie is omitted from the list of those constituting the committee appointed by the Mining Association of Great Britain to direct the experiments at Altofts. Mr. Forgie acted as the representative of Scotland on the committee.

The annual conference of the Scottish Miners' Federation was held on Wednesday and Thursday in Edinburgh.

The proposal to reconstruct the constitution of the South Wales Miners' Federation on the lines of centralisation is to be submitted to a ballot to be taken early next month. This decision was come to at a conference held at Cardiff last week. Various questions arising from the minimum wage award were also discussed.

A meeting of the Scottish Conciliation Board was held in Glasgow on the 2nd inst. to consider the question of weekly wages and "lying-time." The Minimum Wage Board also met to adjust a panel of umpires.

We understand that Mr. J. R. R. Wilson, H.M. inspector of mines in Yorkshire, has been promoted to the chief inspectorship of the Liverpool and North Wales district. Mr. Mottram, at present chief inspector in that district, is to take the place of the late Mr. W. H. Pickering, at the head of the Yorkshire and North Midland Division.

At a meeting of the Conciliation Board for the Federated area of Great Britain on the 1st inst.

in London, an application presented on behalf of the miners for an advance of 5 per cent. on the standard of 1888 was discussed. The meeting was further adjourned until some day to be fixed by the joint secretaries. Mr. Alfred Hewlett having resigned the presidency of the board, Mr. F. J. Jones was appointed in his stead. We understand that Lord Coleridge has been invited to fill the position of independent chairman, rendered vacant by the death of Lord James of Hereford.

A meeting of Durham Conciliation Board was held last week. It was decided that wages should remain unchanged.

The Home Office investigation into the circumstances attending the recent explosion at the Cadeby Colliery was held on Monday, Tuesday and Wednesday, being then adjourned pending the examination of the pit.

The Drudgery of Management.

MR. W. C. BLACKETT, the new president of the North of England Institute, at the annual meeting of this most venerable of mining societies, held last Saturday at Newcastle, gave expression to what must be in the minds of many mining engineers at the present time. To-day, he said, the mining engineer was spending the most strenuous moments of his life in devising ways and means of meeting Acts of Parliament, and had little time left to indulge in scientific pursuits. For all the latter-day woes and anxieties of the colliery manager, the Legislature, perhaps, is not altogether to blame; the increased difficulties of mining due to natural causes, the extending application of electricity to colliery working, and the proper control of the new appliances and methods which quite legitimately form part of industrial progress, each make a call upon the manager which his forebears had not to answer. It is one of the inevitable consequences of competition and civilisation. Again, such developments as those cited above must bring in their train numerous and more complicated statutory requirements. But the Legislature has done little to "temper the wind to the shorn lamb," and to a large extent the duties imposed upon the manager by the new Coal Mines Act seem to have been prompted less by a craving for safety than by an amateurish desire to intervene at every stage in the management.

Colliery managers have probably ere now discovered, in the cruel school of experience, most of the many eccentric vexations that lie embalmed in the Act. Nevertheless we believe that the list which we give on pp. 291-2 will prove a matter of surprise and consternation even to the Government itself. The list in question is a mere recital of the forms that have to be kept, of the returns that have to be made, and appointments and nominations that have to be duly registered, under the new Act. It is incomplete in so far as the regulations yet to be made and the requirements of other Acts unrepealed by the Coal Mines Act are concerned, but it is sufficiently alarming as it stands.

We have not attempted any calculation as to the number of times that the manager will be called upon to sign his name in the course of his day's work—such a calculation would probably be enlightening to the householder who protests against the infringement of his leisure caused by the stamping of insurance cards. Moreover, in many cases the signature of the colliery manager is not a mere form, but implies a considerable responsibility and cannot be delivered until he has carefully scrutinised the matter of a report or formed a scrupulous judgment of an appointee. These, however, are not the cases which so much exasperate him as those in which his penmanship is a purely useless dedication to the goddess of "red tape," meaning nothing more than that he is a drudge to so-called system, and adding nothing to safety or discipline.

In all this the Coal Mines Act is only characteristic of its type, for every Government department appears to devote its energies to the devising of schemes by which it may be able, at enormous expense to the employer, to procure information that in most cases is useless, and at all times is translated into so ill-digested a jangle of facts as to deaden the impulse of the most earnest searcher after truth. But the loss in the case of the mining industry is still more serious, as the duty is imposed upon skilled and highly-paid officials on whose unremitting energy the whole safety and prosperity of the industry depends. It is appalling to think that these Acts may prove the death-blow of societies such as the Institution of Mining Engineers and its congeners, whose unselfish work has been so incalculable a blessing to mining in all its many branches. Yet, as Mr. CLAUDE PALMER observed at Newcastle last Saturday, it is a matter of surprise that mining engineers and managers can be got to devote sufficient time to scientific research, in view of legislation which compels them to occupy their time "with the farcical process of signing their names 200 or 300 times a day." Some—quite wrongly, we think—may look upon the proceedings of these societies as a mere social relaxation, but the danger is more obvious when we consider the effect of this drudgery upon the *morale* and character of management; quite apart from the fact that the manager should have the leisure and the opportunity to gain experience from visits to other collieries and coalfields and communion with other members of his profession, it is to be feared that it will leave him all too little time to attend to the ordinary, but really important, duties of management, which are not to be satisfied by the mere signing of reports.

We are aware that the colliery manager is not the only victim of this new-born bureaucracy. The chief inspectors of mines have for years complained annually of the unwarrantable waste of time involved in the performance of clerical work, and all our great technical industries are smarting under the burden. This week the chairman of the North Staffordshire Railway Company suggested that instead of compelling the railway companies to raise their rates to the detriment of the trader, the State might relieve them of many of the expensive and futile tasks now imposed upon them in the filling up of returns. Probably the shipowner, the cotton manufacturer and the engineering employer could say something also to the point. The only thing is that the mining industry has had to stomach rather more than the others.

Trade Summary.

The London coal trade for the past week has been very quiet. The holidays have checked the flow of public orders, and the railway companies have kept back the heavy coal traffic whilst the passenger traffic has been so large. Manufacturing coals are moving freely, but all house coals are dull. The seaborne market has begun to show a little more activity since the resumption of work at the docks and the riverside wharves. Prices are unchanged. The colder weather has influenced the market slightly, and a firmer tone is recognised. Slacks are in strong demand.

The market at Newcastle is healthy, there being a strong forward enquiry. Prices all round have risen, with the exception of small steam coals, which are rather cheaper.

The Durham coal trade continues firm, and the enquiry is good. House coals are still dull, but other varieties of fuel find a ready market.

Little business has been transacted in Lancashire during the present week, but the tone of the house coal market has improved slightly. Slacks are scarce.

Business in West Yorkshire has been quiet, but prices are steady. There is a considerable scarcity of manufacturing fuel.

South Yorkshire steam coals are firmly placed, but buyers are not purchasing far ahead. Slacks continue in excellent request. House coal is fairly steady.

The demand for Derbyshire house coal is quiet, but sellers stand out firmly for increased prices, and stocks are relatively low. Manufacturing fuel is in strong order.

Shipments at Cardiff have been heavy, to the advantage of sellers. As regards forward business, buyers are adopting a waiting policy. There is considerable pressure for small coal. Monmouthshire coals are unchanged. There is rather more enquiry for bituminous sorts.

The Scottish coal trade is busy, and in some places advances are being obtained.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.—August 6.

The New General Regulations.

Sir ARTHUR GRIFFITH-BOSCAWEN asked the Home Secretary whether, in view of the fact that the Home Office have just issued the general regulations under the Coal Mines Act, 1911, with a notice that all objections must be lodged within 30 days, and that the holiday season is now in full force and, in consequence, many mining engineers and business men will be away on their holidays, he would be willing to extend the period during which objections may be lodged.

Mr. MCKENNA replied: The honourable member has been misinformed. No draft of general regulations under the Act has yet been issued. Drafts are now under consideration, but are not yet ready to be issued under the Act.

Inspectors of Horses.

Mr. HANCOCK asked the President of the Board of Trade whether any inspectors of horses had been appointed under the Coal Mines Act of 1911; if so, how many; and for which districts have they been appointed.

Mr. MCKENNA replied: The President of the Board of Trade has asked me to reply to this question. No appointments have yet been made. A very large number of applications have been received, and, in accordance with the promise given last year on the Coal Mines Bill, these have been referred to the Board for Mining Examinations for consideration. It is proposed to appoint one inspector for each of the six divisions into which the country will eventually be divided for inspection purposes.

August 1.

Weekly Payments.—Legality of Ballots.

Mr. FENWICK asked the Home Secretary whether a ballot in favour of weekly payments, as provided for by the Coal Mines Act, 1911, is valid, if taken before the Home Office instructions were issued?

Mr. MCKENNA replied: I am advised that a ballot for the purpose of ascertaining whether the majority of the persons employed at a mine desire the provision of the Act as to weekly payment of wages to apply to the mine is not valid unless carried out in accordance with the Home Office Rules of June 22 last, made under section 118 of the Act.

July 31.

Rescue Work in Mines.

Mr. W. E. HARVEY asked the Home Secretary if he would state what provision had been made for installing life-saving apparatus at each mine; whether facilities were given to the workmen for training with the rescue apparatus that was now given to officials; and if it was his intention to appoint inspectors to see that the said Act was carried out by special inspectors for this class of work.

Mr. MCKENNA replied. An order was made by me in April last under the Mines Accident (Rescue and Aid) Act which provides for the training of rescue brigades and the supply of breathing apparatus at coalmines. At the end of the year I propose to call for a return from each mine as to the provision made in pursuance of the Order. As regards the second paragraph of the question, the Order does not discriminate between officials and workmen, but requires that the persons trained for rescue work and in the use of breathing apparatus shall be picked men, carefully selected on account of their coolness, powers of endurance, and knowledge; it would be highly dangerous to allow either officials or workmen to be trained indiscriminately for this work. The Order will be enforced by the inspectors of mines, who are fully competent to do so. It would not be desirable to appoint special inspectors for the purpose.

A correspondent says that in connection with the opening of a new mine, known as the Victoria seam, at their Clifton Hall Colliery, Pendlebury, near Manchester, Messrs. Andrew Knowles and Sons Limited have introduced a number of girls and young women on the pit brow, their work consisting of screening or picking coal from the belt. Special accommodation has been made at the pithead for the women workers. The introduction of pit brow lassies here is an innovation.

LABOUR AND WAGES.

North of England.

The voting of Northumberland miners' lodges on the matters before the last council meeting has now been issued. By 647 to 3 a resolution in favour of abolishing Baff Saturday working was carried, this being really a proposal for a ten days working fortnight; and by 647 to 16 the proposal to leave the Miners' Federation was defeated. It was resolved by 650 to 3 to take steps to secure surface workers a minimum wage of not less than 5s. a day. A unanimous vote favours action to abolish three-shift working.

A meeting of the Durham Coal Trade Conciliation Board was held at the Coal Trade Offices, Newcastle, on the 2nd inst., Sir Lindsay Wood presiding, when the quarterly ascertainments of the selling price of coal were presented. The figures were briefly discussed, but no change in wages was made, the rates continuing at 42½ per cent. above the basis of 1879.

Federated Area.

The trouble which threatened recently with the pit boys of Bentley Colliery, Doncaster, has been bridged over by the management conceding a new and liberal price list.

At the quarterly meeting of the Sheffield District Council of the National Amalgamated Union of Labour, held on Saturday, the negotiations in South Yorkshire with regard to the colliery surfacemen's wages came up for consideration. A resolution was passed urging the joint committee on the men's side to press for an early settlement, and expressing full confidence in the joint committee. Councillor A. J. Bailey was instructed to press for an early meeting of the joint committee in Derbyshire, according to agreement, with a view to dealing with the deductions made at some collieries for overtime, and with the condition of affairs at other collieries where the lads' scale had not been put into operation at all.

A meeting of the Conciliation Board for the Federated Districts of England and North Wales was held at the Westminster Palace Hotel on the 1st inst. There were present Messrs. F. J. Jones and J. J. Addy (South Yorkshire), C. Pilkington and W. H. Hewlett (Lancashire), C. B. Crawshaw and J. F. Warrington (West Yorkshire), A. G. Barnes, A. Leslie Wright, W. B. M. Jackson and H. Westlake (Midland Counties), H. Dyke Dennis (North Wales), Col. A. H. Heath (North Staffordshire), Col. W. G. Harrison (Cannock Chase), and Sir T. Ratcliffe-Ellis (secretary), representing the coalowners; Messrs. J. Wadsworth, M.P., J. Hosking, and H. Smith (Yorkshire), S. Walsh, M.P., and J. Parkinson (Lancashire), Albert Stanley, M.P. (Cannock Chase), W. E. Harvey, M.P., and J. Haslam, M.P. (Derbyshire), W. Carter and C. Bunfield (Nottingham), L. Lovett (Leicester), G. Hughes (North Wales), and T. Ashton (secretary). Mr. Alfred Hewlett having retired from the board, on the motion of Mr. W. E. Harvey, M.P., Mr. F. J. Jones (Yorkshire) was appointed president. A resolution of condolence with the relatives of Mr. Henry Fairclough, a member of the board, who has recently died, was unanimously adopted. An application for an advance of wages was discussed, and the meeting was adjourned until a date to be arranged by the joint secretaries.

The dispute at Messrs. J. and J. Charlesworth's Newmarket Silkstone Colliery, Stanley, near Wakefield, through which about a thousand men and boys have been idle for some 22 weeks, has been amicably terminated, and that work will be resumed at the pit shortly.

Scotland.

The strike at Earnock Colliery, Hamilton, belonging to Messrs. John Watson Limited, was settled on the 1st inst.

A number of questions were dealt with on the 2nd inst. at meetings of representatives of the employers and men in Glasgow. The members of the executive of the Scottish Miners' Federation met in the forenoon, and in the afternoon meetings of the Coal Trade Conciliation Board and of the Minimum Wage Board were held in the Windsor Hotel. The executive decided to ask the employers to agree to weekly pays all over the Scottish coalfield, and also to make an application for a uniform pay day with a uniform period of lying time. A meeting of the workmen's side of the Minimum Wage Board was held immediately afterwards, when Mr. Macbeth, Dunfermline, secretary for the men's section, explained that the meeting of the board had been convened with a view to the selection under Rule 19 of a panel of umpires which might be called upon in the event of the local committees at any of the collieries failing to agree with regard to any claim which might come before them. Several points were raised by the delegates on which it was alleged that the employers were not carrying out the spirit of the rules agreed to under the Minimum Wage Act, and it was decided to put forward these complaints at the board meeting and endeavour to obtain an understanding on the matter, failing which that Sheriff A. O. M. Mackenzie, K.C., should be called upon to give a definition of certain rules.—At the meeting of the Coal Trade Conciliation Board, which was held under the presidency of Mr. Adam Nimmo, the vice-chair being occupied by Mr. Smillie, the proceedings were conducted in private. At the close it was stated that a discussion took place regarding the payment of weekly wages, and that it was ultimately decided to appoint a committee of five from each side of the board to meet shortly and hear the views of the respective sides on the question with the object of finally settling the matter. Mr. Nimmo stated that the employers were not averse to the payment of weekly wages, and were willing to inaugurate the system at the earliest possible moment, provided an agreement could be come to on the question of lying time and the fixing of the day on which wages were to be paid. With regard to the question of medical attendance at the collieries, it was pointed out that up till the present time a system had existed at the Scottish collieries whereby a certain weekly payment was deducted from the wages of all mine workers. It was agreed that in view of the Insurance Act and the fact that medical attendants would not receive any payments under that Act until the beginning of next year, the system which has hitherto been in force at the collieries should continue, and that between now and the end of the year the mineowners and the miners' representatives should come to a decision as to what future arrangements should be made. At the meeting of the Joint District Board the panel of umpires was practically adjusted between the parties, and will be put before the independent chairman on an early date for ratification. It is understood that by these proceedings the machinery for settling disputes under the Act is now almost complete.

The nineteenth annual conference of the Scottish Miners' Federation opened on Wednesday, in Edinburgh. Mr. Robert Smillie, the president, who was in the chair, in his address said at present it was quite impossible to give a fair opinion as to the real value of the Minimum Wage Act. Already they found that the coalowners in some parts of the country were doing their best to make it impossible to carry out the Act in the spirit intended. They naturally expected that the arrears of wages due under the Act would be paid without the necessity of the men being required to make out the amounts due to them and to claim them. Some employers took a different view. The miners' representatives had requested the employers to make up the amounts due to the men, and in case of dispute the men should be entitled to prove to the employers the amount due to them. But the most serious complaint they had to make with regard to the action of employers was that some of the organised coalowners of Scotland were endeavouring to get the men to contract themselves out of the Act. They did not expect that it would be left to the employer to say that a man must sign himself out of the Act or be dismissed, but that in case of dispute the matter would be referred to the joint committees set up for the purpose. To their astonishment, reports were coming from all parts of the country that colliery managers were laying it down that the men must contract themselves out of the provisions of the Act or leave their employment. In some cases threats of eviction from their homes were made. They had approached the Prime Minister on that subject, and his reply was that it was the duty of their organisations to protect their members against any such action on the part of the employers. He did not regard it as the duty of their organisations to carry out Acts of Parliament; that was the duty of the Government. But if the Government held to their view that it was the duty of the men themselves to see that the employers did not do that, then the men must be prepared to take up the challenge by means of their unions, and the Government would be face to face again with the same state of things which brought about the present Act. It should be said that many employers were doing their best to give the Act a chance, and had neither threatened dismissal nor refused arrears. There was no doubt that arrears due under the Act were exactly in the same position as wages due to a workman, and an employer might just as well say that a man should leave his employment for asking for his wages. As to the benefits of the Act, he thought they had not yet realised what they would gain under it. In spite of criticism, he felt that it would confer lasting and important benefits on the men. There was no doubt at all that in the past masters had employed men at lower rates of wages than were current at the collieries. The Act would prevent employers doing this, or employing unskilled and dangerous labour underground because it was cheap. Of course some amendments were required. Continuing, Mr. Smillie said the struggle brought them one step nearer the nationalisation of mines in this country. It was now recognised that the coal industry was far too important to be left in the hands of the mineowners to exploit it for private profits and the risk being run from time to time of the whole industries of the country being held up for the want of coal. The matter was to be brought before the public and the miners' representatives would draft a Bill. They would request the Government to take up the Bill. They did not expect the Government would do this, but in the meantime the miners would carry on the propaganda for the purpose of ripening public opinion.

The conference proceeded to discuss the resolutions sent up by the districts. A resolution was adopted instructing the executive committee to instigate a vigorous propaganda during the next 12 months by means of lectures, &c., throughout the mining districts of Scotland. Resolutions were also adopted in favour of a uniform rate for checkweighers' dues, the deduction of these dues through the office, the payment by weight of all responsible facemen employed getting minerals, and abolishing the "line" system in the case of a man desiring to remove from one pit to another. The question of the inspection of mines by workmen was remitted to the executive to consider what further steps could be taken to carry out the various clauses of the new Act. Stirlingshire and Fife sent up demands, the former for time and a-half for Sunday labour and the latter for double time. The Stirlingshire motion was withdrawn, the presidents stating that they did not want the money but only the abolition of Sunday labour.

The Iron, Steel, and Engineering Trades.

As a result of the report of Mr. John M. MacLeod, C.A., Glasgow, to Messrs. James O. Bishop and James Gavin, joint secretaries of the Board of Conciliation between owners of blastfurnaces in Scotland and the blastfurnacemen, as to the price of Scottish pig iron warrants in the Glasgow markets for the months of May, June, and July 1912, there is a rise of 2½ per cent. in the wages of the workmen.

The report of the accountants to the Midland Wages Board was published last week. The board controls the trade in North and South Staffordshire, East Worcestershire, Shropshire, South Wales, and Lancashire and Yorkshire. The report shows that the output of all descriptions of iron made by the 17 selected firms during May and June was 43,494 tons, an increase over the previous two months by no fewer than 22,511 tons. The average selling price obtained in May and June was £7 4s. 9d. compared with £7 0s. 5d. in March and April. In accordance with the sliding-scale arrangements the wages for puddlers are increased by 3d. per ton, making them 9s. 6d., and all other mill and forge wages will be advanced 2½ per cent. In addition to this puddling rate of 9s. 6d. per ton under the sliding scale the men will receive a bonus of 6d. per ton in accordance with the arrangement recently arrived at when they applied for an increased tonnage rate. During August and September, therefore, puddlers' wages will be increased by 9d., making the rate 10s. per ton. Of the total output during May and June bars formed the principal part, reaching 27,808 tons, and realising an average net price of £7 6s. 6d., compared with 14,821 tons and £7 1s. 5d. respectively in the previous two months. Hoops, strips, and miscellaneous iron amounted to 12,927 tons in May and June, and sold for £6 18s. 7d., an increase of 8,176 tons in weight and 4s. 7d. in value, compared with March and April. Angles and tees increased by 444 tons in weight and 6s. 8d. per ton in value in May and June, as compared with the two previous months, and plates and sheets by 907 tons and 1s. 5d. respectively.

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, July 30, 1912, is as follows:—Amsterdam, 921 tons; Alexandria 17,881; Abo, 177; Bremen, 1,533; Bandholm, 2,709; Bombay, 411; Christiansund, 352; Constantinople, 1,269; Cronstadt, 23,110; Copenhagen, 291; Christiania, 94; Christiansund, 58; Drontheim, 112; Dantzig, 192; Flensburg, 3,093; Guernsey, 464; Gothenburg, 917; Ghent, 1,257; Hamburg, 2,728; Harlingen, 1,007; Harburg, 2,511; Harstad, 783; Husum, 521; Konigsburg, 156; Kristvik, 686; Landscrona, 1,431; Ljusne, 701; Libau, 403; Malmo, 4,154; Monte Video, 3,394; Pernau, 3,213; Port Said, 5,496; Porsgrund, 600; Reval, 7,007; Rouen, 4,640; Riga, 8,783; Rotterdam, 10,198; Stettin, 171; Stockholm, 1,877; St. Petersburg, 7,013; Stege, 619; Tuborg, 1,446; Wyk, 114—total, 124,493 tons; corresponding period, July 1911, 39,667 tons; corresponding period, July 1910, 59,904 tons.

EXPLOSIVES IN COAL MINES ORDER.

The question having been raised whether the words "magneto-electrical apparatus," as used in the Order of May 21 last, include what is known as a "dynamo exploder"—*i.e.*, an electrical firing apparatus consisting of an armature rotating in a permanent (non-electrical) magnetic field, as well as the form in which an armature rotates in a field formed by an electro-magnet, the Secretary of State wishes it to be generally known that it was intended to include apparatus of both kinds, and he is advised that the phrase used does, in fact, include apparatus of both kinds.

With regard to the requirement in Clause 2 (*h*) of the Order that every electrical firing apparatus shall be provided with a push button, an internal arrangement by which the firing contact is automatically made at the end of the travel of the handle and on the release of the handle is immediately broken, performs the same function as a push button, and will be admitted as complying with the requirement in the Order as to the provision of a push button.

REPORT BOOKS AND FORMS UNDER THE COAL MINES ACTS.

Under the Coal Mines Act, 1911, and the regulations of the mine applicable thereto, certain books, in which registers are to be kept and reports recorded, must be kept at each mine, also certain returns have to be made, appointments made, authorities given, and notices given and posted.

The "regulations of the mine" are defined (sec. 89 (1)) as "the general regulations applicable to a mine, as supplemented or modified by the special regulations, if any, for the time being in force with respect to the mine."

"The Secretary of State may by order make such general regulations for the guidance of the persons acting in the management of mines or employed in or about mines as may appear best calculated to prevent dangerous accidents, and to provide for the safety, health, convenience, and proper discipline of the persons employed in or about mines, and for the care and treatment of horses and other animals used therein, and any such regulations may vary or amend any of the provisions contained in Part II. of, or the Third Schedule to this Act." (Sec. 86 (1)).

The Coal Mines Act specifically refers to general regulations upon the following subjects :—

1. Sec. 30 (1). Classification of mines for purposes of ventilation.
2. Sec. 57 (3). Hours of employment of winding enginemen.
3. Sec. 60 (4). Use of electricity in mines.
   (Covered by Special Rules, March 1912.)
4. Sec. 61 (1). Supply, use, and storage of explosives.
   (Explosives in Coal Mines Order, May 21, 1912.)
5. Sec. 71 (2). Reading of barometer, thermometer, and hygrometer.
6. Sec. 76. Provision and use of sanitary conveniences in mines.
7. Sec. 85. Rescue work and ambulances.
   (Covered by Rescue and Aid Order, May 4, 1912.)
8. Sec. 93 (2). Fixing hours of employment.

General regulations relating to Nos. 1, 2, 5, 6 and 8 have not yet been made (August 9, 1912).

Section 24 (1) of the Coal Mines Act, 1911, requires that "All such books as are by this Act required to be kept at a mine shall be provided by the owner, agent, or manager, and shall be in the prescribed form."

"Prescribed" means prescribed by the Secretary of State. (Sec. 122.)

In addition to the books and forms referred to above, certain books and forms are required by the Coal Mines Regulation Act, 1908, which limits the length of the working day for miners below ground.

Coal Mines Act, 1911.

[Forms which are to be prescribed by the Secretary of State are indicated thus :—Pres.; and in the case of those which have already been issued, the official number of the form is also given, thus :—Pres. H.O. 42.]

Sec. 2 (1). Appointment of manager.
2 (2). " temporary manager.
3 (2) (*a*). Appointment in writing by owner or agent in the absence of manager.
3 (2) (*b*). Appointment in writing by owner or agent in the absence of under-manager.
4 (2). Appointment of under-manager.
6. Notice to inspector by owner or agent of appointment of manager, under-manager, &c.
Sec. 14 (1). Appointment in writing by manager of firemen, examiners, or deputies.
16 (1). Appointment by workmen of inspectors on their behalf.
[Pres. H.O. 36.] 16 (2). Report of inspection on behalf of workmen to be entered in a book, and a copy of the report to be sent by the owner, agent, or manager to the inspector.
[Pres.] 17 (1). Reports by persons having responsible duties with respect to :—
Safety
Conditions of the roadways
" " workings
" " ventilation
" " machinery
" " shafts
" " shot-firing
" " safety lamps
" " electrical plant
" " animals
if required to do so by the regulations of the mine, to be made in a book.
[Pres.] 17 (2). Copies of reports made under sec. 17 (1), and under the provisions of this Act relating to :—
Inspection before commencing work
Inspection during shifts
to be posted at the pit head.
[Pres. 1st Sch.] 18 (1) (*a*). Annual return (general) by owner, agent, or manager to inspector of division.
[Pres.] 18 (1) (*b*). Annual return of accidents causing disablement for more than seven days.
[Pres.] 18 (1) (*c*). Annual return of rescue and ambulance appliances and brigades.
[Pres.] 18 (1) (*d*). Annual report of such other particulars as the Secretary of State may prescribe.
18 (2). Forms for returns under sec. 18 to be furnished by the inspector of the division.
19. Notice by owner, agent, or manager to inspector of division of opening and abandonment, &c., of mines.
22. Return by owner to the inspector of the division of abandonment of mine.
24 (1). All books to be provided by the owner, agent or manager; to be in the prescribed form; "and the books, or a correct copy thereof, shall be kept at the office at the mine."
25 (1). Notice in writing by owner, agent or manager to inspector of division of division of mine into two or more parts.
[Pres. H.O. 37.] 29 (2). Measurement of ventilation to be entered in a book.
34 (1) (i.). Appointment in writing by the manager of competent person to examine safety lamps.
[Pres.] 34 (1) (i.). Record in a book to be kept of men to whom safety lamps are given out.
[Pres. H.O. 38.] 34 (1) (ii.). Nature of damage to safety lamps to be recorded in a book.
34 (1) (ii.). Appointment in writing by manager of official of the mine for the purpose of receiving notice of damage to safety lamps.
34 (1) (iii.). Appointment in writing by manager of competent person to carry key for unlocking safety lamps.
43 (2). (*b*). Written permission by manager or under-manager to persons to ride on sets or trains of tubs.
50 (4). Notice by manager specifying the manner in which the supports of roofs and sides are to be set, &c.
Sec. 53 (2). Authority in writing by the manager to give signals.
[Pres. H.O. 39.] 56 (1) (*b*) and (3). Report of thorough examination of steam boiler.
[Pres. H.O. 40.] 56 (1) (*c*) and (3). Report of internal examination of steam boiler.
57 (1). Appointment in writing by manager of winding-enginemen.
[Pres.] 57 (3). Particulars to be recorded in a book with respect to hours of employment of winding-enginemen.
60 (4) and 126 (*b*). Special rules.

Special Rules for the Installation and Use of Electricity in Mines, Established in March 1912.

[Pres.] Rule 2 (i.). Notice to inspector of the district of any existing apparatus.
[Pres. H.O. 11c.] Rule 2 (ii.). Notice to inspector of the district of the intention to introduce apparatus into any mine, or into any ventilation district in any mine.
[Pres. H.O. 11d.] Rule 2 (iii.). Notice to inspector of the district of the intention to introduce or re-introduce electricity into any mine where the use of electricity has previously been prohibited under Rule 1.
[Pres.] Rule 2 (iv.). Annual return to inspector of the district.
Rule 4 (i.). Notice prohibiting any person other than an authorised person from handling or interfering with apparatus.
Rule 4 (ii.). Notice containing directions as to procedure in case of fire.
Rule 4 (iii.). Notice containing directions as to the restoration of persons suffering from the effects of electric shock.
Rule 4 (iv.). Notice containing instructions how to communicate with the person appointed under Rule 11 (*a*).
Rule 11 (*a*). Authority to person to operate switchgear.
Rule 14 (*a*). Appointment of competent person to work, supervise, examine, or adjust apparatus.
Rule 14 (*b*). Appointment in writing by manager of electrician.
Rule 14 (*b*). Appointment in writing by manager of assistant electrician.
[Pres H.O. 11a and 11b.] Rule 14 (*d*). Log-book.
Rule 14 (*h*). Authority to work electrically driven coal-cutter or other portable machine. (*See* Rule 14 (*a*) *supra*).
Rule 14 (*d*) and (*e*). Authority to examine and re-light safety lamps by electricity.
61 (1). Regulations.

Explosives in Coal Mines Order of May 21, 1912, Regulating the Supply, Use and Storage of Explosives.

1 (*e*) (i.). Appointment in writing by manager of person to have control of detonators.
1 (*e*) (i.). Appointment in writing by manager of person to have charge of detonators.
1 (8). Appointment in writing by manager of authorised person to fire shots electrically.
4 (5) (*a*) Appointment in writing by the manager of shot-firer.
[Pres. H.O. 52] 4 (5) (*b*) Record in a book (Coal Mines Act, 1911, sec. 24) of the number of shots fired, number of miss-fired shots, and number of cartridges in each shot.
6. Authority in writing by manager or under-manager to fire shot in main haulage road, &c.
[Pres.]. 9. Copy of this Order to be supplied to every shot-firer.
[Pres. H.O. 34.] 9. Copy of this Order (except first and second schedules) to be kept posted at or near mine.

[Pres. H.O. 41.] Sec. 62 (5). Record in a book of condition of roads as to coaldust.

[Pres. H.O. 42.] 64 (3) and 17 (2). Record in a book of inspection by firemen, examiners, or deputies, before work is commenced.

[Pres. H.O. 42.] 65 and 17 (2). Record in a book of inspection by firemen, examiners, or deputies during shifts.

66. Appointment by manager of competent person to examine machinery.

[Pres. H.O. 43.] 66 (*a*). Record in a book of daily examination of external parts of machinery, guides, headgear, ropes, chains, cages, &c.

[Pres. H.O. 44.] 66 (*b*). Record in a book of weekly examination of all other machinery, gear, &c.

[Pres. H.O. 45.] 66 (*c*). Record in a book of weekly examination of shafts.

[Pres. H.O. 46.] 66 (*d*). Record in a book of thorough examination of every airway in the mine.

67 (1). Authority by manager or under-manager to competent person to inspect mine or dangerous place in case of danger.

[Pres. H.O. 47.] 67 (1) and (3). Record in a book of inspection after withdrawal of workmen.

[Pres. H.O. 47.] 67 (1) and (3). Record in (same) book of report that mine or place is no longer dangerous.

[Pres.] 71 (2). Record in a book of readings of barometer, thermometer, and hygrometer.

77 (9). Notice by owner declaring that he does not assent to this section ceasing to have effect.

[Pres.] 79. Notice in writing of every case of industrial disease to be sent to inspector of division.

[Pres.] 79 and Sec. 80 (1). Notice to person nominated by persons employed in case of industrial disease causing loss of life or serious personal injury.

79 and Sec. 80 (3). Notice in writing to inspector of division where any case of industrial disease results in death.

[Pres. H.O. 21 and 22.] 80 (1). Notice in writing by owner agent, or manager to inspector of division of accident and of any loss of life or personal injury caused thereby.

[Pres. H.O. 46.] 80 (1). Notice to person nominated by the persons employed of accident causing loss of life or serious personal injury.

[Pres.] 80 (3). Notice in writing to inspector of division where personal injury results in death.

85 (*a*) (*b*) and 126 (*a*). General regulations.

RESCUE AND AID ORDER, MAY 4, 1912.

(5.) A record shall be kept of each person undergoing training.

[Pres.] 88 (1) (*a*). The owner, agent, or manager shall cause a copy of the prescribed Abstract of the Act and a correct copy of all the Regulations of the mine to be posted at or near the mine.

[Pres.] 88 (1) (*b*). The owner, agent, or manager shall supply gratis to each person employed a book containing so much of the Abstract and so much of the Regulations as the Secretary of State may prescribe as being the parts of the Abstract and Regulations for the time being in force affecting persons of the class to which the person belongs.

[Pres. H.O. 49.] 93 (1.) Notice by manager fixing hours of employment.

[Pres. H.O. 20.] 94 (1). Register of boys, girls and women to be kept by owner, agent, or manager.

118. Rules.

ORDER OF THE SECRETARY OF STATE DATED JUNE 22, 1912, PRESCRIBING THE PROCEDURE TO BE OBSERVED FOR ASCERTAINING AND CERTIFYING THE VIEWS OF WORKMEN.

1. Notice to be posted at pithead specifying the time and place of meeting.

3. Register to be prepared by manager of workmen entitled to vote.

7. Notice to be posted at pithead of purpose, place, and time of ballot.

[Pres. Sch. A.] Form of ballot paper for use except in the case of election of workmen's representatives.

[Pres. Sch. B.] Form of ballot paper for use in election of workmen's representatives.

[Pres. Sch C.] Form of certificate of result of ballot.

Sch. 3 (4). Appointment in writing by manager of "horsekeepers."

[Pres. H.O. 50.] Sch. 3 (13). Record in a book by horsekeeper of condition of each horse, &c.

Sch. 3 (15). Appointment by manager of competent person to exercise supervision over horsekeepers, &c.

[Pres. H.O. 51.] Sch. 3 (16). Annual return by owner, agent or manager to inspector of division of number of horses used, &c.

COAL MINES REGULATION ACT, 1908.
(Eight Hours Day.)

1 (3). Notice to be kept posted at pithead of the times fixed for lowering and raising the men.

2 (1). Owner, agent or manager to appoint person to direct lowering and raising of men.

[Pres. H.O. 35.] 2 (1). Owner, agent or manager to cause a register to be kept of the times of lowering and raising the men, &c.

3 (2). Owner, agent or manager to cause a register to be kept of extension of time.

CONTINENTAL MINING NOTES.

Germany.

Coal Market in Upper Silesia.—Up to the present there are no indications of the usual slackening in the demand for fuel at this time of the year, and it would seem as though consumers had more desire to buy than ever, the demand having latterly become very pressing, and even beyond the capacity of the pits to satisfy promptly in some cases. In these circumstances the low state of the river, in consequence of the dry weather, is inconvenient. Exports continue large, and the consignments to Austria during the last quarter exceeded those for the same period of last year by 100,000 tons. Russian-Poland is also taking Upper Silesian coals in increasing quantities. Of the various grades, those for industrial purposes are most in request and the output is absorbed completely, and coking coals can hardly be raised quickly enough. Gas coals are going off better, and renewed interest is being displayed for house coal. The coke market is unchanged.

Ruhr Coal Market.—The absence of any change may be accepted as evidence of the satisfactory condition of the market in general. Within the last few days, too, consumers have begun to prepare for laying in their winter stocks—rather earlier than usual, probably through the fear of a scarcity of railway wagons further on in the season. The various industries are taking delivery in a satisfactory manner, and consignments to Holland, Belgium, northern France and North Germany continue large. The South German market has quieted down again, current sales being few in number. There is no change in the coke market, and business in briquettes is moving along the usual lines.

THE LONDON COAL TRADE.

THURSDAY, AUGUST 8.

The London coal trade for the past week has been seriously hampered by the holiday spirit. Very little thought has been given to the question of the coal supply by the general public during the week, and railway companies have put aside for the time being all attempts to bring the loaded wagons forward whilst the passenger traffic has been so heavy. Very little demand has been experienced for household fuel, but manufacturing qualities have been in good demand. Bakers' nuts have been very slow, and even double-screened nuts have not had any particular enquiry lately. Slacks, however, continue in strong demand, and are moving freely. Contracts are now rapidly filling up, and the merchants who have held out against the recognised advance in the colliery prices are now falling into line, not many, however, at the 2s. 6d. advance, but wherever an opening occurs at a lower figure, the opportunity is seized upon for securing the year's supply. The Welsh coal market has practically cleared away all stocks of coal during the last few days, but there is almost an entire absence of new business. Very few of the pits, however, resume operations until to-day (Thursday). A good many orders have been booked for forward business at an advance of 1s. per ton as compared with last autumn prices, but contracts are asking 1s. 6d. per ton advance. The seaborne market remains dull, but the resumption of work at all the docks and along the riverside is bringing the seaborne qualities into its normal character. The uncertainty regarding the strike and the serious interference in the delivery of the cargoes will undoubtedly take some little time to rectify. Thirty-one cargoes have arrived in the Thames during the week, but nearly all of them are already sold, so that very little remains for the open market. Prices remain unaltered, viz., 20s. best Durham and 19s. seconds, but the tone is firmer and in some cases holders are refusing to sell at present quotations, and an early advance in the market price is generally anticipated. As a whole, the market since the holidays has been fairly firm; the colder weather has somewhat improved the demand, and the possibility of lessened supplies has stimulated trade. The boom in the iron and steel market is giving very great concern amongst the large buyers of coal, and especially those who are engaged in the shipping interest, for whilst the makers of finished iron and steel are requiring higher prices for early delivery, and reports are current of advances of 5s. to 7s. 6d. per ton for steel, it is evident that more coal and coke will be required in this direction, and that the consumption (already very heavy) will be considerably augmented, and that in the near future. The bulk of the Warwickshire collieries' contracts have all been renewed at the 2s. advance on last year, but the general run of the Derbyshire and Yorkshire collieries are holding closely to the original 2s. 6d. advance. Some contracts have, indeed, been accepted at the full 2s. 6d. advance, but for the most part the large London merchants are still holding back and strongly opposing any settlement. The holiday season has been felt in a variety of ways, for not only has the market been closed for the Bank holiday, but the attendance on Wednesday was exceedingly small, and a large number of the principal buyers are making the week the commencement of their annual vacation, so that very little buying was recorded; but also from the colliery point of view August is a very broken month—the various workers' feasts, flower shows, and festivals are all centred in this season of the year, and so many of the colliers who have paid into clubs, &c., invariably make this their holiday time. The tonnage therefore available is considerably reduced, and the contract quantities have first consideration. As a rule, however, the actual consumption is exceedingly small, so that whatever is bought goes into stock. The colder weather, however, has improved the tone of the market. The dock troubles are now settling down, and work has been normal during the later days of the week. The immense lines of loaded trucks at the various tipping stations—Chelsea, Poplar, Blackwall, &c.—are diminishing, and the railway discharging shoots are beginning to show signs of increasing activity. Barges are being towed up and down the river with something like their old despatch, and supplies are once more evenly balanced.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, August 2.—In consequence of the approaching holidays there were no cargoes of seaborne house coal on offer to-day. Best (Durham) 20s., seconds (Durham), 19s. Cargoes 19.

Wednesday, August 7.—There was a very good enquiry for seaborne house coal at to-day's market, but owing to the holidays there were no Durham or Yorkshire cargoes available. Best (Durham) 20s., seconds (Durham) 19s. Cargoes 31.

THE IRISH COAL TRADE

THURSDAY, AUGUST 8.

Dublin.

Business generally has been fairly active during the past week, and house coal has been in request owing to the sudden advent of cold and stormy weather. City prices keep without change, viz.:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 21s.; best Orrell slack, 21s.; best coke, 23s. per ton; "ball" coal, 1s. 5d. per sack. The coaling vessels arriving during the week only totalled 36, as compared with 66 the week previously, chiefly from Garston, Liverpool, Preston, Point of Aire, West Bank, Newport, Glasgow, Girvan, Whitehaven, and Irvine. The application made on Friday last to the Judicial Committee of the Privy Council on behalf of the proprietor of the collieries in the Queen's County has been sanctioned. The Lord Lieutenant will now be asked to approve of the construction of a line of railway ten miles in length to connect the mines with Athy. The present output is about 100 tons a day, but with proper transport facilities it is estimated that it can be increased to 1,000 or 1,500 tons. The cost of the proposed line is £76,725. In a report of the inspector of mines for the Irish district for 1911 it is stated that the quantity of coal raised in Ireland was 84,564 tons, comprising 71,535 tons of anthracite.

Belfast.

There is a fairly good demand for steam coal, and house coal sales have been more numerous during the past week, inferior qualities having been slightly advanced. City prices are as follow:—Best Arley coal, 25s. per ton; Hartley, 24s.; Orrell nuts, 24s.; Wigan, 23s.; Scotch, 21s.; Orrell slack, 21s. Last week a number of important local contracts were arranged, and the prices at which these have been booked indicate that from 2s. to 4s. per ton over last year's prices will be paid for coal during the coming winter. Present quotations ex-quay are about as follow:—Arley house coal, 21s. 4d. per ton; Scotch house, 18s.; Scotch steam coal, 15s. 6d. to 16s. 6d. per ton; navigation steam, 15s. 6d. to 16s. 6d.; Welsh steam, 16s. 6d. to 17s. 6d. Coal cargoes arriving during the week were chiefly from Partington, Neath Abbey, Maryport, Sharpness, Glasgow, Preston, Ayr, Garston, Lydney, Ardrossan, Whitehaven, and Workington.

AWARDS UNDER THE MINIMUM WAGE ACT.

(*Continued from page* 187.)

Bristol.

The following is the text of the award of the Joint District Board for Bristol, under the Coal Mines (Minimum Wage) Act, 1912.

Whereas a Joint District Board has been formed under the above Act and duly recognised by the Board of Trade.

And whereas I the undersigned George Pearson have been appointed by the Board of Trade to Act as chairman of the said Joint District Board.

And whereas the said Joint District Board has failed within three weeks after the time it was recognised as aforesaid to settle the first minimum rates of wages and district rules for the said district.

Now I, the said chairman, in pursuance of the terms of the said Act, and after having heard the representatives of the owners and the workmen respectively, do hereby settle the said rates and rules as follows:—

	s.	d.
1. Hewers	3	4
2. Fillers and carters	2	8
3. Timbermen	3	3
4. Jiggers	2	10
Trammers	2	6
Hitchers	2	2
5. Incline haulage riders	2	10
6. Horse drivers	2	8
7. Underground enginemen	3	0
8. Onsetters	2	11
9. Branchers	3	3
10. Miscellaneous labourers	2	11
11. Repairers	3	1
12. Rippers	3	1
Boys:—		
13. Youths 14 years of age	1	0
" 15 " "	1	3
" 16 " "	1	6
" 17 " "	1	9
" 18 " "	2	0
" 19 " "	2	3
" 20 " "	2	6

In order to arrive at the minimum wage in each case, the various percentages from time to time payable at the various collieries in the Bristol district are to be added to these rates respectively.

I further find that the general district minimum rates are not applicable in the cases of the following two groups or classes of coalmines owing to the special circumstances of the said groups or classes, and I therefore settle the special minimum rates of such two special groups or classes of coalmines as follows:—

I.—Kingswood, Deep Pit and Speedwell Collieries.

	s.	d.
1. Hewers	3	3
2. Hewers five coals and two feet hewers	3	1
3. Fillers and carters	2	9
4. Timbermen	3	3
5. Jiggers, trammers and hitchers	2	9
6. Incline haulage riders	2	9
7. Horse drivers	2	9
8. Underground enginemen	2	10
9. Onsetters	3	2
10. Branchers	3	3
11. Miscellaneous labourers	2	11
12. Repairers	3	2
13. Rippers	3	2
Boys:—		
14. Youths 14 years of age	1	0
" 15 " "	1	3
" 16 " "	1	6
" 17 " "	1	9
" 18 " "	2	0
" 19 " "	2	3
" 20 " "	2	6

II.—Hanham and Parkfield Collieries.

	s.	d.
1. Hewers	3	2
2. Fillers and carters	2	8½
3. Timberman	3	1
4. Jiggers, trammers and hitchers	2	8
5. Incline haulage riders	2	8
6. Horse drivers	2	7
7. Underground enginemen	2	7
8. Onsetters	3	0
9. Branchers	3	2
10. Miscellaneous labourers	2	8
11. Repairers	3	0
12. Rippers	3	1
Boys:—		
13. Youths 14 years of age	1	0
" 15 " "	1	3
" 16 " "	1	6
" 17 " "	1	9
" 18 " "	2	0
" 19 " "	2	3
" 20 " "	2	6

In order to arrive at the minimum wage in the cases of each of the foregoing two special groups or classes of mines, the various percentages from time to time payable at the various collieries in each of such special groups or classes of mines are to be added to these rates respectively.

I further find that the agreement of November 20, 1911, signed by H. N. Abbott on behalf of the owners and W. Whitfield on behalf of the miners is an agreement entered into before the passing of the Act for the payment of wages at a rate higher than the minimum rate settled under the Coal Mines (Minimum Wage) Act, 1912, within the meaning of section 2, subsection 1, of such Act.

The rules set out in the schedule hereto shall be the district rules applicable to the whole of the district of Bristol.

Dated this 12th day of July, 1912.

(Signed) Geo. Pearson,
Chairman of the Joint
District Board for Bristol.

District Rules.

The following rules shall be the district rules applicable to the whole district of Bristol.

1. In these rules the word "workman" shall mean any person to whom the Coal Mines (Minimum Wage) Act 1912 applies and the word "day" shall mean a colliery working day.

2. Where natural difficulties arise in the working place rendering it impossible for a workman to earn the minimum wage it shall be an abnormal place.

3. In the event of any such abnormal place occurring or any difficulty arising in any place which in the opinion of the workman has prevented his earning the minimum wage it shall be obligatory upon him to inform the manager, under-manager or bailiff as soon as practicable and in any case before leaving the mine or at the top of the pit.

4. No workman shall be entitled to the minimum wage where the difficulty is caused by his own negligence or default.

5. No wages shall be required to be made up unless the average earnings per day worked for the period of one week last preceding fall below the minimum wage.

6. A workman who is incapacitated by age or infirmity, illness or accident or who is inefficient or irregular by reason of absence on any day of the time the pit works each week, unless prevented by either illness or accident medically certified interruption of work due to emergency or other justifiable cause, shall not be entitled to be paid the minimum wage.

7. A workman who from physical causes is unable to do the work ordinarily done by a man in his position in the mine shall be regarded as an infirm workman, within the meaning of the Act, and shall not be entitled to be paid the minimum wage.

8. In the event of delay, accident, interruption or any other cause over which the management has no control, the minimum wage shall be payable only in proportion to the time actually worked plus the walking time.

9. In any normal working place and under normal conditions no workman shall be entitled to have his wages made up to the minimum wage unless he can satisfy the manager that he has done his utmost to secure the output recognised for the colliery and seam at and on which he is working, the equivalent of any "yard" or other incidental work done to be taken into consideration.

10. In the case of branchers or stone drift men the average earnings payable for each of the weeks worked during the period of each contract shall not be less than the minimum wage.

11. In cases where workmen are working in sets at one place and pooling their earnings, no member of such set shall be entitled to be made up to the minimum rate if the average earnings per day of the set over the whole pay (being the period in respect of which a workman's wages are payable) shall amount to the minimum rate.

12. No workman shall be entitled to the minimum wage if it shall be proved that he has failed to proceed promptly to his working place and commence work, or that he has ceased working before the time necessary to enable him to reach the shaft for his time to ascend, or that he has been suspended during his shift for any breach of the various Acts, regulations and rules governing his work, or that he has been found to be working with blunt or improper or insufficient tools.

13. Should any question arise as to whether any particular workman employed underground is a workman to whom the minimum wage is to apply, or whether a workman has failed to comply with any of the conditions contained in these rules, or whether by non-compliance with any of these rules such workman has forfeited his right to the minimum wage, or whether any place is an abnormal place, or as to the alleged negligence or default mentioned in Rule 4, or as to whether any workman has "done his utmost" to secure the recognised output mentioned in Rule 9, such question shall be decided in the following manner, that is to say: The workmen of his pit may appoint a committee of two men working on the same seam at the same colliery to go into the question with the manager, under-manager or bailiff with a view to settling it; and failing agreement, the question in dispute shall be determined by the chairman for the time being of the Joint District Board.

14. A certificate in writing of any decision by any person or persons under the last preceding rule shall be given by such person or persons to both or either of the parties when requested, and such certificate shall be conclusive evidence of the decision.

15. A certificate in writing other than a certificate under Rule 14 that any workman is excluded under these rules from the right to wages at any minimum rate settled under the Coal Mines (Minimum Wage) Act, 1912, shall be given to the employer or workman requesting the same and shall be conclusive. Such certificate shall, where there is no disagreement, be signed by the workman affected and the manager of the mine; but where there is any disagreement or refusal to sign such certificate, then it shall be given in the manner provided by these rules.

16. In any class where boys are employed they shall not be entitled to adult rates until they have reached the age of 21 years; but they may be advanced above their standard rates of wages according to ability and efficiency and also when promoted to other grades.

17. Bailiffs (or overmen), firemen, examiners and deputies are to be regarded as not within the Act.

18. Subject to the foregoing rules, the minimum rates of wages payable in pursuance of the Coal Mines (Minimum Wage) Act, 1912, shall be those specified in the schedule hereunto annexed, to which rates there shall be added in each case the percentage from time to time payable pursuant to the agreement dated March 1, 1907.

(Signed) Geo. Pearson,
Chairman of the Joint
July 12, 1912. District Board for Bristol.

Presentation to Mr. Alfred Howlett.—An interesting event took place on Monday, July 29, at the Queen's Hotel, Manchester, when the following officials of the Wigan Coal and Iron Company Limited.—Messrs. T. W. Hilton, T. M. Percy, John Christopher, John Dean, Richard Christopher, Thomas Bullough, accompanied by Sir Thos. R. Ratcliffe-Ellis (the secretary), and by Mr. James Hamnett (the *doyen*, and representative of the agents of the Company)—waited upon Mr. Howlett, who, from the formation of the company in 1865 and until the end of March last, was a director and manager of the company, for the purpose of requesting his acceptance of an illuminated address, and an album of photographs of the officials and agents of the company. Mr. Hilton said it was his privilege, as senior official of the Wigan Coal and Iron Company, on his own behalf and that of his fellow officials, to ask Mr. Howlett's kind acceptance of the address and album as evidence of their sincere regard and respect, and as souvenirs which they trust in years to come might serve to remind him of those who for many years had the good fortune to serve under his direction and control. Mr. Bullough read the address, as follows:—"To Alfred Howlett, Esq., J.P., Hoseley Manor, Warwick. Sir,—Although we must recognise that the time had arrived when you were more than entitled to lessen your labours, and be relieved from the very arduous work which you have so long undertaken as a director and the manager of the Wigan Coal and Iron Company Limited, we assure you that we all deeply feel the severance. During the long period which it has been our privilege to serve under you, we have received every consideration and the greatest kindness, and at all times it will be a sincere pleasure to us to remember that we had the honour to be associated with you for so many years. We desire that you will favour us by accepting this address and the accompanying album of photographs of officials and agents of the company. We earnestly hope that you may be long spared to enjoy the leisure and repose which—if we may be permitted to say so—you have so well and faithfully earned. Signed on behalf of the officials and agents of the company: T. W. Hilton, T. M. Percy, John Christopher, Jno. Dean, Richard Christopher, Thomas Bullough. Kirkless, Wigan, July 1912."—Mr. Hamnett (who completes 65 years of service in November next), said it was a comfort to see the old associates gathered round their revered chief, and although he had retired from the firm, the name was retained, and he hoped Mr. W. H. Howlett might be long spared, with such an example before him, to render good service to the company.—Mr. Percy and Mr. John Christopher joined in the expressions of previous speakers.—Mr. Howlett, in accepting the address and album, said his memory carried him back a long way. He remembered quite well that Mr. Hamnett and Mr. Hilton were both colleagues with him before the company was formed. It was 52 years since he first went to Haigh. No one had a better staff than he had had, and if he had not done good it was not because he had not had a good staff, but because of his own shortcomings. He was glad to hear what they said about his brother. He had no doubt he would carry out the traditions of the company, and that they would afford him the same help and assistance which they had given to him. He would be very proud indeed of the very handsome gifts, and hoped those after him would point to them with equal pleasure. He thanked God so far there had not been any serious accidents in connection with the Wigan Coal and Iron Company.—The address and album of photographs were the production of Messrs. Walter Richards and Co., of Liverpool. The majority of the photographs were the work of Mr. Fred W. Dow, of The Studio, Park-road, Wigan.

OXIDATION AND DISTILLATION OF COAL-DUST.*

Preliminary experiments on the oxidation of coaldust were commenced in 1907, when the Liévin experimental station was first opened, but the question soon arose whether the dust obtained by pulverising coal possessed the same properties as the dust actually deposited in colliery workings, even though containing the same percentages of volatile matter and ash, it being evident that such deposited dust was liable to undergo alteration when exposed for months at a time to the action of the air in the mine. Experiments were accordingly made with natural and artificial dust from Liévin coal, and these gave sufficient indication of oxidation to induce more accurate investigation of the matter. For this purpose, samples of dust were tested in sealed flasks, which tests revealed the following principal facts in connection with the alteration of the dust. In the first place, formene is disengaged rapidly when the dust is first exposed to the air, but this liberation proceeds more gradually afterwards. The operations of crushing and pulverising the coal to dust are accompanied by a considerable disengagement of this gas, whereas in the case of dust that has long been deposited in the mine, no such liberation of gas can be observed. Secondly, the dust absorbs and combines with oxygen at a rate which gradually diminishes as time progresses, but the gain in weight resulting from this reaction is more than sufficient to counterbalance the loss in weight sustained by the dust from other causes, and it also continues in the case of the old dust collected in the mine. Thirdly, a kind of slow combustion takes place in the coal, manifested by the liberation of carbon dioxide, but it is only in the case of old dust, which has sustained alteration by exposure to air in the mine that this slow combustion attains any notable dimensions.

The investigations also included the alteration sustained by artificially prepared coaldust deposited in the mine, and in addition the effect of distillation on coaldust. Without going into the details of these experiments, the conclusions formed by the authors may be given. When coaldust is exposed to atmospheric influences at the ordinary temperature, it undergoes considerable modifications in course of time. At first, if the dust is from a fiery mine, the liberation of formene is the predominant phenomenon, and constitutes in fact the continuation of the disengagement of firedamp from the coal face This phenomenon is also well known in the case of broken coal. It might have been thought, in view of the fineness of the grains examined, that the disengagement of gas would accompany pulverisation and cease as soon as the coal had been reduced to powder; and in fact there is a considerable disengagement at the moment of pulverisation, also continuing to some extent for several days afterwards. This explains why the dust furnished by freshly-won coal is capable of disengaging, during the first day, a rather larger amount of combustible gas than after exposure to the air for several days. It might, therefore, be considered somewhat more dangerous, but the order of dimensions of this quantity of gas is merely 1 cubic centimetre per gramme, in the case of fine dust. An equivalent quantity would be furnished by the presence of about 0·05 per cent. in the atmosphere of a dust cloud containing 500 grammes of coal per cubic metre, which cannot be considered as dangerous; and therefore it must be admitted that the dust formed at the moment of getting down the coal is not more dangerous than the older dust used in the gallery experiments.

The chief feature of the alteration of coaldust on exposure to air is the absorption of and combination with oxygen. The rate of oxidation depends on the nature of the coal and conditions of exposure, the laws being, however, still undetermined; and it is possible that a certain degree of humidity is favourable to oxidation. During the first 100 days of exposure to the air of the mine, about 1 per cent. of oxygen was combined in one instance, and 3 per cent. in another; but under the less favourable conditions prevailing in the laboratory, no higher figure than 0·5 per cent. could be attained in the same length of time.

On the other hand, the laboratory experiments show that the rapidity of oxidation decreases as time progresses, so that an increase of 6 to 8 per cent. of oxygen appears to correspond to an exposure of one to several years, according to circumstances. Nevertheless, considerably increased percentages are met with in the deposits of dust in the mine, even when the pure coal in such deposits has not been exposed to the air more than 100 days.

It is, however, observed that, in the complex mixture formed by dust deposits in the mine, the constituent which is known to be of recent formation is the one which exhibits merely slight oxidation—a circumstance agreeing with the results of the experiments. On the other hand, other elements of the mixture—carbonaceous shales—are highly oxidised, an irregularity which has been explained by the observation that the galleries follow or intersect the seams of carbonaceous shale or coal, and that these oxidisable products have been exposed to atmospheric action on the walls of the galleries from the time the latter were cut—that is to say, for months, or even years, and had already undergone profound alteration by the time the various causes of disaggregation reduced them to the condition of dust. In some of these carbonaceous shales the increased oxygen content has been found to amount to 10 per cent., referred to the coal in the said shale.

The dust collected in the mine is a mixture of ingredients which differ in origin and age. Some of the fragments of coal met with in such dust have been in a finally-divided state from the outset, and constitute the most inflammable ingredient of the mixture; whilst others are fairly large and less dangerous, though they constitute a potential source of risk, being gradually reduced by the traffic to finer and more inflammable particles; so that it may justly be said that the dust becomes more dangerous with age. The alteration of the dust—another result of ageing—however, has a counteracting effect; and ignition tests show that, given an equal degree of fineness, the altered dust is less dangerous than that in a fresh state. The fragments of coal become mingled with the products of the disaggregation of the floor and walls in the mine, which products in many cases act as neutralising agents diminishing the danger of the dust. If the floor of the gallery is formed of coal, the detached fragments, in the case of a new gallery, are quite comparable to those from the won coal, and are just as dangerous; but those produced when the gallery is already old are highly oxidised and less inflammable. The carbonaceous shale left in position in the roof or wall, or intersected by crosscuts, furnishes products which are always rich in ash constituents, and in the case of old galleries, oxidised as well; and since these shales are often rather friable, the *débris* they yield may constitute an important part of dust deposits. The rocks forming the major portion of the walls of crosscuts furnish dust which is essentially unfavourable to the propagation of ignition; and the same applies to the fragments disseminated through the roads by the transport of goaf packing. Dust deposits also contain the *débris* of various inflammable organic substances, but in such insignificant quantities as to be practically negligible.

The origin of the deposited dust varies, and the conditions of formation are complicated, to such an extent as to render it sometimes difficult to estimate the probable composition and the degree of alteration of the deposit by taking as a basis the known factors of its composition, such as the nature and extent of haulage and pedestrian traffic, age of the gallery, nature of the walls, velocity of ventilating current, &c. Laws might, no doubt, be established from a thorough investigation of the conditions in each mine or each system of working; but all that can be said at present is that dust in the mine is often in an oxidised condition, and therefore less dangerous than might be supposed from experiments carried on with freshly-prepared dust, and also from the percentage content of volatile matters and ash, as well as the degree of fineness. These favourable conditions—from the point of view of safety—however, are not always encountered, and therefore one cannot, without resorting to ignition tests and delicate methods of analysis, assume their existence in estimating the relative danger presented by dust deposits in mine galleries

Nevertheless, these considerations have an important bearing on the value of experiments conducted with unaltered, artificially-prepared dust—namely, that the conclusions which may be deduced from these experiments, on the basis of the relative percentages of ash and volatile matters, are occasionally less favourable than they ought to be in reality, and are never calculated to produce a false impression of security.

Several reasons for the diminished inflammability of oxidised dust have come to light in the course of the authors' experiments. The alterations sustained by the dust lessen its calorific power; hence, other conditions being equal, the temperature of combustion should be lower, the adjacent dust becomes less intensely heated, and the velocity of combustion is reduced. In the course of this heating, the volatile matters begin to come off, and in consequence of their immediate combustion at the threshold of the zone of combustion, appear to play a leading part in propagating ignition. If, however, the dust is oxidised, the distillation of the volatile matters does not begin until a higher temperature has been attained than when the dust is fresh. Moreover, this distillation is less active in the initial stage—which is the most important—whilst the gases liberated furnish mixtures which are relatively less inflammable; and finally it is possible that the tarry matters are less abundant. All these circumstances tend to diminish the velocity of combustion, and therefore the degree of inflammability or danger of the altered dust in comparison with fresh dust.

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COLLIERY ACCIDENTS.

Cadeby Main.

Mr. R. A. S. Redmayne, C.B., His Majesty's Chief Inspector of Mines, who has been directed by the Home Secretary to hold an official enquiry into the cause of the disaster at Cadeby Colliery, Conisborough, on July 9 last, whereby 87 lives were lost, commenced his investigation at the Guild Hall, Doncaster, on Bank holiday. With Mr. Redmayne was Mr. Beele, of Birmingham (whom the Home Office has appointed legal assessor), Messrs. J. R. R. Wilson and G. Poole (H.M. inspectors of mines attached to the Yorkshire and North Midland district). There were also present Mr. R. Smillis (president of the Miners' Federation of Great Britain), Mr. Vernon Hartshorn (president of the South Wales Miners' Federation), Mr. Herbert Smith (president of the Yorkshire Miners' Association), Mr. W. H. Chambers (managing director), Mr. H. S. Witty (agent), Mr. G. Wilkis (secretary) Cadeby Colliery Company, Mr. W. M. Gichard, solicitor, Rotherham, representing the colliery company, Mr Marsdon (local branch secretary of the Yorkshire Miners' Association) and others.

The first witness called was Sidney Bridges, of Conisborough, who stated he had been under-manager at Cadeby Colliery for the past six years. The witness was away on his holiday when the explosion occurred. They only worked one seam at Cadeby, the Barnsley Main, at a depth of 750 yards. The roof was fairly good but rather tender. The pit was divided into five main districts, Nos. 1 and 2 north, east, south, and west. Cleaning up and shovelling were the means adopted for laying the dust in the pit. The only dust would be that from the tubs or from the screen, and there would be practically no dust from the latter. They were not much troubled with gas in this district of the mine. Some of the roads were not ventilated; they were stowed up. They had been troubled to some extent with gob fires. They had all been successfully dealt with, with the exception of the late explosion, without any loss of life. The first gob fire in his experience at Cadeby was in 1906. There were other things which might catch fire outside the coal or the timber, such as dirt.

Mr. Redmayne: What is your idea as to the cause of the timber firing?—I think heat caused that.

Mr. Redmayne said he wanted to account for the fire in the timber if he could. If it was fairly dry there would be no fermentation. There were other mines hotter than Cadeby. He knew of a Lancashire mine, the temperature of which, in one place, was known to be well over 90, and yet there were no cases of fire in the timber, no spontaneous combustion.

Asked how they dealt with the fires, the witness said they tried to scour them out by driving roads right up to the seat of them. All the gob fires had been by the fault in the south district. On November 20, 1911, they had a fire in the goaf. It burnt waste and timber. There was an explosion, and four men were slightly burned. They were wrestling with that fire from November last till April of this year, and he was of opinion they thoroughly scoured it out. They kept a look-out for gas, and had no more explosions. On two occasions it was reported to him there was fire; he went on both occasions but did not find any fire. On one occasion a man said he had seen flame come out from the pack. Witness went again but could not see anything. The temperature on one side of the fault was 94. Ninety-six was the highest they had had, and there had been no fire at all.

Continuing, witness said they took the temperature continually along the fault. Three reports upon the places in the vicinity of this fault were made in each eight hours. The air was taken daily and the samples analysed by a fully qualified chemist. There was not much use in taking the temperature at the time they were taking the fire out. He did not think it was so important to take the temperatures as to take samples of the air.

Witness said he was satisfied now that the gob fire existed in April, but he could not find it. Asked what precautions were taken, he said the whole of the gates leading to the affected part were stowed up. At the time of the explosion witness was on his holiday. There was a certain amount of air coming over the top of the stowing. At the top of the fault was a great cavity which they could not get to, they could not find the top of it. There could not have been a fire in the coal, as they went as high as the coal, cutting away the coal to the stone. He admitted that the fire might have been back from the fall a bit, and this great cavity up from the fall might have acted as a reservoir for the gas, and when it got surcharged the gas came down to the region of the fire. Asked as to the precautions taken to deal with the trouble with gas, witness said they got a good airway open.

Witness stated at the explosion in January, when four men were burned, the shock was felt for a distance of about 150 yards. The whole district was aware that something was wrong, and the men were frightened.

Replying to Mr. Smith, the witness said the temperature was not 94 usually in the district. At the pit bottom it was 75 that morning. It had been as high as 82. He had had no private complaints about the district.

Mr. Smith complained that this was the first time they had heard of the explosion in January; not even the miners' local secretary had heard of it. He asked that the report books be put in.

In answer to further questions, witness agreed, when he went round the mine with Mr. Smith, they found gas. They had not had any blowers of gas in Cadeby.

Mr. Harry Sykes Witty, agent for the Denaby and Cadeby Colliery, was the next witness called. He was previously manager of Cadeby, and is thoroughly conversant with the whole of the underground workings. He explained the working of the mine, and the qualifications which the deputies and officials were required to have. After the explosion in January all precautions possible were taken. He did not agree with Mr. Redmayne that it would have been a wise precaution to withdraw all the men except those engaged at the fire in January last. He went into the place shortly after, and did not find the slightest danger, or any reason why the men should be withdrawn. Witness admitted that on July 5 gob-stink was reported in the morning and reported at night. It was reported up till 10 p.m. on the night preceding the explosion. This meant that somewhere, not very far away from 121, there was indication of fire. But there had often been gob-stink without anything resulting from it. He had no idea where the fire was. He did not see the manager of Cadeby Colliery till the Sunday night, July 7. Mr Bury then told him that stoppings were being built in the affected part of the mine. Gas was given off occasionally from the fault. He did not think there was enough gas in the district to be dangerous. The explosion in January was caused by a man throwing a bucket of water on the gob fire.

Witness was then asked to give his full story of the explosion, which he proceeded to do. Mr. Witty's narrative has already appeared in our columns. There were a few new points in his evidence. He showed that a greater number of volunteers than were required were forthcoming when men were called for. The fact that the second explosion had taken place became known when witness having received a message from Captain Brooke at Wentworth for Mr. Pickering, who was to meet the King that morning, telephoned down the mine for Mr. Pickering, who had shortly before descended, and failed to get any reply from him. Mr. Witty described how he then went down the mine himself, and repeated the evidence given at the inquest. He said the existence of the gob fire had been reported to Mr. Pickering in the ordinary form on the Saturday. Asked by Mr. Redmayne as to how he accounted for the great number of persons engaged in bringing out the bodies, witness said the reports were that the condition of the mine was normal and requests were made for stretcher parties. They had a code of rules of the rescue mine station. There was a rule that nobody should go down the mine after a colliery disaster without the permission of the manager. Upon this occasion a man was stationed at the pit top to prevent any man going to the cage who was not authorised. The lampman had instructions to take the names of all the men to whom lamps were issued, and the police were there to prevent unauthorised persons passing. Everybody who went to get a lamp was allowed to go down the mine.

Mr. Redmayne: Thirty-five persons were killed by the explosion caused by the gob fires. With every possibility of an explosion occurring again you permitted, roughly, 60 persons to go down?—Yes.

Do you think it wise?—Yes. I was asked for them. Probably I should do the same again under the same circumstances. The manager was there on the spot, the inspectors were on the spot.

It was not to save life?—No, I was quite aware of that.

It was to recover dead bodies?—Yes.

Well, seriously, would you, in a like state of affairs, repeat the process?—Witness (hesitating): I think I should be inclined to say no, and come out.

Witness said he was informed that all the men in the first explosion had been killed. A party of 50 was sent down the mine with no other object than to recover dead bodies. Some men went to work on the Tuesday morning of the explosion not knowing what had occurred, but he ordered all mining to be stopped. In all, he had known 35 gob fires at Cadeby. He added that even in the light of recent experiences it would depend upon circumstances and the gas in the district as to whether he would remove the men from the mine in the event of a gob fire being reported. He did not think he should send all the men out of the district just because of a gob stink.

By Mr. Redmayne: There was no restriction on the rescue party.

Mr. Redmayne: The whole secret of rescue operations is that there shall be discipline and method in every part of the mine. Witness admitted a few men passed from the other part of the mine into the affected part after the explosion.

Mr. Redmayne: When I arrived on the Tuesday I had the greatest difficulty to discover what was the number of bodies in the mine, therefore this question follows, what is your system of checking?

Witness explained that the lampman gave each man a check bearing the same number as the lamp issued to him. This check had to be handed back with the lamp. The system had twice been put to the test and not failed, men who had lost their way in the mine being traced because they had not handed in their checks. The system did not break down at the first explosion, but it did over the second because there was not sufficient care in seeing that every man took his check out.

Jas. Springthorpe, the deputy in charge of the South district, who lost his son in the explosion, gave his story of the calamity and spoke of the existence of gob stink preceding it.

On the resumption on Tuesday, the proceedings were not so protracted as on the previous day, the Chief Inspector adjourning at 4 o'clock. The testimony of the various witnesses was taken down by expert shorthand writers, so that no time was lost in their examination. Mr. Redmayne put a few leading questions to each and then left them largely to themselves. Witnesses spoke of the condition of the pit both before and after the explosions. They gave their experiences as members of the rescue party, and told of brave deeds on the part of colleagues. The principal points in the day's evidence were that the south district was undoubtedly gassy at a period prior to the explosion; that a man could not use the telephone because he did not know the code and had never seen it; that men were taken down the mine to work after the explosion, not knowing that it had occurred. The inspector intimated that the enquiry would close the following evening, and he adjourned till after the unsealing of the affected portion of the mine. The right of the representatives of the Yorkshire Miners' Association to be present at this unsealing process was established during the day.

Joseph Farmer, greaser, at Cadeby Colliery, stated he had heard men complain that the south district was very hot, and that they had had a rough time in No. 38. The principal point of interest in the witness's evidence was that "a tremendous lot, 40 or 50 people" were allowed in the mine after the explosion. "I think it would have been better if there had not been so many," said the witness.

William Humphries, road layer, said he discovered the explosion through one of the doors opening and shutting and nobody coming through. At 19 crossgates he found a fall and a dead body the other side of it. He wanted to start taking the bodies out, but was told they were not to be touched till Mr. Bury came. Witness admitted that from 2 o'clock till 4 he had been doing what he thought best without trying to get into communication with any responsible official. He had been in the pit for 14 years.

George Fisher, senior deputy of the west district, stated when he tested for gas after the explosion his lamp went out. The bodies in the 21 crossgates, on the level, and at 19 crossgates bottom were very much scorched. There was dust on one side of the props facing 64, which led to the conclusion that the explosion originated somewhere in 64 neighbourhood. The conditions after the second explosion were much worse than after the first.

Answering Mr. Smillie, he said he did not know that he had ever looked at the account which was kept of the number of persons underground.

Mr. Gichard intimated the sealed portion of the pit would be penetrated at the earliest possible moment. Mr. Smith asked if the men's representatives would be allowed to be present, and Mr. W. H. Chambers said he should have no objection.

Mr. Redmayne said by section 16 of the Act, the representatives of the workmen had, he thought, a clear right to be at the unsealing process; they had the right to appoint two persons who were, or who had been, practical working miners of not less than five years' experience underground.

Mr. Smith called Wm. Slater, Dove, a dataller, and Wm. Barnbrook, a fellor, to prove that the south district was gassy prior to the explosion. Barnbrook said he had seen men carried out through gas, and he was rendered unconscious himself.

The enquiry was adjourned.

The enquiry was brought to a conclusion on Wednesday, the inspector adjourning after a sitting of about five hours. It will, of course, have to be resumed after the affected portion of the mine has been unsealed. This, however, will be a slow process; and, possibly, little or nothing will be heard of it until next month. Only expert men, armed with the breathing apparatus, will be permitted to penetrate the other side of the stoppings at first, and not until ventilation has been properly restored will Mr Redmayne and others visit the affected area. The whole of the operations will be carried out in the presence of one of his Majesty's mining inspectors; and it was clearly understood, before the enquiry adjourned, that every facility would be afforded the representatives of the Yorkshire Miners' Association for obtaining, by personal inspection, all the information they desire to have in the interests of the men.

Some interesting evidence was given on Wednesday, in fact. Mr. Chambers, the managing director, was under examination for close upon two hours. He dealt exhaustively with the nature of gob fires, and the mode and method of treating them from the point of view of his 30 years experience of them. Mr Chambers told the court that he had had to deal with no fewer than 56 of these fires in the Denaby and Cadby pits. He showed that they are almost invariably associated with the part of the workings in which the fault lies.

The Court learned with interest, for the first time, that Mr. J. R. R. Wilson (senior assistant to the late Mr. W. H. Pickering) has been promoted to the Liverpool and North Wales district. Mr. Wilson's friends will congratulate him. It is well known that but for circumstances previously explained he would have descended the pit at the same time as Mr. Pickering and the ill-fated rescue party, in which case it is very problematical whether he would have been a candidate for promotion.

Generally speaking, Mr. Wilson's narrative was a recapitulation of his evidence at the coroner's inquest, but he spoke of at least two new circumstances. One was the discovery of a man in one of the workings who was making a very peculiar noise. Investigation showed that the poor fellow had a terrible wound in one of his arms, a big hole being formed by a piece of flesh which was missing. His head had fallen forward, and his nose and mouth rested in this hole. Hence the strange noise in his efforts to breathe. Another new incident was the discovery of a man named Farmery, lying unconscious face to the ground. When the rescue party came to deal with him, the man exhibited extraordinary strength. It required several men to hold him. Three times was he placed upon the stretcher, the straps of which he broke. He survived, whilst others died, and the witness attributed his survival to his extraordinary strength and constitution. Replying to Mr. Redmayne, Mr. Wilson said his opinion was the original explosion took place somewhere behind No. 7 on the fault side there. All the evidence pointed to the force having come down the face by 64's. For a considerable time there had been heating in No. 7, and he had twice visited that point himself. He related how on one occasion, a miner had told him that whilst having his "snap" he heard a tremendous roar, like cannons going off. He turned round and saw tongues of flame come out of the pack. Witness visited the place and gathered there had been a tremendous fall on the side of the fault, and that gas had collected. He added that he did not think coaldust was the cause of the recent explosion.

Then came some very important questions from the Inspector. "Do you think," asked Mr. Redmayne, "there are any means, other than those adopted at Cadeby, which would be better suited for the prevention of gob fires?" Mr. Wilson's reply was very significant. "We are subject to gob-fires in the Doncaster area." He said "There are three or four well-known collieries where these fires are becoming increasingly prevalent, and they are a source of great danger. They have a lot of gob packs, and very short waste, and the roof cannot get down. There are the same conditions in other parts of the coalfield where they don't put in gob packs; they have gate packs, let the waste break well up between the gate packs, and they don't have gob fires."

Asked if the men ought not to be withdrawn while the gob fires were being dealt with, Mr. Chambers, in his evidence, said in that case they would have at Cadeby a pit for nothing but the extinction of gob fires. They would get nothing else out. When the workings were standing, the fires were more liable to break out than when the coal face was advancing; they had to keep working, no matter what the state of the market, recognising as they did the danger of shutting down.

Mr. Chambers handed the inspector the analyses of samples of the air taken between the first and second explosions. Mr Redmayne said it was the only case he knew of where samples had been taken under like circumstances. They disclosed just what one would have expected, and were of considerable scientific interest.

Another point of interest during the day was that it was stated no trace could be found of a duplicate of a report supposed to have been sent to Mr. Pickering concerning the gob fire prior to the explosion.

The inspector thanked all who had assisted in the enquiry. Notice of the resumption after the unsealing would be given to the owners and the representatives of the men. The enquiry would be adjourned until such time as more evidence would be forthcoming, evidence taken on behalf of himself in the pit. He hoped the same good feeling and assiduity would prevail when they met again.

Mr. Gichard thanked the inspector.

The Midland Iron Trade.—Circulars have been issued by the principal Midland producers of marked iron notifying an increase of 10s. per ton in selling prices, making the basis £9 10s., with the usual 12s. 6d. extra for the Earl of Dudley's brand. The last advance was in April, when, as a result of the increased cost of production following the coal strike, manufacturers found it necessary to raise their quotations from £8 10s. to £9 per ton. It followed a similar rise made on January 1 of the present year. The new price is the highest since the beginning of May 1901.

FIREMEN'S CERTIFICATES

The following memorandum has been issued by the Home Office:—

1. After 1st January, 1913, no person can be appointed to act as a fireman, examiner or deputy, and no person already employed as a fireman, examiner or deputy can continue to be so employed, unless he has obtained a fireman's certificate as required by the Coal Mines Act, 1911, Section 15. *This requirement applies to all firemen, examiners or deputies.* No exception is made for persons holding Managers' or Under Managers' certificates.

A *full* certificate for a fireman, examiner or deputy certifies three things:—

(1) that he can test for gas with a safety lamp,
(2) that he can measure an air current,
(3) that his hearing is good.

All firemen, &c., appointed *after the passing of the Act* (*i.e.*, after 16th December, 1911) have to obtain the full certificate, with the exception only of firemen, &c., employed in mines in which inflammable gas is unknown, who are required to obtain a certificate as to (2) and (3) only, and not as to (1).

On the other hand, firemen, &c., who were appointed *before the passing of the Act* are exempted from obtaining a certificate as to (2), and need only obtain a certificate as to (1) and (3), or (if employed in a mine in which inflammable gas is unknown) need only obtain a certificate as to (3).

2. The certificate can only be obtained from one of the Mining Schools, Institutions or Authorities approved by the Secretary of State, and in order to obtain it a candidate must pass an examination in the subjects mentioned in paragraph 4 below. A candidate is allowed to sit at any examination for the purpose held by any of the approved Schools, Institutions or Authorities; and the approved Schools, Institutions and Authorities have been asked to arrange to hold examinations as far as possible locally in centres convenient to the workers. For information as to the times and places of examinations held by any such School, &c., write to the Secretary of the School, &c.

3. *It is not necessary that a candidate before examination should have attended the classes of the School or Institution or Authority to which he presents himself for examination or the classes of any other School, Institution or Authority.* The examination is mainly of a practical character and only requires such knowledge as a fireman of experience should have already acquired.

Men, however, who have not previously held the post of fireman, examiner or deputy, and no doubt many also who have held the post, will require, before going in for the examination, to have some instruction; and classes have been formed in most mining districts for the purpose of giving instruction in the subjects in which candidates for certificates will be examined.

A word of explanation may be useful here, as there has been some misapprehension among firemen, &c., as to the nature of the instruction required.

In some districts where classes of an advanced character have been formed, it has been supposed that it was necessary to attend these classes in order to qualify for a certificate. This is a mistake. The duties of a fireman, examiner or deputy include, indeed, other matters besides the detection of gas and the measurement of air, and it is very advantageous that a fireman, &c., should have as thorough a knowledge as possible with regard to all matters which may bear upon his duties, but it should be clearly understood that this advanced instruction is not required for the fireman's certificate under the Act and that the only matters in which a candidate need obtain instruction for the purpose of getting a certificate are the subjects mentioned in paragraph 4 below.

4. *The Subjects of Examination will be those set out below in this paragraph, and those only. A candidate will not be asked any questions in regard to any other matter.*

Part I.—Gas Tests.

A candidate will be required to show that he is able to make accurate tests for inflammable gas, and that he can do this with any of the various kinds of safety lamp, and with any of the various kinds of oil, *in use in the district in which he is employed.* For this purpose he will be required, *first*, to show to the examiner that he understands the method of detecting inflammable gas by means of a safety lamp; and, *secondly*, to make correct observations of gas caps as they appear on the flames of various kinds of safety lamps burning the various kinds of oil. By a correct observation is meant that the candidate must be able to judge by the size and appearance of the cap how much gas approximately is present. He will be tested with percentages of gas from 2 per cent. upwards, and no candidate will pass who is unable to see a 2 per cent. cap.

A candidate who ordinarily wears glasses will not necessarily be called upon to make the observations without them, but it will rest with the examiner to decide by such test as he thinks fit whether the eyesight is so defective that under the working conditions in a mine a candidate would not be able to make accurate observations.

Part II.—Air Measurements.

A candidate will be required to show that he can measure the quantity of air in an air current. The quantity of air, in cubic feet per minute, passing through the airway of a mine being found by multiplying the number of square feet in the cross-section of the airway by the speed of the air current in feet per minute, the candidate will be required, *first*, to measure the speed of the air current passing through the airway of a mine, or through some gallery corresponding to or representing the airway of a mine, both (i) by means of an anemometer, and (ii) by observing the speed at which dust or smoke is carried by the air current; and, *secondly*, to calculate from measurements the size (*i.e.* cross-sectional area) of the airway or gallery in which the air to be measured is passing.

Part III.—Hearing

The candidate's hearing will be tested. The Act requires that his hearing should be such as to enable him to carry out his duties efficiently. This does not mean that a fireman must possess a standard of hearing above that of the average man, nor is it required that his hearing must be up to the standard in both ears. If the candidate is able to hear sounds audible to the average man it will be sufficient. The tests will usually be of a simple nature and will naturally be varied by the examiner with different candidates and at different times.

5. A candidate who claims to be exempted from Part I. of the examination must produce to the School, &c., to which he presents himself for examination a certificate from the Manager of his mine that he is employed in a mine in which firedamp is unknown. Note, however, that a fireman, &c., employed in a mine in which gas is unknown, who claims exemption from Part I., would have to pass this part of the examination afterwards if at any time he obtained employment as a fireman, &c., in a gassy mine.

A candidate who claims to be exempted from Part II. must produce a certificate from his Manager that he was employed as a fireman, examiner or deputy on the 16th December, 1911.

6. Each candidate will be examined separately, and not in the presence of other candidates.

7. A fee for the examination will be payable by the candidate in accordance with the scale appended.

8. The Act provides also for further certificates as to eyesight and hearing to be obtained by a fireman, examiner or deputy, at intervals of five years. The object of these further certificates is to ensure that a fireman's eyesight continues to be such as to enable him to make accurate tests for firedamp, and that his hearing continues to be such as to enable him to carry out his duties efficiently. The first of these certificates will not be required until the expiration of five years from the date on which he got his fireman's certificate as above. A fireman, examiner or deputy will be able to get this five-yearly certificate either from one of the Schools, Institutions or Authorities approved by the Secretary of State or from a doctor selected by himself. The fee for obtaining this certificate will be payable by the fireman's employer.

Approved Institutions.

The following is a list of Mining Schools, Institutions and Authorities approved by the Home Secretary for the purpose of granting certificates to firemen, examiners and deputies under the provision of Section 15 (1) (*b*) of the Coal Mines Act, 1911.

SCOTLAND.

Heriot-Watt College, Edinburgh.
Royal Technical College, Glasgow.

NEWCASTLE AND DURHAM INSPECTION DISTRICTS.

Cumberland Education Committee.
Durham County Education Committee.
Newcastle-upon-Tyne Education Committee.

YORK AND NORTH MIDLAND INSPECTION DISTRICT.

Barnsley Education Committee.
Batley Education Committee.
Cleckheaton Technical Institute.
Derbyshire Education Committee.
Dewsbury Technical School.
Doncaster Education Committee.
Huddersfield Technical College.
Nottinghamshire Education Committee.
Rotherham Education Committee.
University College of Nottingham.
Wakefield Education Committee.

MANCHESTER AND IRELAND, LIVERPOOL AND NORTH WALES INSPECTION DISTRICTS

Accrington Education Committee.
Ashton-in-Makerfield Urban District Council Higher Education Committee.
Atherton Urban District Council Higher Education Committee.
Burnley Education Committee.
Leigh Education Committee.
Manchester Municipal School of Technology.
St. Helens Education Committee.
Tyldesley Higher Education Committee.
Wigan and District Mining and Technical College.
Worsley Urban District Council Higher Education Committee.
Wrexham; Chester Street School.

SOUTH WALES INSPECTION DISTRICT.

Glamorganshire Education Committee.
Merthyr Tydfil Education Committee.
Monmouthshire Education Committee.
Swansea Local Education Authority.

MIDLAND AND SOUTHERN INSPECTION DISTRICT.

Birmingham University.
Derbyshire Education Committee.
Gloucestershire Education Committee.
Leicestershire Education Committee.
Stoke-on-Trent Education Committee.

Scale of Fees.

(1) For the full examination (*i.e.*, gas tests, air measurements and hearing), 7s. 6d.

(This will only apply in the case of new firemen appointed after the passing of the Act.)

(2) For candidates taking two parts only of the examination (*e.g.*, gas tests and hearing), 5s.

(This will be the fee for most existing firemen, i.e., firemen appointed before the passing of the Act.)

(3) For candidates taking only one part (*i.e.*, existing firemen employed in mines in which gas is unknown who will be examined as to their hearing only), 2s. 6d.

[The memorandum has been placed on sale at the price of ½d.]

Shipment of Bunker Coal.—During the month of July 1,632 501 tons of coal, &c., were shipped for the use of steamers engaged in the foreign trade, as compared with 1,531,395 tons in July 1911 and 1,687,231 tons in July 1910. The aggregate so shipped during the first seven months of the present year ended with July was 9,758,398 tons, as against 11,090,042 tons and 11,016,691 tons in the corresponding periods respectively of 1911 and 1910.

Allgemeinen Bergmannstag (General Meeting of the Mining Industry), Vienna 1912.—The published programme is to be extended in an important particular, since the Austrian Government contemplates holding an official reception of the members of the Congress. No special form of invitation will be issued for the meeting, which has already been sufficiently announced by the various associations in the technical Press. Applications for tickets should be addressed to the "Komitee des Allgemeinen Bergmannstag, Wien I., Nibelungengasse 13," accompanied by a remittance of 15 kronen for each gentleman's ticket and 10 kronen for each lady's ticket required. Each member attending the Congress will be presented with a permanent souvenir of the occasion, in the form of a bronze plaque mounted on marble, designed by the well-known sculptor Hans Schaeffer and symbolising the tasks of the miner. In order to give those who are unable to attend the Congress in person an opportunity of securing this souvenir, the committee is ordering a limited additional quantity, which will be obtainable at cost price (about 10 kronen) if applied for in good time.

Light Railways and Colliery Development in Ireland.—An application has been made to the Judicial Committee of the Irish Privy Council for an Order in Council to authorise the construction, maintenance and working of certain tramways and light railways in specified districts of Kildare and Queen's County, for the purpose of developing the coalmines recently opened in these districts by Mr. J. J. Parkinson, and providing means of transit for the coal to Athy, which is about 10 miles distant. The project, which will involve an expenditure of about £80,000, has the unanimous approval of all the local authorities. Mr. Parkinson has already spent more than £20,000 in developing the collieries and acquiring the mineral rights over 10,500 acres of the land through which the railway would run. It was stated in evidence that the area had been inspected for geological purposes by two experts, who said that there were 200,000,000 tons of coal available for mining purposes in the area. An English company with a capital of £250,000 was ready to develop this area as soon as it was provided with railway transport and the necessary facilities were obtained either from the Great Southern and Western Railway Company or the Canal Company. The Lord Chancellor announced that the Committee would unanimously recommend the Lord-Lieutenant to approve of the construction of the railway.

SPONTANEOUS COMBUSTION OF COAL.

A Departmental Committee.

It is officially announced that the Home Secretary has appointed a committee to inquire into the circumstances in which a spontaneous combustion of coal occurs in mines, its causes, and the means of preventing it or of dealing with it when it has arisen. The committee consists of Mr. R. A. S. Redmayne, Chief Inspector of Mines (chairman), Sir Arthur Markham, Mr. C. E. Rhodes, Mr. Frank Rigby, and Mr. Herbert Smith.

COASTWISE SHIPMENTS IN JUNE.

According to the monthly coal tables there was a slight recovery in coastwise shipments in June, as will be seen from the following table:—

From	Total cargo.		Total bunker.	
	1911	1912.	1911.	1912.
	Tons.	Tons.	Tons.	Tons.
Bristol Channel ports	355,529	354,625	19,840	16,977
North-western ports	222,146	272,518	59,914	64,350
North-eastern ports	584,557	514,064	30,175	26,403
Humber ports	137,950	180,226	7,044	9,484
Other ports on east coast	18,651	21,404	10,722	3,835
Other English ports	1,492	8,531	6,275	6,920
Total from England and Wales	1,320,325	1,346,368	133,970	127,969
Ports on east coast of Scotland	119,693	105,343	18,381	10,910
Ports on west coast of Scotland	135,370	177,136	30,991	28 089
Total from Scotland	255,063	282,479	49,372	38,999
Irish ports	—	—	2,456	3,175
Total from United Kingdom	1,575,388	1,628,847	185,798	170,143

The destination of cargo shipments was as follows:—

To ports in	June 1911. Tons.	June 1912. Tons.
England and Wales	1,089,585	... 1,001,974
Scotland	133,218	... 165,279
Ireland	352,585	... 461,594

Shipments to London amounted to 407,275 tons.

MINING AND OTHER NOTES.

At the invitation of the president, Mr. T. K. Fox, a picnic of the committee of the Coal Trade Benevolent Association (Sheffield and district branch) was held on the 29th ult., when, notwithstanding the unfavourable conditions of the weather, a most enjoyable day was spent. The party left the Royal Victoria Hotel, Sheffield, for Baslow, at 11 a.m., and luncheon was served at the Peacock Hotel, Baslow, at 1 o'clock. The company visited Chatsworth and other places during the afternoon, and returned by motor cars for Sheffield in time for dinner at the Grand Hotel. After dinner a presentation was made to the honorary secretary, Mr. Riley, consisting of a silver entrée dish suitably engraved, a large walnut smoker's cabinet, and a case of pipes. Mr. Fox, in making the presentation, expressed the great appreciation of the services of Mr. Riley, and hopes of his continuance in that work.

Mr. Pierce Lacy has joined the board of the Metropolitan Carriage, Wagon and Finance Company.

The general committee of the Durham Aged Mine Workers' Homes Association has decided to open the Murton Homes (R. F. Matthews Memorial), on Saturday, September 28. Mr. Berkley-Matthews, donor of £1,000 towards the scheme, has consented to perform the opening ceremony, and the Bishop of Jarrow (Dr. Nickson) has been invited to give an address. The new single men's home at Haswell Moor is to be named "The John Johnson Memorial Home," after the late Mr. John Johnson, financial secretary of the Durham Miners' Association, and formerly M.P. for Gateshead. The single men's home will be opened on October 12, by Mr. J. J. Prest, J.P., of Hardwick Hall, and the Bishop of Durham (Dr. Moule) has been invited to speak.

Speaking at the half-yearly meeting of the Mansfield Railway Company, which is constructing a line to link up North Notts with the new docks at Immingham, Mr. J. P. Houfton, the chairman of the company, spoke in high terms of the excellent facilities afforded for the despatch of coal at Immingham Dock. The directors had every reason to believe that the additional facilities which the dock would afford to traders in and about Mansfield would have a beneficial effect upon the railway. Speaking as a large shipper of coal, he would prefer to ship coal from Immingham than from any other port. Their foreign customers spoke very highly of the satisfactory manner in which the coal was handled and of the up-to-date character of the appliances which materially reduced the breakage of the coal. Referring to the progress of the Mansfield Railway, Mr. Houfton said they had every reason to think the line would be early next year in a position to carry coal from the Mansfield Colliery to Immingham and Grimsby.

The United States Inter-State Commerce Commission has ordered an investigation which is recognised as being aimed at the United States Steel Corporation. It has been announced that it would, upon its own motion, start an investigation into "the rates, practices, rules and regulations governing the transportation of cement, iron ore, iron and steel and their products, and the materials used and consumed in the mining or production thereof to all points in the United States east of the Mississippi and north of the Ohio and Potomac rivers, described as official classification territory." The Commission says that it has received both formal and informal complaints against these rates, and that it is desirable to start an investigation in order "to keep itself informed as to the manner in which common carriers subject to the Act to regulate commerce, as amended, conduct their business." The order, as issued by the Commission, names about 250 railroad companies as respondents, comprising many of the leading systems, but it also takes in railroad subsidiaries of the Steel Corporation, such as the Bessemer and Lake Erie, Birmingham Southern, Duluth and Iron Range, Duluth, Missabe and Northern and Elgin, Joliet and Eastern. No date has yet been set for the beginning of hearings.

According to statistics compiled by Messrs. James Watson and Co., the world's production of pig iron last year showed a decline of 1,938,000 tons as compared with the preceding year. Both the United States and Britain show declines amounting to 364,900 tons and 498,000 tons, but Germany has continued its steady expansion with an increase of 741,000 tons. All the other large producers show increases.

An inquest was held at Bedlington on Monday by Mr. Coroner H. T. Rutherford respecting the death of James Haro Bolton, a sinker, who was killed in the "A" pit of the Bedlington Coal Company on Saturday. James Grant, who was in charge of the sinking engine when the accident occurred, said he caught the correct raps. He made a mistake in having taken the kibble upwards instead of downwards. Deceased, who was in the kibble, was crushed between the iron girder and the kibble. The hook came off the kibble, and it, along with deceased, fell down the shaft, a distance of about 26 ft. A "waiter-on" named Grant, gave similar evidence, and the jury found that deceased was accidentally killed by the kibble being drawn up, and coming in contact with an iron girder.

Messrs. Yeadon, Son and Co., Leeds, two years ago supplied and erected one of their complete briquette plants for Messrs. Paul Boeckel Limited, who are the leading firm of coal importers in St. Petersburg. This plant was for producing both rectangular and ovoid shaped briquettes, and has proved so satisfactory that Messrs. Yeadon have recently despatched to the same firm another of their complete briquette plants on similar lines, but of three times the capacity of the first one.

An interesting presentation took place on the 27th ult., when Mr. J. Strachan, late manager of Pinxton Collieries, on his leaving to take up a more important position under the Blackwell Collieries, was the recipient of a handsome gold watch, suitably inscribed, from the officials and workmen, also a gold-mounted fountain pen from the members of the ambulance class. Mrs. Strachan received a gold bracelet, set with rubies and diamonds, from officials and workmen, and a silver-mounted umbrella from members of the ambulance class.

The report of the South Metropolitan Gas Company for the half-year ended June 30 last states that the national coal strike cost the company's consumers, shareholders and employees £89,000 during the last half-year. It has been necessary to spend this amount in order to replace and provide coal undelivered by reason of bad working at the pits under the Mines (Eight Hours) Act, or unobtainable in England by reason of the national stoppage. Contracts have been entered into for both coal and freight at a very considerable increase over those which have been current, with a single exception, during the past 40 years, and at prices which industry could not sustain if they were likely to be permanent. There is every reason, however, to expect that coal will be obtainable at prices much nearer its normal value when the time for contracting returns.

Having received a letter from the Board of Education with reference to the desirability of introducing into the schools curriculum elementary instruction in mining, the Newport Elementary Education Committee have decided that, while they are in sympathy with the object of the letter, they do not see their way clear to take any action in the matter, as, in their opinion, Newport could not be considered a mining district.

Mr. J. B. Atkinson, H.M. inspector of mines, attended at the Gateshead County Police Court, on the 1st inst. to enter into recognisances to appeal from the decision of the magistrates a week ago in the Chopwell Colliery case. It will be remembered that the manager of the colliery was summoned for not having a switchboard earthed in accordance with the special regulations, but the Bench dismissed the case. Mr. Atkinson's recognisances were fixed at £50, and the magistrates stated a case for appeal.

In the report of the Maryport and Carlisle Railway for the half-year ended June 30, the directors estimate the loss of revenue due to the coal strike at £10,000.

The half-yearly reports of the railway companies disclose heavy losses owing to the coal strike. On the London and North Western there were decreases of £109,875 in goods receipts, of 2,909,611 tons in goods traffic, and of 680,489 miles in goods mileage. The decrease in revenue receipts was £186,879, whilst expenditure has increased by £200,323. On the North Eastern the mineral traffic receipts declined by £328,182, on the Midland by £166,714, on the Great Western by £151,389, and on the Great Central by £101,138.

The North Eastern directors report that satisfactory arrangements having been come to with the Great Central Company for the improvement of their railway between Doncaster and Thorne, and for the provision of increased facilities for the conveyance of coal to Hull for shipment, it has not been necessary to proceed with the Bill deposited in Parliament and submitted to the proprietors at the special meeting last February.

Presiding on Tuesday over the half-yearly meeting of the North Staffordshire Railway Company, Mr. T. Mosley observed that the Government were having a good deal of difficulty with reference to the Railway Bill they had introduced, in one or two sections of which they had endeavoured to fulfil the pledge given to the railway companies. The latter, however, ought to have concessions of some sort in return for the additional expenditure they were incurring, and the directors had suggested to the Railway Association that there were alternatives to raising their rates. If they raised their rates they might or might not increase their receipts, and they might find themselves embarked on litigation with the traders whenever they endeavoured to exercise the powers which might be given to them by the Government. There were, however, a considerable number of items of expenditure which were capable of being reduced or of being got rid of altogether. There was, for instance, the passenger duty, as to which all the companies might combine in asking for immediate relief. Then the companies were constantly required to make returns for Board of Trade and other national purposes; and they were to be required to furnish from January 1 next year, under the new Railway Accounts Act, statistics, many of which would be of no value to the proprietors, the directors, or their officers, but which would be useful for national purposes. The extra expense incurred in providing such information ought to be repaid to the companies by the Government, and their clerical expenditure would thus be considerably diminished. Again, whenever they required additional powers they had in existing circumstances to go to considerable expense, and he contended that they ought to ask the Government later on to give them a far simpler procedure, so that they might get the further powers they required expeditiously and far more economically. The burden of local taxation on the railway companies ought also to be reduced.

At the annual meeting of the Consett Iron Co., the chairman, Mr. C. W. C. Henderson, said the annual cost of recent legislation to the company would be not less than £25,000.

At the half-yearly ordinary general meeting of the Gas Light and Coke Company, the governor, Mr. Corbet Woodall, referring to the late coal strike, said that during that time their stocks were heavily drawn upon. Coal which had lain in storerooms some 8 or 10 years, came at last to the retorts, and a certain quantity, some of it sad rubbish, was obtained from various outside sources. They had the great advantage, however, of being able largely to increase the quantity of oil-gas sent out. This involved the withdrawing of much coke from the market, but they maintained a supply for domestic use, and for such industrial purposes as were most essential. By these means they were able to give a full supply of gas to all consumers, and were never in any real anxiety as to its continuance. Still, the cost was considerable, and they were feeling the burden now more than during the continuance of the strike. Their coal contracts for the current year had been made at prices grievously in excess of those just expired, and steamship freights were also higher. He knew how unstable was the ground underneath the outsider, who roundly blamed the middleman, or the manufacturer, or the producer, as the case might be, for putting up the price of coal or other commodity at the first wind of labour trouble. After all, it was the traders' nature to do so, and as individuals in their place he feared they would all be sorely tempted to do likewise. Yet he firmly believed that it was a mistaken policy to insist upon the payment of the uttermost penny which such circumstances rendered possible. By so doing, the public, who had already suffered heavily, were made to bear still more in order that one party to the strife might enjoy a boom year. Such action not only demoralised the workmen, but by burdening the industry and commerce of the country, brought about a speedy check to the demand, and a consequent fall of prices, which might outweigh the extravagant profits of a short period.

The Sanquhar and Kirkconnel Collieries Limited have abandoned their search for coal on the Sanquhar burgh lands. It was generally supposed that the land belonging to the town contained a good seam of coal, and to prove this the Collieries Limited secured a lease of the minerals, which were let by public roup in February 1911. Since then over £800 has been spent in boring operations without any apparent sign of coal. They have now officially intimated to the Town Council their abandonment of the lease.

A meeting of the governors of the Northumberland Aged Mine Workers' Homes Association was held on Saturday, at Burt Hall, Newcastle. The secretary, Mr. John Wilson, intimated that Major Clayton had offered a site at Annitsford on which to erect 10 more cottages for the use of aged miners and their wives. Arrangements will be made to proceed with the building of these cottages, and it is expected that the foundation stones will be laid on Saturday, September 14.

The Cadzow Coal Company, Messrs. Wm. Baird and Co., the United Collieries Company, Messrs. Archibald Russell Limited, and Mrs. Dixon, wife of the late Mr. James S. Dixon, coalmaster, Bothwell, have agreed to give £5 annually towards the formation of a mining scholarship in connection with Hamilton Academy.

We gave a notice some time ago that Messrs. Holdsworth and Sons Limited, Croft Boiler Works, Bradford, and the Yorkshire Boiler Company Limited, of Leeds, had joined hands, both companies having their registered office at Croft Works. That the combine has been successful may be gathered from the fact that a month ago we learned the combined firms had a large number of orders in hand, and we are now able to add that during the past month they have secured orders for four additional boilers. Work has already commenced in refitting the shop where necessary with the latest and most approved type of machine tools.

The Notts County Council, which made a grant towards the formation of a special class for teachers of local mining classes at the Nottingham University College to enable them to qualify under section 15 of the Coal Mines Act, has reported that the attendance throughout the course was very satisfactory. From 12 centres 128 candidates sat for examination and 38 scholarships were awarded, Prof. McMillan stating that the work was generally satisfactory with the exception of arithmetic, which was weak.

During this week a fine seam of coal has been discovered in the Ellenborough Colliery, near Maryport, which will have an important bearing on the future prosperity of this colliery. The present company commenced operations some 25 years ago, and since then only the small seams, the Rattler Band, Little Main, Senhouse and Virgin have been worked, although it was known that under the old company some of the larger seams had been touched, but probably not on a very extensive scale. Thirty years ago it was one of the most important collieries in Cumberland, and employed over 500 coal hewers. It seems that during this week the men were working as usual in the Rattler Band seam, which is at the low bottom, when they came to a fault. In proving the hitch it was decided to bore to a position slightly higher than the Rattler, when they struck the Ten-quarter seam. A close examination proved that the coal was of a superior quality, 6 ft. 6 in. in height. In order to reach the coal it will be necessary to drive a drift from the Rattler Band, but as the distance is only about 40 yards it will be reached in a very short time. The Ellenborough Colliery is well situated; it is in close proximity to the seaport town of Maryport, within easy reach of the main railway line, and has access to both the Elizabeth and Senhouse Docks. Mr. John Coates is the present manager of the colliery.

Bishop Welldon, the popular Dean of Manchester, descended the Wheat Sheaf Colliery, Pendlebury, near Manchester, belonging to Messrs. Andrew Knowles and Sons Limited, last week.

The question of borough extension, which is now recognised as a burning one in Doncaster through the town's expansion into a big colliery centre, again came before the corporation last week. It was recommended the town clerk be requested to present a report on the legal aspect of the matter. Members protested against the shilly-shally policy of the corporation, who were always asking for these reports, but still got no "forrader." They contended that it was a waste of the time of the officials, that there was not a majority in the council in favour of the extension of the boundaries. As a protest a resolution was moved that the recommendation of the committee be referred back. The voting was equal, nine for and against. The mayor registered his casting vote against, referring the matter back, so that it will now go forward.

Salford Town Council has accepted the following tenders for supplies of coal:—Ashley and Dumville, 2,270 tons best screened furnace coal, 5,000 tons Hartley best screened gas coal; F. E. Moss, 10,000 tons Abram six-feet screened gas coal; Astley and Tyldesley Collieries Limited, 15,000 tons screened Hartley gas coal; R. C. A. Palmer-Morewood, 5,000 tons Swanwick cannel; H. S. Higginbottom Limited, 5,900 tons Lostock Arley screened cobbles; Moss Hall Coal Company, 5,000 tons washed pea nuts.

The South Yorkshire Coal Trade Association have contributed £1,000 to the Cadeby Disaster Relief Fund.

At a meeting of the Bolton Board of Guardians, held on July 31, a discussion arose on the Workhouse Committee's recommendation that an account be kept by the master of the workhouse of the quantity of coal rejected from time to time, with the date when returned to the contractor and the date when replaced. The master of the workhouse was asked to report to the committee as to the quantity of coal rejected and replaced by the present contractors, and as to what measures are being taken to test the quality of the steam coal at present supplied, and whether it was satisfactory.

A sea wall has been built to reclaim a portion of the foreshore at Wellesley Colliery, Denbeath, Fife. This has been a difficult undertaking, and has been under construction for nearly three years. The ground reclaimed extends to about 50 acres, and will be utilised for sidings for Wellesley Colliery, and the railway approaches to the new coal-loading dock at Methil. The wall is 850 ft. long, 40 ft. high, 20 ft. thick at the base, and tapering to 9 ft. at the top, and is constructed of massed concrete. During the work of construction the contractors had to repair frequent damages by heavy seas. The new Wellesley Colliery is owned by the Wemyss Coal Company Limited, and two deep pits have been sunk at great cost to mine the coals under the sea. The surface plant is on the most complete scale, and includes an expensive installation of washers. A very large output is arranged for, and as the colliery is close to the loading docks at Methil, the proprietors are in the most favourable position for booking export orders.

Home Office Prosecution in Durham.—The sequel to a fatal accident at Chopwell Colliery early in May, when a miner named Hudson was electrocuted, was heard recently in the Gateshead Police Court, before the county magistrates. Henry Marshall Imrie, the manager of the colliery, was summoned for failing to comply with certain special rules and regulations of the Coal Mines Act of 1887 relating to the installation and use of electricity in mines, inasmuch as a certain switchbox was not earthed in accordance with Rule 8 The proceedings were taken by Mr. John B. Atkinson, inspector of mines. Mr. Sheraton Holmes, who prosecuted, explained that this switchbox controlled a face conveyor. From the evidence given at the inquest, it appeared that the switchbox was out of order on the day prior to the fatality. Hudson, in fact, took upon himself to put it right. Inside the box were three sets of fingers or prongs. The cover should not have been in contact with these. Hudson took the cover off when the current was turned off. In putting it back he must have shifted one of them in such a way as to bring it in contact with the cover. He asked for the current to be turned on, with the inevitable result that he was electrocuted. This was a purely voluntary act on the part of Hudson, but Mr. Imrie, as manager, was responsible for seeing that the switchbox was put straight. The particular infringement of the rules, pointed out Mr. Holmes, was that the switchbox was not earthed. Evidence was called upon this point, the fact being undisputed. Mr. Cooper, Newcastle, defended. His contention was that an exemption rule covered the case. Under Clause 20 it was expressly stated that rules relating to the construction of cables and other apparatus in use before June 1911 did not come into force until January 1920. Mr. Cooper argued that work such as would have to be undertaken in order to earth the switchbox was clearly constructional work. A lengthy argument upon the interpretation of the rules and the exemption clause ensued between the legal advocates. Eventually the magistrates asked Mr. Cooper to call expert evidence. Mr. Mountain, electrical and mechanical engineer, said that earthing would clearly necessitate constructional work. As the apparatus in question was in use before June, 1911, when special rules came into force, and before which there was no need to have it earthed, if an earthing system were to be carried out, it would mean new constructional work; therefore it would, in his opinion, come under the special clause. In the opinion of the majority of owners in Northumberland and Durham, this exemption clause referred to all apparatus in use at the time the Order came into force. The new rules, they took it, applied to apparatus since constructed.—Mr. Holmes then called Mr. Robert Nelson, H.M. electrical inspector of mines. On the point in dispute Mr. Nelson said: "My evidence is that the question of earthing is entirely apart from the construction of apparatus. It did not involve the scrapping or the interference with the construction of any existing apparatus. It would be an efficient earthing to attach a piece of cable to the switch and another to the armoured cable. This has nothing to do with the construction of the switch, and therefore does not come within the exemption."—After a short retirement the magistrates dismissed the case. On the application of Mr. Holmes they agreed to state a case.

THE FREIGHT MARKET.

The operations of the outward freight market have been somewhat restricted during the week, owing to the interruption caused by Bank holiday. On the north-east coast the supply of tonnage is rather short, but, with collieries fully booked, it is possible for merchants—business being rather slack by reason of the high prices demanded for coal—to stem vessels at somewhat easier rates. At South Wales the market is hardly recovered from the holiday influence. Quotations are generally steady. Very little is doing at the Clyde. At the Humber the market is quiet. Homewards, there has been more than the normal done. Eastern markets are steady. The Black Sea, Azof and Danube have a limited enquiry and an easy tone. The Mediterranean and ore ports are firm. The Baltic is well maintained. America is quiet. The River Plate is active and steady.

Tyne to Ancona, 5,800, 12s. 6d. coal, 16s. coke; Barcelona, 5,000, 12s., 600; Calais, 1,200, 4s.; Carthagena, 1,300, 13s.; Cronstadt, 3,000, 6s. 6d.; Ergasteria, 3,000, 20s., coke; Genoa, 3,900, 11s. 6d.; 3,000, 11s. 6d.; Havre, 900, 4s. 6d., from Elswick; Las Palmas, 3,600, 12s.; Lisbon, 1,900, 10s.; Libau, 2,200, 7s.; Port Said, 4,000, 11s. 3d., ppt.; 5,000, 11s. 3d.; Palermo, 2,800, 12s. 6d.; 2,500, 12s.; Pillau, 1,800, 6s.; Porto Vecchio, 5,500, 11s. 9d., 500, 6¼d.; St. Petersburg, 2,500, 6s. 6d.

Cardiff to Almeria, 2,500, 11s. 9d.; 2,200, 11s.; Alexandria, 5,500, 11s., ppt.; 3,700, 11s. 6d., 500, spot; Algiers, 5,200, 12½ fr., ppt.; 3,000, 12½ fr., 600, ppt.; 3,000, 12½ fr., August 10; Ancona, 1,600, 12s. 9d., 400, ppt.; Buenos Ayres, 5,500, 24s., August 12 cancelling; 4,600, 24s.; Bizerta, 5,700, 13 fr., August 8; Brindisi, 6,000, 11s., 500, spot; Colombo, 14s., free brokerage, August; Cronstadt, 3,900, 7s. 6d.; Caen, 800, 5s. 3d.; Cadiz, 1,700, 10s.; Felixstowe, 1,000, 3s. 9d., Admiralty terms; Genoa, 3,300, 11s. 6d., August 10; 5,600, 11s. 3d.; 4,000, 11s. 6d.; 5,000, 11s. 6d.; Guernsey, 420, 5s. 5d.; Las Palmas, 5,000, 11s. 9d.; 10s. 9d., 1,000 delivery; London, 1,000, 4s. 10½d.; Leghorn, 5,600, 11s. 3d.; Madeira, 5,000, 11s. 9d.; 10s. 9d., 1,000 delivery; Monte Video, 5,000, 22s.; 6,000, 22s., mid-August; Naples, 1,000, 11s., August; 4,200, 11s.; 5,700, 11s., ppt., 1,000; Nantes, 3,500, 7·12½ fr.; Port Said, 6,000, 10s. 9d., August 25; River Plate, 4,500, 23s., August 17; 4,600, 23s. 3d.; 22s. 6d.; 4,400, 24s., ppt.; 4,500, 23s. 6d., end August; Rio de Janeiro, 8,000, 21s., 300, ppt.; 21s., 300, mid-August; Rosario, 24s., end August; Santos, 5,700, 25s., mid-August; Savona, 5,600, 11s. 3d.; 3,300, 11s. 6d., August 10; St. Nazaire, 4,600, 6¾ fr., with options; 3,500, 6¾ fr., August 8; Spezzia, 5,600, 11s. 3d.; Venice, 1,600, 12s. 9d., 400, ppt.; 4,600, 12s. 6d., 500, ppt.; 4,600, 12s.

Swansea to Chantonay, 1,500, 7 fr., ppt.; Alexandria, 4,700, 11s. 9d., 500, August 7; 4,500, 11s. 9d.; Rio de Janeiro and Monte Video, sail, 15s. 3d., 100, August-September; Barcelona, 3,200, 11s. 9d., August 10; Genoa, 3,500, 11s. 10½d., ppt.; Sables, 480, 5s.; Rouen, 1,200, 5s. 9d.; 1,700, 5s. 7½d., ppt.; Guernsey, 400, 5s. 6d., ppt.; Brest, 950, 5s. 3d. coal, 5s. 9d. fuel.

Newport to Rosario, 5,000, 24s., August; Las Palmas, 5,000, 11s. 9d.; Teneriffe, 5,000, 11s. 9d.; Vigo, 650, 9s.; Calais, 1,550, 4s. 10½d.; Alexandria, 5,000, p.t.; Algiers, 5,200, 12½ fr.

Sharpness to Melbourne, sail, 18s.

Hull to Cronstadt, 2,000, 6s. 4½d., August 9; 2,000, 6s. 6d.; 2,700, 6s. 6d., early August; Riga, 2,000, 6s. 4½d., early August; Pernau, 1,600, 6s. 6d.; Port Said, 11s. 6d. August 15-25; Campana, 23s., mid-August; Villa Constitucion, 23s., mid-August; Rosario, 23s. 6d., mid-August; Gefle, 1,700, 7s. 6d.

Clyde to Rokkola, 900, 9s.

Wear to Rochefort, 1,500, 7s.; Libau, 2,200, 7s.; Nantes, 1,700, 7s. 1d.; Algiers, 2,500, 10s. 6d., 700.

Hartlepool to Alexandria, 4,500, 12s.

King's Lynn to Wyburg, 1,200, 7s. 6d.

Grangemouth to Cronstadt, 2,800, 6s. 3d.

Forth to Genoa, 3,000, 12s. 3d.; North Norway, 800, 6s.; Cronstadt, 2,400, 6s. 6d.; Odense, 2,200, 7s. 3d.

Fife port to Stockholm, 2,200, 7s. 9d.; Libau, 2,000, 7s.

Rotterdam to Bordeaux, 3,400, 7s. 3d. coals, 8s. fuel, ppt.; 2,200, 7s. 3d., ppt.; 3,500, 7s. 3d.; St. Nazaire, 2,600, 7s.; Madeira, 3,200, 12s.; La Rochelle, 1,550, 6s. 10½d., ppt.; Rochefort, 1,550, 7s., ppt.; Caen, 1,600, 5s. 4½d., ppt.; St. Nazaire, 2,600, 7s. 1½d., Trignac terms, ppt.; Porto Vecchio, 3,200, 12s. 3d., ppt.; Marseilles, 5,000, 13½ fr. coal, 14½ fr. fuel, August 10; Alexandria, 4,300, 12s. coal, 12s. 9d. fuel, 14s. coke, August 12.

Port Talbot to Nieudiep, 1,900, 5s. 6d.; Genoa, 3,000, 11s. 9d.

Antwerp to Wallaroo, sail, 17s., coke, September-October.

Goole to Rouen, 1,500, 5s. 6d., ppt.; Boulogne, 800, 5s. 3d., ppt.

Hartlepool to Alexandria, 4,500, 12s.

Seaham Harbour to Tunis, 2,600, 14s.

Burntisland to London, 3,100, 3s. 4½d.; 3,500, 3s. 3d.

Bo'ness to Gibraltor, 1,500, 10s. 6d.

Wales to Monte Video, Rio de Janeiro or Bahia Blanca, sail, 19s.; 18s.

Grimsby to Gefle, 1,700, 7s. 10½d.

Homeward charters:—Azof, 4,600, Rotterdam, 12s. 9d., Emden or Weser, 13s., August 15; 4,600, Rotterdam, 13s., on d.w., ppt.; 3,500, ten per cent., 14s. 6d. u.c. or any, 15s. Hamburg, August 10; 5,100 max., 14s. 6d. u.c. or any, 15s., Hamburg, 3d. extra two loading, option Rotterdam 14s., Antwerp, 14s. 3d., August 25; 5,200, Rotterdam, 13s., Antwerp, 13s. 3d., Hamburg, 13s. 6d., ppt.; 5,000, Rotterdam, 13s., Antwerp, Emden, or Weser, 13s. 3d., Hamburg, 13s. 6d., ppt.; Kherson, Nicolaieff or Odessa, 5,600, Rotterdam, 12s., ppt.; 5,700, London or Rotterdam, 12s. 6d., Emden or Weser, 12s. 9d., Hamburg, 13s., with 700 load, ppt.; 6,200, do.; 6,300, do., with 3d. less barley, option Nicolaieff and or Varvaroffka, 1½d. extra; 4,400, London or Rotterdam, 12s. 6d., Hamburg or Weser, 13s., with 700 load, ppt.; Novorossisk or Theodosia, 1,600 net, Rotterdam, 12s., Weser, 12s. 6d., ppt., 4,800, Rotterdam, 12s., Weser, 12s. 6d., 3d. extra both loading, ppt.; 5,500, Rotterdam, 12s., ppt.; Poti or Batoum, 4,800, Philadelphia or Baltimore, 16s. 6d., ppt.; Batoum, 5,700, Rotterdam, 13s. 9d., ore, ppt.; Calcutta, 2,668 net, p.p. United Kingdom-Continent, 30s. 7½d., d.w. basis, net terms, cancelling September 10; 2,339 net, about 30s., d.w. basis; 2,339 net, Barcelona and one port United Kingdom-Continent, 35s., jute-linseed basis, September; 7,000, United Kingdom-

Antwerp-Holland, 30s., d.w. basis, end August; 2,668 net, United Kingdom-Continent, about 30s., d.w. basis, 9d. extra two ports discharge, August-September; 3,057 net, United Kingdom-Antwerp-Holland, 30s. one port, 31s. two ports, Hamburg 6d. extra, d.w. basis, September 5-25; Kurrachee, 6,000, 10 per cent., p.p. United Kingdom-Continent, 21s. 6d., net terms, August; 2,530 net, one port West Italy, 24s. 3d., August; 2,393 net, Cork, Dublin or Belfast, 22s. one port, 22s. 6d. two ports, net terms, cancelling August 26; 2,561 net, Antwerp, 21s., less 2 per cent., September; 2,488 net, p.p. United Kingdom, 21s. 6d., option Naples 23s., net terms, August-September; Virginia, 2,400, Rio de Janeiro, 22s., August; Pensacola, 970 stds., 10 per cent., Rosario, 165s., August; San Lorenzo, 2,184 net, United Kingdom-Continent, 20s. 6d. o.c., less 6d., September-October; 5,300, 10 per cent., 20s. 6d. o.c., less 6d., October 25-November 25; 4,300, 10 per cent., 21s. o.c., less 6d., October 15-November 15; 5,200, 10 per cent., 21s. 6d. o.c., less 6d., August 15-September 10; ditto, September; 4,700, 10 per cent., 21s. 3d. o.c., less 6d., September 20-October 20; 4,500, 10 per cent., 21s. 6d. o.c., less 6d., October 1-31; 6,000, 19s. 6d. o.c., less 6d., October-November; Buenos Ayres or La Plata, 2,708 net, United Kingdom-Continent, 17s. 6d. o.c., less 6d., October 20-November 30; 6,000, 10 per cent., 19s. o.c., less 6d., September; 2,800, 18s. o.c., less 6d., ppt.; 6,500, 10 per cent., 17s. 6d. p.p., no reduction direct, ppt.; 6,000, 10 per cent., 19s. 9d. o.c., less 6d., with options, August 10-31; 6,500, 10 per cent., 18s. o.c., less 6d., ppt.; White Sea, 1,494 net, Sharpness, 62s. 6d., mid-August; Newcastle, N.S.W., sail, 25s. one port, 26s. two ports Peru, November; 22s., Valparaiso and a nitrate port, March-April; Japan, 2,829 net, Singapore, 3.30 dols. one port loading, 3.35 dols., two ports, August; Bombay, 5,800, Antwerp, 25s. 6d., ore, August; 2,279 net, Garston 25s. 3d., ore, September-October; Buenos Ayres, 6,000, 10 per cent., United Kingdom-Continent, 19s. o.c., less 6d., September; Sagunto, 6,000, Rotterdam, 6s. 6d., mid-August; Huelva, 6,200, Rotterdam 6s. 9d., f.d., August; 5,300, 6s. 9d., f.d., 10d. and 1s., ppt.; 4,700, New Orleans, Mobile or Pensacola, 12s., f.d., August; Bayonne, 1,900, Cardiff or Barry, 8s. 3d., pitwood, ppt.; time charter, Brazil and River Plate trade, 6s. one round trip, delivery and re-delivery United Kingdom-Continent; 5s. 9d., early August; Miramichi, 1,500 stds., max., Glasgow, 52s. 6d., early August, reported; West Britain-East Ireland, August; time charter, trans-Pacific round, delivery Newcastle, N.S.W., re-delivery Australia, 6s., with options, August; Gulf timber port, 165s., River Plate, August; Hornillo Bay, 7s., Cardiff, ppt.; time charter, States and West Indies, delivery and re-delivery United Kingdom-Continent, 5s. 2½d., six or nine months; Norfolk, Va., 22s. 6d., La Plata, early August; North Pacific, 47s. 6d., United Kingdom-Continent, September-October, reported; San Francisco, sail, 37s. 6d., United Kingdom-Continent, option Puget Portland, 45s., January-February; nitrate ports, sail, 26s., H.H., 27s. 6d. B.H., less 9d., United Kingdom-Continent, August-September; 27s. 6d., United Kingdom-Continent, August-September next year; time charter, Transatlantic trade, 7s. 3d., one trip, delivery Gulf, August; Newcastle, N.S.W., 2,900 net, Bombay, 14s. 3d., coal, August; Bunbury, 4,000 loads, Cape, about 40s., jarrah, August-September; Buenos Ayres, 4,500, 10 per cent., United Kingdom-Continent, 18s. 6d. o.c., less 6d., November-December; La Plata, 5,700, 10 per cent., United Kingdom-Continent, 19s. 6d. o.c., less 6d., France 1s. extra, seed 1s. extra, August 15-31; San Lorenzo, not above, 4,600, 10 per cent., United Kingdom-Continent, 22s. 6d. o.c., less 6d., August 10-September 20; 3,200, 10 per cent., 22s. 6d. o.c., less 6d., August 25-September 25; 5,000, 10 per cent., 21s. o.c., less 6d., October 10-November 10; 6,300, 10 per cent., 21s. o.c., less 6d., August 10-31; 4,000, 10 per cent., 21s. o.c., less 6d., October 10-November 10; 5,200, 10 per cent., 21s. 6d. o.c., less 6d., August 15-September 10; 5,200, 10 per cent., 21s. 6d. o.c., less 6d., September 1-20; Miramichi, 1,200 stds., p.p. West Britain-East Ireland, 57s. 6d., option Campbelton 55s., August-September; Bilbao, 2,500, Newport, 5s. 10½d., ppt.; 3,400, Calais, 7s. 6d., August 15-28; St. Petersburg, 1,800 stds., Hull or Tyne, lump sum, £3,400, props, August; Bombay, 1,364 net, Garston, 25s., ore, September; Kurrachee, 2,303 net, Cork, 22s., net, August; 2,488 net, p.p. United Kingdom-Continent, 21s. 6d., August; 6,000, max., 21s., net, Sept. 10-25; Nicolaieff or Odessa, 5,800, London or Rotterdam 12s. 6d., Weser 12s. 9d., Hamburg 13s., 3d. less barley, ppt.; 6,500, Rotterdam 12s. 3d., Hamburg 12s. 9d., with 3d. less barley, ppt.; 3,500, Marseilles, 12½ fr., option part oilcake 14 fr., ppt.; Novorossisk, 3,500, Denmark, two ports, 18s. 3d., oilcake, ppt.; Java, 2,198 net, Suez, 25s., August-September; Castro-Urdiales, 3,550, Rotterdam, 7s., ppt.; Portland (Or.), Puget Sound, 8,000, United Kingdom-Continent, 47s. 6d., Mediterranean 49s. 6d., Baltic 50s., November 15-December 15.

The Housing of Miners in Scotland.—At Hamilton last week, Sheriff Shennan gave his decision in an appeal by Cadzow Coal Company against an order by the Middle Ward District Committee of the county of Lanark, calling upon the company to introduce waste water sinks and a gravitation water supply into certain miners' houses at Cadzow belonging to the appellants. The district committee contended that through the lack of these conveniences the houses were not in all respects reasonably fit for human habitation in terms of section 15 of the Town Planning Act. The coal company replied that the introduction of these conveniences was inadvisable and inexpedient, looking to the character of the property and the habits of the tenants. In recalling the order *quoad* these particular works, his lordship said that the convenience or the desirability of the appointments of a house did not help one much in estimating actual habitability. The interpretation of the words "reasonably habitable" depended upon the standard of comfort for the time being in the particular locality, and he could not hold that, in the colloquial language of the day, the "man in the street" would say that houses in these rows were not reasonably fit for habitation because they had not an internal water supply. He did not think that section 15 of the Town Planning Act was intended to enable a local authority to enunciate and enforce a new standard of habitability every few years.

COAL, IRON AND ENGINEERING COMPANIES.

Antrim Iron Ore Company Limited.—A dividend of 1s. per share is announced.

Badalona Works Syndicate Limited.—This private company has been registered, with a capital of £11,000 in £1 shares, to carry on the business of makers of tin and black plates, galvanised sheets and tin stamped articles, &c., and to enter into two agreements in the nature of deeds of aportacion whereby certain property in Spain belonging to Messrs Hijos de Manuel Arquer shall be brought into the capital of the company. First directors: Arcadio de Arquer, Jose de Arquer, W. R. Beldam and G. A. Schwartz. Qualification, one share. Registered office: 165, Fenchurch-street, E.C.

Bonecourt Surface Combustion Limited.—This company has been registered, with a capital of £250,000 in £1 shares, to acquire certain patents and rights relating to improvements in burning gas fuel, to adopt an agreement with Radiant Heating Limited and Combustion Improvements Limited and to carry on the business of makers of and dealers in furnaces, plant, machines and apparatus for working the said inventions. Minimum cash subscription, 20,000 shares. First directors: Earl Denbigh, H. Edmunds, G. Le M. Mander, H. W. F. Garland and P. St. G. Kirke. Secretary, R. Sanderson. Registered office: Parliament-mansions, Victoria-street, S.W.

Briggs (Henry) Son and Co. Limited.—The report for the year ended June 30, 1912 states that the new colliery at Woodlesford, known as the Water Haigh Pit, is rapidly approaching completion, the output now being 800 tons per day, and it is hoped to still further increase this quantity in the near future. The miners' strike, together with the unrest in the transport trade, materially affected the output during the period under review. The balance standing to the credit of profit and loss account, being the year's profit of £64,070, supplemented by the balance brought from last year, £36,340, less £11,475, interim dividend paid in February last, is £88,935, which the directors recommend be appropriated as follows:—To payment of a dividend of £1 14s. 6d. per share on the A shares, and £1 3s. per share on the B shares (free of income-tax), making with the interim dividend a return for the year of £2 5s. per A share and £1 10s. per B share, £37,705; depreciation of investments, £10,000; reduction of amount standing as value of leases, £5,000; leaving a balance to carry forward of £36,229.

Callendar Iron Company Limited.—This company has been registered in Edinburgh, with a capital of £85,000 in £10 shares, to take over the business carried on at Falkirk and elsewhere by the Callendar Iron Company and to carry on the business of iron and brass founders, steel manufacturers, &c. First directors: M. Hay, E. Graham, W. Wood and John Wilson.

Cambrian Collieries Limited.—The following interim dividends for the half-year to June 30 have been declared, payable on the 24th inst., on the ordinary shares at the rate of 10 per cent. per annum, and on the preference shares at the rate of 6 per cent. per annum.

Catalana Tin-plate Company Limited.—This company has been registered, with a capital of £250,000 in £1 shares (110,000 6 per cent. pref. part.), to carry on the business of ironmasters, steelmakers and converters, colliery proprietors, engineers, &c., and to adopt an agreement with the Badalona Works Syndicate Limited. Minimum cash subscription £500. First directors: Arcadio de Arquer, J. de Arquer, W. R. Beldam, G. A. Schwartz, J. Rutishauser and W. C. W. Egerton. Qualification, £250. Remuneration (except managing directors) £50 each per annum for first year, £75 second year and £100 thereafter. Registered office, 165, Fenchurch-street, E.C.

Cayley Robinson Furnace Company Limited.—This company has been registered, with a capital of £100,000 in £1 shares, to carry on the business of manufacturers and repairers of and dealers in furnaces and heating appliances of all kinds, &c., and to adopt an agreement with W. B. Gonin. Minimum cash subscription, 10,000 shares. First directors: Rear-Admiral R. V. French, L. D. Henderson, B. W. Gonin, H. H. Fyfe and T. W. Druitt. Registered office, 57, Moorgate-street, E.C.

Davis (D.) and Sons Limited.—The directors have resolved that an interim dividend at the rate of £6 per cent. per annum be paid on August 1, 1912, in respect of the cumulative preference shares of £1 each, fully paid, of the company for the half-year ended June 30 last, and that an interim dividend at the rate of £10 per cent. per annum be paid on August 1, 1912, in respect of (1) the (old) ordinary shares of £1 each, fully paid, of the company for the half-year ended June 30 last; (2) the (bonus) ordinary shares of £1 each, fully paid, of the company for three months from March 31 last; and (3) the new subscribed ordinary shares of £1 each, 2s. 6d. paid, of the company for the respective number of days on which dividend has accrued to each registered holder to June 30 last.

Fongago Syndicate Limited.—The ordinary general meeting of the shareholders was held on Friday at Dover, Mr. Arthur Burr presiding. The chairman said they had received an offer to buy out the 100,000 ordinary shares which they had in Snowdown, but it had been decided to refuse it.

Fox (Samuel) and Co. Limited.—The report shows a profit of £31,169 for the past year, from which interest upon the debenture stock, £5,000, must be deducted, leaving £26,169, which, with the amount brought forward, makes £49,167. The directors recommend a dividend of 8 per cent. for the year, free of tax, leaving £25,167 to be carried forward.

Glamorgan Coal Company Limited.—The following interim dividends for the half-year to June 30 have been declared, payable on the 24th inst.: On the ordinary shares at the rate of 10 per cent. per annum, and on the preference shares at the rate of 7 per cent. per annum.

Green (Richard) Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to take over the business of a manufacturer of chains, cables, anchors, &c., carried on by R. Green at Cokeland Works, Cradley Heath. First directors, R. Green and Mrs A. Green. Qualification, £50. Registered office, Cokeland Works, Cradley Heath, Staffs.

Guest, Keen and Nettlefolds Limited.—The directors announce profits for the twelve months ended June 30 last amounting to £395,586 0s. 9d., and recommend the payment of final dividends as follows:—On the preference shares at the rate of 5 per cent. per annum for the half-year; on the ordinary shares at the rate of 10 per cent. per annum for the half-year, together with a bonus of 1s. per share on the ordinary shares—all free of income tax.

Hadfield's Steel Foundry Company Limited.—An interim dividend of 1s. per share free of tax has been declared on the ordinary shares.

Hazell Colliery and Brick Company (Barlborough) Limited.—This private company has been registered, with a capital of £15,000 in £1 shares, to carry on the business indicated by the title. First directors, P. H. Haagensen (permanent director and chairman), H. Haagensen, L. A. Smith, F. H. Haagensen, and C. Robinson. Qualification, £250. Registered office, Old Custom House, Great Grimsby.

Kent Central Coal Estates Limited.—Applications have this week been invited for 35,000 7 per cent. cumulative participating preference shares of £1 each at par. The authorised capital is £75,000, and the directors are Messrs. T. H. Good, Scarborough (managing director of the South Derwent Coal Company Limited), H. S. Saunders, R. F. C. Leith, W. Eutherley, and G. Hutchinson. The company has been formed to acquire the Broome Estate and the manorial rights of Elham and Wingmore, comprising about 3,580 acres. It is intended to form subsidiary companies.

Lanarkshire Steel Company Limited.—Usual dividends of 5 per cent. per annum on both classes of preference shares for the half-year.

Lothian Coal Company Limited.—A dividend has been declared on the preference shares of 10s. per share, being the arrears for the 12 months to Whitsunday, 1912.

Main Colliery Company Limited.—The directors, in presenting their report for the year ended June 30, 1912, state that the output of coal for the year was 410,510 tons, as against 479,080 tons for the previous year. After payment of all charges, including special calls made by the Coalowners' Association in connection with strikes, the result of the year's working, including the amount brought forward from the previous year and £7,500 transferred from the reserve for equalisation of dividends, leaves a net balance of £13,787 9s. 11d. The past year's profits have practically been absorbed by the expenditure incident to the two months' stoppage owing to the strike, but, having regard to the large amounts which have been set aside from time to time by the shareholders out of their profits, the directors recommend that the dividend shall be maintained at 6 per cent., and hope that the ensuing year will see a return to normal conditions. The directors have paid an interim dividend of 3 per cent., amounting to £6,300, and they now recommend payment of a further dividend of 3 per cent. upon the ordinary and preference shares, amounting to £6,300, making 6 per cent. for the year. There will then remain a balance of £1,187 9s. 11d. to be carried to the account for the current year.

Mather and Platt Limited.—Interim dividend of 5 per cent., free of tax, for the half-year ended June 30, being at the rate of 10 per cent. per annum.

Midland Railway Carriage and Wagon Company Limited.—The report for the year to June 30 last states that the accounts show a gross profit of £20,297. Adding to this the amount brought forward, namely, £3,566, the sum to be dealt with is £23,863. From this must be deducted £2,000 set apart for depreciation of plant and machinery, £781 part cost of issue of debentures, the debenture interest amounting to £7,743 and £1,000 for additional reserve for diminution in value of investments. The directors propose to pay a dividend on the preference shares at the rate of 6 per cent. (free of income tax), less interim dividend paid February 24 last, leaving to be carried forward £10,835. In view, however, of the large expenditure which is being incurred upon the new works, and the cost during the current year of removal, together with the probable requirements of the company for increased working capital, the directors have decided to recommend that no dividend be paid for the past year upon the ordinary shares.

North Central Wagon Company Limited.—The report for the year to June 30 last states that the balance of revenue account, including the amount brought forward, is £27,968, which the directors recommend should be appropriated as follows:—To interim dividend on the paid-up capital at the rate of 12 per cent. per annum (free of income-tax) paid February 5, 1912, £8,909; in payment of a further dividend on the paid-up capital for the six months ended June 30, 1912, at the rate of 13 per cent. per annum (free of income-tax), making 12½ per cent. for the year, £9,749; transfer to reserve fund, £8,000, leaving to be carried to next year's account £1,219. The reserve fund with the above addition will amount to £138,000.

Onions (Z. W.) Limited.—This private company has been registered, with a capital of £10,000 in £1 shares (2,500 preference), to carry on the business of iron manufacturers, steelmakers, ironmasters, founders, rollers of metals, smelters, blast-furnace proprietors, engineers, &c.

Photos Miners' Electric Lamp Limited.—This private company has been registered, with a capital of £5,000 (4,700 10 per cent. preferred ordinary shares of £1 each and 6,000 deferred ordinary shares of 1s. each), to carry on the business of electrical and mechanical engineers, &c., and to adopt an agreement with K. R. Smith for the acquisition of the patents, inventions and rights referred to therein. First directors, E. R. Smith and K. R. Smith and G. W. Cook.

Schultz (George) and Co. Limited.—This private company has been registered, with a capital of £7,000 in £5 shares (400 preference), to take over the business of an iron and steel merchant, &c., carried on by G. Schultz at 10, Bush-lane, Cannon-street, E.C. First directors, G. Schultz (chairman and managing director), A. Ellis, W. A. Schultz and D. H. Schultz.

Scottish Boiler Insurance and Engine Inspection Company Limited.—The directors announce an interim dividend of 3s. per share, less income-tax, on the ordinary shares for the half-year.

Sheffield Forge and Rolling Mills Company Limited.—The gross profit for the year was £17,329, and the net profit, after payment of interest and all other charges, £15,969. The latter sum, added to £7,987 brought forward, makes £23,956 divisible. The directors recommend a dividend of 10 per cent., free of income tax, appropriate

EXPORTS OF COAL, COKE, AND MANUFACTURED FUEL FROM THE UNITED KINGDOM

During July, and the first seven months of 1910, 1911 and 1912.

To	July, 1912.						July.					
	Coal—Small.		Coal—Through-and-through (unscreened).		Coal—Large.		All coal. Quantity (tons).			All coal. Value (£).		
	Tons.	£	Tons.	£	Tons.	£	1910.	1911.	1912.	1910.	1911.	1912.
Russia	73,867	41,752	47,429	26,923	526,722	356,175	458,301	458,810	648,018	275,641	244,199	421,850
Sweden	102,550	52,212	51,287	23,673	318,439	200,186	429,726	277,423	472,276	234,102	140,551	281,071
Norway	58,219	23,710	17,938	9,648	148,072	90,021	180,806	120,265	221,229	92,148	58,380	123,379
Denmark	57,774	30,233	76,981	43,687	153,131	95,410	194,440	183,034	287,886	102,030	90,448	169,330
Germany	338,461	165,928	428,175	214,475	233,432	140,044	763,406	696,803	1,000,068	375,343	322,154	518,447
Netherlands	90,792	46,907	59,702	30,734	59,220	37,207	186,110	134,070	209,714	97,528	66,173	144,848
Belgium	82,553	32,302	46,321	23,473	50,674	29,035	114,294	105,971	179,548	48,145	45,805	84,810
France	379,912	181,257	332,696	174,492	334,903	211,433	781,324	661,543	1,047,511	427,002	354,623	594,182
Portugal, Azores, and Madeira	22,593	11,727	29,570	14,443	72,376	53,591	98,323	85,428	124,539	59,935	50,339	79,764
Spain and Canaries	37,424	20,646	105,565	56,974	194,107	142,953	232,265	223,747	337,096	150,510	137,337	220,573
Italy	162,037	68,799	214,554	114,296	590,900	446,457	827,976	793,658	967,491	481,339	451,575	629,552
Austria-Hungary	17,233	8,482	12,430	6,679	58,014	37,997	93,122	79,614	87,677	49,946	41,427	53,158
Greece	13,512	7,765	27,351	14,125	19,958	13,139	43,124	74,599	60,821	26,713	43,169	35,029
Turkey	3,819	2,996	10,215	5,555	41,702	30,393	48,304	49,637	55,766	35,598	33,169	39,441
Egypt	30,883	16,273	48,079	23,931	269,803	185,413	242,215	256,064	348,765	158,498	158,347	225,617
Algeria	30,734	15,697	42,539	21,718	25,960	18,852	68,681	83,392	99,233	40,508	44,652	56,267
United States of America	—	—	—	—	50	58	—	102	50	—	120	58
Chile	710	1,102	—	—	51,421	42,263	50,557	48,550	52,131	38,091	29,780	43,365
Brazil	971	758	1,170	752	108,526	87,800	129,444	100,958	110,667	91,700	75,695	89,310
Uruguay	6,414	4,756	3,394	2,100	54,782	45,366	65,455	31,035	64,590	53,156	24,554	52,222
Argentine Republic	4,878	4,866	—	—	317,955	248,989	232,148	198,431	322,833	174,795	145,861	253,855
Gibraltar	2,925	1,318	10,590	5,612	13,328	9,671	16,336	19,218	26,843	10,756	11,303	16,601
Malta	10,568	4,675	8,870	5,056	20,283	14,886	29,845	25,009	39,721	13,513	15,282	24,617
British South Africa	604	450	—	—	2,657	1,618	2,421	7,728	3,261	1,617	4,244	2,068
,, India	140	103	—	—	10,111	7,806	14,670	3,966	10,251	9,974	2,828	7,909
Straits Settlements	1,409	1,924	—	—	3,353	2,703	52	70	4,762	107	104	4,627
Ceylon	651	859	—	—	31,108	24,536	32,631	11,876	31,759	25,531	8,939	25,395
Other countries	36,978	19,694	17,762	10,323	169,640	130,791	140,417	148,527	224,360	96,592	104,365	160,808
Total Anthracite	138,313	95,997	10	9	165,669	142,135	218,828	197,072	304,022	173,902	151,311	238,141
Steam	1,160,650	533,175	300,363	159,076	3,500,875	2,465,416	3,951,322	3,442,615	4,961,888	2,338,441	1,953,877	3,157,667
Gas	77,662	37,903	1,093,500	565,948	88,846	53,760	929,599	884,559	1,260,008	477,630	429,593	657,611
Household	48,402	26,471	1,194	1,811	112,217	66,413	110,153	115,898	161,813	59,241	58,539	94,695
Other sorts	113,564	73,645	197,551	101,825	13,020	7,602	248,488	239,414	351,135	126,912	112,704	183,072
Total	1,568,621	767,191	1,592,618	828,669	3,880,627	2,735,326	5,458,390	4,879,558	7,041,866	3,176,126	2,706,028	4,331,186
Total (July 1911)	*1,106,650*	*496,691*	*1,094,265*	*524,303*	*2,678,643*	*1,685,034*	—	—	—	—	—	—
Total (July 1910)	*1,298,431*	*583,003*	*972,518*	*493,231*	*3,187,441*	*2,099,892*	—	—	—	—	—	—
Coke	—	—	—	—	—	—	66,346	82,651	85,978	52,677	63,768	75,280
Manufactured fuel	—	—	—	—	—	—	122,517	129,227	191,945	83,537	89,307	152,470
Total of coal, coke & manufactured fuel		—	—			—	5,647,253	5,091,436	7,319,789	3,312,340	2,859,103	4,558,936
	First seven mouths of 1912.						First seven months.					
Total Anthracite	586,654	416,142	89	64	691,172	596,402	1,380,937	1,366,747	1,278,215	1,093,577	1,021,655	1,012,608
Steam	5,501,733	2,505,312	1,519,661	829,611	16,660,661	11,927,105	25,826,894	26,427,909	23,682,055	15,497,346	15,278,038	15,262,028
Gas	347,433	163,167	4,885,462	2,527,048	514,950	320,946	5,721,950	5,958,632	5,747,845	2,961,153	2,901,736	3,011,161
Household	226,265	120,270	2,646	2,872	573,357	351,154	819,209	829,466	802,268	440,938	434,087	474,296
Other sorts	805,827	423,482	821,215	434,616	77,764	48,697	1,532,797	1,799,763	1,704,806	782,764	854,498	906,795
Total	7,467,912	3,628,373	7,229,073	3,794,211	18,518,204	13,244,304	35,281,787	36,373,517	33,215,189	20,775,778	20,490,014	20,666,888
Total for seven months of 1911	*8,169,567*	*3,608,031*	*7,491,643*	*3,599,755*	*20,712,307*	*13,282,228*	—	—	—	—	—	—
Total for seven months of 1910	*7,947,999*	*3,563,824*	*6,364,455*	*3,241,172*	*20,969,333*	*13,970,780*	—	—	—	—	—	—
Coke	—	—	—	—	—	—	478,918	545,210	474,086	354,287	415,315	376,981
Manufactured fuel	—	—	—	—	—	—	910,994	981,094	827,228	623,303	678,456	641,581
Total of coal, coke & manufactured fuel	—	—	—	—	—	—	36,671,699	37,899,821	34,516,503	21,753,368	21,583,785	21,685,450

£3,000 for depreciation of plant, and £5,000 to the reserve fund, and carry forward £5,956.

Snowdown Colliery Limited.—A meeting of shareholders was held at Dover recently, Mr. Arthur Burr presiding. The chairman stated that £103,000 had now been spent in developing the colliery. They had passed the Hastings beds without water trouble and the first shaft was now down to 1,037 ft., 120 ft. having been sunk in five weeks. No. 2 pit was down 1,012 ft. They hoped to reach the coal in about 20 weeks. A lease for 1,500 acres was about to be signed and an option on a further 500 acres would be taken. Mr. Burr also gave some information in regard to the progress at Tilmanstone. He said the large switchboard had now been erected, and three new horizontal permanent pumps were now being fitted in the shaft. It was expected that pumping would start at the end of the month. There were now only 22 ft. of sand to be penetrated above the coal at 1,370 ft.

South Wales Colliery Company Limited—The directors have paid interim dividends at the rate of 14 per cent. per annum (4s. 2⅔d. per B share and 2s. 1⅓d. per new B share), and 4 per cent. per annum (6s. 9⅔d. per share) on A and deferred A shares for the half-year, less income-tax.

Walker, Maynard and Co. Limited.—The report for the year ended June 30 shows a profit of £5,726, which, with the balance brought forward, makes a total of £15,787. It is proposed to apply this in paying a 6 per cent. dividend on the preference shares for the first and second half-years, allocating £1,300 to directors' remuneration, £4,129 to depreciation on investments and carrying forward £757.

Watson (John) Limited—An interim dividend has been declared on the ordinary shares at the rate of 10 per cent. per annum.

Wentworth Silkstone Collieries Limited.—This private company has been registered, with a capital of £15,000 in £10 shares, to carry on the business of dealers in coal, ironstone, coke, artificial fuel, bricks, tiles, sanitary tubes, lime, and other substances, &c. The subscribers are:—L. C. Parkin, The Views, Gawber-road, Barnsley, mining engineer, one share; F. Middleton, Victoria-avenue, Barnsley, colliery secretary, one share. Solicitor, J. Hewitt, Barnsley. Registered office, 16, Regent-street, Barnsley.

Grimsby Coal Exports.—The following is the official return of the quantities of coal exported from Grimsby during the week ended August 2:—To foreign destinations (tons): Christiania, 2,437; Gefle, 6,085; Drammen, 1,380; Esbjerg, 2,151; Malmo, 2,204; Ronne, 646; Karrabeksminde, 1,105; Cuxhaven, 170; Antwerp, 424; Sodertelje, 1,514; Dieppe, 1,076; Cronstadt, 2,535; Trelleborg, 1,546; Hamburg, 1,503; Rotterdam, 257; Ahus, 1,241; Ornskoldsvik, 135; Gothenborg, 986; Bremen, 376; Landscrona, 1,188; and Norrkoping, 1,366 tons; total, 30,325 tons. To coastwise destinations (tons): Lerwick, 1,100; Yarmouth (I.O.W.), 200; Lowestoft, 75; and Whitstable, 265 tons; total, 1,640 tons. The export for the corresponding week of last year was: Foreign, 34,499 tons; and coastwise 2,126 tons.

The Developments Around Doncaster.—Some very interesting statements regarding the new coalfields around Doncaster were made by Dr. A. B. Dunne, medical officer to the Doncaster Rural District Council, in the course of a paper which he read at the Royal Sanitary Institute at York last Friday. After commenting in terms of pleasure upon the entire absence of smallpox, despite the influx of a great floating population of navvies and general labourers, Dr. Dunne regretted that the deliberation and discussion which were essential before the local authority could obtain sanction for schemes of sewerage and water supply were out-distanced by the rapidity in which the collieries and the districts around Doncaster were being developed. At Brodsworth, six years ago, they had 320 inhabitants in a district perfectly rural. To-day the population, owing to the coming of the colliery, was over 6,000. It was expected that coal would be reached in November next at the great colliery that was being sunk at Askern Spa, and when once this colliery got going 4,000 men and boys would be employed underground, whereas the present population of the Spa was only 600. They had it upon the authority of Lord Aberconway that in a few years' time the South Yorkshire coalfield would increase its output by 12 million tons per year. Assuming that the year's output of coal per man remained at the present figures, 263 tons, this would mean that within 10 years there would be employed in the district an additional 45,000 men and boys. People were thronging into the district; they were even paying money to get the keys of houses; they were ready to put their belongings in before the houses were finished or the water laid on. A great problem had been thrown upon a rural locality because of the speed at which the coalfield around Doncaster was being developed. They could not touch a colliery in South Yorkshire without a capitalisation of £500,000. They had to get the coal as quickly as possible to earn dividends, and the consequence was the rushing of the administrative authorities of the district in a way in which no other district in England was being rushed.

Bradford Municipal Coal Supply.—The sub-committee of the Finance Committee of the Bradford City Council appointed to enquire into the question of the desirability of a municipal coal supply, met for the last time on Wednesday of last week, when the following conclusions were agreed to:—

> 1. That the Corporation cannot buy coal cheaper than coal merchants. 2. That the profit does not average 1s. per ton on all coal sold by the merchants.
>
> In the light of these conclusions the sub-committee cannot see that there are exorbitant profits in the coal trade, and are of opinion that with the very severe competition which already exists it would be impossible for the Corporation to carry on the trade at a profit.

There was some dissent to the decisions on the part of the representatives of the Labour Party, but the committee decided not to sanction the presentation of a minority report.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER *and* LAST WHITE *pages.*

Abstracts of Contracts Open.

ANDOVER, AUGUST 27.—For the supply to the Guardians at Andover of about 50 tons (either more or less) of either large Cwmamman, Nixon's Navigation, or Dowlais Merthyr best steam coal.

ARMY CONTRACTS (DEVONPORT), AUGUST 13.—Sealed tenders for supply of coal for the period of 10 months from September 1, 1912, at Bristol, Taunton, and Exeter (West Southernhay, &c.), will be received at the A.S.C. Office, New Granby Barracks, Devonport, until 12 noon on August 13.

BANBURY, AUGUST 20.—For supply of coal for period ending April 30, 1913, for the Education Committee—viz.: (1) Polesworth Birch Coppice cobbles; (2) Moira cobbles; (3) Baddesley cobbles.

BIRMINGHAM, AUGUST 20.—For the supply of engine slack at their various pumping stations for seven months from September 1, for the South Staffordshire Waterworks Company.

BURY, AUGUST 15.—For supply of about 40,000 tons of gas coal, 500 tons of boiler slack, 500 tons of burgie, 300 tons of house coal, and 50 tons of Wallsend coal, for the Corporation.

BURY ST. EDMUND'S, SEPTEMBER 1.—For the supply of coal and coke to the shire hall and police station at Bury St. Edmund's, amounting approximately to 50 tons of best cobbles at per ton, 30 tons of coke at per ton, for the West Suffolk County Council.

CLACTON-ON-SEA, AUGUST 14.—For supply and delivery of about 5,000 tons of best screened gas coal, for the Clacton Urban District Council.

HALIFAX, AUGUST 12.—For supply of coal required in the schools and offices during year ending August 31, 1913, for the Education Committee.

HAREFIELD, AUGUST 15.—For supply of about 100 tons of good cobbles coal, free from slate and dust, for the trustees of Harefield Poors Charity.

HAVERFORDWEST, AUGUST 19.—For supply of about 2,000 tons of double-screened gas coal of the very best quality, for the Corporation of Haverfordwest.

IPSWICH, AUGUST 14.—For supply of coal for period ending June 30, 1913, to the East Suffolk and Ipswich Hospital.

LINTON (CAMBS.), AUGUST 21.—For the supply of 150 tons (more or less) of steam coal, for the Guardians.

LONDON, S.W., AUGUST 16.—For supply, between October 1, 1912, and September 30, 1913, of about 130 tons of good household coal, thoroughly screened, and free from dust, to the Bolingbroke Hospital (Incorporated), Wandsworth Common, S.W.

LOWESTOFT, AUGUST 13.—For supply of steam coal (Gedling cobbles) to Oulton workhouse, near Lowestoft, during period from August 12 to June 30, 1913, for the Guardians of Mutford and Lothingland Union.

NORTHALLERTON, AUGUST 20.—For supply of coal and coke from September 1912 to June 1913, for the North Riding of Yorkshire County Council Education Committee.

NOTTINGHAM.—For supply of coal and coke for 12 months, for the Notts. Education Committee.

REDRUTH, AUGUST 15.—For supply of 120 tons of best Forest large house coal, delivered at the union workhouse (half-a-mile from rail and about three from Portreath), for the Guardians.

ROCHESTER, SEPTEMBER 3.—For coal, for the Corporation.

ROTHWELL (NORTHANTS), AUGUST 12.—For the supply of about 2,000 tons of gas coal (screened coal, washed nuts, and peas), for the Gas Committee.

SALISBURY, AUGUST 14.—For supply of 1,000 to 4,000 tons of gas coal, for the Salisbury Gas Light and Gas Company.

SHEFFIELD, AUGUST 16.—For supply of about 300,000 tons of gas coal, nuts and slack, for delivery during 10 months ending June 30, 1913, for the Sheffield United Gas Light Company.

SLIGO, AUGUST 12.—For supply of 1,300 tons, in one or two cargoes, of best screened Scotch splint coal, and of 200 tons, in one cargo, of best Wigan coal, for the committee of the Sligo District Lunatic Asylum.

SWINDON, AUGUST 17.—For supply and delivery of household coal during period ending March 31, 1913, for the Corporation.

WHITEHAVEN, SEPTEMBER 7.—For supply of fuel for ensuing 12 months, for the Whitehaven Education Committee.

WIGAN, AUGUST 15.—For supply of Arley gas nuts, cobbles, or screened or unscreened coal, for the Gas Committee.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

ATHERSTONE, AUGUST 13.—*Borehole, &c.*—For sinking a borehole and testing the yield of water therefrom in the parish of Polesworth, for the Atherstone Rural District Council.

AUCKLAND, AUGUST 19.—*Screening Plant.*—For the manufacture, temporary erection at works and delivery in Auckland, three sets of screening plant with raking gears and a belt conveyor, with all appurtenances, for the Auckland and Suburban Drainage Board.

BATLEY, AUGUST 23.—*Cables.*—For the supply, delivery, and laying of high-tension cables, for the Town Council.

COPENHAGEN, AUGUST 20.—*Cast Iron Piping.*—The British Vice-Consul at Copenhagen reports that tenders are invited by the Waterworks Authorities at that place for the supply of cast iron piping.

HALIFAX, AUGUST 19.—*Fencing.*—For the provision and erection of about 1,300 lineal yards of creosoted red deal fencing in Pye Nest-road, for the Improvement Committee.

INDIA OFFICE, AUGUST 20.—*Girders.*—The Secretary of State for India in Council is prepared to receive tenders to supply girders.

COAL AND COKE EXPORTED FROM PORTS IN ENGLAND, SCOTLAND AND WALES

During the month of July 1912, compared with the corresponding month of 1911.*

Port.	July 1912.		July 1911.		Coals.		Coke.	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle	1,118,634	10,884	794,670	28,358	323,964	—	—	17,474
North Shields	99,618	2,682	71,527	7,616	28,091	—	—	4,934
South Shields	220,220	9,074	162,243	2,023	57,977	—	7,051	—
Sunderland	286,461	302	216,240	471	70,221	—	—	169
West Hartlepool	149,404	678	107,001	1,955	42,403	—	—	1,277
Goole	138,928	1,989	106,426	1,870	32,502	—	119	—
Blyth	372,826	962	328,839	319	43,987	—	643	—
Newport	429,707	1,311	240,509	808	189,198	—	503	—
Liverpool	20,835	325	33,461	319	—	3,626	6	—
Methil	168,107	—	209,547	147	—	41,440	—	147
Glasgow	150,790	4,503	159,269	2,182	—	8,479	2,321	—
Kirkcaldy	8,205	—	6,688	—	1,517	—	—	—
Burntisland	136,647	179	112,315	60	24,332	—	119	—
Cardiff	1,768,702	6,618	1,052,574	4,430	716,128	—	2,188	—
Borrowstoness	55,022	—	39,854	2,218	15,168	—	—	2,218
Llanelly	14,419	—	17,358	—	—	2,939	—	—
Middlesbrough	3,621	5,602	4,072	3,615	—	451	1,987	—
Seaham	100,339	—	69,631	99	30,708	—	—	99
Swansea	369,680	553	230,847	323	139,202	—	230	—
Granton	5,410	497	6,983	3,399	—	1,504	—	2,902
Port Talbot	179,952	18	121,285	712	58,667	—	—	694
Alloa	11,602	—	15,868	305	—	4,266	—	305
Grangemouth	126,898	12,101	111,961	6,476	14,937	—	5,625	—
Neath	12,895	—	—	—	12,895	—	—	—
Hull	462,917	2,647	209,275	1,154	253,642	—	1,493	—
Amble	48,838	—	37,664	—	11,174	—	—	—
Troon	14,005	155	11,495	—	2,510	—	155	—
Grimsby	132,471	172	133,106	—	—	635	172	—
Ayr	4,618	—	1,729	—	2,889	—	—	—
Greenock	4,048	30	—	—	4,048	—	30	—
Leith	167,311	—	85,081	—	82,230	—	—	—
Ardrossan	5,714	—	7,500	—	—	1,786	—	—
Stockton	—	—	—	—	—	—	—	—

N.B.—During June 11,986 tons of coal were exported from Llanelly. These figures were omitted in last month's table.

COAL AND COKE SHIPPED FOR LONDON AND OTHER PORTS IN THE UNITED KINGDOM.*

Port.	July 1911.		July 1912.	
	Coals.	Coke.	Coals.	Coke.
	Tons.	Tons.	Tons.	Tons.
Newcastle	414,588	448	206,163	660
North Shields	—	—	—	—
South Shields	490	—	5,570	—
Blyth	14,875	—	11,254	—
Amble	10,648	—	3,370	—
Sunderland	123,070	—	106,742	—
Seaham	111,015	—	76,355	—
Hartlepool	37,204	25	32,290	—
Stockton	—	—	20	—
Middlesbro'	190	15	—	10
Hull	88,478	—	77,315	—
Goole	87,523	—	112,702	—
Swansea	19,463	400	31,366	750
Cardiff	238,954	—	315,100	60
Llanelly	4,410	—	7,100	—
Newport	46,472	—	65,830	150 pf
Troon	30,333	—	24,373	20
Ardrossan	4,970	—	5,788	—
Ayr	50,619	—	76,423	77
Irvine	8,986	—	5,979	—
Alloa	1,891	—	2,830	—
Whitehaven	18,923	—	25,453	—
Liverpool	129,298	15	167,088	—
Grimsby	7,667	—	7,291	—
Granton	11,029	490	13,189	—
Borrowstoness	12,418	11	12,667	—
Burntisland	43,482	—	38,352	—
Kirkcaldy	1,366	—	1,356	—
Methil	21,035	—	18,490	—
Port Talbot	15,367	62	16,181	336 c 100 pf
Glasgow	28,921	810 c 150 pf	39,250	767
Grangemouth	22,666	32	24,286	—
Greenock	1,198	12	1,387	4
Neath	14,464	—	12,671	—
Leith	11,405	12	8,774	6

* From *Browne's Export List.*

KEIGHLEY, AUGUST 17.—*Pipes.*—For the manufacture and delivery of about 645 tons of cast iron pipes, 9 in. and 6 in. in diameter, and the necessary special castings connected therewith, for the Corporation.

LONDON, AUGUST 22.—*Machinery.*—For fixing guards to certain machinery at their infirmary at East Dulwich-grove, S.E., for the Guardians of Southwark Union.

MANCHESTER, AUGUST 24.—*Boiler, &c.*—The Waterworks Committee invite separate tenders for one Lancashire steam boiler, with superheater, mechanical stoker, fuel economiser, steam and feed pipes, &c., and for two sets of vertical steam pumping engines, to deliver against a pressure of 1,120 lb. per square inch.

PANGBOURNE, AUGUST 12-19.—*Machinery.*—For air-compressing machinery, &c., in connection with the main sewerage works of the town of Pangbourne, Berkshire, for the Bradfield Rural District Council.

ROCHDALE.—*Switch Panels.*—For extra high-tension switch panels, for the Electricity Committee.

STOURBRIDGE, AUGUST 16.—*Main Laying.*—For laying and jointing about 6¼ miles of cast-iron water mains in their district, varying from 12 in. to 5 in. in diameter, together with the provision and fixing of the requisite sluice valves and hydrants, for the Stourbridge and District Water Board.

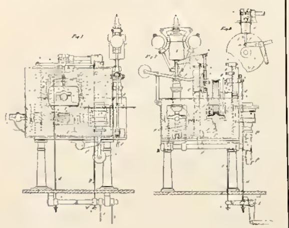
Mineral Rights Duty.—The important case of the Duke of Beaufort came before the Court of Appeal a week ago. There were cross appeals having reference to the three points dealt with in the judgment of Mr. Justice Hamilton (1912, K.B., 281). The point of most general interest to mineral owners had reference to the right to deduct income tax from the mineral rental before arriving at the correct assessment for Mineral Rights Duty. While the Solicitor-General was opening the case for the Revenue, Mr. Justice Kennedy pointed out that the special case put forward dealt with the deduction with reference to arrears of rent only. In the circumstances the Court decided that it would be much better that a specific case should be brought before them which raised the right to make the deduction from current rents. It was explained that there were a large number of cases awaiting the result of the appeal, and the Court intimated that when the specific case was put forward the hearing would be expedited. The Duke is a member of the Mineral Owners' Association of Great Britain, and by arrangement with his solicitors, Messrs. Williams and James, every facility will be given with a view to obtaining the decision of the Court of Appeal at the earliest possible date.

Lectures for Colliery Mechanics.—The next course of these lectures, which were referred to in the North of England Institute's annual report, commences on October 5. The full course extends over three winter sessions and involves attendance at the Armstrong College, Newcastle, for about 24 Saturday afternoons for two hours at each attendance. Students can enter any of the courses, each series of lectures being, as far as possible, entirely independent of the others and constituting a complete course on its own subject. Students entering on the three years course must possess a knowledge of arithmetic, algebra and mensuration, including the following:—Arithmetic: the ordinary rules of arithmetic, including simple proportion and vulgar and decimal fractions. Algebra, as far as simple equations, including square and cube roots and a knowledge of the power of a number such as x^3 or x^4. The use of logarithmic tables. Mensuration: areas of rectangles and of triangles; areas and circumferences of circles; surfaces of cylinders; and contents or volumes of cylinders and prisms. Students should not be less than 17 years of age. The council recommends that colliery owners and others who send students to these classes should insist upon home work being done regularly. The syllabus of lectures is as follows:—Michaelmas term, commencing on October 5 next, "Machine Drawing," lecturer, Mr. E. M. Eden, Assoc.M.Inst.C.E., and "The Chemistry of Fuel," lecturer, Mr. F. C. Garrett, D.Sc., F.C.S. Epiphany term, commencing on January 11, 1913, "Strength of Materials" (with experimental illustrations), lecturer, Mr. Eden; and "Experimental Mechanics," lecturer, Mr. H. Morris-Airey, M.Sc., F.R.A.S. 1913-14, Michaelmas term, "The Steam Engine," lecturer, Mr. J. Morrow, D.Eng.; and "Theoretical Electricity," lecturer, Mr. Morris-Airey. Epiphany term, "Electrical Engineering," lecturer, Prof. W. M. Thornton, D.Sc., D.Eng.; and "Haulage and Winding," lecturer, Prof. Henry Louis, M.A., D.Sc., A.R.S.M., F.I.C., F.G.S. 1914-1915, Michaelmas term, "Transmission of Power," lecturer, Mr. Morrow; and "Pumping and Ventilation," lecturer, Prof. Louis. Epiphany term, "Metallurgy of Iron and Steel," lecturer, Mr. H. Dean, M.Sc., A.R.S.M.; and "Mining Machinery (Mainly Machinery Used Underground)," lecturer, Prof. Louis.

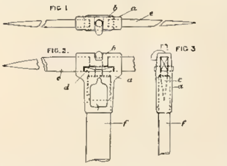
ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

2857 (1912). *Improved Separation of Tar and Ammonium Chloride contained in Gases Produced by Distilling Coal.* F. J. Brongham, of the firm of Lloyd Wise and Co., 46, Lincoln's Inn-fields, London (a communication by Messrs. Solvay et Cie., rue du Prince Albert, Brussels, Belgium).—This invention relates to improved separation of tar and ammonium chloride contained in gases produced by distilling coal in coke ovens and gasworks. By the use of apparatus such as described in the Specification of prior Letters Patent No. 7915 of 1910, in which the gases produced by distilling coal are washed in a bubbling column or gas scrubber with tar, the tar contained in the gases can be easily removed and the saturation of the ammonia, that is to say the combination of the ammonia with acid to form a salt, can then be easily effected by direct washing of the gases in sulphuric acid after the tar is removed. The apparatus described in the said prior specification enables different temperatures to be obtained in the different superposed sections or compartments of the bubbling column or scrubber, and, by suitably regulating the temperatures, a practically anhydrous tar can be withdrawn directly from the treated gases, the commercial value of such tar being greater than that of tar which contains water. Such a method of working has, however, a disadvantage in that the separation of ammonia already in combination in the gases as ammonium chloride and which condenses with the tar in a quantity which is variable and, in the case of certain coals, often considerable, is a delicate operation requiring special manipulation and only giving imperfect results. The object of the present invention is to obviate this disadvantage. According thereto the ammonium chloride is separated in a solid state from the gas previous to the introduction of the latter into the apparatus for removing the tar. The general working of the process may be as follows:—The gases pass through the hydraulic main, which is maintained by a suitable jacket at a temperature sufficiently high to prevent any condensation of the ammonium chloride. The gases then pass into a cooler where their temperature is lowered to from 180 to 120 degs. cent., so that the ammonium chloride which they contain is deposited therein. The gases are then led to the tar-removing apparatus, from whence they pass to the sulphuric acid saturator. It will be seen that the improved process permits of the direct recovery of the ammonium chloride in the solid state independently of the recovery of an anhydrous tar of a quality superior to that of ordinary tar. (Three claims.)

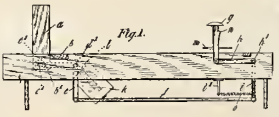
21552 (1911). *Improved Means for Preventing Overspeed and Overwind in Winding or like Engines.* Grant, Ritchie and Co. Limited. Townholm Engine Works, Kilmarnock, Ayrshire, and R. K. McAlister.—This invention relates to improved apparatus for preventing overspeed and overwind in engines such as are used at colliery shafts. In the accompanying drawings figs. 1 and 2 are elevations at right angles to each other of overspeed and overwind preventing apparatus embodying the invention; fig. 3 shows a detail. Two discs A and B or the like are secured to a shaft C adapted to be driven by worm gearing D and bevel or other toothed gearing from the drum shaft; the discs being advantageously disposed one on each side of the worm wheel. The disc A or the like is provided with pins or projections E which move at a speed proportionate to that of the shaft cage and are so disposed relatively to the disc that should they pass a predetermined point they will contact with, and tip over, a suitably supported substantially vertical pin F or the like for releasing a weighted lever G adapted through suitable connections to shut off the steam supply and to apply the brake instantaneously, thereby stopping the engine. The pin F normally rests on a pin H projecting from one arm of the lever G. To provide for the event of the speed of the engine being excessive towards the end of the winding operation, a governor I is adapted as by means of lever and link connections J, to cause a device, *e.g.*, a block K, to move downwards relatively to the pin F or the like into the path of movement of the projections E and thus cause earlier release of the weighted lever G and a consequently earlier stoppage of the engine. The disc B is also provided with pins or projections L which, in the event of the engineman neglecting to shut off the steam supply at the proper time before the end of the winding operation, contact with projections *m* on corresponding depending levers M or the like adapted to shut off the steam supply and also apply the brake, just sufficiently to bring the engine gradually to rest. As shown, the levers M are adapted to be moved out of the path of movement of the projections L by means of the toe pieces *a* which are pivoted at *b* and are operated by means of toggle lever connections *c* which are actuated by a link *d* operable at its lower end by means of an arm *e* on the shaft X, which shaft is connected to the steam-control lever through the intermediary of the lever Y, as aforesaid. The governor I is preferably driven through the intermediary of a friction clutch so that in the event of the engine being stopped suddenly the governor will be permitted to slip, thereby preventing breakage of the driving gear. The friction clutch is connected through the intermediary of levers I^1, I^2 to a weighted rod I^3 movable with a piston fitted in a cylinder I^4 to which fluid is admitted, under the control of the engine stop valve, so as to act on said piston against the action of the attached weight I^5 and thus maintain the friction clutch in driving engagement with the governor; when the engine stop valve is closed, the weight I^5 acts on the levers I^1, I^2 to withdraw the friction clutch. The governor I is adapted to regulate the admission of steam to the engine cylinder or cylinders, being operatively connected, as by means of lever and link connections *f*, with a cut-off gear operating in conjunction with the engine steam distributing valve or valves. (Three claims.)

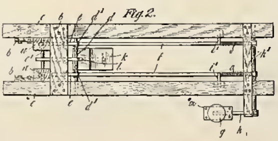


21651 (1911). *Improved Coal Miners' Picks.* W. E. Williams, 20, Lower Viaduct Terrace, Crumlin, Mon.—The pick is an instrument with two steel blades secured in a malleable cast iron or steel shaft head. The shaft can be taken out or changed in a simple manner. Fig. 1 top view of pick; fig. 2 side view; fig. 3 end view. The shaft head (*a*) is made of malleable cast iron or steel. A centre piece (*b*) is formed in the head, in which a hole is left for the shank of expanding wedge (*c*) securing the shaft (*f*) to pass. A locking piece (*d*) for securing the blades turns on this shank in the opening left in shaft head for receiving it. The blades (*e*) are placed into the recesses each side of shaft head (*a*) against the centre piece (*b*). The locking piece (*d*) is then turned around and tapped home—the bevelled ends coming into contact with the notched ends of blades—the latter being thus secured in the shaft head. For releasing the blades a reverse process is required. The shank of expanding wedge is made long enough to allow it to be bent over side of shaft head to facilitate the withdrawal of the shaft. (One claim.)



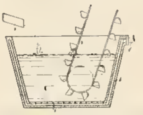
24906 (1911). *Improvements relating to Chocks for Colliery Tubs and the like.* E. Stone, of 82, North-road, Wallsend-on-Tyne.—This invention has reference to chocks for colliery tubs and the like, and has for its object to provide improved means for stopping or chocking the coal tubs chiefly used at the pit's head or shaft bottom. In accordance with the invention, a pair of chocks is provided, adapted to be moved vertically in suitable guides. To each of said chocks is pivoted a bell crank lever connected by suitable levers or connecting rods to a lever or levers terminating in a vertical portion bearing a plate adapted to be pressed down by the foot. The aforesaid chocks are provided with a balance weight so as to return them to the normal position. By depressing the aforesaid foot plate with the foot the chocks will, through the bell crank and other levers, be lowered to admit of the passage of the colliery tub or the like upon the rails, and upon removing the said footplate the balance weight still return the parts to their normal position. There is a piece cut out of the foot trigger for keeping the chocks down so that any desired number of tubs may pass, and when released the balance-weight brings the chocks up in the shut position, thus chocking the tubs completely. Fig. 1 is a side elevation, and fig. 2 a plan. (Four claims.)





18777 (1911). *Improvements relating to Explosives.* B. J. Flürscheim, Rushmoor, Fleet, Hampshire, Ph.D.—This invention relates to new compounds suitable as explosives. It has been found that trinitro-amino-anisol and trinitro-amino-phenetol are eminently suitable for use as explosives or as ingredients in explosives. These new compounds may be either used as such, each alone or both together, for instance, as charges for shells; or they may be used as ingredients in explosive compositions—for instance, in smokeless powders. Both new compounds may also be used in conjunction with any other materials which have been or may be used in conjunction with known nitro-compounds. (One claim.)

26704 (1911). *Improvements in the Manufacture of Light Slabs, Bricks and the like from Blast-furnace Slag.* C. H. Schol, of Allendorf, Dillkreis, Germany.—This invention relates to the manufacture of light bricks, slabs and the like, resembling Rhenish tuffstone, from blast-furnace slag. The invention consists substantially in utilising the bulky porous lumps of slag obtained when granulating the slag, as filling material, and the finely-ground smaller particles of the slag, with or without addition of lime, as binding material. By this means the slag provides both the filling and the binding materials. In carrying out the process the slag is granulated, and the more bulky porous lumps separated by sifting from the finer particles. These latter are finely ground, and constitute the binding material, which is mixed in known manner with the filling material. The mixture is made in known manner into moulded slabs, plates, beams and the like. The improved process may be slightly modified to provide artificial stone of even greater rigidity and strength. For this purpose the lumps of slag for the filling material are given a coating of cement or mortar, and allowed to stand for a certain time, so that the lumps are provided with a complete covering of binding material which has had time to harden. The light, bulky, and consequently somewhat fragile slag lumps, are thus embedded in the slag cement. As this latter has had time to harden, there is obtained a filling material which is very light but externally hard, and which on mixing with the binding material gives a mass from which slabs and the like may be moulded. The same result as is got by embedding the slag lumps serving as filling material can also be obtained in another manner by treating these lumps immediately after the granulation. Blast-furnace slag is generally conducted in liquid condition into a pool of water, where it is quenched and granulated. When freshly prepared, the porous lumps of slag contain 40 to 50 per cent. of water. According to this further modification of the improved process, to these moist lumps of slag are added the binding material, which is in dry condition and powdered to the fineness of dust, in the proportions of 1 part binding material to 10 to 12 parts of the damp porous lumps. The mixing is preferably carried out in a rotary gravity mixer, in which the substances being mixed are stirred up together for about four or five minutes. In this time each lump becomes covered with a fine layer of binding material, whilst its inner pores are still filled with water which subsequently gradually evaporates. The lumps treated in this manner are then loosely piled in a heap. To render the slabs and the like made by the improved processes perfectly frost resisting, a quantity of calcium chloride, or other substance of similar properties, is added to the water with which the mortar is made. A suitable mixture is obtained by using a solution of calcium chloride and water of concentration 10 degs. Beaume. According to the invention water and compressed air are allowed to act upon the slag simultaneously, whereby an exceptionally high proportion of the required filling material is obtained. The accompanying drawing illustrates a device for carrying out this process. (Eight claims.)



27516 (1911). *Improvements in Trough Conveyors.* Gebr. Eickhoff, of Bochum, Prussia, Germany.—According to this invention, conclave run-ways are used, along which the cylindrical rollers travel, the said run-ways being shaped so that there is practically no rising movement at the beginning of the forward stroke, and that resistance by ascent is not opposed till the trough has acquired the requisite acceleration. The shaping of the run-ways so that the radius of curvature varies from one end of the path to the other, giving first a practically horizontal run, and then a path of gradually increasing steepness, is an essential feature of the invention. Rollers are used which are not mounted on

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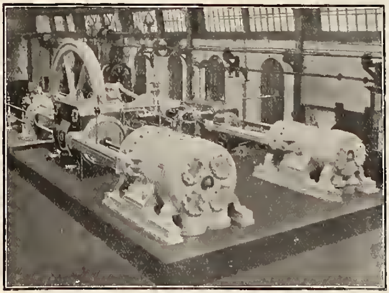

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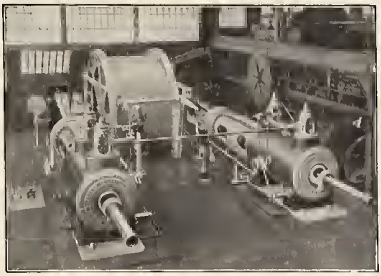

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AIR COMPRESSORS

with Valves to Recent Patents 1909, now at work (or on order) to these new designs

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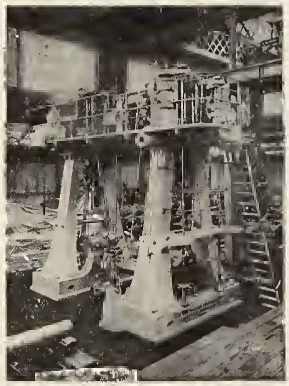

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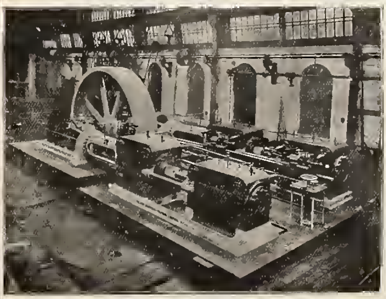

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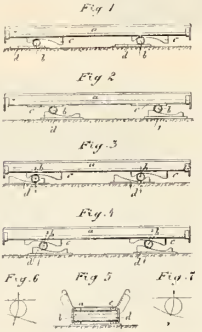
fixed pivots but are rolled along the runways by the movement of the trough. Each roller may be arranged between two concave run-ways, one fixed to the trough and the other on the ground, shaped and arranged so that the points of contact of the roller with said run-ways always lie at the ends of a diameter of the roller, whereby sliding of the rollers is prevented Fig. 1 shows a trough conveyor with movable curved roller paths; fig. 2 shows the inverse arrangement, with fixed curved roller paths; fig. 3 shows a trough with two co-acting roller paths, the rollers being at the bottom of the paths, and fig. 4 shows the same, with the rollers at the top; fig. 5 is a cross-section of the apparatus; figs. 6 and 7 illustrate the positions of the contact points in the case of a single rising path. (Three claims.)



PUBLICATIONS RECEIVED.

"Comité Central des Houillères de France: Station d'Essais de Liévin—'Note sur des Expériences Relatives au Classement des Gisements de Poussières'"; "Printer's Ink" (No. 17), August, price 6d.

GOVERNMENT PUBLICATIONS.

⁂ Any of the following publications may be obtained on application to this office at the price named post free.

Consular Reports: Madeira, 2½d.; Muscat, 6d.; Nanking, 4½d.; Mannheim, 5d.; Helsingfors, 6d.; Costa Rica, 5d.; Rome, 4½d.; Seville, 6d.; Hankow, 4d.; Trade of Japan, 7d.; Foochow, 3½d.; Dalmatia, 4½d.

Local Taxation Committee: Evidence, 4s. 6d.

Railway Returns, 1911, 1s. 7d.

Bills: Bankruptcy, 3½d.; Clyde Valley Electrical Power Order Confirmation, 3d.; Public Accountants and Auditors, 2d.; Factory and Workshop, No. 2, 1½d.; Old Metal Dealers, 2d.; National Insurance Act, 1911, Amendment, 1d.

National Insurance: Special Order, 1d.; Regulations (Scotch) for Sub-Committees (211), 1½d.; ditto for Contributions (Scotch) (231), 1½d.; Accounts of Approved Societies, No. 867, 2½d.; Regulations as to Notices by Employers (Scotch), 1d.; Regulations as to the Time for Joining an Approved Society, 1d.; Part II.—Exclusion, Drivers, &c., Order, 1d.; Order as to Time for Joining an Approved Society, 1½d.

NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

17543. Preparatory fining apparatus for use in connection with blast furnaces. F. Bernhardt.
17546. Manufacture of charcoal. T. McKenna.
17550. Telpherage. Robert Dempster and Sons Limited and H. J. Toogood.
17557. Decomposable wooden mining post. H. Heidkamp.
17563. Drill chuck. O. J. F. Bergsten.
17566. Rail-and-tie grip. F. J. Hill.
17576. Jaws pertaining to lathe chucks and tools for holding objects of cylindrical and irregular shape. G. F. Griggs and J. A. Henderson.
17605. Fuel and arrangements therefor. G. J. Epstein.
17616. Means for discharging vertical gas retorts. H. J. Toogood and Robert Dempster and Sons Limited.
17634 Electrically-operated time-limit detonator for use in blasting and such like operations. W. R. Ash, C. Dalley, and W. S. Toplis.
17640. Coupling-pin for dee shackles. J. James and W. Jones.
17641. Ventilating fan. F. J. Young and C. G. Bouser.
17818. Process for the manufacture of plastic metallic packings. Fried. Krupp Akt.-Ges.
17850. Stand for holding sacks open whilst being filled. F. Mallet.
17655. Means for fastening the doors of closed railway wagons and like vehicles. J. Pettigrew.
17671. Rails. C. F. Weeber.
17680. Protective devices for electric circuits British Thomson-Houston Company Limited.
17697. Well-diggers' cages. S. Pepper.
17702. Apparatus for preventing corrosion in steam boilers. C. Boothby.
17711. Rock and like drills. M. T. Pickstone.
17712. Machines for conveying steel and iron plates. M. L Jones.
17724. Kilns or furnaces employed for calcining or roasting ore, limestone, or other materials. A. L. Leigh.
17725. Form of milometer for trams, trucks, and other vehicles fitted with axle boxes. E. S. Rayner.
17726. Buffer rings or caps for colliery tubs, railway wagons, and the like. W. H. Berrisford.
17729. Railway permanent ways. F. W. Barraclough.
17732. Regulating and reversing apparatus for regenerative gas furnaces. H. Kopper.
77742. Combined continuous conveyors and elevators. W. J. B. Lesch.
17744. Drilling machines. A. Turner.
17748. Coke-oven doors. H. Koppers.
17753. Divers' helmets. Dragerwerk Heinr. and Bernh. Dräger.
17771. Diving apparatus. Dragerwerk Heinr. and Bernh. Dräger.
17782. Automatic lubricating apparatus for elevators, conveyors, and the like. O. Wetzel and A. Kuntz.
17789. Cap for colliery horses and the like. L. John.
17806. Steam-distributing valves for direct-acting pumps. G. and J. Weir Limited and W. Weir.
17807. Water-tube boilers. Edmond Warnaut.
17820. Apparatus for manufacturing tees and knees for iron and steel tubes. Stewarts and Lloyds Limited and J. Menzies.
17825. Bricks for furnace construction. W. Thomas.
17842. Process for the manufacture of plastic materials. J. J. Geistdörfer.
17844. Oscillating sieves. M. M. Forkert.
17850. Portable electric hand-lamps. A. H. Hunt.
17855. Machines for charging and discharging gas retorts. W. E. Lake.
17856. Method of obtaining hewn stones in quarries. W. Barthold.
17885. Steelyard weighing-apparatus or the like. R. R. Gibbs and A. W. Brown.
17888. Controlling gear for winding and hauling engines. J. W. Melling.
17902. Inlets of tube mills. J. E Horsfield.
17903. Outlets of tube mills. J. E. Horsfield.
17921. Method of obtaining oils and other products from coal. A. Duckham and A. M. Duckham.
17930. Mechanism for controlling systems of valves. Soc. André Citroën et Cie.
17935. Treatment of ores. E. R. Sutcliffe.
17941. Rail-clamping devices. J. Patterson.
17944. Boiler flues. R. Allen.
17952. Method of separating magnetic from non-magnetic powdery materials such as iron, sands, and the like. S. L. Elborne and H. Godsel.
17957. Railway spikes. E. Butterfield.
17970. Apparatus for supplying a mixture of gas and air or the like. F. H. Guy.
17995. Moulds for bricks and other blocks. W. Chapman.
18006. Tubular boilers. W. Tabonlewitsch.

Complete Specifications Accepted.

To be published on August 22.

1911.

17434. Process and apparatus for removing the slags from ingot iron and ingot steel in open-hearth furnaces. Stobrewa.
17436. Utilisation of peat or the like in gas-producers. Societa per l'utilizzazione dei Combustibili Italiani and Civito.
17457. Apparatus for raising or lowering materials. Heenan and Froude Limited and Hood.
17769. Grates for boiler furnaces. Fuller.
17888. Composition of matter for combustible purposes. Williamsons Limited and Curtis.
17899. Burners for drying moulds. Deutsch-Luxemburgische Bergwerke und Hutten Akt.-Ges.
18261 & 23754. Gearing or appliances for preventing overwinding in colliery engines and the like. Walker.
19458. Manufacture of armour-plates and other steel articles. Vickers Limited and Benthall.
19523. Drill-rods. Lake.
19770. Miners' bottles and other vessels for holding liquids. Machin, Joy and Freeman.
20890. Furnaces. Royston.
20969. Castings of tool steel. Van den Kerckhove, Perier, Venail, Grenier, and Jansson.
21611. Centrifugal pumps. Michell.
24830. Haulage clips. S. A. Bettney (administratrix of H. A. Bettney, deceased).
28517. Method of forming shafts for mines and the like. Tuckett.
27320. Combined cap and eye guard particularly for pit ponies. Millar.
27484 Apparatus for and actuated by gases of varying density. Simmance and Abady.
28021. Refuse-burning furnaces in conjunction with steam boilers. Marks.
28574. Method of compressing steel turnings and all forms of metal cuttings or filings into solid blocks, and machinery to be used for such purpose. Punnett.
28785. Engine speed-controlling gear for preventing overwinding in collieries and the like. G. Inglis and Co. and Inglis.

1912.

56. Recovery of tin from tin-bearing ores and the like by conversion into volatile tin compounds. Richards.
4496. Method of increasing the temperature of tunnel kilns. Ramen.
4926. Field tube steam superheater for smoke-tube boilers. Becker.
5171. Means for preventing overwinding and overspeed in mine shafts and the like. Hirst.
5458. Well-boring rotary bits. Dodge.
7833. Controlling gear for winding and hauling engines. Melling.
8327. Electric igniters. Born.
8455. Mountings for turbine generators. Ljungstrom and Aktiebolaget Ljungstroms Angturbin.
9291. Hoisting-apparatus. Forman.
12142. Air-relief valves for diving apparatus or equipments. Armaturen und Maschinenfabrik "Westfalia" Aktiengesellschaft.

Complete Specifications open to Public Inspection before Acceptance.

1911.

27415. Props or stemples for mines. Reinhard.

1912.

8527. Balancing of rotating masses. Soc. Anon. pour l'Exploitation des Procédés Westinghouse-Leblanc.
16521. Automatic anti-creeping device for rails. Dinklage.
16963. Electric primers for mines. Son.
17255. Brakes for hand-trucks and the like. Robinson.

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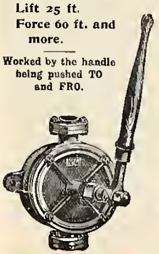

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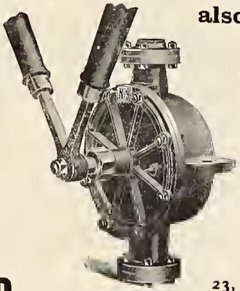

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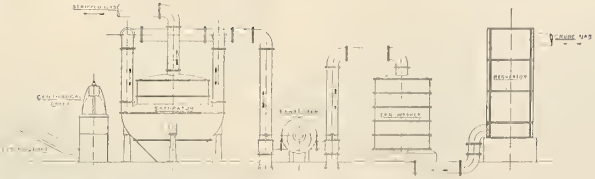

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Theedam, E. C., Ld., Dudley
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Accumulators
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent

Acid Plant
Daglish, Robert, and Co. Ld., St. Helens, Lancs.

Air Analysis Apparatus
Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

Air Compressors
Bailey, W. H., and Co. Ld., Salford, Manchester
Bellis and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co., St. Helens, Lancashire
Davis, John, and Son (Derby) Ld., Derby
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
International Channelling Machines Ld., Sheffield
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Mining Engineering Co. Ld., (The), Sheffield
Nuneaton Engineering Co. Ld., Nuneaton
Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., F. Department, Ipswich
Robey and Co. Ld., Globe Works, Lincoln
United States Metallic Packing Co. Ld., Bradford
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Air Pipes
Allen, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Son, Thompson-street, Bilston
British Mannesmann Tube Co. Ld., London Wall
Lewis, William, and Son, Bilston
Mining Engineering Co. Ld., Sheffield
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C., Ld., Dudley

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Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Wood, John, and Sons Ld., Wigan

Alternators
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Mavor & Coulson Ld., 47, Broad-street, Glasgow

Ambulance Stretchers
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley

Anchors
Wright, Joseph, and Co., Tipton

Anemometers
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Humble, Stephen, 9, Victoria-st., London, S.W.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Angles and Sections (Steel)
Firth, Wm., Ld., Water-lane, Leeds

Anthracite Breaking, Sizing and Washing Plant
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Sheppard and Sons Ld., Bridgend
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Anti-Corrosive Compositions
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

Anti-Friction Metal
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Byland-street Works, Birmingham

Anvils
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Asbestos
Asbestos and General Paint Co. Ld., Birmingham

Axle Greasers
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Barrows (Ore)
Bagnall, W. G., Ld., Stafford
Haslam and Schontheil Ld., Cardiff
Heenan and Froude Ld., Worcester
Theedam, E. C., Ld., Dudley

Bars (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mining Engineering Co. Ld., Sheffield

Bars (Screen)
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Head, Wrightson and Co. Ld., Stockton-on-Tees
Renton, B. M., and Co., Sheffield
Wood, John, and Sons Ld., Wigan

Bearings
Bridge, David, & Co. Ld., Castleton, Manchester
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham

Bellows
Hardy Patent Pick Co. Ld., Sheffield
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Bells (Signal)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Humble, Stephen, 9, Victoria-st., London, S.W.
Theedam, E. C., Ld., Dudley

Belt Fasteners
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Belt Food

Belting
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Frost, Albert, and Co., Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Sutcliffe, R., Horbury, near Wakefield
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Belts (Chain)
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Wright, Joseph, and Co., Tipton

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Coke Oven Construction Co. Ld., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Bitumastic Solution
Wailes, Dove & Co., Ld., Newcastle-on-Tyne

Blasting Apparatus
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Reavell and Co. Ld., Ipswich
Theedam, E. C., Ld., Dudley

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British Westinghouse Electric and Manufacturing Co. Ld., Manchester
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Asbestos and General Paint Co. Ld., Birmingham
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Tangyes Ld., Cornwall Works, Birmingham

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Green and Boulding Ld., 26, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Stringer, John, and Son, Dept. 11, Blackburn
Wellington Tube Works Ld., Great Bridge, Tipton

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Stringer, John, and Son, Blackburn

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Wellington Tube Works Ld., Gt. Bridge, Tipton

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Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
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Yorkshire Boiler Co. Ld., Bradford

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Bute Works Supply Co. Ld., Bute Docks, Cardiff
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Firth, William, Ld., Leeds
Jardine, John, Deering-street, Nottingham
Mining Engineering Co. Ld. (The), Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, & Sons Ld., Darlington
Theedam, E. C., Ld., Dudley
Ward, Thos. W., Ld., Albion Works, Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Books on Mining
Colliery Guardian Co. Ld., 30 & 31, Furnival-st., Holborn, E.C.
Griffin, Charles, and Co. Ld., Exeter-st., Strand
South Wales Institute of Engineers, Cardiff
Southern, T. A., Universal Mining School, Cardiff

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Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

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Reddaway, F., & Co. Ld., Pendleton, Manchester

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Wood, John, & Sons Ld., Brook Foundry, Wigan

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Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
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Spencer and Co. Ld., Melksham, Wilts
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Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Castings (Brass or White Metal)
British Wagon Co. Ld., Rotherham
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, John, and Son (Derby) Ld., Derby
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Castings (Iron and Steel)
British Wagon Co. Ld., Rotherham
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Isca Foundry Co., Newport, Mon.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Nuneaton Engineering Co. Ld., Nuneaton
Railway and General Engineering Co. Ld., Notts
Stewarts and Lloyds Ld., Birmingham & Glasgow
Summerson, Thomas, and Sons Ld., Darlington
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Castings (Malleable)

Cement
Earle, G. & T., Ld., Wilmington, Hull
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Cement-Making Machinery

Cement Manufacturers
Earle, G. & T., Ld., Wilmington, Hull

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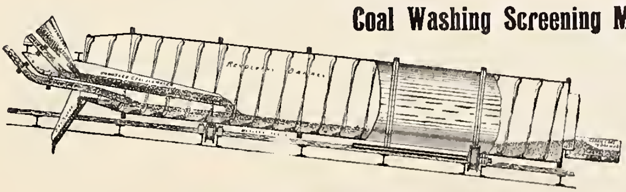

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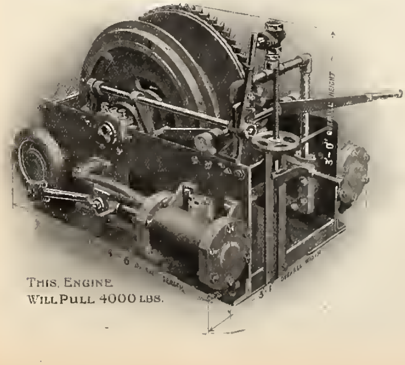

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Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Sutcliffe, Richard, Horbury, near Wakefield

Ebonite and Vulcanite
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Electric Detonators and Fuses
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Electrical Engineers
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mather and Platt Ld., Manchester
Theedam, E. C., Ld., Dudley

Electrical Fault Indicators
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield

Electric Haulages
Avonside Engine Co. Ld., Bristol
Bridge, David, & Co. Ld., Castleton, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davis John, and Son (Derby) Ld., Derby
Deutsche Maschinenfabrik A.G., Duisburg Germany
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, R. H., and Co. Ld., Wakefield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Electric Meters
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Electrical Plant
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Gt. Central Railway, 216, Marylebone-rd., London
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Ward, Thos. W., Limited, Albion Works, Sheffield

Electrical Pumps
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Electrical Stores
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C., Ld., Dudley

Emery Wheels

Enamelled Plates for Notices for Mines
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Theedam, E.C., Ld., Dudley

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Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalhitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Engineers (Consulting)
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Bedford, B. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

Engines (Blowing)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert. and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Gas-Compressing)
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Hauling and Winding)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, R. H., and Co. Ld., Wakefield

Engines (Hauling and Winding)—*continued.*
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Nott
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, R., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

Engines (Locomotive)
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Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)
Mather and Platt Ld., Manchester

Engine Merchants
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

Engines (Oil)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping) (See Pumps)

Engines (Rolling Mill)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany

Engines (Steam)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Exhaust Turbine Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propellers)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Humbolo, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Files
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Spencer, Matthias, and Sons, Sheffield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

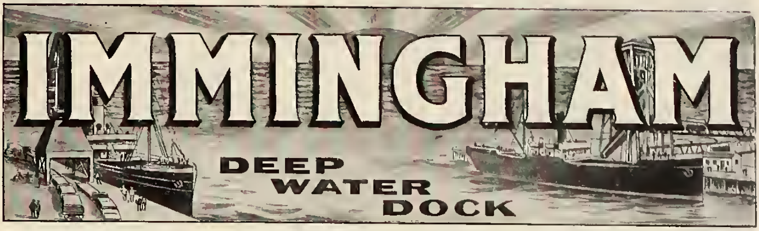
Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

Fire Appliances
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

The NEW COAL PORT



Officially Opened by the King, July 22nd, 1912.

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SAM FAY, General Manager.

Purchasers' Guide to Advertisers' Specialities. (continued).

FIRELIGHTER MACHINERY
Glover, M., and Co., Holbeck-lane, Leeds

FISHPLATES
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Firth, William, Ld., Leeds
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Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

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Stewarts & Lloyds Ld., Nile-street, Birmingham
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Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

FORGES
Hardy Patent Pick Co. Ld., Sheffield

FORGINGS
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Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld. Sheffield

FRICTION CLUTCHES
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
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Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

FUEL ECONOMISERS
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Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld., Bradford

FUEL MACHINERY
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Bakelda Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

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Pillatt and Co. Ld., Stapleford, Nottingham
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Tickle Brothers, Vulcan Ironworks, Wigan

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Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

FUSE IGNITERS
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall

FUSES (SAFETY)
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

GANISTER BRICKS

GAS ENGINES
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Glover, M., and Co., Holbeck-lane, Leeds
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

GAS EXHAUSTERS
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

GAS PLANT
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

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Wellington Tube Works Ld., Great Bridge, Tipton

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Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

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Davis, E., 2, Aire-street, Leeds
Jacobson, Richard, 70, Shoe-lane, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

GAUGES
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

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British Insulated and Helsby Cables Ld., Prescot
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Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

GOVERNORS (HYDRAULIC)

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Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

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Hardy Patent Pick Co. Ld., Sheffield

GRINDSTONES

GUNPOWDER
Curtis's and Harvey Ld., Cannon-st. House, E.C.

GUTTA PERCHA
Cort, Arthur, & Co. 303½, Camberwell-rd., London

HARNESS

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Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, B., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

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Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

HEADING MACHINES
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Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
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Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan

HEAPSTEADS—continued
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Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

HOISTS
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Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

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Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

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Deutsche Maschinenfabrik A.G., Duisburg, Germany
Harvey, G. A., and Co., Loampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

HOSE
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
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Pearn, Frank, & Co. Ld., West Gorton, Manchester
Phillips, C. D., Newport, Mon.
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.
Wood, John, & Sons Ld., Brook Foundry, Wigan

PUMPS (TURBINE)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Tickle Brothers, Vulcan Ironworks, Wigan

PUMPING SHAFTS
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Byland-street, Birmingham

RAIL BENDERS
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley

RAIL SAWING MACHINES
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Youngs, Byland-street Works, Birmingham

RAILS (IRON AND STEEL)
Bagnall, W. G., Ld., Stafford
Bute Works Supply Co. Ld., Cardiff
Firth, William, Ld., Leeds
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

RAILWAY CARRIAGES AND WAGONS
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
Bristol and South Wales Railway Wagon Co. Ld., Bristol
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester
Lancashire and Yorks. Wagon Co. Ld., Heywood
Lincoln Wagon and Engine Co. Ld., Lincoln
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld. Midland Works Birmingham
Moy, Thomas, Ld., Railway Works, Peterboro'
Bigley, Wm., Bulwell, Nottingham
Rolling Stock Co., Darlington
Wigan Wagon Co. Ld., Springs Branch, Wigan

RAILWAY PLANT
Avonside Engine Co. Ld., Bristol
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Bute Docks, Cardiff
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Firth, William, Ld., Leeds
Gt. Central Railway, 216, Marylebone rd., London
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester
Isca Foundry and Engineering Co., Newport, Mon.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld. Midland Works Birmingham
Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Byland-street Works, Birmingham

RAILWAY PLANT (ELECTRICAL)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester

RAILWAY WAGON ASSOCIATION
Association of Private Owners of Railway Rolling Stock, Clarence Chambers, Gloucester
Chorley Railway Wagon Co. Ld., Chorley, Lancs.

RAILWAY WAGON FINANCIERS
Bristol and South Wales Railway Wagon Co. Ld., Bristol
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lincoln Wagon and Engine Co. Ld., Lincoln

RAILWAY WAGON REPAIRERS
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, near Birmingham
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Heenan & Froude Ld., Worcester
Lancashire and Yorkshire Wagon Co. Ld., Heywood, near Manchester
Lincoln Wagon and Engine Co. Ld., 11, St. Mary-street, Lincoln
Moy, Thomas, Ld., Railway Works, Peterboro'
Bigley, Wm., Forest Wagon Works, Bulwell, Nottingham

RAILWAY WAGONS (TIPPING)
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester

RAKES (PIT)
Baker, John, and Son, Bilston, Staffs
Hardy Patent Pick Co. Ld., Sheffield

REDUCING GEAR
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, and Sons (Huddersfield) Ld., Park Gear Works, Lockwood, Huddersfield

REDUCING VALVES (FULL BORE AND STANDARD)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield

REFRIGERATORS
Pulsometer Engineering Co. Ld., Reading

REFUSE DESTRUCTORS
Heenan & Froude Ld., Manchester

REGULATING VALVES (FULL BORE)
Auld, D., and Sons, Whitevale Foundry, Glasgow

RESCUE APPARATUS
British Oxygen Co. Ld., Elverton-st., Westminster
Davis, E., 2, Aire-street, Leeds
Jacobson, B., 70, Shoe-lane, London, E.C.
Knowles Oxygen Co. Ld., Wolverhampton
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., 187, Westminster bridge-road, S.E.

RESPIRATORS
British Oxygen Co. Ld., Elverton-st., Westminster
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., Westminster

RIVETS
Baker, John, and Son, Bilston, Staffs
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley
Ward, Thos. W., Limited, Albion Works, Sheffield

ROCK DRILLS
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Spencer, Matthias, and Sons, Sheffield
Stephens, B., and Son, Carn Brea, Cornwall

ROLLERS AND PULLEYS (HAULAGE)
Bagnall, W. G., Ld., Stafford
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

ROOFS AND OUTDOOR BUILDINGS
Heenan & Froude Ld., Newton Heath, Manchester
Isca Foundry & Engineering Co., Newport, Mon
Norton's (Tividale) Ld., Tipton
Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton

ROPES (COTTON DRIVING)
Kenyon, Wm., & Sons Ld., Dukinfield
Wright, J. and E., Ld., Birmingham

ROPES (DRIVING)
Kenyon, W., & Sons Ld., Dukinfield Manchester

ROPES (HEMP AND MANILLA
Wright, J. and E., Ld., Birmingham

ROPE PRESERVATIVE
Wright, J. and E., Ld., Birmingham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

ROPES (WIRE)
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Cooke, William and Co. Ld., Tinsley, Sheffield
Elliot, George, and Co. Ld., 16, Great George-st. Westminster, S.W.
Glover, Wm. Jas., and Co., St. Helens, Lancs.
Haggie Brothers Ld., Gateshead-on-Tyne
Latch and Batchelor Ld., Hay Mills, Birmingham
Thompson and Co., Wigan
Wright, John & Edwin, Ld., Garrison st., B'ham

ROPEWAYS
Bleichert, Adolf, and Co., 99-100, Palmerston House, Bishopsgate-st. Within, 60, E.C
Tickle Brothers, Vulcan Ironworks, Wigan

RUBBER-COVERED ROLLERS
Reddaway, F., & Co. Ld., Pendleton, Manchester

SAFETY VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster and Tonge Ld., Pendleton, Manchester

SAWS AND SAWING APPLIANCES
Appleby, E. G., and Co., 10, Victoria-street, Westminster
Glover, M., and Co., Holbeck-lane, Leeds

SCREENS FOR COAL AND COKE
Baker, John, and Son, Bilston
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley

SCREENING
Barns, W., and Son, Globe Works, Holloway, N
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

SCREENING PLANT
Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

SCREWING MACHINES
Frost, Albert, and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Byland-street Works, Birmingham

SCREWS (STRETCHING)
Youngs, Byland-street Works, Birmingham

SEWAGE TREATMENT PLANT
Mather and Platt Ld., Manchester

SHAFTING
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Entreprise Générale de Fonçage de Puits, 5, Rue de Suède, Paris
Hardy Patent Pick Co. Ld., Sheffield
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Phillips, C. D., Newport, Mon.
Spencer and Co. Ld., Melksham, Wilts
Uskside Eng. Co. Ld., Newport Mon.
Wright, Joseph, and Co., Tipton

SHAFT SINKERS
Trefor Boring and Mining Co. Ld., 41, rue Royal Brussels

SHEET IRON
Firth, Wm., Ld., Water-lane, Leeds
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

SHEET METAL WORKS (FOR CYLINDER CASINGS
Baker, John, and Son, Bilston
Kenyon, Wm., & Sons, Ld., Dukinfield
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

SHIPPING
Gt. Central Railway, 216, Marylebone-road, N.W.

SHOT-FIRING BATTERIES AND CABLES
British Explosives Syndicate Ld., Glasgow
British Insulated and Helsby Cables Ld., Lancs.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Haslam and Schouthell Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

SHOVELS AND SHOVEL TREES
Baker, John, and Son, Bilston, Staffs
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

SIDINGS
Bagnall, W. G., Ld., Stafford
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, & Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

Purchasers' Guide to Advertisers' Specialities.—(continued).

Sleepers (Iron and Steel)
Allen, W. G., & Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
Baird, J. W., and Co., West Hartlepool
Bute Works Supply Co. Ld., Cardiff
Firth, Wm., Ld., Water-lane, Leeds
Benton, B. M., and Co., Midland Works, Sheffield

Smiths' Tools
Hardy Patent Pick Co. Ld., Sheffield

Smith Work
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Wright, Joseph, and Co., Tipton

Smoke Helmets
Siebe, Gorman and Co. Ld., Westminster, S.E.

Speed-Reducing Gears
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Sphincter Grip Armoured Hose
Reddaway, F., & Co. Ld., Pendleton, Manchester

Springs
British Wagon Co. Ld., Rotherham
Lancaster and Tonge Ld., Pendleton, Manchester
Skinner, J. P. and Co. Ld., Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Stampings
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Steam Experts
Tickle Brothers, Vulcan Ironworks, Wigan

Steam Fittings
British Mannesmann Tube Co. Ld., London Wall
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Russell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staffs.

Steam Mains and Pipe Installations
Stewarts and Lloyds Ld., Birmingham & Glasgow
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

Steam-Saving Appliances
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Burnley
Yorkshire Boiler Co. Ld., Bradford

Steam Traps
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster & Tonge Ld., Pendleton, Manchester
Stewarts & Lloyds Ld., Birmingham and Glasgow
United States Metallic Packing Co. Ld., Soho Works, Bradford
Wright, Joseph, and Co., Tipton

Steam Winches
Bridge, David, & Co. Ld., Castleton, Manchester
Clarke, Chapman & Co. Ld., Gateshead on Tyne
Phillips, C. D., Newport, Mon.
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Steel
Cooke, William, and Co. Ld., Tinsley, Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Latch and Batchelor Ld., Hay Mills, nr. B'ham
Mining Engineering Co. Ld. (The), Sheffield
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Spencer, Matthias, and Sons, Sheffield
Stewarts & Lloyds Ld., Birmingham and Glasgow
Thompson and Co., Wigan
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

Steel Blooms Billets
Benton, B. M., and Co., Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Flats and Rounds
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Tinbars
Scott, Walter, Ld., Leeds Steel Works, Leeds

Stone Breakers
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln

Structural Steel Work
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Hardy Patent Pick Co. Ld., Sheffield
Heenan ann Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Wright, Joseph, and Co., Tipton

Sulphate of Ammonia Plant
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Sulphur Recovery Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Superheaters
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
Pulsometer Engineering Co. Ld., Reading
Stringer, John, and Son, Dept. 11, Blackburn

Surgical Appliances
White & Wright, 93, Renshaw Street, Liverpool

Surplus Steam Valves (Full Bore)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Hopkinson, J., and Co. Ld., Huddersfield

Surveying (Books on)
Thomas, Wm., Cambrian Mining School, Porth

Surveying (Instruction)
Thomas, Wm., Cambrian Mining School, Porth

Surveying Instrument Makers
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavement, London
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Switch Boards
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Switch Gear
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Swivels (Ball-Bearing)
Bridge, David & Co., Ld., Castleton, Manchester
Youngs, Ryland-street Works, Birmingham

Tamping Plugs

Tanks
Bagnall, W. G., Ld., Stafford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Harvey, G. A., and Co. Loampit Vale, Lewisham
Isca Foundry & Engineering Co., Newport, Mon.
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Valor Co. Ld., Rocky-lane, Aston Cross, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

Tanks (Ferro Concrete)

Tar Distilling Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 28, Mount-street, Manchester

Technical Education
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Telephones
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Timber (Colliery)
Baird, J. W., and Co., West Hartlepool
Osbeck and Co., Newcastle-on-Tyne

Tipplers.
Bagnall, W. G., Ld., Stafford
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Spencer and Co. Ld., Melksham, Wilts
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

Tools
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Tram and Wagon Corner Plates
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Theedam, E. C., Ld., Dudley

Transformers (Electrical)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Transport Plant
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Trommels
Barns, W., and Son, Globe Works, Holloway
Heenan & Froude Ld., Worcester and Manchester
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts

Truck Shunting Plants
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Tubbing and Well Cylinders
Head, Wrightson and Co. Ld., Stockton-on-Tees
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Tub Drawbars
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Ormerod, Edward, Atherton, near Manchester
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

Tube Expanders
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

Tube Fittings
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Wednesbury
Stewarts & Lloyds Ld., Birmingham and Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tubes (Iron and Steel)
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Lewis, William, and Son, Bilston
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tub Greasers and Controllers
Theedam, E. C., Ld., Dudley

Tubs (Colliery)
Allen, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Humble, Stephen, 9, Victoria-st., London, S.W.
Longbotham, H. H., and Co. Ld., Wakefield
Theedam, E. C., Ld., Dudley
Wigan Wagon Co. Ld., Springs Branch, Wigan
Wright, Joseph, and Co., Tipton

Tunnel Segments
Railway and General Engineering Co. Ld., Notts
Tickle Brothers, Vulcan Ironworks, Wigan

Turbines
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester

Turbines (Exhaust)
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Turbo Compressors
Tickle Brothers, Vulcan Ironworks, Wigan

Turntables
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Isca Foundry & Engineering Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Tuyeres
Baker, John, and Son, Bilston, Staffs
Railway and General Engineering Co. Ld., Notts
Russell, John, and Co. Ld., Walsall
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C. Ld. Dudley

Valuers
Radford, R. H., Son, and Squire, Sheffield
Stringer, John, and Son, Blackburn

Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Green and Boulding Ld., 28, New Bridge-st., E.C.
Haslam and Schontheil Ld., Cardiff
Hopkinson, J., and Co. Ld., Huddersfield
Mather and Platt Ld., Manchester
Russell, John, & Co. Ld., Alma Tube Works, Walsall

Vices
Frost, Albert, and Co., Sheffield
Glover, M., and Co., Holbeck-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

Vulcanised Fibre
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Washers
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Jardine, John, Deering-street, Nottingham

Washers—continued.
Benton, B. M., and Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Water Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Water Filters
Pulsometer Engineering Co. Ld., Reading
Wright, Joseph, and Co., Tipton

Water Softening and Purifying
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Wright, Joseph, and Co., Tipton

Water Tube Boilers
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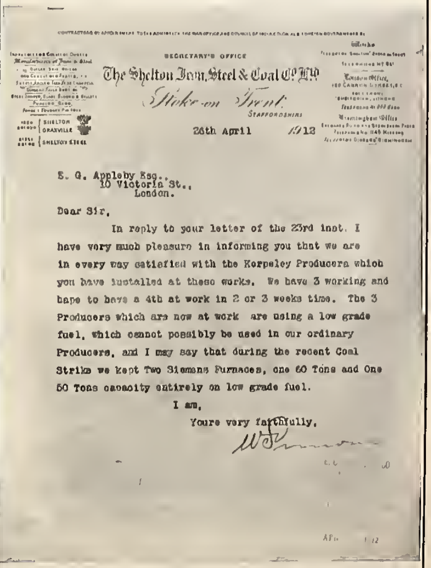

SECRETARY'S OFFICE

The Shelton Iron, Steel & Coal Co. Ltd.

Stoke-on-Trent.
STAFFORDSHIRE

26th April 1912

E. G. Appleby Esq.,
10 Victoria St.,
London.

Dear Sir,

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I am,
Yours very faithfully,

LOW GRADE FUEL.

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☞ ISSUED SINCE THE LAST APPEARANCE OF THIS LIST.

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H.O., 228	Qualifications of Surveyors (February 27, 1912): Coal Mines Act, 1911	1d. each. By post 1½d.
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H.O., 450	Form of Certificate of Qualification of Fireman, Examiner, or Deputy (May 2, 1912): Coal Mines Act, 1911	1d. each. By post 1½d.
H.O., 497	Testing Horses for Glanders Order of 17th May, 1912... ...	1d. each. By post 1½d.
H.O., 510	Search of Workmen for Prohibited Articles Order of 21st May, 1912	1d. each. By post 1½d.
H.O., 511	Explosives in Coal Mines Order of 21st May, 1912 (revoking all previous "Explosives" Orders)	4d. each. By post 5d.
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H.O., 634	Procedure for Ascertaining and Certifying the Views of Workmen. Order dated 22nd June, 1912	1d. each. By post 1½d.
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C.G., K.	Pamphlet Form (H.O., 11)	2d. each. By post 3d.
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C.G., 67.	Do. Notice to Inspector of the District under Rule 2 (ii.) (H.O., 11c)	1d. each. By post 1½d.
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Continued on Page 315.

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Continued from Page 314.

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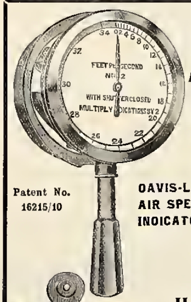

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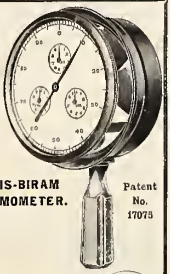

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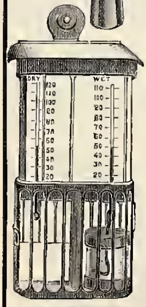

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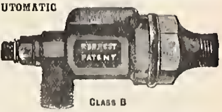

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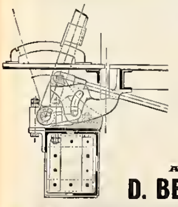

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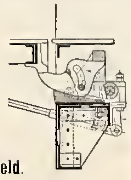

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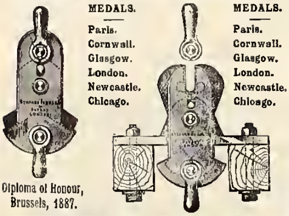

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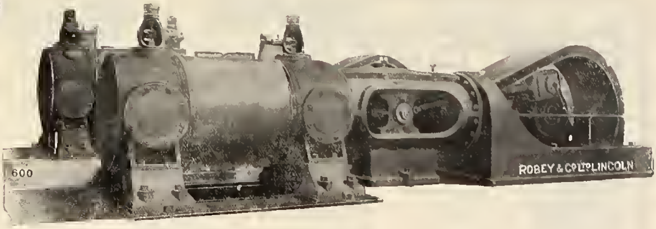

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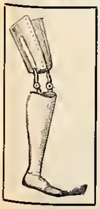

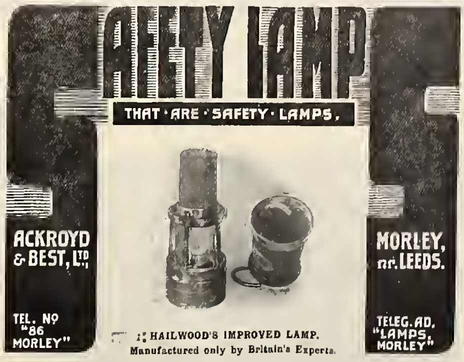
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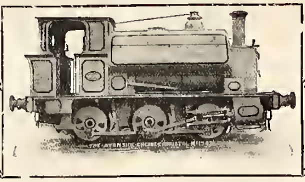

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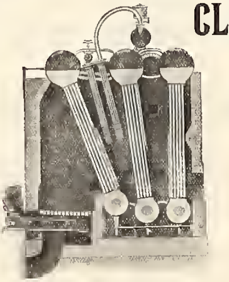

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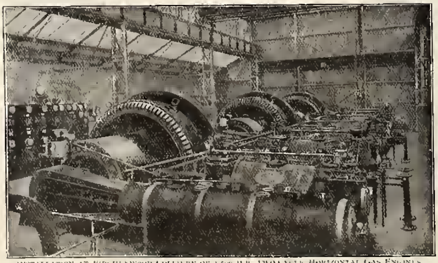

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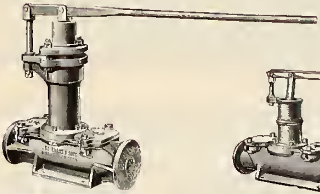
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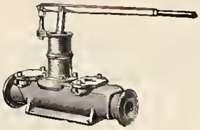
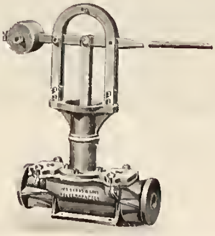

Bucket Type.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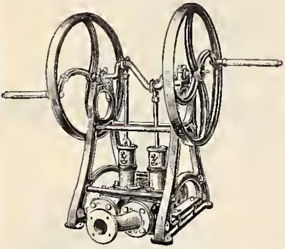
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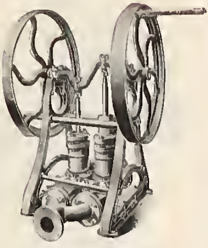
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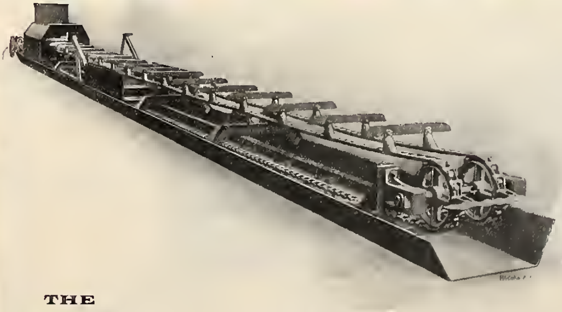

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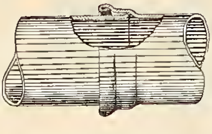

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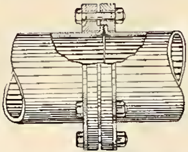

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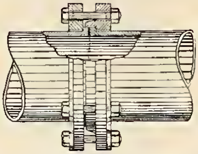

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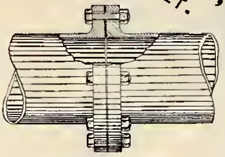

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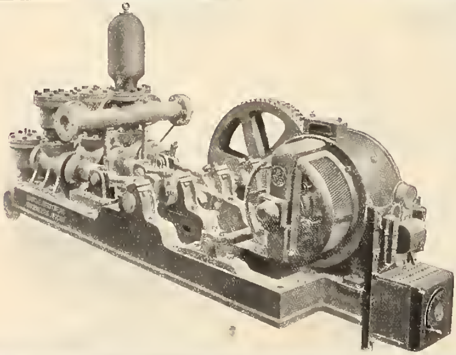

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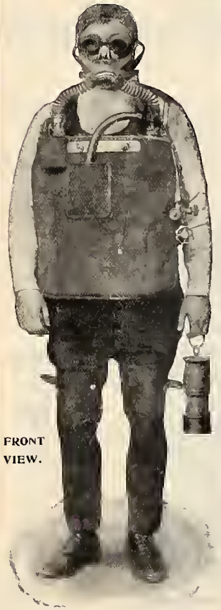

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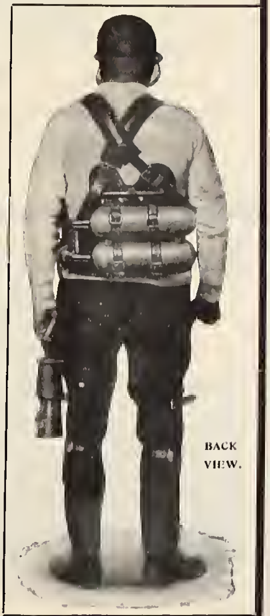

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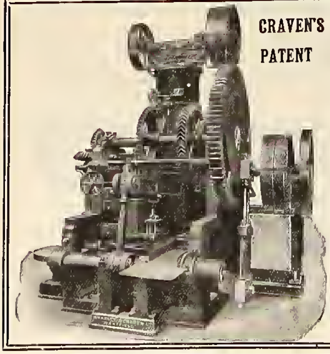

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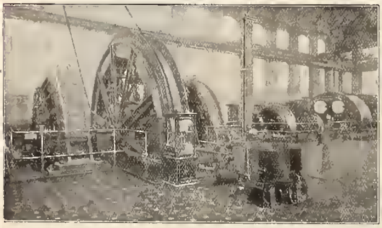

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Erected in Works for inspection

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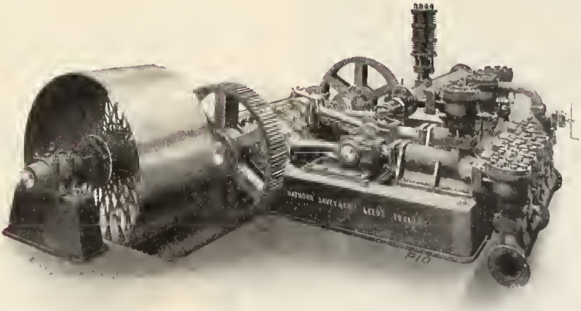
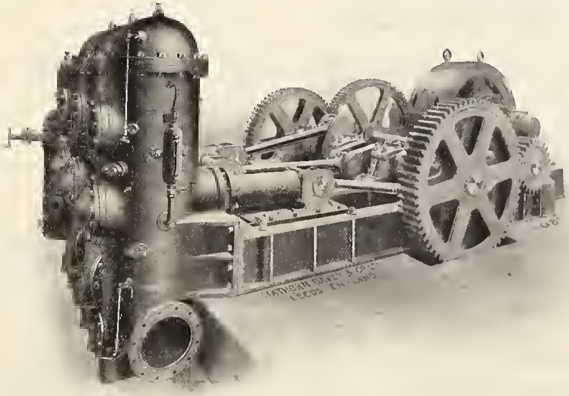


Belt-driven Three-throw Plunger Pump. Pump Work in Cast Steel.
To raise 500 Gallons per minute, 2,300 feet high.



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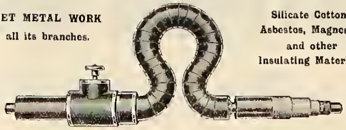

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And all kinds of Colliery Requisites.
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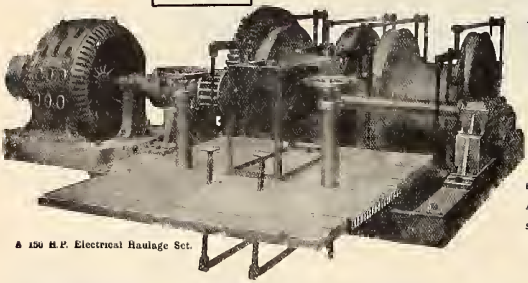

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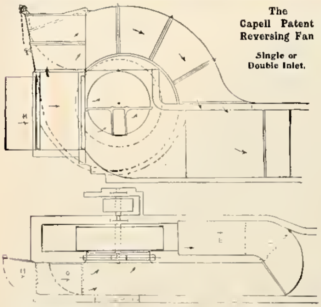

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Single or Double Inlet.

CAPELL PATENT FANS (1906-1907).
REVERSING FANS ARE REQUIRED BY NEW MINES ACT.
These give larger Volumes and higher Manometric Effects. The Result is a Smaller Fan is now used for all duties. Fans—Rope or Belt or Direct Driven.

SOME RESULTS OF THESE NEW FANS ARE NOW GIVEN.

1. IN ENGLAND.
Fan, 12 ft. 6 in. × 7 ft. 0 in.
Date, Oct. 5th, 1907.
Revols. 265
W.G. ... 8 inches
Cubic ft. per min. 376,000
H.P. in av. 472
H.P. indicated . 579
Useful Effect 81·5 %

2. IN PENNSYLVANIA.
Fan, 16 ft. 0 in. × 8 ft. 0 in.
Direct Driven.
Date, October 6th, 1907.
Revols. 158
Cubic ft. ... 431,700
W.G. ... ... 4·3 inches
Useful Effect 80 %

3. IN ENGLAND.
Single Inlet Fan.
16 ft. 0 in. × 5 ft. 6 in.
Revols. 170
Cubic ft. ... 298,000
W.G. ... ... 5½ inches
Useful Effect 74 %

INDUCED DRAUGHT. IN-BYE FANS, CUPOLA FANS, FORGE FANS, HAND MINING FANS, AND DUPLICATE MINE FANS.

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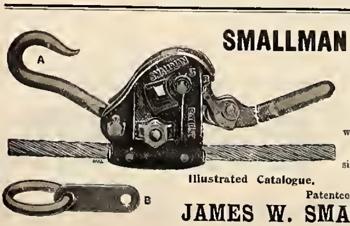

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Patented 1902, 1906 and 1910.
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The 1911 lever has large lateral stops and a wedge-shaped head.
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Estimates given for any depth or size.

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for

Water-gauge Glasses.

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The Glasses are of special manufacture, toughened to withstand the blow caused by the bursting of the gauge glass, and are all carefully tested by allowing a wood ball weighing ¾ lb. to drop from a height of 8 ft. on to the centre of the glass, the glass being supported at each end.

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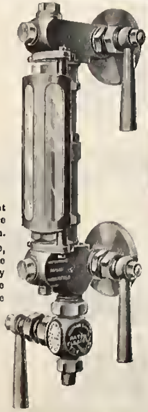

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Patentees and Manufacturers of
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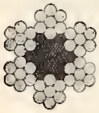
HAY MILLS, near BIRMINGHAM.

Fig. 2. HAULING.



Lang's Lay Ropes.

Fig. 20 WINDING.

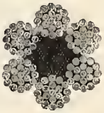
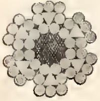


Fig. 1. HAULING.



Patent Flattened Strand Ropes.

Fig. 4. WINDING.

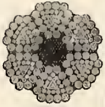
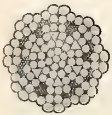


Fig. 13a. SINKING.



Advantages of Patent Flattened Strand Ropes

1. Greater wearing surface, therefore longer ife of rope and less wear npou pulleys.
2. Grester strength, thereby admitting of smaller ropes being used for existing loads, or of increased loads without increase in size of rope.
3. Spliced easily and more effectively.
4. Less tendency to twist and stretch in working.

Fig. 13a for Sinking and Fig. 11b for Cranes, &c., are non-twisting.

Fig. 11b. CRANE, &c

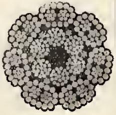
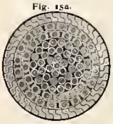


Fig. 15a.

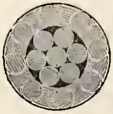


WINDING.

Locked Coil Ropes.

Indispensable for deep shafts.
Stronger than any other rope of same size.
Entirely free from twist.
Smooth surface reduces wear to a minimum.
Duration far ahead of any other construction.

Fig. 20.



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THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CIV. FRIDAY, AUGUST 16, 1912 No. 2694.

MINING INSTITUTE OF SCOTLAND.

A general meeting of the Mining Institute of Scotland was held on Saturday afternoon, in the rooms of the institute, 39, Elmbank-crescent, Glasgow. Mr. JAMES HAMILTON, the president, occupied the chair, and there was a large attendance of members.

At the outset, the following gentlemen were admitted to membership:—Messrs. W. L. Duncan, mining engineer, Gorebridge; Robert Laird, mine manager, Castlecary; W. E. T. Hartley, inspector of mines, Stirling; Robert Burt, colliery manager, Castlecary; Robert Howieson, East Wemyss; A. R. Sharp, colliery manager, East Wemyss; Wm. Laird, colliery manager, Fallin; Thomas Bryson, assistant in mining department, Royal Technical College, Glasgow; P. McIlhenry, sub-inspector of mines, Burnbank, Hamilton; Robert Heron, colliery manager, Bannockburn; John Barrowman, mining engineer, Staneacre, Hamilton; E. B. Johnston, civil and mining engineer, Uddingston; J. F. Stark, under-manager, Dennyloanhead; and John A. Kilpatrick, mining engineer, Lugar.

The following were afterwards elected to represent the institute on the council of the Institution of Mining Engineers:—Messrs. James T. Forgie, Bothwell; Robert McLaren, H.M. inspector of mines, Airdrie; James Hamilton, Glasgow; Daniel Burns, Royal Technical College, Glasgow; C. A. Carlow, Leven; Robert W. Dron, Glasgow; George Gibb, Rutherglen; Douglas Jackson, Newmains; Charles Latham, Glasgow; Wm. McCreath, Glasgow; Jas. Nisbet, Coatbridge; Wm. Smith, Dalmellington Ironworks, Ayr; Jas. B. Sneddon, Mid-Calder; William Williamson, Hamilton; and William Walker, H.M. inspector of mines, Edinburgh.

FIG. 1.—COMPARISON OF RESISTANCES OF MINE-FAN WITH RESISTANCE OFFERED TO PASSAGE OF AIR

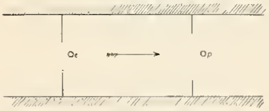


FIG. 2.—DIAGRAM OF CONNEXIONS OF FANS AND FAN-DRIFT WITH SHAFT

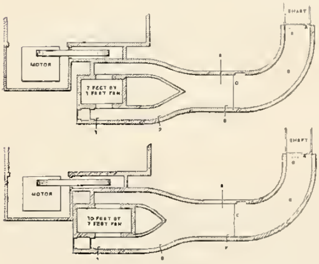


FIG. 3.—FORM OF PITOT TUBE USED IN EXPERIMENTS

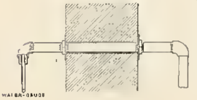


FIG. 4.—EFFICIENCY-CURVE OF ELECTRIC MOTOR

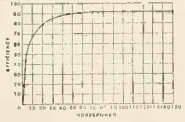
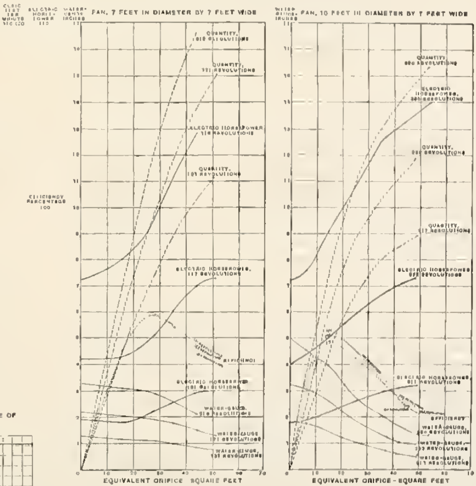


FIG. 5.—DIAGRAM SHOWING THE RELATIONSHIP BETWEEN THE SPEED OF THE FAN, CUBIC FEET OF AIR, WATER-GAUGE, POWER, EQUIVALENT ORIFICE, AND EFFICIENCY.



The Inglis Engine Controller.

Mr. GEORGE GIBB, Rutherglen, introduced a discussion on "The Inglis Engine Controller"—a paper read at the last meeting by Mr. James Black, Airdrie. The controller in question had been in use in Holytown Colliery for some time, and while it had only been brought into operation for experimental purposes, the results were pretty much in accordance with those given by the author in his paper. The adjustments were very simple and the results most satisfactory indeed—in fact, within reasonable limits it was almost impossible to conceive conditions where, if called upon, it would fail to act.

On the suggestion of Mr. D. M. MOWAT, it was agreed to adjourn the discussion till next meeting.

The Capping of Winding Ropes.

Discussion was thereafter resumed on the paper contributed at a former meeting by Mr. Douglas Jackson, Newmains, on "The Capping of Winding Ropes." The discussion was closed and the author thanked for his paper.

Facts and Theories Relating to Fans.

A paper on the above subject was read by Mr. DAVID M. MOWAT.

At the outset Mr. Mowat said he did not claim to propound new theories or to state new facts, but rather to put before the members, in a form which he hoped would be understood by all, certain facts concerning fans which might be of use to them. In doing so he confined himself to the type of fan which produces a partial vacuum by centrifugal action, such as the well-known fans of Guibal, Waddle, Schiele, Rateau, etc., these including practically all the ventilators in use in Great Britain.

In the course of his paper the author said, in a fan having an *évasé* casing and chimney, the theoretical difference of pressure created is double that produced in the case of the open fan, owing to the restitution of energy stored up as velocity in the air leaving the tips of the blades by means of the reduction in velocity of the air in the *évasé* casing:—

D = the diameter of fan in feet, and
R = the number of revolutions per minute—

$$\text{Theoretical water-gauge} = \frac{0{\cdot}0000856\ D^2 R^2}{68{\cdot}4} = 0{\cdot}00000125\ D^2 R^2$$

This theoretical water-gauge is never obtained, owing to defects in design and construction. The percentage actually obtained depends on the manometrical efficiency of the fan, which may vary from 0·4 to 0·75, the actual water-gauge produced being, therefore, from 40 to 75 per cent. of the theoretical water-gauge. If the fan drift be entirely closed to exclude the entry of air, the water-gauge then produced at a given speed is the highest which the fan can produce at that speed. This water-gauge thus measured, divided by the theoretical water-gauge, gives the manometric efficiency M.

$$\text{Thus,} \qquad M = \frac{\text{Actual water-gauge}}{\text{Theoretical water-gauge}},$$

or actual W.G. = theoretical W.G. × M, the actual water-gauge being measured with closed drift.

Actual W.G. = theoretical W.G. × M = $0{\cdot}00000125\ D^2 R^2 M$.

In actual practice how is this water-gauge to be measured, and when will it be obtained? In a given fan running at a certain speed it will always be produced, but it will very seldom be possible to measure it under working conditions. It is only when the fan drift is completely closed, so as to prevent the entry of air to the fan, that this water-gauge will be obtained. If air is allowed to enter the fan in increasing quantity, by opening up the fan drift, the water-gauge will be found to be apparently decreasing, until it falls to a very low value, when the air is allowed to enter at the mouth of the drift freely. To understand what has

Table I.—Tests on a Barclay Fan, 7 ft. in Diameter and 7 ft. Wide, at Bardykes Colliery.

Revolutions of fan per minute.	Water-gauges.					Quantity of air in cubic feet per minute.	Electrical horse-power.	Horse-power in fan-shaft.	Efficiency.		Equivalent orifice, No. 1 gauge. O_e.	Ratios No. 1 gauge.					W.G. corrected for speed when O_e = O.	Invisible W.G. A-B.	Orifice of passage. O_p.	Ratio.	
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.				Over-all.	Fan.		Revolutions.	Quantity.	$\sqrt{\text{W.G.}}$	$\sqrt[3]{\text{E.H.P.}}$	$\sqrt[3]{\text{H.P.}}$				O_e. :	O_p.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
	B In.	In.	In.	In.	In.				Per cent.	Per cent.	Square feet.			In.	In.	In.	A In.	In.	Square feet.		
217	1·850	1·850	1·850	1·850	—	0	18	13	Manometric	64·20	0	1·000	—	1·000	1·000	1·00	1·85	0	—	1	∞
294	3·250	3·250	3·250	3·250	—	0	40	33		61·50	0	1·353	—	1·325	1·305	1·36	3·25	0	—	1	∞
360	5·000	5·000	5·000	5·000	5·000	0	72	63		63·50	0	1·659	—	1·648	1·585	1·69	5·00	0	—	1	∞
360	4·550	4·500	4·500	4·550	—	33,300	76	66	31·20	36·20	6·07	—	—	—	—	—	5·00	0·45	61·20	1	10·00
359	4·060	4·060	3·940	4·000	—	74,560	91	80	52·50	58·75	14·42	—	—	—	—	—	4·95	0·89	30·80	1	2 10
215	1·250	1·187	1·187	1·250	1·250	—	24	19	46·40	58·75	19·76	1·000	1·00	1·000	1·000	1·00	1·82	0·57	29·20	1	1·43
292	2·187	2·125	2·030	2·250	2·250	—	56	48	48·60	56·70	20·82	1·360	1·39	1·320	1·320	1·36	3·21	1·02	30·55	1	1·41
359	3·250	3·125	3·030	3·375	3·125	—	102	89	48·60	55·80	21·00	1·670	1·71	1·610	1·620	1·67	4·95	1·70	29·10	1	1·34
217	0·750	0·750	0·720	0·810	0·750	81,442	30	24	32·00	40·20	36·70	1·000	1·00	1·000	1·000	1·00	1·85	1·10	30·30	1	0·81
292	1·250	1·187	1·150	1·375	1·250	107,840	68	59	31·20	36·00	37·50	1·340	1·32	1·290	1·320	1·35	3·21	1·96	30·00	1	0·75
360	2·000	1·940	1·750	2·060	1·875	133,584	127	111	33·10	37·92	36·80	1·660	1·64	1·640	1·620	1·67	5·00	3·00	30·10	1	0·75
216	0·625	0·560	0·560	0·625	0·560	84,846	31	25	27·00	33·45	41·70	1·000	1·00	1·000	1·000	1·00	1·83	1·20	30·20	1	0·68
290	1·060	1·000	0·940	1·125	0·940	113,824	71	62	26·80	30·70	43·20	1·340	1·34	1·300	1·320	1·35	3·17	2·11	30·50	1	0·67
357	1·500	1·440	1·310	1·625	1·410	139,575	133	116	24·80	28·42	44·30	1·650	1·65	1·550	1·620	1·67	4·92	3·42	29·50	1	0·62
214	0·500	0·500	0·440	0·530	0·375	89,486	32	26	22·00	27·10	49·30	1·000	1·00	1·000	1·000	1·00	1·80	1·30	30·70	1	0·58
291	0·940	0·780	0·720	0·940	0·750	119,676	73	64	24·30	27·70	48·20	1·350	1·34	1·370	1·320	1·35	3·18	2·24	51·20	1	0·57
364	1·250	1·187	1·125	1·375	—	153,800	140	122	21·60	24·81	53·50	1·700	1·72	1·580	1·630	1·68	5·10	3·85	30·50	1	0·54

Table II.—Tests on a Barclay Fan, 10 ft. in Diameter and 7 ft. Wide, at Bardykes Colliery.

Revolutions of fan per minute.	Water-gauges.					Quantity of air in cubic feet per minute.	Electrical horse-power.	Horse-power in fan-shaft.	Efficiency.		Area of Equivalent orifice, No. I gauge. O_e.	Ratios No. 1 gauge.					W.G. corrected for speed when O_e = O.	Invisible W.G. A - B.	Orifice of passage. O_p.	Ratio.	
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.				Over-all.	Fan.		Revotions.	Quantity.	$\sqrt{\text{W.G.}}$	$\sqrt[3]{\text{E.H.P.}}$	$\sqrt[3]{\text{H.P.}}$				O_e :	O_p.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
	B In.	In.	In.	In.	In.				Per cent.	Per cent.	Square feet.			In.	In.	In.	A. In.	In.	Square feet.		
130	1·30	1·30	1·30	1·30	1·30	0	19	14	Manometric	61·70	0	1·00	—	1·00	1·00	1·00	1·30	0	—	1	∞
176	2·25	2·25	2·25	2·25	2·25	0	42	35		58·20	0	1·35	—	1·32	1·30	1·35	2·25	0	—	1	∞
216	3·30	3·30	3·30	3·30	3·30	0	72	63		56·50	0	1·66	—	1·59	1·56	1·64	3·30	0	—	1	∞
131	1·16	1·15	1·20	1·27	1·20	44,040	18	13	44·70	62·00	15·95	1·00	1·00	1·00	1·00	1·00	1·32	0·16	43·00	1	2·70
177	2·06	2·05	2·08	2·15	2·10	57,615	43	36	43·50	52·00	15·65	1·35	1·31	1·33	1·33	1·40	2·27	0·21	49·00	1	3·13
216	3·12	3·05	3·12	3·20	3·15	69,348	80	70	42·80	48·70	15·30	1·65	1·57	1·64	1·64	1·75	3·30	0·18	63·80	1	4·17
131	1·10	1·10	1·10	1·25	1·10	74,585	22	17	58·80	76·20	27·80	1·00	1·00	1·00	1·00	1·00	1·32	0·22	62·00	1	2·23
176	1·90	1·90	1·90	2·12	1·80	99,412	51	43	58·30	69·10	28·10	1·34	1·33	1·31	1·32	1·36	2·25	0·35	65·60	1	2·33
216	2·90	2·82	2·80	3·10	2·60	122,326	96	84	58·25	66·60	28·00	1 65	1·64	1·62	1·63	1·70	3·30	0·40	75·00	1	2·63
131	1·00	0·97	1·00	1·16	0·70	87,655	25	20	55·30	69 05	34·20	1·00	1·00	1·00	1·00	1·00	1·32	0·32	60 30	1	1·76
177	1·75	1·65	1·70	1·95	1·25	118,169	60	51	54·30	64 00	34·90	1·35	1·35	1·32	1·31	1·37	2·27	0·52	64·00	1	1·81
218	2·60	2·45	2·50	2·85	2·00	146,502	112	98	53·70	61·30	35·40	1·66	1·67	1·62	1·64	1·70	3·37	0·77	65·00	1	1·80
131	0·85	0·80	0·80	1·00	0·40	103,060	29	23	47·70	60·00	43·70	1·00	1·00	1·00	1·00	1·00	1·32	0·47	58·70	1	1 30
177	1·50	1·36	1·35	1·72	0·80	137,608	70	61	46·50	53·40	43·80	1·35	1·33	1·33	1·36	1·38	2·27	0·77	61·00	1	1·32
216	2·15	2·00	1·95	3·55	—	165,974	128	112	43·80	50·20	44·20	1·65	1·62	1·59	1·64	1·70	3·30	1·15	60·50	1	1·31
130	0·75	0·70	0·65	0·95	—	111,333	30	24	43·80	54·75	50·20	1·00	1·00	1·00	1·00	1·00	1·30	0·55	58·60	1	1·08
176	1·30	1·25	1·15	1·60	—	150,713	73	64	42·50	48·20	51·50	1·35	1·35	1·32	1·34	1·38	2·25	0·95	60 20	1	1·10

taken place, it is necessary to consider the relationship between the fan and the drift, or mine, as the case may be. By his conception of the equivalent orifice and the orifice of passage, Murgue has enabled a perfect analysis of these relations to be made. He has compared the resistances of the mine and the fan with the resistances offered to the passage of the air by two orifices in sheets of iron arranged in series, as shown in fig. 1. *Oe* represents the orifice having a resistance equal to that of the mine, and *Op* represents the orifice having a resistance equal to that of the fan. The area of *Oe* will vary with every varying condition of the mine, while the area of *Op* for a given fan will remain constant. Murgue found a definite value similar to the ohmic resistance for the resistance of a mine when he compared the mine with its "equivalent orifice."

The problem is to find the area of an orifice in a sheet iron plate which will have the same resistance as a mine which passes a quantity Q in cubic feet per minute with a water-gauge in inches of W.G., the area thus formed being the equivalent orifice *Oe* of the mine. The area *Oe* thus obtained is, therefore, the area having a resistance equivalent to that of the mine. Similarly, the area of the orifice of passage of the fan—

$$Op = \frac{0{\cdot}00039\ Q}{\sqrt{\text{W.G.}\ p}};$$

W.O. *p* being the water-gauge required to pass the quantity Q through the fan itself, W.G.*p* being that part of the total water-gauge produced which is always invisible. In practice, therefore, the actual water-gauge produced is expended in two portions, one portion overcoming the resistance due to the passage of the air through the equivalent orifice *Oe*—that is, the mine—and the other portion overcoming the resistance due to the passage of air through the orifice of passage *Op*—that is, the fan. The relationship between the values of *Oe* and *Op* is a most important one. The work done in overcoming the resistance in *Oe* is useful work, while that done in overcoming the resistance in *Op* is so much waste.

If we assume that *Oe* is equal to *Op*, then of the pressure expended in producing ventilation one-half goes to overcome the resistance in the fan, and the other half to ventilate the mine. Ignoring altogether the losses due to friction, defective construction, or design, it is evident that the maximum efficiency cannot exceed 50 per cent., and will be, because of these defects, a great deal less, only half of the effort being usefully employed. The theoretical efficiencies are subject to reduction on account of (*a*) manometrical inefficiency; (*b*) defects in design and construction, and (*c*) frictional losses (mechanical).

The power lost under (*a*) is not directly in proportion to the manometrical efficiency. If the revolving wheel, on account of the form or angularity of the blades, is not producing water-gauge, it is not using power to drive it as a fan, but is running only as a flywheel. The actual efficiency obtained will probably not exceed 80 per cent. of the theoretical efficiency. If *Op* is more than 3*Oe*, it will probably be found that the saving in power thus effected will be more than counterbalanced by the increased friction of the machine, owing to its greater size and weight. The most economical relationship between *Oe* and *Op* appears to be when *Op* is from two to three times as great as *Oe*.

It appears to the writer to be very desirable that data should be obtained as to the most economical relationship between *Oe* and *Op* in the various types of fans. It may be that in a mine having a very large equivalent orifice, an open-running fan would give more economical results, on account of its comparatively low internal resistance. To ventilate a hall, which is just a mine of large equivalent orifice, no one would think of using an encased fan. The principal difficulty of obtaining such data with the necessary degree of accuracy is that of measuring the power required to drive the fan. If the fan is engine-driven, the horse-power obtained by means of indicator diagrams is a very uncertain measure of the actual power expended. In order to obtain such data accurately, the fans would require to be motor-driven, and the motor carefully tested by means of a dynamometer or other suitable method, in order to ascertain its efficiency.

The writer had occasion several years ago to make careful tests of the performance of two fans on a mine. The tests were made at Bardykes Colliery with one fan 7 ft. in diameter by 7 ft. wide, and the other 10 ft. in diameter by 7 ft. wide. The smaller fan was first erected, but was found to be too small for the work to be done, and was therefore replaced by the larger fan. Fig. 2 shows the fans and fan drifts connecting with the shaft. The fan drift has a minimum area of 100 square feet, varying in cross-section from 10 ft. by 10 ft. to 17 ft. by 7 ft., where it joins the haft. When the tests were made the pit-mouth was not closed, the fans drawing air from the surface at the end of the drift. Resistances were inserted in the drift at A and B, consisting of spars and spaces, each 3 in. wide alternately, the spars in A being vertical and in B horizontal, so as to baffle eddy currents as far as possible. The area of the resistance A was altered during the tests by closing some of the spaces. The water-gauge was measured at five gauges numbered 1 to 5. Nos. 1, 2 and 3 were fitted with Pitot tubes, while Nos. 4 and 5 were fitted on open-ended tubes. No. 4 was fitted telescopically, so that the water-gauge could be measured at any point of the drift from one side to the other. The quantity of air passing was measured at C with an anemometer attached to a small travelling crane, by means of which the anemometer could be moved into any position in the drift without the observer having to leave the manhole in which he was situated. The drift at that point was 10 ft. square, and was divided by wires into 25 squares of equal area. The fans were driven by a squirrel-cage motor of 150-horse power, by means of a leather belt 20 in. wide. The motor was connected with a 500 kw. turbo-alternator, the speed of which was varied so as to obtain the required number of revolutions in the fan. The speed of the fan was measured by means of a speed-counter. The velocity of the air was naturally much higher at the outside of the curve than at the inside, the current at the inside during the passage of the smaller quantities being reversed.

It was found that the measurement of the water-gauge by a plain tube at No. 4 was absolutely unreliable, the readings varying as the tube was moved from one side of the drift to the other. With a Pitot tube at No. 4 the readings were the same from side to side of the drift. It was also found that No. 1 gauge (which was out of the current) gave the same reading when hooded or when turned down. The form of Pitot tube used is shown in fig. 3. Experiments were also made with various forms of hood on the ends of the tubes, but these were not found to be satisfactory.

The writer is satisfied that the results obtained with the Pitot tubes are quite reliable. The water-gauges were carefully measured by means of a scale graduated to tenths of an inch. The anemometer used was a new one, which had just been adjusted; it was compared with another, and found to agree closely with it. The result obtained by measuring and reading the velocity in each square separately was the same as was obtained by shifting the anemometer each half-minute or minute into another square and reading the total at the end of 12½ or 25 minutes. The latter method, which was simpler, was therefore followed. One comparison was made simultaneously between the quantity of air passing in the drift and that leaving the chimney of the fan, and the results were practically identical. The electrical horse-power at the motor was measured by means of a Kelvin wattmeter, which had just been adjusted. The efficiency curve of the motor obtained by actual tests is shown in fig. 4. The results of the tests are given in Tables I. and II.

Columns 1, 2, 3, 4, 5, 6, 7, and 8 are the result of observations; column 9 is estimated from the motor efficiency and the efficiency of the belt-drive, which has been taken at 95 per cent.; whilst columns 10 and 11 are calculated from the quantity, water-gauge, and horsepower, as under:—

$$\text{Efficiency} = \frac{Q \times W.G. \times 5{\cdot}2 \times 100}{E.H.P. \text{ or } H.P. \times 33{,}000} = \frac{0{\cdot}01576Q \times W.G.}{E.H.P. \text{ or } H.P.}$$

Columns 12, 13, 14, 15, 16, and 17 are calculated from the foregoing data; column 18 shows the water-gauge readings with closed drift corrected for slight variations in the speed of the fan, the correction being made on the principle that the water-gauge varies as the square of the number of revolutions; whilst column 19 shows the total water-gauge obtained in column 18 minus the actual water-gauge registered at No. 1 gauge in column 2, the difference thus obtained being the invisible part of the water-gauge created which is required to pass the air through the fan itself. The orifice of passage shown in column 20 is calculated by equation (10) from the data contained in columns 7 and 19. Column 21 shows the ratio between Oe and Op. An examination of columns 12, 13, 14, 15, 16, 17 and 20 affords proof of the accuracy of the observations. With one or two exceptions, the relationship between the speed of the fan, the quantity of air, the square root of the pressure (W.G.), and the cube root of the power is remarkably close.

Fig. 5 shows graphically the relationship between the speed of the fan, quantity of air, water-gauge, power, equivalent orifice, and efficiency. It will be seen that the highest efficiency is obtained in the 7 ft. fan with an equivalent orifice of about 15 square feet, and in the 10 ft. fan with an equivalent orifice of about 28 square feet. The orifice of passage of the 7 ft. fan may be taken as 30 square feet, thus giving the highest efficiency when $Oe : Op :: 1 : 2$.

The orifice of passage of the 10-ft. fan may be taken as 62 square feet, thus giving the highest efficiency when $Oe : Op :: 1 : 2{\cdot}21$.

Both these are Barclay fans of the double-inlet drum type, and the orifice of passage in this type appears to be:

$$Op = 0{\cdot}62\,D^2, \text{ or } D = \sqrt{\frac{Op}{0{\cdot}62}}$$

If similar reliable data were available for other types of fans, there would be no difficulty in determining the most economical size of fan for any required duty. For example, if a Barclay double inlet fan was wanted to give 200,000 cubic feet per minute with a water-gauge of 3 in., by equation

$$Oe = \frac{0{\cdot}00039\,Q}{\sqrt{W.G.}}$$

$$\therefore Oe = \frac{0{\cdot}00039 \times 200{,}000}{\sqrt{3}} = 45 \text{ square feet.}$$

Taking the most economical ratio between Oe and Op as $1 : 2{\cdot}3$, then $Op = 45 \times 2{\cdot}3 = 103{\cdot}5$ square feet.

By equation, $$D = \sqrt{\frac{Op}{0{\cdot}62}}.$$

$$\therefore D = \sqrt{\frac{103{\cdot}5}{0{\cdot}62}} = 13 \text{ feet diameter.}$$

The discussion was adjourned to next meeting.

A distinctly modern phase of the royal and ancient game of golf was inaugurated last week, at Fence Houses, when Lord Joicey opened handsome club premises for the Lambton Collieries' Golf Club. It was claimed in the speeches that this was the first golf course in the kingdom provided by a colliery proprietor for the benefit of his employees. There is a membership of 150, and Mr. Austin Kirkup is chairman. Lord Joicey, who was presented with an elegant aluminium putter, suitably inscribed, as a memento of the occasion, announced that he would give a cup for the club championship contests.

DURHAM AND NORTHUMBERLAND COLLIERIES RESCUE STATIONS.

Extensions and Improvements.

In pursuance of the Home Office Order, under the Mines Accidents (Rescue and Aid) Act, 1910, the committee of Durham and Northumberland coalowners, &c., responsible for the erection and equipment of the fire and rescue station in Scotswood-road, Newcastle-upon-Tyne, is taking steps to establish and equip three similar stations, to be situated at Crook and near Houghton-le-Spring, in the county of Durham, and at Ashington, in the county of Northumberland, respectively. Sites have been secured and plans are now being prepared by a Newcastle firm of architects. Each station will be as fully equipped as is the existing station at Newcastle, and no pains or expense will be spared to secure that each shall be fully up to date. It is anticipated that the stations will be ready for service before the term of office of Mr. W. C. Blackett, who is chairman of the committee, as president of the North of England Institute of Mining and Mechanical Engineers has expired.

In accordance with the provisions of the Order, there will be kept and maintained at each station not less than 15 sets of portable breathing apparatus, with means of supplying sufficient liquid air to enable each apparatus to be constantly used for two days, and of charging such apparatus; 20 electric hand lamps; four oxygen reviving apparatus; an ambulance box or boxes provided by the St. John Ambulance Association or similar boxes, together with antiseptic solution and fresh drinking water; and cages of birds and mice for testing for carbon monoxide. The necessary motor vehicular facilities will, of course, be provided.

At the Newcastle station an important alteration in equipment is in process of being made. Hitherto the breathing dress which has been provided has been of the improved Aerolith type. This type, however, is being gradually superseded by the Aerophor apparatus, of which the patents are held by Mr. Blackett. It is claimed for the Aerophor that it is much safer than other apparatus, being beyond the control and interference of the wearer; it is lighter and simpler and free from delicate parts; it requires less skill, knowledge and practice in its use; it is more comfortable to the wearer, its air being cool and refreshing; it is far less costly in upkeep for a central station; and it possesses a special fitting to serve air to persons in distress—a feature which no other breathing dress possesses.

The apparatus depends for its action on the fact that liquid air expands to about 800 times its own volume when returning to its gaseous state, furnishing some 8 cubic feet of oxygen from each pound of liquid. As the apparatus is chargeable with about 9 lb. of liquid air, it will be seen that the supply of oxygen is ample, it being remembered that a man only absorbs about 1 cubic foot per hour. At the rate of evaporation allowed by the apparatus, the charge of 9 lb. of liquid air lasts some three hours, increasing in richness all the time. The liquid air used consists, in the beginning, of 60 per cent. of oxygen, but, owing to the nitrogen evaporating slightly faster, gradually becomes richer as the charge in the breathing dress becomes less. The action is strictly opposite to that of breathing dresses with oxygen service, where, during the latter stages of re-breathing the same air chemically deprived of carbonic acid gas, there is an increasing percentage of nitrogen, and, therefore, it is alleged, increasing danger.

The apparatus consists of a knapsack A filled with asbestos wool, and insulated from the relatively hot outer atmosphere by a layer of special insulation material K, a layer of felt T, and an outer leather cover L. The liquid being poured into the knapsack at S is absorbed in the asbestos wool, and thereafter evaporates at a breathable rate into a metal pipe E, where, being warmed up to a refreshing temperature, it is led to the breathing bag B, and so, by the nose and mouth mask M, to the wearer's lungs. It is exhaled again into the exhaust pipe P, a return to the breathing bag being made impossible. The pipe P leads the air past the exhaust valve V and a fitting F to a purifier U, where any balance of air which is required to maintain a uniform supply in the breathing bag may be freed from carbonic acid gas and dried. The fitting F supplies a means which no other breathing dress possesses. The wearer can, by its means, attach an easily carried face and mouthpiece, and with his surplus air, which still contains a very considerable percentage of oxygen, serve a person in distress over a period of emergency. The mask M is of a specially constructed composition of indiarubber and canvas, closely fitting over mouth and nose and securely strapped to a skull cap, which, being made of asbestos, protects the head and neck from the influence of heat. It is claimed that the mask is specially comfortable and hygienic. The whole apparatus is mounted on a strong canvas jacket and is put on in a few seconds. For the storage of liquid air special metal vacuum vessels are used, of a capacity of 50 lb. of liquid air each, reducing the evaporation to a minimum of no consequence.

It may be added that, with the former breathing apparatus, the pack was entirely separate from the breathing arrangement. In the Aerophor the pack and breathing bag are united, and the pack is built to fit across a man's loins, instead of extending the length of his back as with the former apparatus; the advantage of the later pack will be realised when it is remembered that its wearer may require to crawl through very low parts of the mine where anything projecting above his shoulders is liable to be caught and damaged by the roof. The arrangement of the purifier is different in the Aerophor from that in the Aerolith, the new cartridge of caustic potash presenting a larger surface for the absorption of carbonic acid gas and a surface, moreover, easily scraped and renewed. In the Aerophor provision is made, in the event of the breathing bag being torn by accident, whereby pipes inside the bag may be coupled up direct from the pack in which the liquid air is stored to the mouthpiece. By this means, whilst breathing would be rendered more difficult, it could at least still be maintained, whereas without this coupling arrangement a man whose breathing bag became torn would run a great risk of speedy asphyxiation from foul air. The Aerophor—fully loaded with a charge lasting three hours—is about the same weight (about 26 lb.) as the Aerolith which it is superseding, but has the advantage that it only requires a charge of about 9 lb. as against 10 lb. required in the Aerolith.

The arrangement whereby a pipe can be attached to the fitting F at the base of the pack so as to supply air

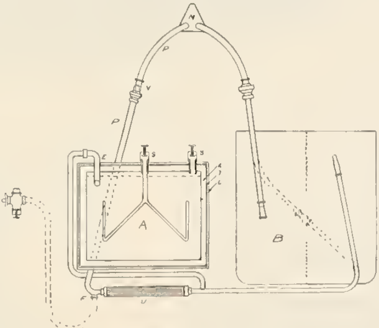


DIAGRAM OF AEROPHOR

to any partially gassed man who may be found in the mine is worthy of special attention, for it enables a rescuer to take immediate steps to counteract the foul air from which the object of his solicitude is suffering, and to impart to the latter an immediate supply of air which, although the rescuer himself has exhaled it, is still rich in oxygen and perfectly utilisable in the sustaining of life.

Messrs. Henry Simonis and Co., the constructors of the original Aerolith, are also constructors of the Aerophor. They have supplied to the Newcastle station, also, a very ingenious collapsible stretcher — the "Veleda"—which, light and compact (it weighs about 26 lb., and packs into a space about 18 in. by 10 in.), should be found of great use in rescue operations.

Thus far, the Newcastle brigade has been called out about 20 times on fire and rescue work since the station was opened in the early part of last year.

BRITISH RAILWAYS IN 1911.

The annual returns in respect of the capital, traffic, receipts and expenditure of the railway companies of the United Kingdom for 1911 have been issued as a Blue Book [Cd. 6306]. The total amount of authorised capital at the end of 1911—£1.401 millions—exceeded the total at the end of 1910 by approximately £2 millions. The total amount of railway capital returned as paid up at the close of 1911 was £1,324 millions, an increase of about £5½ millions, as compared with £4 millions in 1910, and £3¼ millions in 1909. The average rate of dividend on the ordinary capital was 3·62 per cent. in 1911, as compared with 3·48 per cent. in 1910. The average rate of dividend on the preferential capital rose from 3·51 per cent. in 1910 to 3·56 per cent. in 1911, and the rates on the other classes of capital remained substantially unchanged.

The gross receipts from traffic, £117,200,000, represent a sum of £5,007 per mile of line open at the end of the year for traffic, as against £4,885 per mile in 1910. The gross traffic receipts for the year 1911 are the highest recorded, and show, on comparison with those for 1910, increases of about £1½ millions from passenger traffic, and £1¾ millions from goods traffic. Of the total, £53·9 millions were received from passenger and £63·3 millions from goods traffic.

The receipts from "minerals" and those from "general merchandise" were the highest recorded. The receipts from live stock, on the other hand, were lower than in any year since 1906. Taking minerals alone, the receipts amounted to £29,746,000, an increase of £537,000 or 1·8 per cent., whilst the tonnage carried amounted to 409·8 million tons, an increase of 4·7 million tons, or 1·2 per cent. The increase per cent. in the tonnage carried was thus slightly smaller than the increase per cent. in the receipts. It may be observed that the production of coal increased in 1911 by 2·8 per cent., and that the aggregate quantity of coal shipped as cargo, and also for their own use by steamers (both in the coastwise and in the foreign trade) increased by 2·4 per cent.

The total train mileage, including "mixed trains," was 428·6 million miles, an increase of 5·4 million miles, or 1·3 per cent.; in goods trains, however, the increase was only 1·2 per cent., rising from 154·6 million miles to 156·5 million miles. The average receipts per train mile from goods traffic have been steadily rising for some years past, and the average for 1911 (96·97d.) was the highest recorded in these returns. The average receipts per train mile from passenger traffic show a slight increase, following a somewhat larger increase in 1910. For some years prior to 1910 the average had tended generally to decline. During the last 10 years, receipts per train mile from goods traffic increased by 32·4 per cent., whilst those per train mile from passenger traffic decreased by 3·5 per cent.

The working expenses rose from £76·57 millions to £78·62 millions, an increase of 2·7 per cent. Both the gross receipts (£127·2 millions) and the net receipts £48·58 millions) were higher by 2·6 per cent. The proportion of working expenses to gross receipts were the same as in 1910, viz., 61·8 per cent. The various heads of expenditure were as follow (in millions):—Maintenance of way, works, and stations, £11·75 (+£0·29); locomotive power, £21·06 (+£0·40); repair and renewal of carriages and wagons, £6·98 (+£0·31); traffic expenses, £22·51 (+£0·75). The expenditure on "locomotive power" increased by £400,000, as compared with an increase of £190,000 in 1910, and the expenditure on "repair and renewal of carriages and wagons" increased by £310,000. The amounts of "rates and taxes" paid by the railway companies in 1911 (£5,079,000) was a decline of £23,000 on 1910. The decrease in 1911, although small, is interesting, only two other such decreases being recorded in the returns for the past 40 years. The following figures show the cost of coal and coke, and of materials used in the repair of engines, for the 15 principal companies:—

Year.		Expenditure on coal and coke.		Expenditure on materials in locomotive repairing department.
		£		£
1902	...	5,042,000	...	2,152,000
1903	..	4,959,000	...	2,211,000
1904	...	4,874,000	...	2,151,000
1905	...	4,810,000	...	2,189,000
1906	...	5 048,000	...	2,329,000
1907	...	6,175,000	...	2 593,000
1908	...	6,539,000	...	2,567,000
1909	...	5,544,000	...	2,474,000
1910	...	5,613,000	...	2,514,000
1911	...	5 661,000	...	2,553,000

It will be seen that the amount expended on coal and coke by these companies rose from £5,613,000 in 1910 to £5,661,000 in 1911, and that there was a small increase in their expenditure on materials for the repair of locomotives.

The following statement affords some indication of the course of prices of coal and materials in recent years. The figures quoted in the case of coal relate to all descriptions of coal, and not to those kinds only which are used for railway locomotive purposes:—

Year.		Approximate price of coal at the mines, according to the "Mineral Statistics."		Average export prices, computed from the quantities and declared values of of the exports.		
				Of coal.		Of iron and steel rails.
		Per ton. s. d.		Per ton. s.		Per ton. £
1902	...	8 2¾	...	12·19*	...	5·44
1903	..	7 8	...	11·58*	...	5·32
1904	...	7 2½	...	11 02*	...	4 84
1905	...	6 11¼	...	10 47*	...	5 00
1906	...	7 3½	...	10 82*	...	5 63
1907	...	9 0	...	12 63	...	6 54
1908	...	8 11	..	12 65	...	6·12
1909	...	8 0¾	...	11 20	...	5 79
1910	...	8 2¼	...	11 63	...	5·86
1911	..	8 1¾	...	11·31	...	6 13

* The export price of coal includes, from April 19, 1901, to October 31, 1906, the export duty of 1s. per ton on coal valued at more than 6s. per ton.

It may be of interest to compare the number of train-miles run with the quantity of fuel consumed for locomotive purposes, and also with the cost of fuel to the companies. The following table shows the annual percentage increases or decreases which have occurred in these figures years by year since 1901 so far as the particulars are available:—

Year.		Increase (+) or decrease (−) in each year as compared with the previous year. In total train-mileage (all railway companies).		In quantity of fuel consumed for locomotive purposes (by all railway companies).		In cost of fuel (to 15 principal railway companies).
		Per cent.		Per cent.		Per cent.
1901	...	−0 8	...	−1 6	...	+ 0 03
1902	..	+0 2	...	+2·8	...	−15 8
1903	...	−1 5	...	+0 6	...	− 1·6
1904	...	+0 8	...	+0·4	...	− 2 5
1905	...	+1·0	...	+1 3	...	− 1 3
1906	...	+3 3	...	+4·3	...	+ 4 9
1907	...	+3·4	...	+6 9	...	+22 3
1908	..	−1·2	...	−3 3	...	+ 5 9
1909	...	−0·9	...	−1 8	...	−15·1
1910	...	+1 0	...	+1·6	...	+ 1·2
1911	...	+1·3	...	*	...	+ 0 9

* Not yet available.

During the years 1901-1910 the quantity of coal consumed for locomotive purposes increased by 11·3 per cent. and the total train mileage by 5·3 per cent., passenger train-mileage having increased by 21·3 per cent., while goods train mileage decreased by 14·2 per cent. The increase in coal consumption per train-mile was no doubt attributable to an increase on the whole in the speed of passenger tains and to heavier loading of goods trains. In 1911 the total train-mileage further increased by 1·3 per cent. The quantity of coal consumed for locomotive purposes by the companies collectively has not yet been ascertained.

The rates of increase shown under the head of "cost for wages" are the highest recorded since those of 1900 with the exception of the year 1907 when the increases were as follow:—In locomotive department, 5·2 per cent.; in traffic department, 3 5 per cent.; in the two departments taken together, 4·1 per cent. The total length of the running track of the railways of the United Kingdom at the end of 1911 was 39,916 miles, and the total length of sidings was 14,660 miles. At the end of 1910 the length of running track was 39,851 miles, and that of sidings was 14,460 miles. At the end of 1911 the length of line (in equivalent of single track) worked solely by electricity was 206¾ miles, and 258 miles were being worked partly by electricity. The corresponding lengths of line at the end of 1910 were 205 and 229¾ miles respectively. The total quantity of electrical energy used in 1911 was 250,296,470 Board of Trade units as compared with 235,933,706 in 1910. These figures do not represent the entire quantity of electrical energy generated, the quantity lost in conversion being excluded.

The following table shows the quantity of minerals carried by the principal companies in 1911 and the receipts therefrom, as well as the length of track and sidings open on December 31, 1911:—

Company.	Tons.		Receipts. £		Miles of track and sidings.*
England and Wales—					
Alexandra (Newport and South Wales) Docks and Railway	5,775,205	...	55,164	...	104
Barry	9,429,999	...	41,524	...	287
Brecon and Merthyr	3,127,763	...	67,349	...	107
Burry Port and Gwendraeth Valley	530,919	...	14,656	...	31
Cambrian	529,528	...	56,976	...	377
Cannock Chase and Wolverhampton	516,339	...	5,543	...	7
Cardiff	1,674,687	...	27,397	...	129
Cheshire Lines	4,748,928	...	121,533	...	419
Cleator & Workington Junction	1,249,452	...	52,993	...	59
Dearne Valley	1,490,773	...	31,870	...	39
East & West Yorkshire	794,737	...	18,322	...	19
Furness	3,378,854	...	220,679	...	369
Great Central	29,462,533	...	2,032,732	...	2,252
Great Central and N. Staffs. Joint	299,904	...	9,704	...	26
Great Eastern	7,366,101	...	993.016	...	2,540
Great Northern	16,557,754	...	1,624,553	...	2,655
Great Western	44,927,244	...	3,620,936	...	6,645
Hull and Barnsley	3,973,169	...	339,894	...	295
Lancashire & Yorkshire	18,930,386	...	1,370,388	...	2,194
Llanelly and Mynydd Mawr	243,282	...	10,175	...	15
London & N. Western	43,699,795	...	3,599,831	...	5,502
London & S. Western	4,341,779	...	490,122	...	2,218
London, Brighton and South Coast	3,115,753	...	393,336	...	1,234
London, Tilbury and Southend	682,641	...	36,025	...	222
Manchester Ship Canal and Railway†	1,797,569	...	32,754	...	156
Manchester, S Junction and Altrincham	1,979,487	...	16,626	...	36
Maryport and Carlisle	778,984	...	50 309	...	100
Methley Joint	510,438	...	6,515	...	14
Midland	41,780,500	...	4,898,723	...	4,852
Midland and Great Northern Joint	706,750	...	49,934	...	337
Neath and Brecon	1,360,166	...	53,852	...	54
North-Eastern	51,064,551	...	3,511,437	...	4,842
North London	1,635,452	...	67,643	...	69
North Staffordshire	5,687,145	...	362,381	...	501
Oldham, Ashton-under-Lyne, and Guide Bridge Junction	309,750	...	5,512	...	18
Rhymney	9,822,639	...	254,592	...	162
Somerset and Dorset	687,790	...	61,319	...	179
S.-Eastern & Chatham	4,237,042	...	406,394	...	1,588
South Yorkshire Joint	564 873	...	16,141	...	35
Stocksbridge	251,901	...	5,716	...	5
Taff Vale	17,661,258	...	562,692	...	387
Wirral	457 565	...	8,159	...	40
Metropolitan	2,131 952	...	50,711	...	132
Metropolitan District	284,519	...	4,113	...	65
Total England and Wales (all lines)	352,650,146	...	25,973,674	...	42,212
Scotland—					
Caledonian	21,700,902	...	1,310,041	...	2,713
Glasgow & S.-Western	7,106,898	...	413,865	...	1,104
Great N. of Scotland	563,324	...	67.974	...	523
Highland	328,447	...	49.798	...	636
North British	24,991,466	...	1,616,779	...	2,652
Total Scotland (all lines)	54,850,007	...	3,465,499	...	7,773
Ireland—					
Great Northern of Ireland	586,319	...	83,709	...	827
Great Southern and Western of Ireland	627,181	...	99,444	...	1,537
Midland (Irish Sections)	414,761	...	48 350	...	364
Total Ireland (all lines)	2,311,948	...	306,562	...	4,591

* Equivalent of single line. † In addition to the traffic on the canal, including 3,198,814 tons of minerals, on which dues, tolls, and wharfages were paid to the company, a very large traffic passed free along the canal.

Practical steps towards opening up the sealed portion of the Cadeby Colliery were taken on Saturday, when relays of picked men from Cadeby and other collieries commenced their task of removing the brick stoppings. Mr. W. H. Chambers, managing director of the Denaby and Cadeby Collieries Company Limited, and Mr. H. S. Witty, agent, who has temporarily taken over his old position as manager of the Cadeby mine, have personally supervised the arrangements. The stoppings were built 9 ft. thick at 33's level, and 14 ft. thick at 14's level. Later another stopping was put up outside 33's, and this has formed an exhaustion chamber for an inert gas, which has been pumped into the sealed area for some days. The stoppings will be taken down and re-erected nearer the seat of the fire, and so on, pulling down and rebuilding, until the ventilation of the affected area is restored sufficiently to allow of the place being prepared for entering.

THE "RAVENSBOURNE" PUMP.

We recently had the pleasure of inspecting, at the works of Messrs. Merryweather and Sons, Greenwich-road, London, S.E., a new type of pump known as the "Ravensbourne." It can be arranged either for portable or stationary form, and is suitable for driving by electric, petrol, oil, gas, or other motive power engine.

The pump which was on test at the time of our visit, an illustration of which is given in the first figure, was of the portable type and driven by a small petrol engine. A great advantage of a pump of this kind is that it can be wheeled about and worked by one man, and a further advantage is that in the case of rough country where the passage of wheels would be inadmissible, crossing ditches, &c., it is capable of being carried by four men. Extra wide wheels are fitted where it is necessary to wheel the pump over soft ground.

The pump is of the double-barrel reciprocating type, constructed entirely of gunmetal, the air vessels being of copper. The pump crank shaft is driven by the engine through a special speed-reducing gear, consisting of a double train of machine-cut steel tooth wheels, running in a gunmetal casing which forms an oil bath. The petrol motor is capable of developing 2-horse power, and is of a single-cylinder vertical type. The cylinder is water-jacketed, the cooling being carried out on the thermo-siphon principle from a separate tank shown at the rear of the pump. Ignition is supplied by means of a high-tension magneto, and a carburetter of the latest type for petrol is provided, although we were informed that a carburetter to use either patrol or paraffin, should it be found difficult to obtain a supply of the latter, would be fitted if desired. A relief valve is provided to prevent injury to the pump in the event of the delivery branch being shut down while the engine is running. A light detachable sheet metal covering for the motor completes the set.

For the purpose of demonstrating the pump's efficiency as a fire extinguisher, a ¾ in. jet was fitted, and its behaviour was highly satisfactory, throwing a jet of water on to an adjacent building some 40 to 50 ft. in height, at the rate of 1,000 gallons per hour. For filling tanks we were told that the same pump was capable of delivering 1,000 gallons per hour to a height of 60 ft., or half the quantity at double the height. In the event of the apparatus being required for spraying purposes, the diameter of the pump plungers is reduced so as to obtain the higher pressure, up to 200 lb., necessary for spraying purposes. A special feature of the apparatus is that the pump can be disconnected if required, and the petrol engine employed for the purpose of driving light agricultural machinery by means of a belt, for which purpose a 13 in. pulley is provided between the pump and the gearing.

The second illustration shows the "Ravensbourne" pump in stationary form, the power in this case being obtained from an electric motor. The pump is of larger capacity than that fitted to the portable petrol set, being capable of delivering 2,700 gallons per hour. The motor is also capable of developing 3 B.H.P., and is wound for 100 volts direct current. Sets of this description, we understand, have been supplied to estates both abroad and in this country. The drive from the electric motor is transmitted through spur gearing, the whole being mounted on a suitable bedplate ready for bolting down, and forms a very light and compact installation. Messrs. Merryweather inform us that the "Ravensbourne" pump has met with considerable success, and is now being extensively adopted in cases where light pumping machinery is in demand. For its size, the makers claim it to be the most efficient pump on the market for negotiating a deep suction lift, being easily capable of working on a lift of 25 ft. It appeared to us to be very light in weight and simple in construction, and is undoubtedly excellently adapted for service as a general utility pump.

It may not be out of place to call attention to the notice we gave in our issue of March 1910, describing a new enterprise this firm had then started by the manufacture of woven canvas fire hose. At that time it was quite in its infancy, being the first venture in London of this new industry. It was, therefore, interesting to note on our recent visit the great activity in the weaving factory on passing through the works. We were informed that it had been found necessary to considerably extend the machinery in order to keep up the ever-increasing supply.

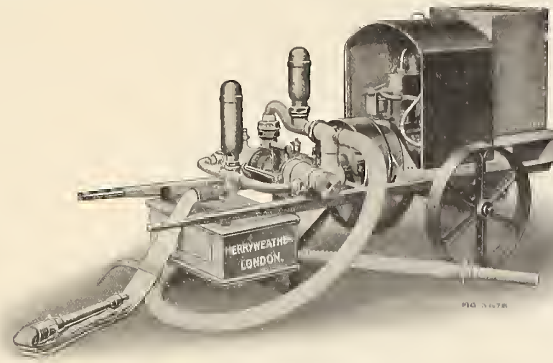


Fig. 1.—"Ravensbourne" Pump, Portable Type.

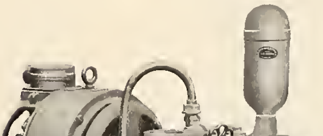


Fig. 2—"Ravensbourne" Pump, Stationary Type.

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, August 9, 1912, is as follows:—Alexandria, 3,258 tons; Antwerp, 100; Amsterdam, 2,506; Algiers, 454; Bremen, 3,051; Copenhagen, 674; Cronstadt, 28,796; Christiania, 98; Dahlsbruk, 1,493; Drontheim, 231; Dantzig, 587; Gefle, 1,217; Gothenburg, 274; Ghent, 903; Hamburg, 6,943; Harburg, 554; Harlingen, 1,197; Heligoland, 188; Husum, 523; Iggesund, 1,182; Libau, 201; Malmo, 1,414; Oxelosund, 4,930; Pernau, 3,077; Riga, 993; Rotterdam, 7,418; Rystad, 1,938; Rouen, 3,312; Stockholm, 52; Stettin, 273; St. Petersburg, 10,698; Trieste, 200; Trelleborg, 1,402; Venice, 975; Wasa, 4,072—total, 95,544 tons; corresponding period, August 1911, total 90,959 tons.

Income-tax and Wasting Assets.—In debate on the Finance Bill, in the House of Commons recently, Mr. Pollock moved a new clause making provision for the Income-tax Commissioners to allow deductions to be made in income-tax returns in respect of inherently wasting assets. He said he had eliminated such wasting assets as were not truly entitled to immunity. Mr. Pete supported the clause. The Chancellor of the Exchequer said this was a problem which embarrassed and perplexed every Chancellor of the Exchequer. He quite agreed that it was a matter which should be dealt with, but if this clause were carried it would involve a loss to the Revenue of at least £2,000,000. The principle which was sought to be laid down in regard to foreign minerals would also be applicable, so he had been advised, to the British coalfields, and that made it a very serious proposition. It would be impossible to apply the clause without completely readjusting the whole machinery of the income-tax. There was no Chancellor of the Exchequer who would not desire to remedy the grievances mentioned by hon. members opposite, but to do so on the lines suggested would involve a great loss to the Revenue, especially in regard to foreign mines. Whilst he sympathised with its object, he could not accept the amendment. The clause was rejected by 172 votes against 87.

REPORT BOOKS AND FORMS IN REGARD TO COALMINES UNDER THE INDIAN MINES ACT, 1901.

The Indian Mines Act, 1901, in effect corresponds to a combination of the coalmines, metalliferous mines and quarry legislation of the United Kingdom. It extends to the whole of British India, including British Baluchistan, the Santhal Parganas, and the Pargana of Spiti; it applies to all workings made for commencing or opening any mine, and also to any pit, quarry or other excavation, any part of which exceeds 20 ft. deep or extends beneath the superjacent ground. The Act is founded upon the British Coal Mines Regulation Act, 1887, which has recently given place to the new Coal Mines Act, 1911, modified so as to meet the peculiar requirements of India.

It is interesting to note that in certain cases variations in the Indian Act from the Coal Mines Regulation Act, 1887, have been adopted in the Coal Mines Act, 1911. For example, instead of including General Rules in the body of the Act, section 20 (1) enables the Governor-General in Council to make rules for the whole or any part of British India for carrying out the purposes and objects of the Act, and gives similar power to each local government, with the previous sanction of the Governor-General in Council, for the whole or any part of the Province.

As in the Coal Mines Act, 1911, certain subjects for such rules are specifically enumerated, as follows, but without prejudice to the generality of the power contained in the section:—

(*a*) regulate the duties and powers of the Chief Inspector and of inspectors of mines in respect of the inspection of mines under this Act, and provide for appeals from the orders of the Chief Inspector and inspectors of mines;

(*b*) provide for the appointment of chairmen and members of mining boards and committees and regulate the procedure of such boards and committees;

(*c*) prescribe the duties of owners, agents and managers of mines and all persons acting under them;

(*d*) prescribe the qualifications of managers and of all persons acting under them;

(*e*) regulate the manner of ascertaining, by examination or otherwise, the qualifications of managers and persons acting under them, and the granting and renewal of certificates of competency;

(*f*) fix the fees (if any) to be paid in respect of such examinations and the grant and renewal of certificates as aforesaid;

(*g*) provide for the making of enquiries into charges of misconduct or incompetency on the part of managers and persons acting under them, and for the suspension and cancellation of certificates of competency;

(*h*) prescribe the matters in respect of which notices, returns and reports shall be furnished by owners, agents and managers, the forms of such notices, returns and reports, the persons and authorities to whom they are to be furnished and the particulars to be contained in them;

(*i*) prescribe the plans (if any) to be kept by owners, agents and managers, and the manner and places in which they are to be kept for purposes of record;

(*j*) regulate, subject to the provisions of the Indian Explosives Act, 1884, and the rules thereunder, the storage and use of explosives;

(*k*) provide for the safety of the persons employed in mines, their means of entrance thereinto and exit therefrom, the number of shafts or outlets to be furnished, the fencing of shafts, outlets and passages, and the care of all machinery;

(*l*) prohibit, restrict or regulate the employment of women or children either below ground or on particular kinds of labour where such employment is attended by danger to the life, safety or health of such women or children;

(*m*) require owners or agents to maintain registers of women and children employed, and prescribe the forms of such registers;

(*n*) provide for the water supply, sanitation and conservancy of mines;

(*o*) provide for the safety of the roads and working places in mines;

(*p*) provide for the ventilation of mines and the action to be taken in respect of noxious gases;

(*q*) require and regulate the use of safety lamps in mines;

(*r*) provide against the accumulation of water in mines;

(*s*) regulate the procedure on the occurrence of accidents in mines and the supply of medical appliances and comforts for the benefit of persons injured therein:

(*t*) provide for the fencing of any mine or part of a mine, whether the same is being worked or not, where such fencing is necessary for the protection of the public;

(*u*) provide for the protection of public property and works from injury in respect of any mine when the workings are discontinued; and

(*v*) prescribe the notice to be given by the owner, agent or manager of a mine before extending any mining operations under his control at or to any point within 50 yards of any railway subject to the provisions of the Indian Railways Act, 1890, or of any public works or classes of public works which the Local Government may, by general or special order, specify in this behalf.

Sixty-four rules made under section 20 (1) were in force on December 31, 1910, 54 having application to all coalmines, and 10 applying to all mines in British India.

The 54 rules are under notifications by the Governor-General in Council, dated March 10, 1904, April 21, 1906, and October 23, 1908, and refer to (*a*), (*d*), (*e*), (*f*), (*g*), (*i*), (*j*), (*k*), (*o*), (*p*), (*q*), (*r*), and (*t*).

The 10 rules are under notification by the Governor-General in Council, dated December 30, 1908, and refer to (*a*), (*h*), and (*v*).

In addition to what may be termed General Rules under section 20 (1), the owner, agent or manager of a mine *may* make special rules for the control and guidance of the persons acting in the management of, or employed in or about, the mine as he may deem necessary to prevent accidents and provide for the safety, convenience and discipline of the persons employed in or about the mine.

So far little advantage has been taken of this permissive power, but it will now be necessary to establish special rules generally throughout the coalfields, and a model code is now under consideration by the coalmining communities in India.

As is the case with the coalmining legislation of the United Kingdom, reports, registers, records, authorisations, appointments and notices are required by the Indian Mines Act, and by the General and Special Rules issued under its provisions.

The following is a list of these requirements. Prescribed forms (indicated thus: *Pres.*) are prescribed by the rules made under the Indian Mines Act.

Sec. 3 (*a*.) Appointment of "agent."
13 (1.) Appointment of manager.
[Pres.] 16. Notice in writing by owner, agent, or manager to inspector of mines of new mines.
[Pres.] 17. Notice by owner, agent, or manager to prescribed authorities of occurrence of accident causing loss of life or serious bodily injury.
20. (Rules.)

Notification, March 10, 1904.

Rule 2 (*g*). Appointment by owner, agent, or manager of competent person to examine the state of the external parts of the machinery and of the headgear, ropes, chains and other similar appliances of the mine which are in actual use both above ground and below ground.
2 (*g*). Report of examination under this section to be recorded in a paged book.
4 (*a*). Appointment by owner, agent, or manager of competent person to inspect every part of a mine in or through which any person has to work or pass.
4 (*b*). Report of inspection under Rule 4 (*a*) to be recorded in a paged book.
5. Appointment of competent person to make inspection after withdrawal of workmen.
5. Report of inspection under this section to be recorded in a paged book.
5. Report under this section that mine or part is not dangerous to be recorded in a paged book.
Rule 12. Plan (with form for filing) of abandoned mine to be sent by owner to Chief Inspector of Mines.
13 (*g*). Appointment by manager of competent person to fire shots.
17 (*a*). Appointment by manager of competent person to examine safety lamps.
17 (*c*.) Authority to carry a lamp key.

Notifications, April 21, 1906, and October 23, 1908.

50. Authority by owner, agent, or manager to competent person to act as manager in emergent cases.
50. Written notice by owner, agent, or manager to Chief Inspector of Mines of appointment of manager in emergent cases.
53 (*b*). Report in writing by owner, agent or manager to chief inspectors of mines, changes of address of managers, and particulars of all new appointments.

Notification, December 30, 1908.

[Pres.] 1. Annual returns by agent (or if there is no agent, by the owner or manager) to Chief Inspector of Mines *and* district magistrate, of persons employed, output of minerals, accidents, and inspections.
2. Notice by owner to Chief Inspector of Mines of abandonment of mine.
3. Notice by owner to Chief Inspector of Mines of reopening of mine.
4. Notice by owner, agent, or manager to Chief Inspector of Mines of change of name of mine, owner, or agent.
5 and 7. Notice (accompanied by plan) by owner, agent, or manager to Chief Inspector of Mines *and* Railway Administration of intention to extend mining operations to vicinity of railway.
6. Notice by owner, agent, or manager to be renewed if operations in respect of which notice is given under Rule 5 are not commenced within a certain time.
8. Notice by owner, agent, or manager to Chief Inspector of Mines of accident causing loss of life or serious bodily injury, or when an accidental explosion occurs in a mine.
10. Notice by owner, agent or manager to Chief Inspector of Mines when any person dies as the result of an injury already reported as serious under Rule 8.

Section 21.—Special Rules.

As already stated, a draft code of rules has recently been under consideration by the Government and mining communities of India. The requirements under these rules, when settled, will be given in a future article.

At the half-yearly meeting of the North-Eastern Railway Company, Lord Knaresborough alluded to the effect of the coal strike. Of the £368,000 reduction in revenue, he said £328,000 could be attributed to the falling-off in mineral traffic. With every sign of good trade it would not have done, said his lordship, for them to curtail their wagon-building programme, and not only had they not done that, but they had made arrangements for hiring a thousand additional wagons, which were now in course of delivery. His lordship impressed upon the users of wagons the desirability of releasing wagons promptly. If the North-Eastern wagons were placed end on end they would cover 450 miles of line, and therefore users would appreciate the difficulties which would arise at terminals and on running lines if the stock became unnecessarily large. The National Insurance Act, continued Lord Knaresborough, would cost the Company £40,000 a year and represented ¼ per cent. dividend, and an additional income tax at the rate of 5d. in the £. He believed that such taxes would ultimately have to be borne by wages.

THE EXPLOSIBILITY OF CARBONACEOUS DUST.

Report on Two Explosions.

A White Paper [Cd. 6223] has been issued by the Board of Trade, containing reports by H.M. inspectors of factories on the circumstances attending explosions which occurred at the works of Messrs. William Primrose and Sons Limited, Centre-street, Glasgow, on November 10, 1911, and at the works of Messrs. J. Bibby and Sons, Formby-street, Liverpool, on November 24, 1911.

In the first of these explosions five persons were killed and eight injured. Mr. W. Sydney Smith, H.M. inspector for dangerous trades, considers the cause to have been the ignition of carbonaceous dust, possibly by a spark, but more probably by a naked light. China beans mixed with a proportion of Pnyin beans from Calcutta were being ground, and the China beans are said to contain stones. Such stones would, however, be broken into small fragments in the bean breakers and crushers on the second floor before the crushed beans reached the millstones. Any sparking due to contact of stones between the chilled iron plates of the crushers would most probably occur at these machines, but these showed no signs of explosion. Small fragments of stone, if present in the feed to the millstones, would scarcely cause sparks, but if sparking had occurred within the millstones it is doubtful if the heat produced by such sparks would be sufficient to ignite the dust. Consequently the sparking theory is rejected. The inspector points out that on the wall of the room was a length of rubber tube and a portable gas burner on a bracket. There was slight leakage from the discharge holes of the mills; it is conceivable that a jet or puff of dust in the direction of the burner, if sufficiently dense to come in contact with the flame, might have originated the explosion. Mr. Smith is inclined to think that the direct cause, however, was the fall of dust from an overhead beam on to the Bunsen burner. This dust was in a state of fine subdivision, and had the appearance of pale brown flour. A sample of dust from this beam was submitted to Dr. Wheeler, chemist to the Home Office Committee on Explosions in Mines, for examination as to its explosive properties. These experiments showed that the dust, if blown into an explosion tube, could be ignited at a lower temperature than many samples of coaldust—viz., at 1,050 degs. Cent., and the flame travelled along the whole of the tube as a bright flash, the speed of travel being appreciably faster than in the case of the majority of samples of coaldust tested in a similar manner.

Mr. John Jackson, H.M. inspector of factories, in his report on the explosion at Messrs. Bibby's works, records that 39 persons were killed and 101 others were injured. The explosion was, in his opinion, due to the ignition of a dense cloud of dust produced by the breaking of the driving belt of the "street and dressing machine" disintegrator in No. 1 floor of block 18. With a view of ascertaining the explosive properties of this dust, Mr. McNair has made a number of experiments with dust collected from wall ledges and overhead pipes in another room in the premises where disintegrators were at work. Briefly the results were:—(*a*) The dust was not explosive if suspended in the air in small quantities; (*b*) A dense cloud of dust yielded an explosion with—(1) an ordinary lucifer match when ignited in the dust; (2) the flame of an ordinary gas jet; (3) the flash caused by fusing of an electric fuse wire; (4) the spark produced by breaking circuit of an electro-magnet; (*c*) negative results were obtained in a dense dust cloud with—(1) sparks produced by grinding steel on an emery wheel; (2) a tobacco pipe filled with glowing tobacco; (3) a glowing cigarette.

The inspector considers three possible causes of ignition—the striking of a match, the breaking of a magnet circuit with resultant spark, or the bursting of an electric fuse. An examination of the fuses on the lighting circuits showed that two of them had blown. Experiments made by Mr. Ram and Mr. McNair with similar fuses, melted by gradually raising the current, and leaving behind a similar long length of wire after they had failed, were found to give a flash sufficient to fire a dust cloud.

In a note, Mr. Sydney Smith, inspector for dangerous trades, states that the exceedingly inflammable nature of dust samples collected from Messrs. Bibby and Sons' factory has been verified experimentally by Dr. Wheeler, chemist to the Home Office Committee on Explosions in Mines. The average ignition temperature of the samples is slightly less, while the flame-propagation in a dust cloud is even greater, than that of many varieties of coaldust, tested under identical conditions. Under ordinary working conditions the amount of dust in the air of the rooms of this factory would be insufficient to flame even in the presence of naked lights. In the case of coaldust about 2 oz. of dust per cubic yard of air are necessary for this; probably the same proportion applies in the case of carbonaceous dusts of cake mills, grist mills, flour mills and similar works. He thinks the cause of the ignition must be left an open question.

In an appendix, Mr. L. C. McNair, H.M. inspector of factories, states that the dust which was collected from the tops of pipes and wall ledges in rooms unaffected by the explosion showed on analysis the following percentage composition:—

Carbohydrates	30·81
Moisture	9·03
Ether extract	12·10
Albuminoids	38·90
Ash	6·00
Fibre	2·50
	100·00

The sample was of a fibrous nature, and although the dust was very light, considerable difficulty was experienced in devising means to keep the particles in suspension in air long enough to produce conditions suitable for explosion. The results of Mr. McNair's experiments have already been outlined.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Increase of Wages Granted, 6¼ per cent. on the Standard—Important Memorandum of Warning from Coalowners—Colliery Groups Seek Special Treatment Under Statutory Award—Railway Companies wish to Raise Coal Rates—Complaint of Insufficient Dock Facilities at Cardiff—Questionable Points in the Award Decided—Amount of Local Rates Exceed Colliery Profits—Swansea's Trade Still Booming.

A meeting of the Conciliation Board was held on Friday last, when the workmen's representatives submitted a demand for increase in the wage rate by 6¼ per cent., which would bring the total up to 57½ above the standard—only 2½ below the maximum of 60 per cent. The owners agreed to concede the demand, and consequently there was no need to call upon the independent chairman, although, as a matter of fact, Lord St. Aldwyn was in Cardiff, having been called in to deal with the question of interpretation of award which is referred to elsewhere. It will be remembered that the men were entitled to some advance on the occasion of their last application; but they made the mistake of asking too much, rejecting the smaller offer of the employers, and as the chairman can decide only "yes" or "no," his decision had to go against the men on account of their excessive demand.

The following is the text of copy of a memorandum which the coalowners' representatives handed to the workmen's representatives when giving their decision as to the increase of wages:—

> The owners' representatives have given very careful consideration to the application of the workmen's representatives for a further advance of 6¼ per cent in the general wage rate; and they wish to remind the workmen's representatives that, quite apart from the great advance which has taken place in the cost of working in recent years owing to the increase in wages cost, the colliery owners, in addition to the Eight Hours Act, now have to bear the burden of the new Coal Mines Regulation Act, Minimum Wage Act, and the National Insurance Act, this legislation having been recently imposed upon the colliery owners. A very serious effect of these upon the cost of production is certain; and, when this has been ascertained, it will be necessary that it should have full recognition in the rates of wages to be paid. The additional burden of such a further advance in wages as is now proposed must be most detrimental to the working of the collieries; but, recognising their obligations under the Conciliation Board agreement, the colliery owners have decided to grant the advance.

At a meeting of the statutory Wage Board for South Wales, held on Friday, applications were made with regard to a number of collieries in Glamorganshire and Monmouthshire—that they should be accorded exceptional treatment because of excessive costs of production, and the resultant small margin of profit. The applications were not dealt with on Friday, but will come up for full consideration on Monday next, August 19.

It has to be noted in this connection that an endeavour is being made to raise again the question of increasing the railway rates in South Wales, apparently because shareholders have suffered in their dividends owing to the strikes of the past half-year. The question came up by formal resolution at the meeting of the Barry Company six months ago, the loss of dividend because of last year's strike being the prime motive. Later events have brought the matter still more prominently to the front. It is argued that all expenses are increasing, whilst the coal rates remain as they were fixed more than a quarter of a century ago; also, that all the prospect is of still further additions to the working costs. Nothing was done by the Barry board as the result of the discussion at their February meeting, and it is doubtful, whatever be the outcome of the present discussion, whether that company will take the initiative in any such movement, for that is the freighters' line, the board being composed mainly of coalowners. Moreover, there is the irresistible fact—one that could be urged with decisive effect before the Railway Commissioners—that these lines have, notwithstanding present experiences, a very high dividend record. The fact is concealed because the stock has been "split," and therefore the real amount of distribution upon the original stock is not disclosed clearly. Practically, they are 8 to 10 per cent. lines, and even higher.

Mr. Vassall, chairman of the Taff Vale Railway Company, put the idea of increased rates into explicit form at the shareholders' meeting. He said they must not lose sight of the claim by the railway companies to make a reasonable increase in their rates in order to meet the increase in their cost of working. There was the Government's pledge that they would this session further a Bill facilitating the imposition of such rates. There had been much discussion and correspondence between the Railway Association (representing the companies) and the Board of Trade (representing the Government), and they were not without hope that, whether any Bill was passed or not, some means would be found for bringing into effect the claim which the companies had for a reasonable increase of rates

Out of nearly 2½ millions of tons of coal carried by the Rhymney Railway Company during the first half of this year, as much as 1,435,219 tons were taken to the Cardiff docks, and this fact gives special importance to a complaint which was voiced at the half-yearly meeting by Mr. W. H. Bell, the deputy-chairman. A shareholder had asked if the coal traffic on the line generally was increasing to the satisfaction of the directors, and, if not, what was the reason? Mr. Bell answered that it was no use sending coal over the line unless they could ship it off at the end. A great deal more coal might come down if they had better facilities at Cardiff, but instead of being shipped at Cardiff it went to other ports where there were better facilities.

With reference to this complaint, Mr. Prosser, general manager of the Rhymney line, has since stated that for some time there has been a want of facilities at the Cardiff docks. Several large freighters had made complaint. He had made inquiries of a large colliery company why they were not sending their coal down the line as formerly, and was informed that, owing to the lack of facilities for quick shipment, they were sending their traffic to other places. The dock people were trying to do something, but they were very slow. If the new dock were properly equipped, plenty of additional tonnage could be dealt with.

From the dockowners' side, Col. Denniss, manager of the Cardiff Railway and Docks, states in reply that the diversion of coal to other docks "is entirely due to the Rhymney Railway Company having failed to provide storage facilities for coal awaiting shipment," though repeatedly urged to do so. "Every ton of coal sent to Penarth Dock involves the Rhymney Company in a loss of three miles of earnings, and to Barry Dock of nine miles of earnings." To him, he says, freighters have complained that they are compelled to send their coal to docks other than Cardiff, because of the lack of storage facilities on the Rhymney line, whereas on other railways there was substantial provision.

As to Cardiff Docks, Col. Denniss adds: "The appliances for coal shipping at the Bute Docks are far in excess of present requirements. The shipments are not within 30 per cent. of the capacity of the existing appliances." Four new movable coal cranes are to be put at the Queen Dock, which will complete its equipment, making it one of the finest coal-shipping docks in the country. The first is expected to be ready for use in six weeks.

The Rhymney Company are adding largely to their sidings accommodation for storage of coal, but these new sidings are five miles from Cardiff Docks.

Three points of doubt were resolved by the independent chairman at the meeting of the statutory Wages Board, these having arisen out of the interpretation of his award. First was the question whether the "standard" of 1879 should apply, or whether the 1877 standard or the anthracite standard was that upon which the award should be based. The owners contended that the 1879 standard was that which should be taken, and Lord St. Aldwyn decided in favour of this contention. On a second point, also, his decision was in the employers' favour. The workmen had argued that any rates below those fixed in the award were automatically wiped out; that, for example, where labourers were getting 2s. 10d. per day, the award had raised that rate to 3s. 2d., and that these men must be paid 3s. 2d. plus percentages.

Upon a third question the men were more successful. This referred to the requirement that daywagemen must work five-sixths of the time in order to become entitled to the minimum wage. If this applied to the night shift, where it is the custom to pay six turns for five worked, then (as the men's representatives pointed out) a man must work full time before he could claim the minimum. Lord St. Aldwyn is reported to have said that he did not intend the award to have that effect, but had meant the night shift to be in as favourable a position as the day men. He had placed five-sixths in his award and could not now alter it, but he suggested to the coalowners that they should take the workmen's arguments into consideration and endeavour to meet them. The coalowners assented to this suggestion, and will give the point their consideration.

Sir George White, presiding at the meeting of Main Colliery shareholders, made a remarkable statement as to the pressure of rates upon the industry. They had, he said, not only the extra charges put upon them by the Legislature, but also a great increase in the local rates. In 1900 they paid £1,446, which worked out at 0·83d. per ton; but last year they were mulcted in £5,563, or 2·79d. per ton; whilst for the year ended June 30 last they paid no less than £5,445, or 3·18d. per ton. The rating authorities were doing their best to kill the goose that laid the golden eggs. If it came to a question of cutting into the employment of 2,000 men, who represented half the population of Skewen, and the shutting up of hundreds of houses followed, they would discover too late that their policy was an unwise one. As a fact, the rates that the company had paid during the past two years had actually exceeded their profits, which was a ridiculous state of things, and not to be suffered any longer. The Main Colliery is situated near Neath, adjoining the Great Western main line.

Swansea Harbour Trustees had a very satisfactory report presented to them at their meeting. Trade has continued to advance, and one more record has been established. The comparative figures with last year need not be quoted, because these would be misleading, last year being a time of strike. It is enough to note that the totals exceed any previous month; and that present indications warrant expectation that before the end of the year the losses due both to the coal strike and to the sympathetic strike with London dockers will be more than made up. Similar indications prevail at all the other ports, the July shipments being very high, and at the present time well maintained.

Swansea Education Authority, holders of the mineral rights of the Aber estate, Maesteg (the revenue forming part of the endowment of their Intermediate School) have granted a new lease. Under the present lease, which has only a few years to run, the royalty has been 5·8d. per ton, and the new terms are reported to be £3,000 a year dead rent with 7d. per ton royalty. Messrs. Cory Bros. and Co. are the lessees. The area is 655 acres.

Speaking at a demonstration of miners at Porthcawl, Mr. W. Brace, M.P., president of the South Wales Federation, said that a strong Federation was now more necessary than ever, in order to see that the rules under Lord St. Aldwyn's award were not interpreted in a way adverse to the workman. The Federation was the power which had forced the Government to concede the minimum wage principle upon the statute book, which also would save the men from exploitation in the future. The award was taking higher wages into the homes of thousands of workmen, and it should be given the best chance, so that in administration its defects might be discovered and at the end of twelve months they might go before the independent chairman and show by facts and figures that the wage was not what it ought to be. If the award had done no more than establish the committees at the collieries, it would still be an enormous advantage, for instead of a man in an abnormal place having to make his own bargain, two of his fellows would go into the place and make it.

One estimate places the additional wage payments under the award to reach the total sum of one million sterling per annum. Others range downward to £600,000. Nevertheless, there is much criticism from the men's side, especially directed against the new rules.

Some feeling is expressed in certain areas because of failure in paying up wage arrears under the recent award, and another cause of unrest is the continuance of day-to-day engagement instead of monthly. To test the latter point, the Pontypridd and Rhondda delegates decided on Tuesday that action should be entered in every case where men had been dismissed on a day's notice.

Glyncorrwg sinkings have reached a good seam overlying the No. 2 Rhondda, and it proved to be 2 ft. 4 in. thick. The No. 2 is expected to be reached in about three months' time.

Ten thousand men at the Ebbw Vale collieries and ironworks have been idle for more than a week, the whole of the undertaking being disorganised and enormous loss occasioned—because a few lampmen chose to leave the Miners' Federation and join the Enginemen and Stokers' Union. No dispute or grievance existed as between the employers and the workmen, but solely on account of this inter-union disagreement, the entire body of employees have been stopped. The trade unions settled their differences on Tuesday. Meanwhile, £20,000 in wages had been lost, and the business of the company seriously injured.

WORKMEN'S COMPENSATION

(Specially Contributed.)

Capacity of a One-eyed Man.

Hargreaves v. *Haughead Colliery Company.*—This case (House of Lords) raised a question of general importance—namely, if a miner loses one eye by accident, and is subsequently able to resume work at full wages, is he entitled to have a declaration of liability made under which the employers will be held liable if cataract supervenes in the other eye?

It appeared that upon February 18, 1910, the appellant sustained injury by accident arising out of and in the course of his employment with the respondents, and as a result one of his eyes had to be removed.

The Sheriff-Substitute found that on November 12, 1910, the appellant's incapacity ceased, that he was fit to resume work as a miner, and that his wage-earning capacity was not diminished by the loss of his right eye. This decision was upheld by the Court of Session.

On appeal to the House of Lords, Lord Macnaghten said: "In this case, I think the injury plainly results from the loss of the man's right eye. At the time of the accident there was no sign of incipient cataract. It is not very clearly stated, but I think that is the fair result. It seems to me impossible to say that the arbitration ought to have been kept open. If a man gifted by Nature with two organs of vision loses one, then to say that the arbitration ought always to be kept open on the chance of his losing the other is, I think, absurd. For these reasons, I think the appeal ought to be dismissed, and I move your lordships accordingly."

The other learned lords concurred.

Are "Pupil" Children Dependents?

Young v. *Niddrie and Benhar Colliery Company.*—In this case (Court of Session, March 6) a miner, who was killed by accident in April, 1911, left a wife with two "pupil" children. In 1907 he deserted his wife and children, and they were maintained out of the earnings of the two elder children. The deceased did not contribute anything towards the support of the pupil children beyond occasional sums of 2s. 6d. and 3s., which he gave to them when he met them on the road, and sums amounting to £2, which he paid to the claimant when she met him on the road in the two years after desertion. In 1909 she obtained a decree in the Falkirk Sheriff's Court against him for aliment for the pupil children, but he avoided payment by leaving Castlecary, where he had been employed. The claimant tried to trace him, and afterwards learned of his death by accident in the respondents' pit.

In these circumstances the Sheriff-Substitute found that the pupil children were wholly dependent upon the earnings of the deceased within the meaning of the Act, and that therefore the employers were liable in compensation to the amount of £216 9s.

On appeal this decision was reversed. The Lord Justice-Clerk said the question was not, Was the person a dependent? but, Was the person at a certain time actually receiving benefits as dependent on one having an obligation to give support, that one being the injured servant of the master whom it was proposed to make liable to carry on that support? The practical value, and not the absolute right, was, in his lordship's opinion, the question. Dependents were to get compensation for what they had been receiving and had lost by the death, not for something they might have had if the deceased had done his duty while alive.

Refusal to Undergo Operation

Booker v. *Brodsworth Main Colliery Company.*—In this case (Doncaster, May 14) it appeared that on June 15, 1911, the applicant was pushing a tub out of a stall when he slipped and fell. The tub dragged him some distance, and he was caught in the side by one of the pit props. He received as a consequence compensation of 17s. a week until August 24. He was then told by Dr. Graham that he could do light work, and on September 1 he started pony-driving, but when he tried to lift something he hurt himself again, and could not work, but in October the colliery doctor told him there would be no money for him unless he started work. He then commenced shifting dirt, but this was too heavy for him, and he was ordered on compensation again. In February he was sent to a nursing home and asked to undergo an operation, but refused.

Applicant said that since the compensation was stopped he had to sell his furniture and go into lodgings.

Dr. Graham said he considered the man was fit to go back to work.

The case was eventually settled, the respondents agreeing to pay £20.

His Honour said that it was at his suggestion that the settlement had been arrived at. He knew the colliery company treated their men very fairly. Had he had to decide he would probably have dismissed the application. It must not go out that it was an admission of liability.

Compensation while in Prison

Bailey v. *Wearmouth Colliery Company.*—In this case (Sunderland, May 22) the question arose whether a man is entitled to compensation while he is in prison.

It was stated that applicant was employed as a labourer at the colliery, and on June 7, 1910, he was crushed between two wagons, his left hand being injured. In July 1911 he was arrested on a charge of housebreaking and assaulting the police, and at Durham Sessions, in the following October, he was committed to prison for six months. The compensation of 10s. 3d. a week was stopped on his arrest, and had not been resumed.

It appeared that there was no decision in the Court of Appeal on the question of continuing compensation to a person while in prison, but the county court judge at Lincoln had reduced the amount of compensation to 1d. per week during imprisonment so as to keep the award alive. Mr. Meynell also contended that the incapacity had ceased.

Judge Bonsey reduced the award to 7s. 6d. per week from the time the payment of compensation had been stopped.

Is a Blister an Accident?

Sturman v. *Shireoaks Colliery Company.*—In this case (Worksop, May 16) it appeared that while following his employment at Southgate Colliery, Clowne, the applicant raised a blister on his hand; blood-poisoning supervened. Eventually his little finger had to be amputated.

It was contended that it was not a question of amount involved so much as the principle as to whether a blister came within the meaning of the Act, as an accident.

His Honour said he held the opinion that the blister, though caused by the man's employment, was not of the nature of an accident or mishap required by the Act. In any case it was necessary to prove that the blood-poisoning was directly caused by the blister at the time.

While giving a verdict for the respondents he suggested, however, that it was a case where the company might meet the applicant in some way.

⁂ *We shall be pleased to answer in this column questions relating to Workmen's Compensation and Employers' Liability. All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.*

INDIAN AND COLONIAL NOTES.

India.

Indian Pig Iron for Japan.—The rate war between the British India Steam Navigation Company and the Nippon Yusen Kaisha on the India-Japan service has benefited importers interested in that trade. Amongst the most important branches of trade so affected is that of pig iron. For the most part the raw material has hitherto been imported from the Hanyang works in China at very remunerative rates as the result of mortgages held by the Japanese. The refusal of the Chinese shareholders to approve the plan put forward by the Mitsui Bussan and the subsequent stoppage of the works has necessitated a new source of supply being sought. The low freights ruling in the Indian trade have secured the orders for that country. The Mitsui Bussan, as agents for the Imperial Iron Foundry at Wakamatsu, have placed orders for 30,000 tons with the Tata Iron Foundry, and various Osaka houses have contracted for a further 20,000 tons.

Africa.

The following are details of the reductions in railway rates which came into operation on July 30, as announced by Mr. Sauer in the House of Assembly:—South African coal, clay, earth, earthen pipes and tiles, bricks, native timber, limestone and other minerals, £303,000. Examples: From Withank to Johannesburg, 1s. 6d. per ton; Witbank to Kimberley, 7s. 3d. per ton; Witbank to Bloemfontein, 6s. per ton; Witbank to Cape Town, 31s. 9d. per ton; Glencoe to Kimberley, 9s. 6d. per ton; Glencoe to Capetown, 29s. 4d. per ton; Coalbrook to Kimberley, 4s. 8d. per ton; Coalbrook to Capetown, 25s. 1d. per ton. Maximum rate for any distance, 17s. 6d. per ton. A rebate on coal shipped oversea of 1s. per ton (this rebate will not be allowed on bunker coal), £20,000. Reductions in charges in shunting services at private sidings. This alteration will afford substantial relief to private siding holders, except in Natal, where little or nothing has hitherto been charged for services rendered, £50,000.

In the annual report of the executive committee of the Transvaal Chamber of Mines it is stated that there have been complaints in connection with the supply of trucks for coal traffic, arising from the admitted shortage of rolling stock, delay in clearances by the railway of trucks from dispatching stations, and, in some instances, delay in off-loading. This has affected not only goldmines, but collieries, power stations, and export depots at the ports. At the instance of the Transvaal Coal Owners' Association the executive committee took the matter up, and appointed a small sub-committee to meet the General Manager of Railways. At the conference which took place in July it was pointed out that, owing to the deficiency in the number of coal trucks, many of the mines had been on the verge of stopping work, and the collieries had at times been at a standstill. The general manager admitted the seriousness of the position, which, he explained, had been accentuated by various causes, including the restricted number of locomotives. He was able to state that rolling stock for coal traffic was to be supplemented almost at once by the addition of 135 large trucks and 50 hopper trucks, and anticipated that the position would be satisfactory by the end of the year.

Australia.

Mr. Edward Dunn, F.G.S., is about to retire from the post of Director of Geological Survey of Victoria. Mr. Dunn was born in Bristol in 1844 and succeeded Professor Gregory in 1904.

The directors of the Broken Hill Proprietary Company announce, in a circular to shareholders, that they propose to embark upon the business of manufacturing iron and steel. They state that they are of opinion that an opportune time has arrived for an extension of the company's business and for the utilisation of the large iron ore deposits at Iron Knob for the manufacture of iron and steel. It will be remembered that the general manager, Mr. Delprat, was recently sent to Europe and America in order to enquire into the whole proposition. As a result, the services of an expert were secured. His report, confirmed by the general manager, is stated to be most favourable as to the results to be obtained by the company from the industry. The directors propose to make certain alterations in the memorandum and articles of association and to increase the capital by the creation of 540,000 shares of 8s. each, so as to enable them to make financial arrangements for obtaining additional capital on terms most beneficial for shareholders, and in connection with any scheme decided upon the shareholders, it is stated, will be given priority in participation. An extraordinary general meeting of the company will be held at Melbourne on September 27 to consider the proposals

Caledonian Coal Company.—It is announced that the purchase by the shipping firm of Howard, Smith and Co., of Melbourne, of a controlling interest in the Caledonian Coal Company, has been followed by a not wholly unexpected development, it having been decided to transfer the head office from Glasgow to Newcastle, New South Wales. The move is regarded generally as one of considerable importance, as it signifies that in future all chartering of ships by the company will be done from the Australian port, instead of from Glasgow; and when it is considered that on the chartering of a fair sized trampsteamer the brokerage alone amounts to about £1,500, this is a very important departure. Hitherto the Newcastle offices of most of the northern colliery companies have been subordinate to the head offices at Sydney or elsewhere, and the decision of the Caledonian Company to establish its headquarters in Newcastle is not unlikely to be generally followed.

Coal Discovery in New South Wales.—Amongst recent coal discoveries in the State, one at Pillaga, 384 miles north-west of Sydney, is attracting considerable local interest. It appears that while sinking a sub-artesian bore on private property, a 3 ft. seam was gone through. A further 20 feet was sunk, when another seam was struck. The coal is of good quality and will find a rapid consumption in the district, the local timber supplies being limited

Coal-cutting Machines.—"Are coal-cutting machines dangerous?" This is the latest question raised (writes our Sydney correspondent) in coalmining circles, the men at Hebburn Colliery having declined to work coal-cutting machines to cut pillars in the mine, on account of alleged danger to the workers, who assert that the machines make so much noise when in operation that they cannot hear the coal face of the roof working. Consequently they are unable to tell when falls of coal are likely. It is contended by some of the men that if the noise of the machines cannot be silenced, either partially or wholly, their use should be prohibited. The State Chief Inspector of Collieries, with other officials, is now investigating the matter.

Alleged Unnecessary Regulations.—The Minister for Mines has been asked by a deputation of Queensland colliery owners and managers in the southern districts not to enforce the new regulations relating to continuous ventilation, employment of ten men in mines having only one outlet, employment of a special worker to fire all shots, and the locking up of all detonators. It was explained that none of their mines were gaseous, and that the precautions insisted upon were unnecessary and expensive. It was decided to ascertain what could be done in the matter.

Canada.

It is probable that the Dominion Coal Company will very shortly begin to develop the Springhill property, and two additional collieries are projected. Diamond bores have been put down, with gratifying results.

The Commission which was appointed by the Nova Scotia Provincial Government to enquire into the causes of the flooding of the Port Hood Colliery last June visited the mine during the week ending June 1 and took evidence.

Our Toronto correspondent says:—The city authorities of Toronto are considering whether, in view of the large consumption of coal by the city and the increase in the price of American coal, it would not be profitable to import coal direct from the British mines. Mayor Geary, who is now in England, has been instructed to investigate the coal situation in Wales, and to ascertain whether it would be possible to have Welsh coal delivered here at a reasonable rate.

The Minto Coal Company has been organised to take over the coal interests recently acquired by Sir Thomas Tait in Queen's and Sunbury counties, in the Grand Lake district of New Brunswick. It has an authorised capitalisation of 400,000 dols. Associated with Sir Thomas Tait are John Henderson, of Northfield, Sunbury county, A. R. Slipp and R. B. Hanson, of Fredericton, N.B., and Victor E. Mitchell, K.C., Montreal. Estimates place the amount of coal in the deposits at almost 2,000,000 tons. The company are preparing to ship large quantities over the Gibson and Minto Railway before the end of the year, and are erecting about 50 working men's houses at Minto.

Our Toronto correspondent says Mr. J. B. Dowling, of the Canadian Geological Survey, recently made an examination of the coal deposits about 40 miles south of Moose Jaw, Saskatchewan, with the result that his estimate of the quantity of the available supply of coal in the southern part of the province of Saskatchewan has been greatly increased. Last year this was placed at 13,000,000,000 tons, but Mr. Dowling's later investigation indicates that there is probably twice that quantity. The Government of Saskatchewan proposes to establish a cheap power system for the transmission of power from the coalfields to supply Regina, Moose Jaw and other towns, and has appointed W. O. Wynne Roberts, late consulting engineer to the city of Regina, to make an exhaustive report on the coal areas of Southern Saskatchewan in connection with the projected power scheme, which, if found to be feasible, will be begun as soon as possible.

The Nova Scotia Steel and Coal Company have equipped a rescue car to serve their scattered collieries, which possesses some interesting features. The car is similar to those equipped by the United States Bureau of Mines, but in addition to carrying breathing apparatus, the Nova Scotia Company's car is fitted with hose and reel and connections, fire extinguishers, axes &c., for fighting either surface or underground fires. Twelve sets of Draeger apparatus with the necessary oxygen reserve and a refill pump are provided, together with blankets and sleeping accommodation for the rescue teams. The car is also provided with all necessary surgical appliances and dressings and is provisioned. A recharging station for the electric bandlamps is installed on board, and a portable telephone which can be immediately attached to the nearest telephone circuit is provided. Upon certain signals being given, the nearest available engine-driver will attach his locomotive to the rescue car and proceed to the indicated colliery This is the first car of the kind in Canada, and although it is not equipped on such an expensive scale as some of the rescue cars of the United States Mines Bureau, it has certain unique features, and will, it is hoped, prove the pioneer car to be followed by others in Canada. Canadian roads and distances do not lend themselves to motor-car transport such as is adopted at the English and Scotch stations. The Dominion Coal Company have just received a full equipment of Draeger apparatus and Pulmotors to fit out a sub-rescue station for the new Lingan collieries and a station at the Springhill Mines. The Acadia Coal Company at Stellarton have also a fully-equipped station. It is understood the Canadian Commission of Conservation have in course of compilation a handbook on rescue work for mines, combined with fire-fighting and first-aid instruction.

LAW INTELLIGENCE.

HOUSE OF LORDS.—July 19.

Before the Lord Chancellor, Lords Macnaghten, Halsbury, and Atkinson.

The Statutory Duties of Managers.

Watkins v. the Naval Colliery Company Limited.—This action arose out of a cage accident which occurred at the Naval Colliery owing to a failure of the brake in August 1909. Several men were killed, including one Watkins. Mrs. Watkins, the widow, sued the company, and the action was tried before Mr. Justice Pickford, the jury returning a verdict for the plaintiff with damages £500 The verdict and judgment was appealed against, and the Court of Appeal reversed the decision at the Assizes. The South Wales Miners' Federation, for Mrs. Watkins, took the case to the House of Lords.

The Lord Chancellor, in giving judgment, reviewed the facts, and pointed out that some time before the accident occurred the respondents' manager increased the number of men allowed to travel in the cage from 21 to 26. On the occasion of the accident the gear did not work properly, and a spanner which was in use to cure the defect in the machinery proved defective. The result was that the whole strain fell upon the brake, which failed, resulting in several men being thrown violently down the shaft. At the original trial it was said there was no negligence on the part of the owners, owing to the fact that they employed a competent manager and other officials, and were therefore not liable. His lordship said he could see nothing and he had heard nothing to convince him that reasonable and proper care was taken. It was said in the Court of Appeal that the lords justices were satisfied that the colliery owners had done their best, and had good and proper officials, who had received proper instructions. But turning to the Coal Mines Regulation Act, it was expressly provided that when men were working in the pit proper apparatus should be provided for raising and lowering the men. This provision was not disputed, and he (the Lord Chancellor) was of opinion that there was a statutory obligation on the owners to provide proper apparatus for the purpose of raising and lowering the workmen. The further point of common employment was also raised, but he did not think this applied, and for these reasons he thought the plaintiff was entitled to succeed. It was really unnecessary to go into the question of common employment, having regard to the fact that it was a breach of statutory obligations on the owners to make the provisions he had spoken of. The statute appeared to impose a condition on the colliery owner without qualification, and the owner had to comply with this. The learned judges in the Court of Appeal considered they were bound by the Britannic Merthyr case, but in that case a new trial was all that was asked for. He moved that the judgment of the Court of Appeal be reversed, and the appeal be allowed, with costs.

Lords Macnaghten, Halsbury, and others concurred.

Lord Atkinson, concurring, said the rules relating to the construction and equipment of mines were put in unqualified terms. These imposed upon the owner the absolute duty to permit no person to be employed in the mine without the proper apparatus for lowering and raising, and the statutory liability of the owner was clear.

The appeal was then allowed with costs.

HIGH COURT OF JUSTICE.

KING'S BENCH DIVISION.—July 12.

Before Mr. Justice Pickford.

Strikes and Coal Deliveries.

Pharaon and Co. v. Pardoe Thomas and Co—This was an action brought by Messrs. Pharaon and Co., of Beyrout, Syria, against Messrs. Pardoe Thomas and Co., coal merchants, of Newport, Monmouthshire, claiming damages for alleged breach of contract by the defendants to supply to the plaintiffs 7,500 tons of Waen Nantyglo coal at 21s. 9d. per ton c.i.f. Tripoli. The plaintiffs were under contract with the Ottoman State Railways to supply them with 7,200 tons of coal, and they covered this by the contract in question with the defendants. The coals were to be delivered in two cargoes—the first to be shipped during the second fortnight in April and the second cargo during the second fortnight in July. The defendants failed to deliver the second cargo, their defence being that there was a strike, and that they were unable to deliver. They also pleaded a sub-contract with another colliery. It was contended for the plaintiffs that the strike clause, if there was one, did not operate if a ship could be found. With regard to the plea which the defendants also put in that they could not deliver owing to the war between Turkey and Italy, he contended that this defence could not be effective, as coal had never been declared contraband of war. With regard to defendants' suggestion that plaintiffs gave the defendants an extension of time for the delivery, this was denied by the plaintiffs. Counsel asked his lordship to award plaintiffs damage as they had forfeited their deposit of £1,400 to the Turkish Government, and they claimed altogether some £2,800.

For defendants it was maintained that it was quite evident from the letters that had passed that the defendants took up the attitude that the failure to send the coal was to be attributed to the conditions established as a result of the war between Turkey and Italy, and from that position they had not budged. It was submitted that the letters which formed the contract were to be held to be subject to a war clause, which would come into operation in the event of a European war, and he should call evidence to show that all contracts for coal were subject to such a clause.

His lordship said he must hold that the plaintiffs succeeded in the case, as there had been an undoubted breach of contract. There would be judgment for the plaintiffs for £2,750, with costs.

Stay of execution was granted on the usual terms.

July 18.

Before Mr. Justice Hamilton.

An Argentine Contract.

Cory Brothers and Co. v. the Port Argentine Great Central Railway Company Limited and Spilsbury.—In this action the plaintiffs claimed a return of money paid by them under an agreement of April 21, 1909, the consideration for which, they alleged, had failed. Major Spilsbury and the Port Argentine Great Central Railway Company obtained valuable concessions from the Argentine Government for the purpose of building a port and harbour in the bay of Semborombom, in Argentina. They approached Messrs. Cory, who agreed to take £10,000 preference shares, and to pay to Major Spilsbury £5,000. Messrs. Cory were, in exchange, to receive certain exclusive rights for the supply of coal, together with other rights. Plaintiffs paid the money, but said now that the defendants had entered into contracts in which they had not safeguarded their rights.

His lordship, giving judgment, said that, in his opinion, no breaches had been proved up to the date of the writ—not even a nominal breach. The defendants therefore won on all points.

Judgment was entered for defendants, with costs.

JUSTICIARY APPEAL COURT (SCOTLAND).—July 14.

Before the Lord Justice-General, the Lord Justice-Clerk, and Lords Dundas, Salvesen, Mackenzie and Guthrie.

Important Appeal under the Eight Hours Act.

W. H. Roger v. Stevenson.—This was an appeal by William Houston Roger, Rigend House, Townfoot, Dreghorn, who on January 26 at Kilmarnock Sheriff Court was charged that he, being the manager of Montgomeryfield Colliery, Dreghorn, Ayrshire, on five separate dates in October and November last failed to cause a register to be kept at the colliery in the form prescribed by the Secretary for State, contrary to the Coal Mines Regulation Act, 1908. It was found proved at the trial that (1) on October 24, 1911, four miners were below ground for 9 hours 20 minutes; (2) that the register produced was supplied to the colliery in official form, and that the entries were made by the pithead men; (3) that on November 13, 1911, an inspector of mines visited the colliery and inspected the register, at which time no cause was entered for the men being below ground for the period specified; (4) that on November 3, 1911, two firemen were below ground for 15½ hours, and that the cause of their detention below ground was not entered in the register at the date of the inspector's visit; and (5) on October 24, 1911, the men worked in a shift, the last man of which left the surface at 6.5 a.m., and the first man recorded as having returned to the surface at 8.30 a.m. Sheriff-Substitute Mackenzie found the appellant guilty of two out of five of the charges brought against him, and not guilty of the others, and a fine of £1, with the option of ten days' imprisonment, was imposed.

The Court quashed the conviction, with twelve guineas expenses. As the question raised is important, it was intimated that their lordships' reasons would be given in writing later.

SCOTTISH COURT OF SESSION.

OUTER HOUSE.—July 26.

Before Lord Cullen.

Successful Demurrage Claim.

Dampskibsselskabet Danmark v. C. Poulsen and Co.—This was an action brought by Dampskibsselskabet Danmark Copenhagen, Denmark, the registered owners of the steamship "Helge," of Copenhagen, against Christian Poulsen and Co., coal exporters, 70, Wellington-street, Glasgow, for £142 10s. of demurrage. By charter party dated July 5, 1911, the defenders chartered the "Helge" to proceed to Leith, whence, after loading a full cargo of coals of about 2,550 tons, she was to proceed to Cronstadt, freight to be paid at the rate of 3s. 9d. per ton. The charter party provided "the cargo to be loaded in 84 running hours—2 p.m. Saturday to 6 a.m. Monday except unless used. Time to count when written notice of readiness in dock to receive the entire cargo is given to the charterers' agent or handed in to his office between the hours of 9 a.m. and 5 p.m. The loading date to be not before 6 a.m. on July 15 to 17." It was also provided, "If the steamer be detained beyond her loading time the charterers to pay demurrage at the rate of 16s. 8d. per loading hour." The "Helge" arrived in Leith at 4 p.m. on Sunday, July 16, 1911. Notice was duly given on the following morning, and the running hours commenced at 9 a.m. on that day and expired at 9 p.m. on Thursday, July 20. The loading was not completed until 3 a.m. on Friday, July 28. In these circumstances the pursuers claimed demurrage amounting to £142 10s.

The defenders maintained that the pursuers were not entitled to any demurrage at all, and they founded their defence on an exception clause in the charter party which provided that the parties thereto "mutually exempted each other from all liability (except under the strike rules) arising from or for time lost through . . . strikes, lock-outs of workmen, or disputes between masters and men or by reason of . . . obstructions on railways or in harbours (not including congestion of ships or traffic) or by reason of . . . any unavoidable accidents and hindrances beyond their control either preventing or delaying the working, loading or shipping of the said cargo occurring on or after the date of this charter until the expiration of the loading time; and thereafter if the steamer be not available." Between July 5 and 12 there was a strike of dock coal trimmers and scutchers at Leith. This prevented the loading of coal during that period. In consequence collieries sending coal to Leith Docks for shipment had to restrict their output, as the coal already forward was not being shipped and there was no outlet. In particular the Edinburgh Collieries Company Limited, with whom the defenders had placed an order for 1,500 tons of Lothians steam coal for the "Helge," was affected in this way. After the strike ended on July 12 there were arrears of shipment and more ships wanting coal than could be at once supplied with it. In this way the "Helge" was delayed.

The answer made by the pursuers was that the defenders did not take due steps to provide cargo for the "Helge," and that the delay in loading was due to this cause and not to the effects of the strike.

The Lord Ordinary granted decree for the sum sued for with expenses. His lordship was of opinion that the pursuers were right. He thought he must presume that, had the defenders taken the colliery company bound to punctually supply the "Helge" on her arrival with 1,500 tons, they would have duly implemented their obligations. The defenders got 800 tons from the Ormiston Colliery Company, but this left 200 tons of cargo unprovided. Apart from the delay in shipping the 1,500 tons from the Edinburgh Collieries Company, the 200 tons which the defenders had made no bargain for with the Ormiston Company or otherwise was not ordered until July 26 and not shipped until July 27. It was true that, owing to the strike, the defenders had difficulty in providing this part of the cargo after the Ormiston Coal Company decided to supply only 800 tons. But they were, he thought, at fault in making no more provision for this part of the cargo than a precarious one dependent on the option of the Ormiston Coal Company to supply it if it suited them to do so. On the whole matter he was of opinion that the defenders, on whom the onus lay, had not proved that the delay in loading the "Helge" was due to the effects of the strike. It might be quite true to say that but for the strike the "Helge" would have been loaded within the running hours. But notwithstanding the strike, she might have been timeously loading had the defenders made due provision for her being punctually supplied with cargo. This, in his opinion, they failed to do.

At a meeting of the Glasgow Chamber of Commerce this week the Home Affairs Committee reported that letters were read from Mr C. E. Price, M.P., who sent a copy of a communication received by him from the President of the Board of Trade, stating that following on the deputation from Scottish chambers of commerce and other associations on June 11, he would be prepared to consider alternative forms in the wording of Clause 2, and it was resolved to recommend that a reply be made to Mr. Price to the effect that the attitude of Glasgow Chamber was not antagonistic to the railway companies, but that they were of opinion that the onus of proof should still lie with the railway companies and not on the traders, and that Mr. Price be requested to endeavour to obtain for the information of the directors a copy of the redrafted clause, which the committee understood had been circulated among railway companies. The recommendation was adopted.

FOREST OF DEAN COAL TRADE.

The half-yearly gale rent audit of rents and royalties due to the Crown from the coal and ironstone galees has been held. After the audit the Crown officials invited the galees to dinner at the Speech House. Mr W. Forster Brown, deputy-gaveller, presided, and was supported by Mr. T. H. Deakin (Parkend and New Fancy collieries), Mr. Frank Brain (Trafalgar Collieries), Mr. M. Maclean (Cannop), Mr. Tudor Crawshay (Lightmoor), Mr. Joseph Hale (Crump Meadow Colliery), Mr. W. R. Champuoss (Foxes Bridge, Colliery), Mr. S. J. Elsom (representing the free miners), Mr. J. W. Ouise, Mr. J. A. Carter (manager, Severn and Wye Joint Railway), Mr. G. W. Blackall (engineer, Great Northern Railway, Gloucester).—The chairman, in submitting the toast of "Prosperity to the Coal Trade and Kindred Industries of the Forest of Dean," said that there were some misguided individuals, he believed, who held, if he understood their creed aright, that by ruining an industry they could benefit themselves. They held that, by making the cost of production so high that there were no profits to be earned, the State would be able to take over the mines, he presumed, for the benefit of those gentlemen who made those proposals, but it was perfectly evident that if the State took over an industry which had already been practically ruined, they were not going to carry it on at the expense of the whole community for the benefit of a small number. As to the effects of the coal strike upon the Forest, Mr. Forster Brown said he did not think perhaps it had been so much felt subsequent to the strike as in some other districts. The output for the half-year just ended amounted to 467,687 tons, a decrease of 39,495 tons compared with the preceding half-year, and 34,763 tons compared with the corresponding half-year. That decrease was not so great as perhaps might have been expected, and it looked that if the strike had not taken place the output would have continued to have shown the same upward tendency as it had been doing in the recent past.—Messrs. Deakin, Brain and Maclean, whose names were associated with the toast, responded. Mr. Deakin in his remarks referred to a number of measures which had been passed affecting the coal trade, and went on to say that he could not but think that in that district everyone had come to the conclusion once again that strikes and lock-outs were barbarous methods for settling disputes, and ought not to be used by any civilised country in this the twentieth century. He asked whether anyone was better off in that district for the six weeks' strike they had last spring. He did hope that thrice-taught lesson would not be forgotten by colliery owners or colliery workmen, for sooner or later—and it might be sooner than later—they might have to deplore a result that no regret would heal and which no remorse would make good. Mr. Brain in his speech referred to the question of nationalising of mines, and said it would be both interesting and profitable for the Government to try and experiment, so far as the Forest of Dean was concerned. He should think it would be an excellent opportunity of acquiring the collieries on very reasonable terms—terms that they could almost dictate. (Mr. Deakin: Not quite). The Crown would then have the minerals, mineral rights and the collieries, and they would have a good opportunity of showing how well they could manage it as compared with how badly the owners had managed it. Mr. Maclean, referring to Mr. Brain's pessimism in regard to the future of that coalfield, said that he always talked about closing down, but yet the pits did not close down, and he did not seem to be exhausted as far as he knew. When they could once establish the steam coal trade on a firm footing there, then Mr. Brain would have to postpone his swan song. (Laughter.)

Other toasts were honoured.

OBITUARY.

Mr T. R. J. Logan, iron and coal master, died at his residence, West Hurlet, Renfrewshire, on the 9th inst. Mr. Logan's health for some time had been indifferent, but it was only recently that he became seriously ill. He was the third son of the late Rev. T. D. Logan, rector of Charlestown, county Louth, Ireland, and was in his seventy-seventh year. He was educated privately and at Trinity College, Dublin, where he took the degree of M.A., and afterwards served in the Militia for some years, eventually retiring with the rank of major. In 1863 he entered the firm of William Dixon, the well-known iron and coal masters, which was converted into the present public company of William Dixon Limited in 1906. In the business of that concern, of which he was latterly chairman, he had throughout these years taken an active part and a deep interest. He also acted as factor and commissioner on the landed estates, which belonged at one time to Mr. W. S. Dixon and which are now the property of Mrs. Mary Morgan of Govanhill and Grosvenor-place, S.W. Mr. Logan was a director of the Cathcart Railway Company, and also at one time a member of Govan Parish School Board and a manager of the Victoria Infirmary. His wife, a daughter of the late Mr. Neil Robson, predeceased him many years ago.

Several important orders have been secured by Messrs. The Underfeed Stoker Company Limited, including one for 26 E type stokers for the Central Argentine Railway.

THE COAL AND IRON TRADES.

Thursday, August 15.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week, 129,428 tons of coal and 3,764 tons of coke were despatched from Tyne Dock, an increase of 9,407 tons of coal and 2,797 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 50,507 tons of coal and 2,237 tons of coke, a decrease of 4,585 tons of coal and an increase of 628 tons of coke. The Blyth shipments totalled 82,576 tons of coal and coke, an increase of 9,282 tons. The following considerable coal sales have been reported during the week:—Some 15,000 tons of good North-west Durham unscreened bunkers, for delivery over next year, at 12s. 9d. per ton f.o.b.; 92,000 tons of second-class Durham gas coal for delivery over 12 months to the Aalborg Portland Cement Works at from 11s. 6d. to 12s., according to quality; some 60,000 tons of best unscreened Durham bunkers for similar shipment at 12s. 6d.; and several lots, aggregating 50,000 tons, of ordinary Durham unscreened bunkers for delivery over next year at from 12s. to 12s. 3d. A small cargo of best Blyth steams has been sold for September loading by second-hand holders at 14s. An enquiry for 20,000 tons of Northumberland steams for shipment to Gefle and Skutskar up to the end of the season is in circulation. Some of the coking and bunker coal collieries are stated to be so steadily sold for next year's delivery that they have closed their books for the present. Merchants are stated to have offered 12s. 6d. per ton for best steams for delivery well into next year, but without receiving any acceptance from the collieries. Offers of 12s. for gas bests for next year's shipment have been refused, the collieries demanding 12s. 6d. The price paid for the two lots of German coke stated last week to have been sold for delivery at Middlesbrough this month is said to be 19s. 6d. per ton. There is a very strong enquiry for most descriptions of fuel, both for prompt and forward shipment. Loading turns are well filled up for some time ahead, and with a strong freight market shippers find profitable bargaining difficult. Most descriptions of fuel are very well maintained. In the steam coal section, however, there has been some successful talking down. Quotations for prompt shipment are as follow:—Best steams, Blythe (D.C.B.), 13s. 9d. to 14s. per ton, f.o.b., a fall of from 9d. to 1s. on the week; Tynes (Bowers, &c.), 14s., unaltered; seconds, Blyths, 12s. 6d. to 13s., 6d. advanced; Tynes (Hastings or West Hartleys), 13s. 3d. to 13s. 6d., stronger; unscreened, 12s., inclined to advance; smalls, Blyths, 9s. 9d., 3d. cheaper; Tynes, 9s., similarly reduced; specials, 10s. to 10s. 3d., from 3d. to 6d. lower; smithies, 12s. to 12s. 6d., no change; gas bests (New Pelton or Holmside), 13s. to 13s. 3d., steady; seconds (Pelaw Main or similar), 12s. 6d. to 12s. 9d., from 3d. to 6d. higher; specials, 13s. 6d., 6d. cheaper; unscreened bunkers, Durhams, 12s. 6d. to 13s., from 3d. to 6d. increased; Northumbrians, 12s., unaltered; coking coal, 12s. to 12s. 6d., steady; smalls, 12s., well maintained; households, 14s. 6d., steady; coke, foundry, 23s. 6d., a decrease of 1s. 6d.; blastfurnace, 21s., 1s. cheaper; and gas coke, 19s. to 20s., 1s. advanced.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 83,730 tons of coal and 1,420 tons of coke, as compared with 88,880 tons of coal and 1,495 tons of coke for the corresponding period of 1911, which is a decrease of 5,150 tons of coal and 75 tons of coke. The coal market maintains all its recent firmness, and business is if anything rather quiet owing to the full loading turns, which extend for fully three to four weeks ahead with a few collieries, and some collieries report that they are well sold for well into September, having in consequence neither large nor small coals to offer. Prices all round are very firmly held in these circumstances, and business not infrequently has had to be refused; in fact, at the moment, most of the business doing is by second hands at slightly below the collieries' quotations. The enquiry for forward business is good, indeed very strong, but tonnage is scarce, and rates of freight are inclined to rise. It is this fact which is more than likely to put a check on the coal market and prevent any further advance in coal prices. Coke of all qualities is in active request, and prices have further advanced. The demand for bunkers over next year is exceptionally strong, and owners appear to be in a hurry to get their next year's requirements covered at present prices. There has been some considerable amount of bunker contracting done during the last few days at prices realising about 2s. to 3s. per ton according to quality over last year's figures. The following are market quotations:—Special Wear gas, 14s. to 14s. 3d.; seconds, 12s. 6d. to 13s.; coking unscreened, 12s. 6d.; smalls, 12s.; smithies, 13s. 9d.; peas and nuts, 14s.; household, ordinaries, 14s. to 14s. 6d. bests, 15s.; foundry coke, 23s. to 24s.; blastfurnace coke, 21s. 6d. to 22s.; gas house coke, 20s. Current bunker quotations are: Pease's, South Derwent, Framwellgate, 12s. 10½d.; Priestman's, Consett or Burnhope, 13s. 3d.; Morrison's Marley Hill, 13s. 6d.; South Hetton, 12s. 9d. to 13s.; Ryhope, 13s. to 13s. 6d.—all f.o.b. South Dock. The freight market during the last week has been very firm indeed, with a slight advance in rates for all directions, but whilst writing for the Bay, but especially for the Mediterranean, things seem more easy owing to colliery turns opening out more freely and with a slight show of more boats asking Mediterranean ports. Fixtures reported during the last few days include the following:—Baltic: Cronstadt 6s. 6d., Pillau 6s. 6d., Swinemunde for a 5,000-tonner 6s., Helsingfors 8s. Coast: Havre 4s. 6d., Devonport 5s. 6d., London 3s. 1½d. Bay: Rochefort 6s. 6d., Oporto 10s. 9d. Mediterranean: Trapani 12s. 6d., Catania 12s., Genoa four boats at 11s. 10½d., then two vessels at 12s., Marseilles 11s. 6d., and another larger steamer at 11s., Nice 11s. 9d., Civita Vecchia 12s. 6d., Barcelona 11s. 9d.

Middlesbrough-on-Tees.

COAL.

Fuel continues firm. Durham collieries are turning out very large quantities of coal, and as the owners have good order books, it is difficult to get prompt coal at less than top quotations. Sellers hold out for high prices for next year, and there is a good deal of forward business in negotiation. Deliveries of gas coal are fairly heavy. Best gas coal ranges from 13s. to 13s. 6d., and seconds from 12s. 6d. to 13s. Bunker coal is rather scarcer, and sellers are inclined to hold out for little higher rates. Ordinary Durham bunkers are quoted 12s. 9d. to 13s. f.o.b., whilst best sorts are 13s. 6d., and specials 14s. to 14s. 3d. Household coal is in only very moderate request, and ordinary Durhams are in the neighbourhood of 14s. There is increasing pressure for coking coal, and unscreened kinds run from 12s. 6d. to 12s. 9d. Coke is an advancing commodity. Demand for local consumption is greater, and average blast-furnace quality now realises 21s. delivered at Teesside works. Foundry coke is 22s. 6d. to 23s. 6d. f.o.b. Gas coke is in good request with the supply now adequate, and the price is 18s. to 18s. 6d. f.o.b.

IRON.

There is not a great deal of business passing, but a lull in buying was looked for after recent activity. The situation generally is very healthy, and values of Cleveland pig iron are higher than they have been for over five years. The upward movement in pig is due chiefly to the large needs both for home consumption and for shipment, but a rather sharp rise in Cleveland warrants has also assisted advances. Producers of pig iron are still behindhand with deliveries, but the increased output is satisfying customers better, and stocks are not being so heavily drawn upon as they were a little while ago. No. 3 g.m.b. Cleveland pig is now selling at 61s. 9d. f.o.b., No. 1 has been advanced to 66s. 9d.; No. 4 foundry, and No. 4 forge are each 61s. 6d.; and mottled and white iron each 61s., all for early delivery, rather higher rates being asked on forward account. Rather substantial enquiries for east coast hæmatite pig are reported, but as yet they do not appear to result in business. Mixed numbers are 74s. 6d. delivered to the end of next month, and 75s. for delivery further ahead. Business in foreign ore is at a standstill, but market rates are well upheld on the basis of 22s. ex-ship Tees for rubio of 50 per cent. quality. Producers of manufactured iron and steel are working at full pressure, and have orders which will keep them well employed for the next 18 months. Next week practically all the Teesside finished iron and steel works will be closed for the local race holidays. Principal market quotations stand: Common iron bars, £8 5s.; packing iron £6 5s., iron ship plates £7 15s., ditto £8; iron ship angles £8 5s., iron ship rivets £9 10s., steel bars (basic), £7 15s.; steel bars (Siemens), £8 5s., steel ship plates £8, steel ship angles £7 7s. 6d., steel strip, £7 12s. 6d., steel hoops £7 15s., steel joists £6 17s. 6d., cast iron railway chairs £3 17s. 6d., light iron rails £6 15s., heavy steel rails £6 7s. 6d., and steel railway sleepers £7—railway material net, and all other descriptions less 2½ per cent.

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South-West Lancashire.

COAL.

The slight improvement in the house coal trade reported last week still continues, and prices are also as before named. There is a full average demand for screened coal for use in forges and manufactories. With regard to shipping, bunkering requirements under contract are fairly up to the average, and as far as excursion steamers are concerned probably ahead of any previous season. Outside business is only quiet, but to some extent this is due to freight difficulties. Prices of screened Lancashire steam coals range from 11s. 3d. f.o.b. upwards, with a tendency to harden. The coastwise and cross-Channel trade for house fuel may be considered an average summer shipment, with prices unchanged from those quoted last week. Slack continues firm in price, and, despite the local holidays in some of the manufacturing towns, there is not any great surplus to dispose of. List prices are still from 9s. 9d. to 10s. for rough slack, with good medium qualities at 9s. to 9s. 3d. and commoner and smaller sorts at 8s. 6d. or thereabouts—all into wagons at the pit.

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South Lancashire and Cheshire.

COAL.

The Manchester Coal Exchange was very well attended on Tuesday. There is more life in the demand for house coal, and prices are firm at late rates, *i.e.*, best coal 16s. to 16s. 9d., good medium qualities 14s. 6d. to 15s. 6d., and kitchen qualities 11s. 9d. to 12s. 9d.—all at the pit. Furnace coal continues brisk at about 12s. 6d. per ton at the pit, and shipping coal is steady, the price being about 12s. to 14s. f.o.b. Partington. Slack moves away very freely, and prices are firm at 9s. to 9s. 9d. for best, with seconds at 8s. to 8s. 6d.—all into wagons at the pit.

IRON.

The pig iron market is still very firm, and prices are well maintained. All the forges are extremely busy on Crown iron bars at £8 5s., second quality £7 15s., hoops £8 7s. 6d., sheets £8, and deliveries from them are hard to obtain. Steelworks are fully occupied on bars at £7 17s. 6d. to £8 less 2½ per cent., and billets at £5 17s. 6d. to £6 net. Ironfounders and engineers are only moderately employed. Wagonbuilders continue very busy.

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Yorkshire and Derbyshire.

Leeds.

COAL.

There has been a distinct improvement in the demand for house coal since the holidays. The cold weather has made the keeping of fires a necessity, and merchants in both near and distant markets have sent a good many orders for prompt supplies. The pits have averaged five days' work this week, without any addition having been made to stocks. The tonnage sent to London and the eastern and southern counties has been unusually heavy for the middle of August. All the indications point to a brisk autumn and winter trade. The demand for the standard quality is satisfactory, and reserves are light. The output of the better-class Haigh Moor and Silkstone coals does not increase, and it is probable that the supply will be quite inadequate during the coming winter. Under these circumstances, pit prices are very firm, and the collieries are not anxious to sell forward. Contracts are not accepted at anything less than 2s. per ton advance on the figures quoted 12 months ago. Current pit prices for London:—Haigh Moor selected, 14s.; Wallsend and London best, 13s.; Silkstone best, 13s. (special qualities, 13s. 6d. to 14s.); Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. to 11s. 6d. The improvement in the coastwise trade noted last week has been maintained. A good many cargoes of medium-priced coals have been shipped ex Goole and Hull for the Thames, and the demand from the south coast is also rather better. For fairly prompt shipment at Hull the following f.o.b. prices are realised: Haigh Moor best, 15s. 3d. to 16s.; Silkstone best, 14s. 6d. to 15s. 3d.; Silkstone house, 13s. 9d. to 14s. 3d.; large house nuts, 12s. 6d. to 13s. 6d. In Leeds, Bradford, and other West Riding centres merchants are fairly well employed in the retail trade, there being a ready sale for the cheaper qualities sold in bags. The following pit prices are steady:—Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. 6d. to 16s.; Silkstone house, 14s. 6d. to 15s. 6d.; ordinary house coal, 14s. to 15s.; secondary sorts, 12s. to 13s. 6d. With the better working of the pits, manufacturing fuel is more plentiful. There is a full demand, however, and pit prices are strong. Small washed nuts, coking smalls and best quality slacks are somewhat scarce. Current quotations:—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slacks, 8s. to 9s.; small slacks, 7s. to 7s. 6d.; coking smalls, 6s. 6d. to 7s. The boom in the iron and steel trade continues, and washed furnace coke is in consequence very firm. There are no stocks, and for prompt supplies special qualities are quoted at 16s. 6d. per ton at the ovens. Average samples sell readily at 16s. The heaviest demand relatively comes from the Frodingham district. A fair number of new gas coal contracts are reported this week at average advances of about 2s. per ton. Especially strong is the market for gas nuts, and for these the advance approximates 2s. 6d. per ton. An increasing number of gasworks are using slacks and unscreened coals. The pits are able to work full time. Current pit prices:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal 9s. to 10s. The export trade in gas coal is brisk, current f.o.b. Hull prices averaging as under:—Screened gas coal, 12s. 6d. to 13s. 6d.; gas nuts, 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d. to 12s. 6d. The market on Tuesday was well attended, but there was no feature of special interest.

Barnsley.

COAL.

There has been nothing during the week to interfere with the firmer tone in all branches of the trade which was manifested at the previous market. In every direction the position of sellers has become stronger, and so remarkably active has the demand become that buyers are showing greater anxiety to make the best arrangements to cover their requirements to the end of September at least. Though the collieries generally are making a full working week, there are stoppages here and there for local holidays and other causes which during the present and vigorous state of trade is causing a considerable reduction in the output. The demand, particularly for export, is especially large at the present time, and a big bulk of the tonnage has to be dealt with before the end of the shipping season. Delays are still occurring at Hull owing to the difficulty of vessels finding quick berths for unloading, and the irregularity in the trade adds to the congestion which is now being experienced. In addition to the active state of the foreign trade, the demand for all classes of steam coal from the large industrial districts, which are so abnormally busy, provides collieries with a ready and quick market for the disposal of the output, and, with stocks practically *nil* on the collieries, prices are still showing an upward tendency. The best class of large steams is now making 12s. per ton for prompt business, and it was reported at the market to-day that an offer at this price to cover several months' supplies was refused. Secondary qualities of Barnsley bed steams are also appreciably dearer, and, though there was not an equally decided advance obtainable for this class of coal, prices are up about 6d. per ton, making quotations from 11s. to 11s. 6d. per ton. The daily tonnage of this class of coal required by the railway companies is also particularly heavy, and there seemed little prospect of any weakness being developed over the next few weeks. In regard to the smaller class of steam fuel, buyers find themselves against an equally strong market, and there is a scarcity of small nuts, which are quoted at from 10s. to 10s. 6d. per ton, secondary sorts making from 6d. to 9d. per ton less. Slacks are also in strong request, though prices remain as a week ago, best sorts making 7s. 9d. to 8s. per ton, and from 9d. to 1s. per ton less is being paid for rougher qualities. The position of affairs in regard to gas coal contracts is creating more anxiety on the part of coalowners than for some time. Although contracts have been renewed at prices which are reported to be widely varying and well below the original demand of 2s. 6d. per ton, there is still a strong disposition on the part of collieries producing the best quality fuel to persist in the original demand. However, they appear to be meeting with little success, and gas companies are finding offers at something like 1s. 6d. per ton advance. The colder weather continues to assist the house coal collieries in a very material degree, and deliveries are being made at above the average tonnage. This enables prices to be held as last quoted, and contracts are being renewed at from 1s. 6d. to 2s. per ton. The business done in coke is also of an exceptionally active character, the demand for North Lincolnshire being particularly heavy, and producers are fully occupied in coping with orders. Prices are strong on the basis of 16s. per ton for ordinary qualities.

Hull.

COAL.

There was a large attendance on the Humber Coal Exchange on Thursday, and a fair amount of business passing. Both prompt and forward business showed signs of increased activity, steam hards being fully 6d. dearer on the week. Baltic shipments are now in full swing, and buyers, who earlier in the season held off in the hope of prices going down and freights easing off, have now come into the market to complete their season's requirements. The tone generally is very firm, and in view of the continued big inland demand, it is now regarded as unlikely that the prices for steam coal will recede. Foreign agents seem to have become reconciled to the position. Railway companies are also reported in the market for their next half-year's requirements. The export from all the Humber ports has for some weeks past been on a large scale, and this activity continues. At Hull the appliances are kept busy, and vessels have had to wait 24 to 48 hours for turns occasionally, but otherwise coal is coming along freely and despatch generally is good. Several vessels have taken in coal cargoes and bunkers at the new King's Dock at Immingham. A feature of the market is the demand for gas coal for export, while rough slacks for manufacturing purposes continue in strong request. The freight market continues high, and the shortage of tonnage these past few days has enabled shipowners to hold out for full late rates. Many exporters are holding back in anticipation of a better supply next week. The Baltic rate remains fairly steady at about 6s. 6d. Hull to Cronstadt, other rates on offer being:—Reval 6s. 9d, to 7s., Pernau 6s. 6d., Riga 6s. 4½d., Swedish Sound ports 7s. 6d., and Bandholm 7s. 9d. There is little doing in the Mediterranean direction, recent fixtures including Genoa from Hull 11s. 3d., and Alexandria 11s. and 11s. 3d. Hamburg has been done at 3s. 6d. from Immingham, and Rouen from Hull at 5s 6d. The following are the approximate prices for coal f.o.b. at Hull:—South Yorkshire: Best steam hards, 15s. 6d.; washed double screened nuts, 13s. 6d. to 13s. 9d.; washed single screened nuts, 12s. 3d. to 12s. 6d.; unwashed double screened nuts, 12s. to 12s. 6d.; unwashed single screened nuts, 11s. 3d. to 11s. 6d.; washed smalls, 10s. 6d. to 11s.; unwashed smalls, 9s. 6d. to 9s. 9d. West Yorkshire: Hartleys, 12s. 6d.; rough slack, 10s. 3d. to 10s. 6d.; pea slack, 8s. to 8s. 3d.; best Silkstone screened gas coal, 12s. 9d. to 13s. 6d.; best Silkstone unscreened gas coal, 12s. to 12s. 3d.; Derbyshire and Notts: Best steam hards at Hull, 14s. 6d. to 14s. 9d.; best steam hards at Grimsby, 14s. 3d. to 14s. 6d.; Derbyshire nuts (doubles) at Hull, 12s. 6d. to 13s.; Derbyshire nuts (doubles) at Grimsby, 12s. 6d. to 12s. 9d.; Nottinghamshire hards at Hull, 14s. 6d.; Nottinghamshire hards at Grimsby, 14s. 3d.

Chesterfield.

COAL.

There is this week a slightly improved demand for house coal, which is due, no doubt, to the cold unseasonable weather. Prices are firm and are now from 2s. to 2s. 6d. per ton higher than they were a year ago. Stocks are exceptionally low for the time of year. The demand for coal for manufacturing use is as active as ever, the difficulty being to secure the necessary supplies. This applies more particularly to cobbles and nuts for steelmaking purposes, which are comparatively scarce. Slack for boiler firing is in strong demand at the recently advanced prices, and the tonnage going forward for consumption in the Lancashire cotton mills has never been so great as it is at present. Collieries hold no stocks, and consumers are entirely dependent upon the daily output of the pits. Prices are likely to be higher still during the coming winter. For steam coal for locomotive use there is an excellent demand, and prices are hardening. Railway companies are urgently pressing for deliveries on account of contract, and are willing to pay an advanced price for extras; but the pressure upon the collieries is so considerable from every direction that it is found impossible in most cases to do more than supply the quantity that is strictly due against contract. The export trade is now in an active condition, and heavy shipments of steam coal are being made. Prices are very firm at 14s. 6d. per ton free alongside ship at Grimsby for the best brands of Derbyshire Top Hards. It is not improbable that this figure will be increased to 15s. during the present month. There is, however, only a limited quantity of free coal for sale, the bulk of the production for this year being already disposed of. A satisfactory demand is experienced for cobbles and nuts for near Continental ports, while washed nuts and washed slack are in very brisk request, both for shipment and for inland consumption. Prices of these qualities are hardening. The coke market is very strong. There is an active demand for all qualities of coke, the supplies of which are inadequate to meet the needs of consumers. Coking smalls are dear and scarce. To-day's prices of coal are as follow:—Best 13s. 6d., seconds 12s., cobbles 11s., nuts 10s., slack 8s.

IRON.

The demand is very great for pig iron, and also for finished iron. Prices are hardening for both kinds. All the works of the district are in a state of great activity, and there is sufficient employment assured already for the rest of the ear.

Nottingham.

COAL.

There has been no material change in the condition of the coal trade in Nottinghamshire compared with a week ago. In the household section business is of a quiet character, notwithstanding the break during the holidays, and there does not seem much prospect of a revival this month. Merchants are still holding off buying in bulk, whilst prices are 2s. 6d. above last summer's rates; but it is reported that in some cases owners are showing a disposition to accept a slight reduction. Still, no general decrease has at present been resorted to, and rates at the pits are:—Hand-picked brights, 12s. 6d. to 13s. per ton, good house coal 10s. 6d. to 12s., large nuts 10s. to 10s. 6d., small nuts 8s. 6d. to 9s. 6d., cheap kitchens 7s. to 8s. 6d. A buoyant spirit dominates the steam coal section, which is materially assisted by the active demand for shipments, and the sale of industrials is being well maintained. Values in some cases are inclined to move upward, but the general rates rule as follow:—Best steams, 11s. to 11s. 6d. per ton; seconds, 10s. to 11s.; nuts and cobbles, 9s. 6d. to 10s. For slacks there is a good steady demand, and late rates are being obtained. Gas coal is going out of hand steadily, and in regard to contracts owners are asking for an advance.

Leicestershire.

COAL.

Business has opened out very fairly since the holidays. A fair amount of new business has been placed, and this, with the amount already on hand, is sufficient to maintain a good output. The collieries are generally working pretty nearly a full week. Stocks on hand are not, as a rule, of very much account, though there is in some quarters more than others; but as a rule there is no great accumulation. Prospects of business are good on the whole. A good deal of forward buying at full prices has taken place, and the total is quite up to the average. There is not much more activity in household coals, and till the holiday season is concluded there will not be much of a revival. The market for steam coals is quite good. Steam cobbles are in demand, and there is a brisk enquiry for special slacks for automatic stokers. Local merchants are not very busy, and for a week or two they anticipate a quiet time. The market is very firm at late rates, with every appearance of so continuing, and certainly with no downward tendency.

South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL

The coal trade throughout the Cannock Chase district continues in a satisfactory condition, and the outlook for the coming winter is encouraging. Prices are fairly well maintained, and are likely to move upwards. After a slack week the men are settling down to work again, and most of the collieries are much busier than is usual so early in August. The enquiry for house coal is on the mend, and there is a brisk demand for most manufacturing sorts. Slack is in good request. There is an improvement in business at the landsale depots.

Birmingham.

COAL.

The wintry August has given a slight stimulus this week to the household trade. People are buying who hesitated a week or two ago, and although summer prices are still in operation, a continuance of the present conditions will send up prices very quickly. The call for all kinds of manufacturing fuel is kept up to a high standard, and prices are maintained. Forge coal is about 9s. 3d. at the pits, commoner sorts being a little less, and slacks are firm at from 6s. 6d. upwards.

IRON.

The market was better attended than on the last two weeks, though there were still many absentees. Operations throughout the district, however, are in full swing, the August holiday being shorter than usual on account of the heavy pressure, and an uninterrupted run throughout the autumn is looked forward to. Pig iron is rather dearer than a fortnight ago. Although the blastfurnaces were in operation during the holidays, no stocks are accumulated, every ton produced in the district going into consumption. Cold-blast, used for the highest class iron, is none too plentiful at 125s., strong foundry iron 95s., best hot air 90s., part-mine 63s. and 64s., common 56s. 6d., Northamptonshire 61s. to 62s., Derbyshire 62s. 6d. to 63s. 6d. The pressure of work at the bar mills is in no way eased, and some makers, it is said, have offers for all their production this year. The raising of the basis of standard qualities to £9 10s. has not in any degree checked the demand. Makers of unmarked bars are also experiencing a busy time. Specifications are coming to hand with unfailing regularity, and there is also an abundance of new enquiries, although makers are wary about committing themselves too far ahead. At the present rates of £8 2s. 6d. to £8 7s. 6d., delivered Birmingham, the difference between unmarked and marked qualities is about normal. In other branches the conditions show little alteration on the week, and with the exception of galvanised sheets the tale all round is one of brisk business at fairly remunerative prices. Gas strip makers are gradually working off their contracts at the lower prices and report a continuous accession of new business at £8 5s. to £8 7s. 6d., according to size of order. For strong steel strips for hinge work £8 to £8 2s. 6d. is asked, and the finer qualities—mostly used in the bedstead industries—fetch £10. The galvanised sheet branch is a shade firmer, though prices are still out of proportion to other departments of the market. Competition in the South American markets is not so keen, and makers are hoping prices may shortly level up. In the steel trade healthy conditions continue to prevail, the structural departments consuming increasing quantities of most kinds of finished material, while the shipbuilders are good customers. A small quantity of American sheet bars and billets have been landed at Swansea, but consumers could do with considerably larger quantities. English prices are about £6, and in a few special cases £5 17s. 6d. Siemens qualities are the usual 2s. 6d. extra. Continental prices are about £5 15s.

Forest of Dean.

Lydney.

COAL.

There has been more doing in the house coal trade of this coalfield during the past few days, and the collieries generally are making better time. Merchants are beginning to realise that their purchases for stocking must be made during the next two or three weeks if they mean to take advantage of the summer prices now in force. Orders from the inland merchants show a little improvement, and should further increase before the close of the month. Fairly good shipments have been made this week, and basin stocks are reduced. Prices continue at—block 15s. 6d., rubble 14s. 9d., Forest 14s. 6d., nuts 13s., and rough slack 7s. 6d. at pit, and 1s. 9d. per ton extra f.o.b. Lydney and Sharpness. The steam coal pits are maintaining good outputs, and sales are very satisfactory, with prices unchanged.

Gloucestershire, Somersetshire and Wilts.

Plymouth.

COAL.

Messrs. W. Wade and Son report a good wholesale demand for house and steam coal at slightly advanced prices all round. Steam freights have been quoted a little lower at the coal ports. Retail prices are still at their summer level.

A correspondent says boring operations extending over the last two months have resulted in the discovery of extensive and valuable coalseams in the vicinity of Kingston, Hyde, Cheshire, within 40 ft. of the surface. A local firm of contractors have been entrusted with the work of constructing a dip tunnel to the nearest seam, and about a dozen men are now engaged on the work.

THE WELSH COAL AND IRON TRADES.

Thursday, August 15.

North Wales.

Ruabon.

COAL.

It is pleasant to be able to write that at last the Birkenhead dockers' strike has terminated. A settlement was arrived at on Friday last, and an agreement entered into, which is terminable by a month's notice from either side. This has helped the coal trade in this district a little, but as things have not yet assumed their normal state the collieries have been unable to work full time. Now that the strike is over, more boats will load at Birkenhead, and the trade in coal for shipment should greatly improve during the next week or so. The household trade also still continues rather dull, and best quality large household coal is obtainable at from 14s. 6d. to 16s. per ton at the collieries, and merchants are able to buy spot lots at less than these figures. The landsale trade is also dull, and the average price obtainable is about 17s. 6d. to 18s. 4d. Coal for manufacturing purposes is in good demand, and steam coal for this trade is being sold at figures which average about 12s. The railway companies are pressing for deliveries, and, of course, the collieries are able to keep up a good supply against contracts of all kinds, seeing that they have been sending so little for shipment of late. Gas coal is going away against new contracts, the making of which is now practically at an end for another year, and it is hoped that the collieries may feel the benefit of the advanced prices which have been obtained. With regard to contracts with merchants, the colliery companies seem loth to contract beyond the end of the present year, as a further rise in the price is considered inevitable after Christmas. The demand for slack continues to be good in this locality, and the rougher sorts are being sold at 7s. per ton f.o.r., while all the nuts which are made find a ready market at an average of 11s. per ton f.o.r. Gas coke is in fair demand at 15s. per ton at the works.

Monmouthshire, South Wales, &c.

Newport.

COAL

The local steam coal market has for some days past been developing a firmer tendency, the stronger tone shown permeating all departments. Collieries mainly are well stemmed for the remainder of the month, and managers seem disinclined to quote for delivery too far ahead, as they confidently anticipate that values will advance. Enquiry continues active, confirming the stronger quotations now prevalent, and presaging a busy time right along the autumn. Very best Black Veins are quoted 16s., best smalls being firm at 9s. 3d. On the house coal market buyers are now beginning to stir, although, as yet, not very many contracts have been placed. Coke is exceedingly scarce and firm. Pitwood is in good demand, and with values well maintained. In the freight market a fair amount of tonnage has been taken up, rates for the Mediterranean ruling a shade firmer, likewise for Bay ports. Latest approximate quotations may be taken as follow, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 6d. to 16s.; western-valleys, best, 14s. 9d. to 15s. 3d.; eastern-valleys, best, 14s. to 14s. 6d.; other sorts, 13s. 9d. to 14s.; colliery smalls, best, 9s. to 9s. 3d.; seconds, 8s. 9d. to 9s.; inferiors, 8s. 3d. to 8s. 6d.; screenings, 9s. 3d.; through coals, 10s. 9d. to 11s.; nuts, best washed, 11s. to 11s. 3d.; house coals, best, 18s. to 18s. 6d.; seconds, 16s. 6d. to 17s.; patent fuel, 17s. 6d. to 18s. Coke: Furnace, 21s. to 23s.; foundry, 25s. to 27s. Pitwood: Best French fir, 24s. to 25s. ex-ship.

IRON.

The general conditions of the local iron and steel trades show little alteration on the week. The strong tone is well maintained, and, taken as a whole, the prospects for some months to come are very favourable. At tinplate and sheet bar mills good business continues, and works are fully employed with current orders, £5 12s. 6d. to £5 15s. for Bessemer and £5 15s. to £5 17s. 6d. Siemens being to-day's official quotations for Welsh bars. A busy time is also being experienced at the rail mills, where specifications are coming to hand well, and with good order books, manufacturers are holding firm for last-quoted prices of £6 7s 6d. to £6 10s. for heavy sections, with the usual 10s. extra for light ditto. The pressure of work at local blastfurnaces is in no way eased, manufacturers being quite unable to guarantee prompt delivery, except at their own figures. The official quotation for Welsh hæmatite has increased during the past week and now stands at 79s. to 80s., delivered to works in the district. The tinplate market remains quiet, to-day's values being on the basis of 14s. 9d. to 14s. 10½d. Bessemer, and 14s. 10½d. to 15s. Siemens, for 20 × 14 × 112.

Cardiff.

COAL.

There is this week a definite improvement in the coal trade. A better tone is not only evident on the part of buyers, but sellers are also more optimistic as to the future course of the market. A large quantity of coal standing on the railway sidings previous to the holidays has been absorbed, with the result that only in very few instances have buyers been able to get on at the figures ruling prior to the holidays. Sellers are also looking on it as a good sign that contractors are enquiring in a good many quarters for quotations. This is considerably earlier than is usually the case, and the only conclusion to draw from it is that they are expecting to be able to place orders on more favourable terms now than later on. It is unquestionable that the recent advance of 6¼ per cent. in wages will stiffen prices, as in the majority of cases this will mean an increase in the cost of production of at least 6d. per ton. There is also no doubt that, as has happened on previous occasions with the increased wages received by the men, the production of coal will have a tendency to decline. Large wages are now being very generally earned by the miners, and with a plentiful supply of loose money they are taking holidays freely. Present prices for best steam coals are from 17s. 3d. to 17s. 6d. Whilst the lower figure is being accepted in some cases for prompt shipment, the higher figure is firmly quoted for business from now to the end of the year. Superior Admiralty seconds easily command 16s. 9d., and in a few cases even 17s. has been paid. Ordinary seconds remain steady at 16s. to 16s. 6d. A contract for the supply of 45,000 tons of best Admiralty coals for the French Navy has been secured by Messrs. Lyberg Limited, of Cardiff. The coal to be shipped is stated to be Nixon's Navigation, and delivery is to be made between August 15 and December 15 at Toulon Naval Harbour. As the contract is a c.i.f. one, it is impossible to say how much is being paid for the coal and how much for freight; but the general impression is that the price will work out at a shade under 17s. 3d. f.o.b. Up to the present very few, if any, contracts have been arranged for next year, but sellers' agents declare that at least 1s. per ton more should be realised to place the collieries on the same footing as they have been during the current year. Even that will barely cover the extra cost incurred by the most favoured collieries through the new Coal Mines Act, the Minimum Wage Act, the National Insurance Act, and the recent advance in wages secured under the award of the Conciliation Board. An unfortunate incident occurred at the end of last week at the collieries of the Ebbw Vale Steel, Iron and Coal Company. Through 20 lampmen employed at the Marine Collieries, Cwm, seceding from the Miners' Federation of Great Britain in order to join the Enginemen and Stokers' Union, the whole of the colliers came out on strike. These numbered about 5,000, and the manager of the iron and steel works at once issued notices that in consequence of the stoppage of the coal supplies the whole of the metal works would be closed, rendering idle a further 5,000 men. This meant a loss practically of £20,000 a week in wages, and was looked upon with very great anxiety by the tradesmen of the district, who had not yet recovered from the last strike. Happily, at the time of writing, wiser counsels seemed to predominate, and there was every prospect of the men returning to work. The South Wales collieries are now rapidly recovering the trade which through the late strike was diverted to the north-country collieries, and it would be a pity if anything occurred to arrest the movement. Throughout the greater part of last year there was a difference of about 6s. per ton in the price of Welsh coal as compared with best Newcastle steam coals. This naturally resulted in the loss of considerable trade, but at present the difference between the two classes of coal is only from 3s. to 3s. 6d. per ton, or something like the normal difference that existed a couple of years ago, and the Welsh coalowners are therefore hoping soon to get back the whole of the business they have lost, at even better prices than those at present ruling. So confident are they as to the future that very few show any anxiety as yet to contract over next year. They recognise that trade in all directions continues to boom, especially the iron, steel and copper trades, the improvement in which has always been taken as a sure indication that good times are about to prevail in the coal industry. The fact that freights, though still very high, are beginning to show signs of an easier tendency, will also help business. Within the last day or two, 11s. has been accepted in several cases for Genoa. South American rates are also lower, but Baltic rates continue very firm, the freight to Cronstadt ranging from 7s. 6d. to 7s. 9d., which is exceedingly high for the time of the year. The tonnage taken up last week amounted to a little over 247,000 tons. The small coal market keeps very strong, bunkerings being 11s. to 11s. 6d., best ordinaries 10s. 6d. and cargo qualities 10s. to 10s. 3d. per ton. Washed nuts are 14s. 6d. to 15s. and washed peas 12s. 6d. to 13s. The Egyptian State Railways are in the market for tenders for 300,000 metrical tons of large screened coal for delivery over the whole of next year. Quotations have to be sent in by October 2, and collieries have the option of tendering for either of the following quantities for certain specified delivery per month, namely—60,000 tons, 120,000 tons, 180,000 tons, 240,000 tons, and 300,000 tons. The coals to be supplied include ordinary Admiralty descriptions, Monmouthshire Black Veins and western valleys. Current prices of Monmouthshire coals are rather firmer, Black Veins being 15s. 6d. to 16s., western-valleys 14s. 9d. to 15s., and eastern-valleys (best) 14s. to 14s. 6d., in each case f.o.b. Cardiff. Good house coals are from 17s. 6d. to 18s. 6d., No. 3 Rhondda large 16s. 9d. to 17s. 3d., through-and-through 14s. and small 11s 6d. to 12s. No. 2 large is 12s 6d. to 12s. 9d., through-and-through 10s 9d. to 11s., and small 9s. 6d. per ton. The *Cardiff Journal of Commerce* publishes a table showing the average declared price per ton of coal exported from the chief British ports during the month of June. Patent fuel is scarce, and prices continue high, Crown brands being 19s. and other qualities 18s. per ton. Shipments for the week exceeded 26,000 tons, the Crown Company despatching 4,000 tons, Swansea 14 950, and Port Talbot 7,132 tons. There is a strong demand for coke, and good foundry realises 25s. and special qualities 27s. 6d. per ton. Furnace coke is 20s. Pitwood is 25s.

IRON.

All the tin-platers returned to work on Monday. The week's stoppage helped materially to reduce stocks, the shipments—214,778 boxes—exceeding receipts from works by 95,892 boxes. Stocks are now down to 272,300 boxes, or only about a fortnight's supply. In prices there is no appreciable change. Block tin has gone up £3 15s. per ton, the cash price being now £207 5s.; but whilst this assists manufacturers in maintaining their quotations, they have hitherto failed to induce buyers of plates to give any better prices. For spot delivery Bessemer 14 × 20 cokes are still offering at 14s. 7½d., whilst option contracts are being fixed at 14s. 9d. basis. Terne plates 28 × 20 continue steady at 25s. 9d. for October-December delivery. Many of the works still find some difficulty in securing steel bars. This applies not merely to the Monmouthshire works, but to mills in the vicinity of Swansea and Llanelly, with the result that the importations of foreign bars to Swansea last month reached nearly 5,000 tons. Last week there was an exceptionally heavy import of semi-steel both from Spain, Belgium, Germany, and America, the aggregate quantity landed being over 12,000 tons. Siemens bars for prompt delivery are still quoted at from £5 15s. to £5 17s. 6d. per ton, but for the last three months of the year some makers ask from £6 to £6 2s. 6d. per ton. Prompt Bessemer bars are £5 12s. 6d. to £5 15s. The improvement in galvanised sheets noted last week is well maintained, 24-gauge corrugateds selling at £11 17s. 6d. per ton. Big sheets for galvanising—6 × 3 × 30-gauge—are £9 5s. per ton, and the same price is quoted for C A roofing sheets. Welsh pig iron is rather firmer, mixed numbers hæmatite being 78s. 6d. f.o.t. Best rubio iron ore is still offering at 19s. 6d. for prompt delivery, but for forward business prices seem inclined to stiffen. Scrap metals are variable, new steel crop ends being 60s. to 61s., ordinary heavy steel 55s. to 57s. 6d., and heavy wrought and cast scrap 52s. 6d.

Swansea.

COAL.

Last week the holidays caused a considerable curtailment in the trade of the port, the shipments of coal and patent fuel only totalling 67,010 tons. There was a good attendance on 'Change this morning, and the undertone of the anthracite coal market was decidedly firm. There was an excellent demand for Swansea Valley large, with values slightly harder. Red Vein large fully held its position. Machine-made cobbles remained steady at last quotations, and nuts of all sizes continued firm. Beans and peas were a little easier. Rubbly culm and duff were easily disposed of at full prices. In the steam coal market, large remained unsteady, with very little enquiry, but smalls were very firm. Bunker qualities, especially through-and-through, continued firm, with a rising tendency. The following were the approximate closing quotations:—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 16s. 6d. to 18s. 6d., less 2½ per cent.; Red Vein large, 12s. 6d. to 14s., less 2½ per cent.; machine-made cobbles, 22s. to 24s.; Paris, French, and German nuts, 23s. to 25s. 6d.; beans, 21s. to 23s. 6d.; machine-made large peas, 13s. 6d. to 14s. 9d.; ditto fine peas, 12s. 3d. to 13s. 6d., all net; rubbly culm, 7s. 6d. to 8s. 3d., less 2½ per cent.; duff, 5s. 6d. to 5s. 9d., net. Steam: Best large, 18s. 6d. to 18s. 9d.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s. 6d. to 11s. 6d.; small, 9s. 6d. to 10s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 18s. 6d.; through-and-through, 15s. 6d. to 16s. 6d.; small, 12s. 6d. to 13s. 3d., all less 2½ per cent. Patent fuel, 17s. 6d. to 18s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

Monday only was recognised as a holiday at the steel-smelting departments, during the past week, but the large bar-rolling mills were idle the full period. There was no break in operations at the blast furnaces, Landore, as damping down means considerable cost even for a couple of days. The Mannesmann Tube Company were actively engaged for five days, and the foundries and engineering works had ample work on hand. Work was resumed at the tin-plate and sheet rolling mills throughout the district, and also at the finishing departments connected with this staple industry. The shipments of tin-plates were extremely heavy, they totalled 214,778 boxes, the receipts from works were 118,880 boxes, and stocks in the dock warehouses and vans 272,300 boxes.

Llanelly.

COAL.

The coal trade of this district gives every sign of becoming very much stronger during the next few months. For most coal there is a better enquiry and prices are firm. A stronger market has been predicted for some time, and it is fully expected that collieries will be very busy during the coming months. The colliery people are asking higher prices for contracts, but in some instances they refuse to quote for the time being. Anthracite is going very well, and this market should have good times over the winter. There is a big scarcity of several kinds. Best large sorts have a splendid enquiry at higher prices, whilst some of the machine-made kinds are difficult to get. Steams are also improving, especially for smalls, and prices for these are firm. Outputs are not yet up to normal and it will be another week or two before the men properly settle down to work. This week's prices are:—Best malting large, 21s. to 23s.; second malting large, 20s. to 22s.; Big Vein large, 16s. 6d. to 18s. 6d.; Red Vein large, 13s. to 14s.; machine-made large cobbles, 21s. to 23s.; German nuts, 22s. to 23s.; French nuts, 22s. to 24s.; Paris nuts, 22s. to 24s.; machine-made large beans, 22s. to 24s.; ditto second quality, 20s. to 22s.; machine-made large peas, 14s. to 15s.; rubbly culm, 8s. to 8s. 6d.; duff, 5s. to 5s. 6d.; large, 13s. to 14s.; through-and-through, 10s. 6d. to 11s.; small steam, 8s. 6d. to 9s. 6d.; bituminous small, 10s. 6d. to 11s.—all f.o.b.

THE IRISH COAL TRADE

Thursday, August 15.

Dublin.

There has been no particular change since last week, but upon the whole city merchants are better engaged than is usual at this season, owing to the wet and cold weather prevailing. Prices generally remain unchanged, but it is expected that advances will be made in Scotch coals very shortly, owing to the higher prices which are being obtained at the other side. Quotations in the city are:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; best coke, 23s. per ton; "hull" coal, 1s. 5d. per sack; steam coal, from 20s. per ton upwards. The import trade has been fairly active, the coaling vessels arriving during the week totalling 52, as compared with 36 the week previously, chiefly from Troon, Garston, Girvan, Glasgow, Irvine, Cardiff, Newport, Ayr, Point of Aire, Swansea, and Maryport. At the recent half-yearly meetings of the railway and canal companies, it was stated that there had been a very considerable decrease in the coal traffic owing to the late coal strike, the falling off upon one of the systems amounting to over 20,000 tons.

Belfast.

The demand for house coal is rather quiet for immediate requirements, but as there is a probability of an early advance in prices, supplies are now being laid in for winter. Householders and consumers of steam coal are also beginning to cover future wants, as it is not expected that prices will be any lower than they are at present. There is no further change in prices this week either with regard to household or steam qualities. Quotations in the city are as follow:—Best Arley coal, 25s. per ton; Hartley, 24s.; Orrell nuts, 24s.; Wigan, 23s.; Scotch, 21s.; best Orrell slack, 21s. Ex-quay prices:—Arley house coal, 21s. 4d. per ton; Scotch household, 18s.; Scotch steam coal, 15s 6d. to 16s. 6d. per ton; navigation steam coal, 15s. 6d. to 16s. 6d.; Welsh steam, 15s. 6d. to 17s. 6d. Supplies of all classes are very plentiful, cargoes arriving during the week being chiefly from Ellesmere Port, Glasgow, Girvan, Garston, Troon, Manchester, Preston, Ayr, Lydney, Ardrossan, Maryport, Sharpness, Campbeltown, and Swansea.

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SUBSCRIPTIONS.

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H. Greville Montgomery,
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(A Classified List appears on page 358.)

⁂ The offices of this Journal are at 30 & 31, Furnival-street, Holborn, London, E.C. Cheques, &c., to be made payable to the Colliery Guardian Co. Limited. All remittances should be crossed ______ & Co. Postage stamps should not be remitted for amounts exceeding one shilling.

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Wanted for abroad, a Colliery Engineer experienced in modern mining, mechanical and electrical practice; age between 35 and 45 years; salary £400 per annum, with three years' engagement; second-class passage out and home.—Apply, stating experience, and enclosing three recent testimonials, Box 4866, *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

Wanted, a Contractor to take over a seam of coal in Lancashire, and to undertake the coal getting, filling, and roofing, &c.—Box "LANCASHIRE," 4867, *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

The Appointment of a Certificated MANAGER for a colliery in the Midlands has been made.

Wanted, 2 Belt Flywheels, about 12 ft. diameter, 16 in face, 8 in bore, 5 to 7 tons each, or Rope Wheels similar sizes.—EDMONDSLEY COLLIERY, Durham.

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⁂ *For other Miscellaneous Advertisements see Last White Page.*

Forthcoming Annual Meetings.

Institution of Mining Engineers—Provincial Meeting (Birmingham) September 11, 12 & 13, 1912
Midland Counties Institution of Engineers Sept. 1912
Manchester Geological and Mining Society, Oct. 8, 1912
North Staffordshire Institute of Mining and Mechanical Engineers ... ... October 14, 1912
South Staffordshire and Warwickshire Institute of Mining Engineers ... October 1912 (2nd week)
Iron and Steel Institute—Autumn Meeting ... ... September 1912
Association of Mining Electrical Engineers—October 4 & 5, 1912 (Provis.)

The Colliery Guardian.

LONDON, FRIDAY, AUGUST 16, 1912.

The average value of coal, coke and manufactured fuel exported from the United Kingdom during July was 12s. 5·4d. per ton, as compared with 11s. 2·7d. in July 1911 and 11s. 8·7d. in July 1910.

The value during the first seven completed months of the present year is 12s. 6·7d. per ton, as compared with 11s. 4·6d. and 11s. 10·3d respectively in the corresponding periods of 1911 and 1910.

Of the total exports of coal during July, the mean value of the large coal exported was 14s. 1·1d.; through-and-through (unscreened) coal, 10s. 4·8d.; and small coal, 9s. 9·3d. The average value of all kinds of coal exported was 12s. 3·6d., an increase of 2·9d. as compared with the preceding month. Otherwise divided, it fetched the following values:—Steam coal, 12s. 8·7d.; gas coal, 10s. 5·2d.; anthracite, 15s. 7·9d.; household coal, 11s. 8·4d.; and other sorts of coal, 10s. 4·06d. The value of the coke exported was 17s. 6·1d. per ton, and of the manufactured fuel 15s. 10·6d. per ton.

The exports of coal, coke and manufactured fuel during July amounted to 7,319,789 tons, of a value of £4,558,936, as compared with 5,091,436 tons, valued at £2,859,103, in July 1911, and 5,647,253 tons, valued at £3,312,340, in July 1910.

During the first seven months of the present year ended with July the aggregate shipment was 34,516,503 tons, valued at £21,685,450, as against 37,899,821 tons, valued at £21,583,785, and 36,671,699 tons, valued at £21,753,368, in the corresponding periods of 1911 and 1910 respectively.

It is stated that negotiations are proceeding and it is expected will reach a satisfactory termination for the amalgamation of Messrs. John Watson Limited and Messrs. Archibald Russell and Co. Limited. The two firms combined have an output of 4,000,000 tons of coal annually.

A meeting of the Conciliation Board for the coal trade of South Wales and Monmouthshire was held at Cardiff on Friday last. The meeting was held to consider the application from the workmen's representatives for an advance of 6¼ per cent. in the general wage rate. After a full discussion, the owners' representatives decided to agree to give the advance. Accordingly the wages payable to the workmen at Association collieries will be advanced 6¼ per cent. as and from September 1 next, making the rate 57½ per cent. above the standard rates of 1879. Subsequently a meeting of the Joint District Board for South Wales, including Monmouthshire, was held under the presidency of Viscount St. Aldwyn, the independent chairman of the Board. Certain questions raised by the workmen's representatives, and upon which the two sides had failed to agree as to the interpretation of the award of the independent chairman, were discussed, who dealt with the points submitted.

The work of removing the brick stoppings at the Cadeby Colliery, the scene of the recent disastrous explosion, was started on Saturday afternoon. Inert gas is being used to extinguish the fire.

The Home Secretary has appointed Messrs. Herbert Danby, Harold Taylor Foster, Douglas Hay, Herbert John Humphrys, Paul Salthouse Lea, Edward Sims Rees, and Frank Noel Siddall to be junior inspectors of mines.

An explosion involving the death of over a hundred miners occurred on the 8th inst. in the Lothringen pit at Gerthe, near Bochum, in Westphalia.

It is announced that the result of the international competition which has been held under the auspices of the Home Office with the aim of obtaining the best miner's electric lamp, will be officially declared at an early date. It will be remembered that a well-known English mineowner placed a sum of £1,000 as a prize for the best lamp fulfilling the requirements for an absolutely reliable and workable miner's electric lamp, thus endeavouring at the same time to eliminate one of the principal causes of mining disasters. The judges appointed by the Home Secretary (Mr. C. E. Rhodes and Mr. C. H. Merz), after careful practical trials, have now, amongst 195 lamps sent from all parts of the world, awarded the "Ceag" lamp the first prize of £600; eight other competitors receiving £50 each. The "Ceag" lamp, of which over 20,000 have been actually working in collieries for some years, has been constructed by Mr. Farber, of Dortmund, and placed on the market by the "Ceag" Electric Safety Lamp Company, 19, St. Dunstan's-hill, London, E.C. A description of this lamp will be given in next week's *Colliery Guardian*.

Mr. Smillie, who presided yesterday at a special conference of miners at Blackpool, complained of various grievances of the men under the Minimum Wage Act, and especially of alleged attempts by employers to force men, in some cases under penalty of dismissal, to contract out of the Act. The district delegates generally reported that the administration of the measure was most unsatisfactory.

THE MINIMUM WAGE.

The Miners' Federation of Great Britain are holding an important conference at Blackpool to consider the working of the Minimum Wage Act. As no decision as to future action had been arrived at at the time of writing, comment must necessarily be deferred. It would appear, however, that many of the difficulties that were anticipated have actually arisen, and it may be said at once that the miners are not, and never were, likely to obtain under this Act the satisfaction of all their ideals. The occasion is not inopportune to give a brief analysis of the awards, now that they have all been issued, and to point out some striking variations in method which they illustrate.

A Comparison of the Rates.

In the next column will be found a table setting forth the minima conceded under the awards in the various districts, contrasted with the rates demanded by the Miners' Federation and shown in the schedule drawn up in February.

Some explanation is due in regard to the above table on certain points. In the first place, in several districts there are somewhat higher rates awarded to stallmen contractors, and for this reason, in the table, the wages of day-wage hewers have been taken in Nottinghamshire, Derbyshire and Cannock Chase, as affording a true basis of comparison with the rates awarded to pieceworkers in other districts.

District.	Rates demanded. Piece workers (hewers).	Rates demanded. Day-wage workers. Men.	Rates demanded. Day-wage workers. Boys.	Rates awarded. Piece workers (hewers).	Rates awarded. Day-wage workers. Men.	Rates awarded. Day-wage workers. Boys.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Northumberland	6 0 to 7 2	5 0	2 0	5 6	4 9	2 0
Do. small collieries				5 0	4 0	2 0
Durham	6 1½	5 0	2 0	5 6	4 9	2 0
Cumberland	6 6	5 0	2 0	6 0	3 9	2 0
Lancs. & Cheshire	7 0	5 0	2 0	6 6	5 0	2 0
South Yorkshire	7 0	5 0	2 0	6 9	5 0	2 0
Do. Don. & Loxley Valley (ganister mines)				5 6	4 6	2 0
West Yorkshire— Eastern division	7 6	5 0	2 0	6 8	5 0	2 0
Western division				6 2	4 10	2 0
Cleveland	5 10	5 0	2 0	5 4	4 3	2 0
Derbyshire (except S. Derbyshire— No. 1 district	7 1½ to 7 6	5 0	2 0	6 0*	4 6	2 0
No. 2 district				6 6*	4 6	2 0
Ashgate, &c., colls.				5 6*	4 6	2 0
South Derbyshire	6 6	5 0	2 0	6 0	4 6	2 0
Nottinghamshire— Top Hard mines (except Gedling)	7 6	5 0	2 0	7 0*	4 6	2 0
Other mines (including Gedling)				6 3*	4 5	2 0
Leicestershire	7 2	5 0	2 0	6 2	4 10	2 0
Shropshire	6 0 to 7 0	5 0	2 0	6 0	4 6	2 0
Do. Hanwood dist.				5 9	4 6	2 0
North Staffordshire				6 6	5 0	2 0†
Do. Cheadle dist.				6 0	4 6	2 0†
South Staffordshire (exclg. Cannock Chase) and East Worcestershire Thick coal				6 2†	3 0	1 10
Do. Thin coal				5 11†	3 0	1 10
Cannock Chase				6 3*	4 9	2 0
Warwickshire				6 1†	4 6†	2 0†
Forest of Dean	5 10	—	—	5 2‡	—	1 9‡
Bristol	4 11	—	—	3 4§	2 2§	1 0§
Do. Kingswood, &c.				3 3§	2 9§	1 0§
Do. Hanham and Parkfield				3 2§	2 7§	1 0§
Somerset— Radstock division	4 11	—	—	3 5§	2 10§	1 0§
Newbury division				3 3§	2 8§	0 10§
North Wales	6 0	5 0	2 0	6 0	4 9	2 0
South Wales and Monmouthshire	7 1½ to 7 6	5 0	2 0	4 7§	3 0§	1 0§
Do. Pembroke				3 0§	2 6§	1 0§
Scotland	6 0	5 0	2 0	5 10	4 9	2 2

* Daymen at the faces. † Including 50 per cent. on standard rates. ‡ Including 30 per cent. on standard rates. § The current percentages to be added to these rates.

The scales again, in their entirety, have been so drawn up that comparatively few men will be in receipt of the bare actual minimum, and there are many classes of day-wage men whose rates are in excess of the 5s. demand by the Miners' Federation. The rates accorded to hewers are generally about 6d. a day lower than the amended rates finally claimed by the Federation.

The Rates and the Percentages.

In considering the rates it is important to bear in mind the influence of existing agreements which themselves provide a minimum percentage upon standard rates. In this connection the procedure of the independent chairmen has varied considerably. It would appear that in only three instances—*i.e.*, North Staffs, the Black Country and the Forest of Dean—have rates been fixed which specifically include the percentages upon standard rates; in others, whilst the rates fixed represent the standard rates, it is stipulated that they are to be subject to additions corresponding to the agreed changes in the percentage; in other cases, again, it is palpable that the rates fixed by the chairmen are those which they consider to correspond to the rates, plus the percentages in force at the date of the award, or, in other words, the existing daily earnings. The proper method would appear to us to be that which has been enunciated by Mr. Reginald Guthrie, the secretary to the Northumberland and Durham Coalowners' Associations. Mr. Guthrie's view is that the Act and the awards "make no alteration in the general methods of dealing with wages, but only fix minimum rates below which no person who complies with the conditions laid down in the rules is to be employed. Subject to this, all conditions of employment which were previously in existence continue to operate. No new basis rate is fixed, and it is not the case that the awards settle a wage of fixed amount for every workman. The earnings of individuals paid by piece will vary as they have hitherto done, but, subject to compliance with the district rules, any workman earning less than the minimum fixed by the awards will be entitled to have his wages made up to that figure." This has received the assent of at least one of the chairmen, for Sir Robert Romer, in forwarding his award to the members of the Durham Board, asked them to call attention to the following facts:—"Such a settlement is not intended to be a general settlement of wages. It only settles, in accordance with the intent and effect of the Act, what is the minimum below which the wages of the different classes of workmen affected shall not fall. It does not affect wages that are higher, or the method by which in your district those wages are settled from time to time." This assurance was repeated, even more definitely, by his lordship in reply to representations from the members of the Cleveland Board.

The method adopted by Lord St. Aldwyn in South Wales is essentially different from that pursued by the majority of the other chairmen, in that he has actually fixed new standard rates in a large number of instances, which may imply materially higher wages, not only when the minimum is reached, but also at all stages up to the maximum rate provided in the existing wages agreement.

Allowances and Customs.

In making a comparison of the rates set forth in the table, it should be remembered that their intrinsic value does not always correspond. The Act provides that "nothing in this Act shall prejudice the operation of any agreement entered into or custom existing before the passing of this Act for the payment of wages at a rate higher than the minimum rate settled under this Act." In the majority of the districts the old customs with regard to allowances have been maintained; thus, the value of the benefit of the house, rent and coal allowances, which are preserved in Northumberland and Durham, is computed to be equivalent to 1s. per day, and in other districts the monetary value of these local customs may be placed between 9d. and 1s. per day. In Lancashire and Cheshire, however, the custom of supplying coal to married day-wage men free, or at less than the market price, has been discontinued by agreement, the rates in this instance having been settled by the Board.

Safeguards.

It is generally conceded that the success of the Act will largely depend on the adequacy of the safeguards provided in the rules, notably those against indolence. The tests of efficiency to be enforced in the various districts disclose considerable variations in method. The requirements may be divided under three headings, namely, (1) those as to attendance at work; (2) those as to the efficiency of the work done; and (3) in the case of pieceworkers, those as to the amount of coal, &c., wrought. To entitle them to the minimum rates the men must, in the absence of certificated exemption on the ground of illness or accident, or some other justifiable cause, work, in the majority of districts, 80 per cent. or four-fifths of the shifts in any pay. This provision is to be found in the Lancashire and Cheshire, South and West Yorkshire, Derbyshire, Notts, Shropshire, North Staffs, Warwickshire, Forest of Dean, and Scottish rules; in North and South Wales the workman must attend during five-sixths of the time during which the pits are open, and in Northumberland, Durham, Cumberland, Leicestershire, and Somerset, attendance on all occasions is demanded. The requirements as to efficiency are, in some cases, vague. A workman is required to do his work "efficiently," with "regularity," and "diligence," in a "workmanlike manner," to use his tools properly and efficiently, to obey orders, to proceed to his working place without delay, and so forth; in addition, most of the rules provide, as a condition to the payment of the minimum, that coal-getters shall send out such a quantity of coal as, calculated at the tonnage and other rates, shall amount to such minimum. At this point the verge is reached of the "abnormal places" question, and the effect of the arrangement is generally to place upon the workman the onus of proving that his deficiency in output is due to causes beyond his control.

It is undoubtedly at these points that the greatest strain will be placed upon the Act. The arguments upon which the Miners' Federation base their claim for amendment of the Act are materially those which they employed in Parliament; but the differences of opinion as to the value of the rates fixed and the interpretation of certain phrases in the Act, such as the "average daily rate of wage" are not immediately so important as the minor questions of fact that are its inevitable consequence. The great countervailing benefit that mineowners have to anticipate from the Minimum Wage Act is the facility which it affords for securing a much-needed higher standard of discipline. The forfeit of the minimum wage is in itself a penalty, hitherto not always available, for irregular attendance at work, loitering, slackness, and other forms of so-called inefficiency. The district rules do indeed enforce conditions which are extremely drastic, if we recall some of the casual, easy-going methods of the past, and appreciate the hostility of the workman to any form of restrictive interference with his habits. But this is an essential condition to the bargain, and the employers are not likely to give away any advantage that they may have gained in this respect. The President of the Board of Trade has stated that the only redress of the aggrieved miner lies in the law courts, and one at least of the chairmen has refused to add any footnotes to his award. On the whole, it is a healthy sign that the miners' leaders appear to recognise that a better course than to take all disputed cases to the county court is to enlist the offices of the local joint committees, which, be it said, was the expedient offered at an early stage by the employers as providing the best and most economical machinery for the settlement of disputes. On the other hand, there must be many cases in which men will be obliged to forfeit their right to the minimum if they are incapable of changing their habits, for these men can look for relief neither to the Act nor to the joint committees or umpires, nor to the county court judge. Theirs are cases which are clearly provided for; nevertheless it is these cases that are most likely to create trouble, for it is the man with the weak case that is generally most prone to appeal to force.

The Aged and Infirm.

The only other point with which we shall deal here is the exception of workmen from the minimum rates on the ground of age or infirmity. This was an express condition in the negotiations between the employers and the representatives of the workmen; the decision in individual cases is left, according to the rules in many districts, to the machinery provided for settling points in dispute, but in others actual age limits have been fixed, which denote a considerable difference in opinion as to the age at which the powers of a workman normally become impaired. Thus, in Northumberland and Durham, ages of 57 and 63 have been fixed for pieceworkers and datallers respectively, beyond which they are to be disentitled to the minima; in North Wales a limit of 60 years has been fixed; in South Wales, 63; and in Scotland, Leicestershire, Nottinghamshire, Derbyshire, South Derbyshire, and South and West Yorkshire, 65; in the two districts last mentioned, however, the limit is reduced to 60 years in the case of those unable to do a fair day's work. We cannot but think that the enforcement of these rules must lead to many cases of hardship, but this is one of the inevitable results of legislation, and so long as the hardship and tribulation falls only upon the old, the weak or the infirm, robust humanity does not seem to care so very much.

Trade Summary.

The London coal trade for the past week has begun to show signs of returning activity. The cold weather has undoubtedly stimulated trade and given an impetus to public orders. Prices are unchanged and "spot lots" are still the ruling feature of the market. Contracts are renewed very slowly and only in very few cases where the recognised 2s. 6d. advance is adhered to. The bulk of the renewals are at somewhat lower prices and range from 1s. 6d. to 2s. advance on last year. Manufacturing qualities are in good demand. Small nuts are weaker, but slacks are selling freely. Bakers' nuts and kitchen cobbles are improving, but all wholesale prices continue easy.

There is a strong enquiry at Newcastle for all descriptions of fuel, both for prompt and forward shipment. Best steams, however, are rather lower in price.

The Durham coal market is firm, with stems well filled. Prices are steady. Tonnage difficulties are imminent. There is a strong demand for coke and large sales of bunkers are being made.

The Lancashire house coal trade continues to improve slowly. For other classes there is a full average demand and slack remains very firm in price.

In West Yorkshire there has been an improved demand for house coal since the holidays and the coastwise trade is very active. Manufacturing fuel is more plentiful, but sells with readiness.

The South Yorkshire trade continues to gain strength. The demand for hard coal is especially keen, both as regards large and small sizes. Competition is leading to some cutting in gas coal tenders. House coal is steady and coke is exceptionally active.

There is an improved demand for Derbyshire house coal and prices are firm, with stocks low. There is no abatement in the demand for manufacturing coals.

The market at Cardiff is distinctly stronger, large quantities of coal having been cleared since the holidays, and sellers are optimistic. Small coals are very strong. Monmouthshire coals are rather firmer. Patent fuel is scarce.

The Scottish coal trade is active, and foreign shipments continue to increase, the demand for splint coal and hard coal of every description being very strong. The house coal trade also shows signs of expansion.

THE BY-PRODUCTS TRADE.

Tar products:—The market as a whole is firm, and prices in several cases are favouring sellers. Benzols are firm. Toluol advancing. Naphthas are dearer, especially crude. In carbolics, crystals are rather feeble, but crude is dearer. Pitch quiet, and somewhat prone to easier prices in some localities. Nearest current values are:—

Benzols, 90's, 1s.; ditto 50's, 9¾d.; toluol, 10¾d.; carbolic acid, crude (60 per cent.), 2s. 7d. to 2s. 8d.; ditto crystals (40 per cent.), 7¼d.; solvent naphtha, 1s. 1d., as in quality and package; crude ditto, 5¼d. in bulk; creosote, 3½d. for ordinary qualities; pitch, 51s. 6d. to 52s. f.o.b. east coast; ditto, 51s. to 52s. f.a.s. west coast; ditto, 55s. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—There is a firmer feeling about the market, and prices seem inclined to move away again on the upward plane. The forward position is very strong, and for January-June £14 10s. to £14 12s. 6d. is asked. Actual business in prompt is rather quiet, but there is more uneasiness evinced by buyers than by sellers. Closing prompt prices are:—

London (ordinary makes), £13 8s. 9d.; Beckton, £14; Liverpool, £14 5s.; Hull, £14 3s. 9d. to £14 5s.; Scotch ports, £14 5s.; nitrate of soda (ordinary), 11s. 1½d. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

MANAGERS AND FIREMEN'S CERTIFICATES.

Sir,—I enclose copy of a letter I have sent to-day to the Home Secretary on a matter which will be of interest to many of your readers. T. A. Southern.

[COPY.]

The Right Hon. R. McKenna,
Secretary of State,
Home Office,
Whitehall, S.W.

Sir,

COAL MINES ACT, 1911.

Firemen's Certificates.

Will every manager, under-manager, and other underground official, who does not hold a fireman's certificate be debarred, after 1st January next (even though he holds a first- or second-class certificate of competency under this Act), from inspecting a working place and giving permission to a miner to enter it to begin his shift, in the temporary absence of the certificated fireman?

The Act appears to have this effect, but the point has apparently not been foreseen and made clear. I have received several enquiries about it, and I would respectfully suggest the desirability of your making known your ruling on this point, because if the Act has this effect, there are doubtless many managers, under-managers, and other officials, not *regularly* engaged in performing the duties of a "fireman, examiner, or deputy," who have not anticipated that they must possess a fireman's certificate if they desire to be qualified for the *occasional* performance of any part of a fireman's duties of inspection, and many of these officials, if your ruling is as here suggested, will wish to secure a fireman's certificate before 31st December next.

I am sending a copy of this letter to the mining Press, to which you will, I presume, communicate your reply.

I am, Sir,
Your obedient servant,
T. A. Southern.

The Universal Mining School,
Cardiff,
8th August, 1912.

ELECTRIC LAMPS FOR MINERS.

Result of the Home Office Competition.

It will be remembered that in May 1911 the Secretary of State for the Home Department announced a prize of £1,000 for the electric lamp suitable for miners which best fulfilled certain specified requirements. The amount of the prize was placed at the disposal of the Secretary of State by a colliery proprietor, and the object of the competition was to encourage the production of safe and efficient types of electric lamps for miners.

Mr. Charles Rhodes (a former president of the Institution of Mining Engineers) and Mr. Charles H. Merz (a member of the recent Departmental Committee on the Use of Electricity in Mines) consented to act as judges, and the conditions of the competition were as follow:—

1. The competition was open to persons of any nationality.
2. The judges were empowered to award the whole of the prize, or to divide it, or to make no award if no lamp appeared to them to be of sufficient merit.
3. The competition was open for six months, closing on December 31, 1911.

The requirements which all the lamps submitted in competition were asked to fulfil were as follow:—

1. Each lamp was to be of sound mechanical construction so as to withstand rough usage.
2. It was to be of simple construction, and easy to maintain in good order and repair.
3. It was to be so constructed as to render impossible the ignition of inflammable gas either within or without the lamp.
4. The lamp battery was to be so constructed that any liquid it might contain could not be spilled with the lamp in use.
5. The lamp was to be so constructed as not to be liable to deterioration by corrosion as a result of the action of the electrolyte.

6. It was to be effectively locked.

7. It was to be capable of giving an amount of light not less than 2-candle power continuously for 10 hours.

8. The light was to be well distributed outside the lamp.

In addition to the above, regard was directed to be paid to :—(*a*) The first cost of the lamp ; (*b*) the cost of maintenance ; (*c*) convenience in handling ; and (*d*) the weight of the lamp when charged and ready for use.

The judges have now issued their award, which is in the following terms :—

Miners' Electric Safety Lamp Competition.

"We have had submitted to us 195 lamps, varying very considerably in design and construction.

"We have awarded the first prize to the C.E.A.G. lamp sent in by Mr. F. Farber, Beurhausstrasse 3, Dortmund, Germany, and inasmuch as a number of other lamps possess considerable merits, we have apportioned the amount offered for competition as follows :—

		£
Farber, F.	Beurhausstrasse 8, Dortmund, Germany	600
Attwater, Thos.	22, Pelham-square, Brighton	50
Bohres, Adolf	Zietenstrasse 12, Hanover, Germany	50
Bristol Electric Safety Lamp Works..............	40, Gt. Smith-st., Westminster	50
Electrical Co. Ltd., The ...	122-124, Charing Cross-road, London, W.C.	50
Gray, W. E.	19. Archer-street, Camden Town, London, N.W.	50
Joel, H. F.	134B, Kingsland-road, London, N.E.	50
Oldham and Son	Denton, Manchester	50
Tudor Accumulator Co....	119, Victoria-street, Westminster, S.W.	

Charles H. Merz.
August 1912. C. E. Rhodes.

LABOUR AND WAGES.

North of England.

On Saturday afternoon and evening a series of meetings were held in Newcastle by the Northumberland colliery enginemen and firemen respecting their hours and wages. The questions upon which a ballot took place some time ago were discussed at length, and ultimately it was decided to forego in the miscellaneous men's case the claim for 6d. per day and support an eight hours day. The stationary firemen decided upon an eight hours day, with wages to remain as at present for the 12 hours. It was decided by the winding men to modify their demand from a 6s. basis wage to that of 5s. a day basis wage. The locomotive men adhered to their original demand of a 10 hours' working day. A general meeting of all the grades concerned was subsequently held, and unanimously endorsed the decisions of the sectional meetings. It was further agreed that the general officers and wages board should place the results of the meetings in their modified character before the coalowners.

Federated Area.

Considerable dissatisfaction, it is stated, is expressed at the action of certain colliery owners in West Yorkshire in connection with the application of the Minimum Wage Act, and Mr. John Wadsworth, general secretary of the Yorkshire Miners' Association, on Tuesday, at the close of a meeting of the executive committee at Barnsley, made a statement bearing upon the situation. He declared that certain owners in West Yorkshire have made no attempt to put the Act into operation, and permission has been granted men at several collieries to take a ballot. In South Yorkshire, Mr. Wadsworth says, owners have shown a disposition to meet the men, and their attitude has in every way given satisfaction. At some collieries in West Yorkshire it was reported the men had been induced to contract out of the Act by being given an advance in wages of 15 per cent., and in other cases advances of 3d. or 4d. per ton had been given. These owners would find out, Mr. Wadsworth said, that this would not help them very much as time passed along, because even if the owners were to give the men 50 per cent. advance, and the men did not earn the minimum wage, they would be able to sue the employer for the difference. In South Yorkshire they were hopeful of being able to ultimately settle all the difficulties without serious trouble, and the owners were willing to deal with the workmen at the colliery and avoid expense caused by setting up committees. It was further alleged in West Yorkshire the owners absolutely refused to set up committees or to deal with the grievances of the men at the respective collieries in a proper manner. They wanted the owners to try and settle the differences at the collieries whenever possible without setting up all the machinery which would cost money to both the Coalowners' Association and the Miners' Association, and they hoped by-and-bye to be able to work under better conditions than now existed. They did not want to be spending their time and money in fighting in the law courts, though their men were justified in demanding being paid the minimum wage under proper conditions. The officials were pleased at the way in which some of the coalowners had paid all the arrears to the men from the commencement. There was great credit due to these collieries, although at other pits when the men had made application for their arrears they had been given 14 days' notice to terminate their employment. It was reported that about 1,500 men had been paid out-of-work pay at the Barrow, Pyewood, Moor End, Old Silkstone, Frickley, Gildersome and other collieries.

Scotland.

The annual conference of the Scottish Miners' Federation was resumed in Edinburgh, on the 8th inst., the president, Mr. Robert Smillie, in the chair. Mr. John Robertson, Lanarkshire, moved a resolution protesting against the action of the Government in refusing to abolish female labour on pit banks, which was adopted. Mr. David Gilmour, Lanarkshire, moved a resolution condemning the action of Lord Shaw, when Lord Advocate, in taking away, through the Sheriff Courts Act, 1907, the defence previously existing in Scotland since 1837 against summary eviction, and pending the passing of a general law against the right of employers of labour to evict during trades disputes, calling upon the present Government to redeem the pledge given by Lord Shaw to restore the law in Scotland to its old footing. The president held that they had not gone back on the matter. They had a Bill ready which the Labour party was balloting for each session, but what they were seeking in this resolution was something pending the passing of that measure. The resolution was unanimously adopted.

Mr. J. Robertson, Lanarkshire, speaking to a resolution demanding the demolition of all insanitary and unsatisfactory dwelling-houses at collieries and the substitution of buildings which should provide decent living accommodation at a moderate rental, declared that 70 per cent. of the houses occupied by miners in Scotland did not fulfil conditions permitting of their having a decent place to live in.

A resolution was adopted to give facilities by law to checkweighers to attend and convene meetings, &c.

Mr. McKerrell moved a resolution in favour of the nationalisation of mines. Mr. Gibb said the probability was that under a scheme of nationalisation the mines would be purchased at so enormous a price that they would hang like a millstone around the necks of the nation, and the change might not be so enormous an advantage to the miners. From the standpoint of the welfare of the nation also a fixed price would be a good thing. The resolution having been adopted unanimously, the president mentioned that that morning they had received the first draft of a Bill on the subject. He thought they had got beyond the stage of deciding to take over the mines of the country without compensation. But they had a feeling that there was a difference between the mines and the minerals. They were not prepared, if they could prevent it, to allow the present owners of the mines to get a fabulous price for the mines.

The proceedings of the annual conference of the Scottish Miners' Federation were concluded on the following day. At a private sitting of the conference the following resolution was adopted :—"That this conference is of opinion that the time has come when a uniform working policy of five days per week should be adopted by the Scottish miners, and instructs the executive committee to consider and report to a future conference as to what steps should be taken to attain this desirable object." The officials were re-elected.

A meeting of the Scottish Coal Trade Conciliation Board was held on Saturday in the North British Station Hotel, Glasgow, to consider a proposal to introduce a system of weekly wages for miners. At a meeting held some days previously, the employers indicated that they were willing to inaugurate the system at the earliest possible moment, provided an agreement could be come to regarding the question of lying time and the fixing of a uniform day for the payment of wages. A discussion took place also regarding an allegation on the part of the miners that a few of the coalowners were not paying the full advance of 12½ per cent. in wages recently granted under Lord Hunter's award, as independent chairman of the Board, these firms, it was understood, claiming that the advance under the Minimum Wage Act, to certain grades of workmen, stood instead of the general increase of wages. At the close of the meeting it was announced that no agreement had been come to with regard to either of the subjects on the agenda.

Miners' Federation of Great Britain.

A special conference of the Miners' Federation of Great Britain was opened at Blackpool on Thursday to receive reports from districts as to the working of the Minimum Wage Act, and to consider the policy of the Federation. The conference was a fairly large one, all the districts of the Federation being represented. Mr. Robert Smillie, acting president, was in the chair. The acting president said that was the first conference representative of all the districts in the Federation which had been held since the death of Mr. Enoch Edwards, M.P., and he thought it only right a reference should be made to the loss sustained by the passing away of their president. A vote of condolence was passed in silence.

The acting president said they might remember that at the conference held in London on Wednesday, May 22, they had reports from the various districts as to the progress which had been made in setting up Joint Boards under the Minimum Wage Act. They had also reports of a more or less vague character as to the experience in some of the districts where a short opportunity had been given as to the working of the Act; and as a result of the reports and the discussion which took place, a resolution was passed, the last paragraph of which read: "This conference hereby records its strongest protest against those awards, and calls upon the Government to take such immediate action as will remedy the defects complained of. The conference instructs the executive council to ask for an interview with the Government, and that a further conference be held without delay to receive the report of the deputation. When Mr. Asquith found it convenient, their executive had an interview with the Prime Minister in the House of Commons. They found when they had to put their case, in spite of everything which had been done to get the boards set up all over the mining districts of the country, that they had not even their final reports from some of the districts, as the chairman's award in some of the districts had not been received at that time. They had had only a very brief period to gain experience as to how the Act itself was going to work out after the awards, but they had, they believed, sufficient grievances under the awards themselves, as they understood them, to make out a strong case to the Prime Minister for an alteration even then of the law. The points which they emphasised before the Prime Minister were that the 5s. for adults underground works as the minimum wage, the 5s. around which centred a very considerable amount of talk during their dispute, and during the passing of the Bill through the House of Commons that 5s.—which had been sympathetically spoken of by all the Government officials, whom their executive met during the dispute—that 5s. was not accepted by the chairmen in many of the districts; and they found that while the 2s. for lads at 14 had been fixed as the minimum in nearly all the districts, there were districts in which the 5s. for adult workers had not been accepted. Then the second point was in connection with what was called regularity of employment under the Act. They found that, generally speaking, 80 per cent. of the possible attendances at work had been recognised as bringing the person within the Minimum Wage Act, but they found that in two very important districts the chairman had fixed 100 per cent. of attendances as necessary before a person, if he could not give reasonable excuse for his absence, could be entitled to the benefits of the Minimum Wage Act. The third point was that though the Act had been in force only a very short time, they found, from reports from some districts, that colliery managers had been forcing workmen to sign themselves out of the provisions of the Act under pain of dismissal in certain cases. It was found that the number of such cases was limited at that time. He feared the cases would not be so limited to-day, when they heard the reports from districts, of colliery managers who had told workmen that unless they were prepared to sign themselves outside the provisions of the Minimum Wage Act there was no further employment for them. As they had these reports only a few days before meeting the Prime Minister, they had to admit that they could not lay it down with authority that this was being done with the consent of the authorised employers, and it might be a mistake on the part of the managers who had acted in that way. The other point was the question of arrears under the Act. Some of them were of opinion that any arrears of wages which had accrued from the time the men started work up to the time the Minimum Wage Act award came into force would rank as arrears due to the workman, and he would be able to get them. They had no idea that each individual would have to make out his own claim, and obtain them individually. They had to report to the Prime Minister that in some cases no arrears had been paid. These were the main complaints they had to make. The Prime Minister replied expressing his very great satisfaction that the Act was working out so well as it was; that while it was not altogether satisfactory, that at least, taking into consideration the great principle it was working out reasonably satisfactory. They had pointed out to him that so far as possible, under an Act of Parliament, it should apply equally to all concerned, and on that ground they thought that in Durham and Northumberland and Cleveland he believed where the award demanded 100 per cent. of attendances it did not seem altogether fair that 75 or 80 per cent. of attendances should be sufficient to give men the benefits of the Act. They said they did not think that was equitable and just under all Acts of Parliament, and Mr. Asquith might take that into consideration. The Prime Minister's reply on that point was that he would like further information, and he believed he promised to communicate with Lord Mersey and Sir Robt. Romer and ascertain whether there were any reasons why it should be required. On the threatened dismissal of the workmen to induce them to contract out of the Act, Mr. Asquith gave them a remarkable reply. He said he thought their trade unions were for protecting men against anything of this kind. Under ordinary circumstances that was so. The chief function of their trade unions was to protect men against injustice wherever it might arise. They told Mr. Asquith they did not expect their trade unions to be used for the purpose of carrying out an Act of Parliament, and they considered if the principle was wrong and the employer had no right to introduce the principle of contracting out of the Act, then they thought it was the duty of the Government which had forced them to accept this Act to force the employer to carry it out. Mr. Asquith did not, in his main reply, touch upon this matter of workmen being threatened with dismissal. They had to call his attention to this, and Mr. Asquith then said, "I don't think it can be said you are unevenly matched. I cannot help thinking you can protect yourselves." The deputation said the miners could protect themselves by means of strikes, but the Act was passed to prevent strikes. Mr. Asquith said he quite agreed, but the matter was one which could be settled without resort to strikes. Those who had heard Mr. Asquith speak, knew that he had a habit of dropping his voice at the end of a sentence, and he made one remark which was not reported in the newspapers, and he added "I think it very wrong of the employers to act in this way." The reporters, he thought, did not hear that remark, but the deputation heard it, and he took it that the Prime Minister considered it wrong and against the spirit of of the Act of Parliament. They had not then sufficient experience of the working of the Act, and their reports from the various districts were not sufficiently clear to justify them in saying to what degree or to what extent they wanted any change in the law. They met the Prime Minister to let him know the Act was not working so smoothly and well as they expected. They had called that conference to put them in touch with the reply of the Prime Minister, and to get a full report from the various districts in order to find out whether there was any justification for any of the complaints under the Act, and if so, to remedy the failures if failures existed.

The conference then went into committee and received reports from Yorkshire, Lancashire, Derbyshire, Nottinghamshire, the Midland Federation, Scotland, South Wales, Durham and Northumberland as to the working of the Act in those counties and the difficulties which had arisen through colliery managers asking men to contract themselves out of the provisions of the Act as aged or infirm workmen, and the further difficulty of obtaining the wage in those cases where workmen had failed to earn it under the contract.

Mr. J. G. Hancock, M.P., who made the official statement, said the reports from the districts as to the administration of the Act were most unsatisfactory. The conference will discuss these reports at the sitting on the following day. The conference endorsed the action of the executive in making a grant of £500 to the transport workers who had been on strike, and the conference voted a further sum of £500 to the strike fund. A resolution was also passed expressing regret at the serious loss of life which had taken place in the Cadeby Main, Barnsley Main, and Westphalian explosions, and its sincere sympathy with the bereaved relatives of the men who lost their lives.

In regard to a rescue station, the Wrexham and district collieries have grouped together, and it is understood that the central station will be erected at Wrexham, where a motor-driven vehicle will be kept in constant readiness and the crew will be formed of men from the various collieries. It is proposed to have the building erected near to Wrexham Station, as being the most central position.

THE SCOTCH COAL AND IRON TRADES.

Thursday, August 15.

Glasgow and Lanarkshire.

COAL.

A large business has been done in the coal trade since last report. It was feared that hardening prices and high freights might check the export business, but the foreign shipments continue to show an increase. The clearances at the different ports have to a greater extent than usual been for abroad, and at the same time the volume of the coastwise trade is well maintained. The aggregate shipments at Scotch ports in the past week amounted to 372,122 tons, showing an increase of 14,876 tons compared with the preceding week, but the total was 8,374 tons less than that of the corresponding week of last year. The Glasgow shipments amounted to 85,951 tons, against 80,551 in the preceding week and 100,025 tons in the corresponding week of last year. Supplies of coal in the Glasgow district have been good. Steam coal has been in active request, and the better qualities of house coal have sold freely for shipment. The demand for splint coal and for hard coal of every description has been very active. On account of the full supplies, prices generally have not advanced to the extent that was expected, but any change taking place has been in an upward direction. The f.o.b. quotations at Glasgow are for steam coal 11s. 6d. to 12s. 3d., ell 11s. 6d. to 12s. 6d., splint 12s. 6d. to 13s., washed treble nuts 13s. to 13s. 6d., doubles 12s. 6d. to 13s., and singles 11s. 6d. to 12s. per ton. The consumption of coal at iron and steel works and other manufactories is on a very extensive scale. The household branch of the trade has been showing expansion, and retail prices in the large consuming centres are from 1s. to 1s. 6d. per ton higher than they were a month ago.

IRON.

The Glasgow pig iron market has been very active since last report, and there has been a further substantial increase in prices, the upward movement in makers' quotations being specially marked. Home users of iron have been busy purchasers for future delivery over the greater part of the present year, and some transactions are reported to have taken place for the early part of next year. Cleveland warrants have sold from 60s. 7d. to 61s. 9d. cash, 60s. 10½d. to 61s. 11d. one month, and 61s. to 62s. three months, a quantity of iron having also been purchased at 61s. 4½d. and 61s. 5d. for delivery in two months. A large business is reported in Scotch pig iron, and makers have again raised their prices. Govan and Monkland are quoted f.a.s. at Glasgow, Nos. 1, 69s. 6d., Nos. 3, 68s.; Carnbroe, No. 1, 73s. 6d., No. 3, 69s. 6d.; Clyde, Calder, and Langloan, Nos. 1, 76s., Nos. 3, 71s.; Summerlee, No. 1, 76s., No. 3, 72s; Gartsherrie, No. 1, 77s., No. 3, 72s.; Coltness, No. 1, 92s. 6d., No. 3, 72s. 6d.; Eglinton at Ardrossan or Troon, No. 1, 69s. 6d., No. 3, 68s. 6d.; Glengarnock, at Ardrossan, No. 1, 78s., No. 3, 73s.; Dalmellington, at Ayr, No. 1, 70s., No. 3, 68s.; Shotts, at Leith, No. 1, 76s. 6d., No. 3, 71s. 6d.; Carron, at Grangemouth, No. 1, 77s., No. 3, 72s. per ton. An increasing amount of hæmatite pig iron is going into use at the steel works, and merchants quote Scotch hæmatite 80s. per ton for West of Scotland delivery. The number of furnaces in blast in Scotland is 88, compared with 83 at this time last year, and the five extra furnaces now in use are all employed in the production of hæmatite pig iron. The shipments of Scotch pig iron in the past week were 2,706 tons foreign and 3,689 tons coastwise, the total of 6,395 tons being 1,223 less than in the corresponding week of last year. The week's arrivals at Grangemouth of pig iron from Middlesbrough and district amounted to 7,917 tons, compared with 10,768 in the corresponding week of last year. The arrivals of Cleveland iron since January 1 were 263,821 tons—31,077 tons less than in the corresponding period of last year. This decrease is attributable to the dock strikes that occurred in the early part of this year. There is great activity in the various branches of the finished iron and steel trades, and it is understood that considerable additional orders were received in anticipation of the recent advance in prices. Scotch iron crown bars are now quoted £8 2s. 6d., best bars £8 10s., and best horseshoe iron £8 12s. 6d, these rates showing an advance of 7s. 6d. per ton compared with last week, and being subject to the usual 5 per cent. discount for Clyde delivery.

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Renfrew, Ayr and Dumbarton.

COAL.

The coal shipments in the past week show a marked increase, the extra clearances having taken place at Greenock, Troon and Ayr. The clearances have been at Bowling 114 tons, Irvine 1,020, Ardrossan 3,514, Greenock 4,553, Troon 10,424, and Ayr 20,178—total 39,805 tons, compared with 31,547 in the preceding week, and 29,409 in the corresponding week of last year. Of this total of 39,805 tons, 11,528 tons went abroad, and 28,277 tons coastwise. The increased shipments are well distributed over the coastwise and the foreign branches of the trade. The inland business has to some extent been reduced, so far as the manufacturing consumption is concerned, by holidays in some districts, but the trade as a whole is in a very healthy state, and there has been a firm tendency in prices.

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Stirling, the Lothians and Fife.

COAL.

The coal trade in the Lothians and in the Firth of Forth district generally is very active. In many cases the collieries are being taxed to the utmost to provide requisite supplies of coal. In the course of the past week 108,435 tons were shipped abroad and 18,357 tons coastwise. At Granton 5,782 tons were cleared, Bo'ness 18,808, Leith 46,782, and Grangemouth 55,420—total 126,792 tons, compared with 118,882 in the preceding week and 108,470 in the corresponding week of last year. Best screened steam coal is quoted at Leith 12s. 6d. to 13s., secondary qualities 11s. 6d. to 12s., treble nuts 13s. 6d. to 14s, doubles 12s. 6d. to 13s., and singles 12s. 3d. to 12s. 9d. per ton. The business in the Fife district continues very active, and there has been an ample supply of vessels. From various causes, however, the shipments have fallen considerably short of those of the preceding week, but the prospects are quite encouraging. The clearances have been at Burntisland 54,670 tons, Methil 58,715, Alloa 2,296, Dysart 1,596, Wemyss 1,158, Charleston 693, and Tayport 446—total 119,574 tons, compared with 126,266 in the preceding week, and 142,592 in the corresponding week of last year. At Methil and Burntisland first-class screened navigation coal is quoted 15s. to 16s., unscreened 13s. to 13s. 6d., steam coal 11s. 6d. to 13s., treble nuts 13s. 6d. to 14s., doubles 12s. 6d. to 13s., and singles 11s. 9d. to 12s. 6d. per ton.

THE LONDON COAL TRADE.

Thursday, August 15.

The London coal trade for the past week has shown signs of returning activity; the colder weather has undoubtedly stimulated orders from the public generally, and merchants who have neglected their buying arrangements for the past few weeks have been making special offers for household qualities in order to make preparations for the better demand, which cannot now be long delayed owing to the rapidly approaching winter months. The bulk of the London merchants, however, report that in June and July huge consignments of coal were stored in the houses of the wealthier classes, much earlier in the summer than usual this year, in order to avoid any possible contingencies which may arise from any shortage of supply or labour troubles in the following winter. In many cases also the carmen report that when they went to deliver the summer supply they found a considerable balance of fuel left over from the supply of the preceding winter, clearly showing that unusual preparations were made during last year to combat the difficulties arising during the troublesome period. On the other hand, it must ever be borne in mind that there are thousands of homes in the Metropolis—and many of them good-sized houses, especially in the West End, and in flats—where the accommodation for storing coal is exceedingly limited, and the householder is entirely dependent upon the weekly or fortnightly supply from trolley men or merchants, so that with ordinary coal-consuming weather the demand is steadily maintained whatever the price may be. The gas companies have undoubtedly reaped a rich harvest during the past year, and gas cooking stoves have very largely increased in all the suburbs of London. This may possibly lessen the demand from the merchants' point of view, but collieries supplying gas coal will in all probability find an increasing number of orders. Stocks at the various depots and wharves are beginning to show very large proportions, and merchants who have been holding back their empties and using the time for repainting, &c., are now anxious to get them back into full working operation. In the manufacturing coal department also the same activity is noticeable, and as the various waterside factories which have suffered from the recent dock strike get back to full work again, the demand for steam coal and coke is likely to increase. Contract renewals are proceeding very slowly; the whole of the trade at present is working upon the special quotations given from time to time by the colliery representative in order to keep the collieries working full time. The few pits which have kept tenaciously to the recognised 2s. 6d. advance have found themselves left high and dry for orders, whilst "spot" lots have regulated practically the whole of the buying and selling on the market. The public advertised prices are all 2s. above last year, and unless some very unforeseen circumstances should arise, there is every probability of an early rise in prices during September. All qualities of household fuel are firm, and whilst colliery prices remain high, the margin of profit for the merchant is comparatively low, so that many of the smaller merchants are openly advocating a speedy rise in the public prices. In the seaborne market the quoted prices are 20s. for best Wallsend and 19s. for seconds. Eleven vessels are entered as arriving in the Thames during this week, the majority of which are already sold, and in consequence prices are merely nominal, although the tone is very firm. The cheaper qualities of house coals, Derby brights, kitchen cobbles and bakers' nuts have considerably improved in demand during the week, but prices are unaltered, and where some concession has been made in the price, the extra demand has been clearly demonstrated. The Leicester collieries with their low pit prices have been selling very freely. Small nuts have somewhat lessened in value, and notwithstanding the limited output are still moving very slowly. Slacks, however, continue in good demand. Contract renewals are gradually closing, but only with those collieries who have slightly modified their prices.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, August 9.—There was no alteration in the seaborne house coal market to-day, no cargoes pressing for sale. Best (Durham) 20s., seconds 19s. Cargoes 8.

Monday, August 12.—There was a fair demand for seaborne house coal at to-day's market, but no cargoes pressing for sale. Best (Durham), 20s., seconds 19s. Cargoes 36.

Wednesday, August 14.—The seaborne house coal market was very quiet to-day, no supplies forthcoming of either Durham or Yorkshire. Best (Durham) 20s., seconds 19s. Cargoes 11.

THE TIN-PLATE TRADE.

Liverpool.

The tone of the market is quietly steady. Works are all booked up over the next three months, and are standing to their quotations for forward shipment. Raw materials keep very firm. Current quotations for coke tin-plates may be called:—I C 14 × 20 (112 sh. 108 lb.), 14s. 7½d. to 14s. 9d. per box; I C 28 × 20 (112 sh. 216 lb.), 29s. 3d. to 29s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 1½d. to 15s. 3d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. per box; I C 14 × 19¼ (120 sh. 110 lb.), 15s. per box; I C 20 × 10 (225 sh. 156 lb.), 21s. 6d. per box; I C squares and odd sizes, 14s. 10½d. to 15s. basis. Ternes are steady at 26s. to 26s. 6d. for I C 28 × 20, and charcoal tins rule firm and in fair demand at 17s. basis and upwards according to tinning. Finished blackplate is strong at £11 per ton basis for delivery end of the year. Works are very full of orders for this class of plate. Coke wasters are in steady demand and are quoted:—C W 14 × 20, 13s. 7½d. to 13s. 9d. per box; C W 28 × 20, 28s. 1½d. to 28s. 3d. per box; C W 14 × 18¾, 13s. 7½d. to 13s. 9d. per box; C W 20 × 10, 19s. 6d. per box—all f.o.b. Wales, less 4 per cent.

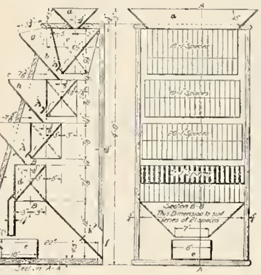
— PROGRESS. —

Testing of Gas Coals.

Herr H. Strache has devised a method for prompt testing of coal, in which only very small quantities, 1½ to 3 grains, of coal are used, and yet the results obtained are of practical value. The sample is heated in a very hard glass tube; the tar is absorbed by an asbestos plug; the gas goes to a Strache gas calorimeter, and is exploded with air, and the heating value read off directly. Weighing the tube before admitting the sample, before distilling and after distilling, shows the amounts of coke and volatile products. Weighings of the asbestos plug show the amount of tar. The coke residue is then burned off in oxygen passed through the tube, which gives the amount of carbon, hydrogen and ash in the coke. The CO_2 from the gas produced can also be measured, and this gives the total carbon in the gas evolved. The test thus gives eight values, and takes up little time. The method has been worked out at the Vienna gas research station.

A Mechanical Laboratory Sampler.

We extract from *Mines and Minerals* the following description of an appliance used by the Philadelphia and Reading Coal and Iron Company at their chemical laboratory at Pottsville. As the samples come in they are broken in a laboratory jaw-crusher run by a small motor. After this operation the crushed coal is placed in the hopper *a* of the sampler shown in the figure. The coal falls through the ¾-in. aperture in the bottom of the hopper on to a riffle sampler—that which falls in the grooves, being one-half, slides down to the chute *b* and is deflected to the next set of riffles. The discard takes the direction given it by the chute *c* and goes to the bottom of the case that encloses the riffles. The lowest riffle sample goes by chute *d* into the sample box *e*, which is a drawer that can readily be removed and inserted at will. The discharge at *f* is so arranged that all dust and discarded coal goes outside the laboratory where the latter can be removed readily. Assuming that the sample is 100 lb., then when it reaches the sample box it is reduced to 6·75 lb. In case the sample was 50 lb. it would be placed in the first side hopper or *g* and be reduced to the same quantity, or in case it was a 25 lb. sample it would be placed in hopper *h*, and so on, the final sample being 6·75 lb. The sample is removed from the sampling box, reduced to its proper size and placed in a labelled bottle until it is tested for its heat units in a calorimeter, or analysed if that be the object.



Coke-oven Gas for Town Use.

A paper on the subject was recently read by Mr. W. S. Blauvelt before the American Gas Institute. In December 1899, the New England Gas and Coke Company began delivering the surplus gas from the by-product coke-oven plant at Everett for general distribution and sale as illuminating and fuel gas. During the 12 years which have nearly elapsed since the Everett plan commenced operation, the number of coke-oven plants in the United States from which surplus gas is sold for illuminating purposes has increased to 11. The total sales of coke-oven gas for general distribution have increased each year, except in 1908, until in 1910 they exceeded 12,000,000,000 cubic feet, or, approximately, 23 per cent. of the total coal gas sold. Of the 11 coke-oven plants now delivering illuminating gas, all except one have been operated continuously since they started. In 1902, the Semet-Solvay plant at Detroit, Mich., began the delivery of its surplus gas to the Detroit City Gas Company. In order to determine the type of oven best adapted for each of these varying conditions, the Semet-Solvay Company decided to build at Detroit several ovens of different types. In August 1909, six experimental ovens, built of silica material and similar in all respects to the old standard type of Semet-Solvay oven, except that they are equipped with an improved and enlarged form of recuperator, were put into regular service. With these recuperators, the air used for combustion in the oven heating flues is heated to a temperature of about 1,400 degs. Fahr., or about 600 degs. higher than with the older and simpler form of recuperator. In October 1909, six more experimental ovens were put into service. These ovens were arranged so that they could be fired with producer gas or with oven gas at will. Outside regenerators were provided in which both the air and the producer gas used to fire the ovens were heated. The results obtained with these ovens were quite unsatisfactory, owing mainly to leaks; it was, therefore, decided to abandon the outside regenerators and rearrange the oven heating system. Three ovens were rebuilt equipped with individual regenerators and were arranged to be fired with oven gas. Two ovens were rebuilt equipped with improved recuperators and arranged to be fired with oven gas or producer gas at will.

The results of these two experiments were both quite satisfactory, but there were a number of details in which it was evident that some improvement could be made. They are, therefore, being rebuilt with individual regenerators and arranged to be heated by oven gas only. At the same time three additional ovens are being erected to be fired with producer gas, on the Doherty economiser system or with oven gas at will.

In the original installation each block of ovens was equipped with a double hydraulic main, having separate compartments for rich and lean gas. Duplicate gas condensing and washing systems were provided for the rich and lean gas. As the daily coke output of the plant was increased, it became necessary to enlarge the capacity of the gas condensing and washing apparatus. After a series of experiments with a Doherty washer-cooler, it was decided, in 1909, to replace the tubular condensers and the bubbling washers with this type of apparatus. To prevent leakage it was necessary to devise a method which would automatically control the gas pressure in the ovens. Experimentally it was found that a satisfactory yield of gas, uniformly low in nitrogen—that is to say, below 4 per cent., could be obtained from a block of coke ovens only when the variation of gas pressure in the hydraulic main was less than $\frac{3}{100}$ in. water column. After successful pressure-controlling mechanisms were devised and installed, it became a comparatively simple matter to control the calorific power of the gas. From the coal used at this plant the gas produced during the coking process varies from about 700 B.Th.U. per cubic foot when an oven is freshly charged to about 350 B.Th.U. per cubic foot at the conclusion of the coking period. In practice it is customary to vary the calorific power as the illuminating power is changed, as given in the following table:

15 candle-power gas	....	605 B.Th.U.
16 ,, ,,	....	620 ,,
17 ,, ,,	....	635 ,,
18 ,, ,,	....	640 ,,

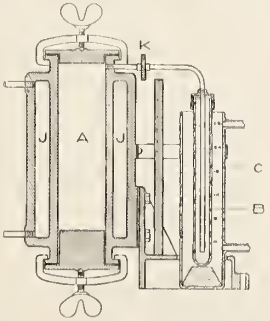
As no gasholder is used, calorific determinations made on the gas, as delivered direct from the plant, frequently vary as much as 20 B.Th.U. from the standard, but the average of all determinations for a period of 12 hours is seldom more than 5 B.Th.U. below or more than 10 B.Th.U. above the standard required. In 1908, apparatus was installed for washing the gas, before enrichment, with an absorbing oil which removed practically all of the naphthalene and other condensible hydrocarbons. The best foundry coke has been made from a coal mixture containing from 25 to 26 per cent. volatile matter. From such a coal the yield of gas and other volatile products is necessarily much lower than would be obtained from a good gas coal containing 32 to 34 per cent. volatile. Notwithstanding this handicap, the normal yield of gas per ton of dry coal, the nitrogen content in the gas not exceeding 4 per cent., varies from 10,400 to 10,800 cubic feet., when coking in 20 hours. With higher heats and a shorter coking period, the total make of gas is materially increased. No accurate determinations have been made of this increased make of gas due to higher oven temperatures, but the results obtained from the entire plant when one block was operated for several weeks at 16-hour coking time indicate that the yield of gas per ton of dry coal from this block approximated 11,500 cubic feet.

Ankylostomiasis in Assam.

Much of our knowledge of the subject of ankylostomiasis has come from India, where the opportunities for investigation are greater than in more temperate climates, and it is a well-grounded source of anxiety that, as the workings in the Indian coalfields become deeper with the exhaustion of the upper seams, ankylostomiasis may occur in a virulent form. Some interesting notes on the disease are given by Dr. J. D. Gregorson in in a paper read before the Assam branch of the British Medical Association. He suggests that possibly the *Ankylostoma* has been accused of causing many illnesses with which it has had little or nothing to do. Preventive measures are now adopted on the tea gardens in Assam, but outbreaks occur from time to time. Dr. Gregorson suggests that the worm may be capable of manufacturing the toxin, which, it is now conceded, is responsible for the symptoms, at times in greater quantity or in greater strength. He says that recently there was a bad outbreak on one of the tea-gardens under his charge, several deaths occurring. He deals at some length with the cases observed, for which we may refer the reader to the *British Medical Journal* for February 26, 1909, in which they are recorded. The results, however, have apparently created a doubt as to whether the disorder was entirely attributable to the ankylostoma. An important point is referred to by Dr. Gregorson. Accepting the theory, first advanced by Looss, that the larva can penetrate the skin and thence reach the intestines, he observes that, owing to the irritation of the mucous membrane of the air cells and passages during transit, it may be one of the predisposing causes of the pneumonia observed in the tea gardens, which becomes epidemic and yet does not appear to spread from man to man, and if pneumonia, possibly tetanus and anthrax.

Determining Moisture in Coal and Coke.

The engineers of the United Gas Improvement Company, of Philadelphia, have devised an apparatus for the determination of moisture in coal and coke, which can be set up at the spot where the fuel is to be used. The apparatus and the results obtained from it are described in the *Journal* of the Franklin Institute, by Mr. J. A. P. Crisfield, engineer of construction with company. A section of the apparatus is shown below. The sample (1 lb.) of fuel to be tested for moisture is placed in the chamber, A, which is heated by a steam jacket, J, the temperature being maintained at a point that will drive off all the moisture, but not any of the volatile matter in the sample. A graduated glass tube, B, is surrounded by a jacket, C, through which cold water flows, thus forming a condenser. The graduations of the tube, B, are of such magnitude that when 1 per cent. by weight of the sample is driven off in the form of moisture and condensed in the tube, the volume of the condensed water vapour driven off will just equal the volume between any two graduations on the tube. K is a ground joint union which permits the graduated tube, B, to be disconnected and emptied after the determination is completed. A balance is provided, by means of which 1 lb. of fuel can be introduced into the chamber A. The apparatus should be erected on a wall or table near the point where the fuel is to be used (on the operating floor of a water gas set, for instance). The sample having been placed in the chamber A, steam at about 230 degs. Fahr. is turned into the jacket J, at which temperature none of the hydrocarbons in the sample will be driven off. A cock on the discharge pipe of the jacket J should be left slightly open, to allow any condensed water to flow away, so as not to affect the temperature of the jacket. Previous to the turning on of the steam, a current of water has been started in the condenser, and the water level in the tube B, has been brought up



Sectional View of Moisture Determinator.

to the zero mark. The determination is now begun, and the apparatus may be left to itself for an hour or so, at the end of which time it will be found that practically all the water has been driven off and condensed in the tube B, where it is read off directly as a percentage of the original weight of the sample.

Before the apparatus was put into service a calculation was made to determine its characteristic error, which showed an error of about 0·13 per cent.—the true content of moisture would be 0·13 per cent. greater than the indicated content, owing to the volume of the voids in the sample of coke. To check this calculation, definite quantities of moisture were added to dry samples of coke and the samples examined in the determinator; with the result that the practical error agreed with the theoretical error.

Although the instrument was devised particularly for use in checking high guarantees connected with the combustion of coke and coal, it has ben found useful in various ways. For instance, in a coal gas plant where the yield of gas, ammonia, tar, &c., per pound of coal is figured in great detail, it is found that the uncertainty introduced by the presence of a variable amount of moisture is very annoying. With the use of the moisture determinator, however, this uncertainty is, to a large extent, eliminated. In one case it was found that the content of moisture in gas coal as weighed into the bins averaged as high as 9 per cent. for a period of some months. If this content of moisture had not been known, the poor results from the use of such coal would have widely misled the operating engineer. New uses for the instrument are constantly being suggested, among them the determination of water in metallic ores, and water and light oils in tar.

MINING AND OTHER NOTES.

Mr. Frank Brain (chairman of the Gloucestershire Mining Committee) presided at a meeting at Coleford last week, and distributed the prizes won by students in the recent examination, and announced the scholarship awards. The chief prize is of the value of £200, and entitles the winner to two years' experience at a colliery at Wigan, and free tuition there. In addition there are nine travelling scholarships in the senior, and three in the elementary classes of the value of £5 each to cover a week's visit to some colliery district in the company of their lecturer, Mr. J. J. Joynes. Mr Brain announced that Mr. Albert Ruffrey, Cinderford, had secured the £200 scholarship, with 241, marks.

It is understood that Mr. David Gilmour, general secretary of the Lanarkshire Miners' Union, has received an invitation from the Government to act as one of the members of the Royal Commission on the Housing of the People of Scotland. The union have approved of Mr. Gilmour's acceptance of the appointment.

Mr. and Mrs. James Fairley, of Shafto House, Craghead celebrated their golden wedding on Sunday, having been married at the Congregational Church, Winlaton, on August 12, 1862. Several presentations were made to Mr and Mrs. Fairley, including gifts from the South Moor Coal Company Limited, Mr. R. W. Cooper, managing director of the company, the officials of South Moor Colliery, the mechanics of South Moor Colliery, and the officials and deputies of Craghead Colliery. Mr. Fairley has been manager at Craghead Colliery for 42 years, and has had the active charge of South Moor Colliery since 1883.

Mr. Thomas Griffith, of Walter-road, Swansea, colliery proprietor, of the firm of Messrs. Griffith and Pollard, of Swansea, who died on June 13, left estate valued at £28,621 gross, with net personalty £27,636.

At the half-yearly meeting of the Hull and Barnsley Railway and Dock Company, held on the 13th inst., at Hull, a discussion arose on the statement in the report that it was expected that the new joint dock of the North Eastern and Hull and Barnsley companies at Hull would be ready for opening within the next 12 months. Mr. E. Laverack said that the Act authorising the construction of the dock was passed 13 years ago, and he was told that the present dock accommodation at Hull was so inadequate that many vessels had to wait seven days before they could get berths and unload their cargoes. That must tend to drive trade away from the port. Their competitor, Immingham, on the other side of the Humber, was only authorised five or six years ago, and was completed and open for traffic. Mr. G. J. Bentham, M.P., endorsed the remarks of Mr. Laverack. He did not think Immingham would run away with their trade, but he did believe that greater facilities would induce extra trade, and if the Hull Joint Dock was completed in anything like time they would have nothing to fear from the competition of Immingham. The chairman, Mr. W. S. Wright, said their interest had always been to push the dock along, but the character of the work did not permit of such rapid construction as had been possible at Immingham. The London dock strike had interfered with their supply of cement, of which they used a large quantity. He could not give a definite date for the completion, but it would be fully open within 12 months.

An interesting little gathering took place this week at Middleton Colliery, when a number of members of the North-Eastern Railway Locomotive Improvement Class walked the length of the railway in celebration of the centenary of the engine "Blenkinsop," the first commercially successful locomotive which served the colliery.

At a meeting of the Barnsley British Co-operative Society Limited, on the 12th inst., a proposal to make a grant to the relief fund for the dependants of the Cadeby Main and Barnsley Main explosions led to severe comments being made on an alleged delay of the administration of the funds now in hand. It was decided to give £200 with the condition that the directors should distribute the money direct to the widows and children. Councillor S Jones, a director of the society, and a member of the executive of the Miners' Association, said they were all absolutely disgusted to think of all the money subscribed for mining disasters which was held up. He hoped that before long a national fund would be formed by the pooling of the whole of the balances of the relief funds.

Mr. George Beal, West Sleekburn, an old official of the Bedlington Coal Company, has retired from active service at the age of 67 years. He has served under the Bedlington Coal Company for the past 54 years, beginning at Barrington and afterwards removing to West Sleekburn. He has been an official at the colliery for 35 years, the last eight of which he spent as master wasteman.

At the last monthly meeting of the Wigan Town Council, the mayor presented the Edward Medal, on behalf of the King, through the Home Secretary, to Mrs. Green, the widow of James Green, who before his death was a fireman at the Bamfurlong Collieries.

At the last meeting of the Newcastle Chamber of Commerce, the secretary stated that he had been requested to place before the council a suggestion for the formation of a strong and representative committee to take into consideration the question of Tyne shipments. The matter will be dealt with at the next meeting of the council.

At the half-yearly meeting of the Great Western Railway Company on the 9th inst., Viscount Churchill stated that minerals had shown a decrease of £151,389, which was due entirely to the strike. The total decrease in the revenue was £234,343. The National Insurance Act would cost the company for health insurance, unemployment insurance, and the expense involved in administering it, about £60,000 a year.

Sir Gilbert H. Claughton, Bart., chairman of the London and North-Western Railway Company, in presenting the accounts at the half-yearly meeting last week, said that in receipts there was a decrease compared with the corresponding half-year of £193,541, which was entirely due to the dislocation of business caused by the coal strike. In expenses there was an increase of £213,478. As one small example of how the coal strike affected their expenses, he might mention that the mere picking up of coal from their emergency stocks on the ground, instead of coaling the engines direct from the trucks, and restocking, cost them an additional sum of over £8,000. There was a very large increase of 32 per cent. in compensation, almost entirely in claims upon goods traffic. This was the unfortunate aftermath of the labour troubles of last year, and also of the more recent coal strike. Under the head of demurrage there was an increase of £18,000, which was almost entirely due to their having had to hire a number of wagons to supplement their own supply in order to meet the great and irregular pressure of traffic occasioned by the various labour troubles. The chairman added that the cost of the National Insurance Act would be £64,000.

Mr. George Thomas Rait, F.C.A., of Milton, Hayne-road, Beckenham, Kent, chartered accountant, of Ethelburga House, 91-3, Bishopsgate, E.C., chairman of the Scottish Australian Mining Company and other companies, who died July 2 last, aged 69 years, left estate of the gross value of £377,926, of which the net personalty has been sworn at £377,821.

As the outcome of a discussion on miners' nystagmus (neurosis) held on July 19, during the Oxford Ophthalmological Congress, the following resolution was unanimously passed:—"That, in the opinion of the Congress, the character of the illumination is the chief factor of the production of miners' nystagmus, and that a Departmental Committee should be appointed to make enquiries into, and to report upon the exact conditions under which the disease occurs."

It is stated that negotiations are proceeding, and are believed to be practically assured of success, for the amalgamation of John Watson Limited and Archibald Russell Limited, two of the most important coalmining companies in Lanarkshire. John Watson Limited has a total issued and paid-up capital of £300,000, in £1 ordinary shares. In May last year the capitalisation, which then consisted of £10 shares, with £8 10s. paid, was raised to the present figure by the payment of a bonus aggregating £45,000, to be utilised in making the shares fully paid; the denomination was then reduced to £1. The company was registered in 1890, and last year paid an interim dividend of 8s. 6d. per share on the £10 shares, and a final dividend of 1s. 6d. per share on the £1 shares, both free of tax. Archibald Russell Limited is a private company, registered in 1904, with a capital of £500,000, in £10 shares fully paid.

In the faculty of engineering at University College, London, Mr. E. Kilburn Scott has been reappointed lecturer in electrical design for the session 1912-13, and Mr. A. H. Barker has been reappointed lecturer in heating and ventilating engineering. Mr. B. J. Lloyd-Evans has been appointed demonstrator in the department of mechanical engineering.

Mr. G. Dickson, of Moorgreen, has been appointed manager of the High Park and New Watnall Collieries, belonging to Messrs. Barber, Walker and Co, in place of Mr. O. MacGregor, who takes over the duties of manager at the Bentley Colliery, Doncaster, next week. Mr. Dickson has been under-manager at the High Park Colliery for several years, and is now vacating a similar position at the Moorgreen Colliery.

The reports of the engineers to the South Staffordshire Mines Drainage Commissioners were issued last week. In regard to the works of the Tipton district, Mr. E. Howl states that the rainfall for the last five weeks had been 3·43 in., and the pumping 10,468,600 gallons per 24 hours, compared with 10,456,700 the previous month, and 8,772,200 in the corresponding period last year.

An enquiry which may result in a large increase in the population of West Hartlepool has just been received by the mayor of the borough. The enquiry comes from the Horden Collieries Company, who ask for particulars of workmen's dwellings that may be to let in the town. It is understood that they are considering the advisability of housing at West Hartlepool several hundreds of the men employed at their Blackhalls Colliery, which is situated some five or six miles north of that town. There is no lack of suitable accommodation in the borough, for it is estimated that at the present time the empty houses number about a thousand, and that over 700 of these are workmen's dwellings.

On the occasion of the annual excursion of the Hetton Colliery officials, a presentation was made at the North-Eastern Hotel, Scarborough, to Mr. Earl Best, manager of the colliery. Mr. Lambton made the presentation, which consisted of a suit case.

At the half-yearly meeting of the Great Northern Railway Company last week, Lord Allerton stated that the train mileage for the half-year was reduced by 1¼ million miles, but the cost of coal consumed was nevertheless £6,000 more. It might be thought that the reduction in train miles was caused by their shortage of coal, but that was not so. As a matter of fact they had an unusual quantity of coal, and when they finished up at the close of the strike they had in stock a supply which would have lasted them several weeks longer. The Insurance Act would cost the company £30,000 a year. In reply to a question as to whether the use of oil fuel for any of the company's locomotives was contemplated, the chairman said that many correspondents obligingly came to the company's assistance during the strike with a view to showing the directors how to do without coal. As a matter of fact, they had an engine running with oil during the time. There was no difficulty about using oil as fuel; that might be taken for certain. In connection with their electric power they had a Diesel engine which worked as regularly as clockwork, and they could depend on the exact number of gallons of oil which it would use in a week. In every way it seemed perfectly satisfactory from that point of view, and not unreasonably expensive. Still, when coal went up to 40s. a ton oil went up too. Locomotives could be worked by oil, but it was not cheaper, so far as their company was concerned, than working them by coal.

At the last meeting of the committee of the coal merchants' and dealers' section of the Bradford Chamber of Trade, attention was drawn to the case of Messrs. T. Smith, Lucas and Hainsworth, who had been proceeded against for siding rent, and who counter-claimed for the detention of wagons. It was resolved that the section should support the case. Subsequent to the meeting the secretary of the Chamber (Mr. Fred Pickering) communicated with the railway company's solicitors with a view to an amicable settlement being arrived at, and as a result the hearing of the case has been adjourned until October. An endeavour is being made to arrange a conference between representatives of the railway company and of the coal merchants' section. In regard to membership of the section it has been decided that no person shall be eligible who is not a legitimate coal merchant and also that each person's name shall be brought before the committee for consideration.

Mr. P. M. Chester, general manager of the Oakwell Colliery, Ilkeston, interviewed on Thursday, August 8, with reference to the rumour of closing the pit, stated that "after many years of successful working we have recently met with a series of troubles which have now proved too much for the company's resources. The fire of December 1910 was closely accompanied by water troubles in other districts, and by the discovery of faults which involved great expense. The reduced output necessarily meant loss, but we have endeavoured in every way to get over these difficulties and again reach a paying output. Considerable financial assistance was provided, but calculations as to the amount required before we could resume such paying output have been seriously upset by the increased physical difficulties and by the direct losses and delays in development caused by the strike of March and April. The legislation of the past few years has proved a great burden; in addition to the Eight Hours Act no less than five Acts of Parliament affecting mines have come into force this year. We have tried to sell the undertaking as a going concern, but our efforts made in several directions have so far proved abortive, and we are now finally closing down."

An interesting presentation recently took place at Westminster Colliery, on the occasion of the completion of 50 years of service by one of the staff, Mr. R. Barratt. The presentation took the form of a gold watch, which was suitably inscribed, and was presented to Mr. Barratt, on behalf of the directors, by Mr. H. Dyke Dennis, J.P., the chairman of the North Wales Coal Owners' Association, who congratulated the veteran servant on the completion of his "half century not out," and testimony was borne by other officials of the company to the efficient and faithful manner in which he had always performed his duties.

At the half-yearly meeting of the Lancashire and Yorkshire Railway Company, Sir George Armytage, the chairman, observed that they had always since the 1893 strike kept a large stock of coal ready to meet such emergencies, and during the coal strike they had not to buy an ounce of coal beyond their contract prices, and when the strike was over had 75,000 tons left.

The late Mr. W. H. Pickering, of Lawn House, Lawn-road, Doncaster, chief inspector of mines for the Yorkshire and North Midland district, has left estate valued at £1,310.

Messrs. the Sandycroft Foundry Company Limited, of Sandycroft, near Chester, give notice that in future the title of their firm will be Sandycroft Limited. They state that they have been compelled to make this alteration owing to the confusion of ideas resulting from the use of the old title, many people imagining that the firm are makers of iron castings and heavy engineering work only. As a matter of fact they have been making electrical machinery, starters, motors, and generators for the past twelve years.

Presiding at the half-yearly meeting of the Midland Railway Company, Mr. G. Murray Smith, the chairman, said that the miners' strike had turned what promised to be a very good half-year for railways into one which was not so good, and the strike was solely responsible for the dividend being reduced. The total decrease during the half-year was £235,580. It was absolutely untrue that the directors had to buy a large amount of coal during the strike at a high price. They began with an ample supply of coal, and at the end of the strike they had sufficient to carry on for some weeks. He said the Insurance Act would cost the company about £55,000 per annum. Referring to the Railway Bill, the chairman recalled the undertaking which the Government gave after the strike, and said that pledge had not yet been carried out, but of course they could rest assured that a solemn undertaking entered into by the Government would be carried out.

CONTINENTAL MINING NOTES.

Austria-Hungary.

Austrian Mining Congress.—The programme of the Congress, which will be held in Vienna on September 16-20, is as follows:—Monday, September 16: Informal assembly in the Kursalon, 1, Stadtpark, 8 p.m. Tuesday, September 17: General meeting in the large hall of the Industriehaus, No. 4 Schwarzenbergplat, 10 a.m., followed at 2 p.m. by a banquet in the Kursalon, and at 8 p.m. by a reception by the Austrian Minister of Public Works. Wednesday, September 18: 9 a.m., reading of papers, the meeting being held in the premises of the Austrian Engineers' and Architects' Association, No. 9, Eschenbachgasse; 3 p.m., excursion round Vienna on the tramway (special cars); 7.30 p.m., reception by the Municipality in the Rathaus. Thursday, September 19: 9 a.m., reading of papers continued; 11 a.m., conclusion of proceedings. In the afternoon excursions to the Government powder works at Blumau and the municipal gasworks, Leopoldau; 8 p.m., supper (Hôtel Métropole, No. 4 Morzinplatz) on the invitation of Count Heinrich Larisch-Mönnich, president of the Central Association of Austrian Mineowners. Friday, September 20: Full day excursion to the Wachau. Applications for tickets will, until further notice, be received at the committee rooms, No. 13, Nibelungengasse, Vienna 1.

Belgium.

The following table shows the production of coal in Belgium during the first half of the year, and the stocks on June 30, 1912 and 1911 respectively:—

	Output.		Stocks June 30.	
District.	1912. Tons.	1911. Tons.	1912. Tons.	1911. Tons.
Hainaut—				
Couchant de Mons	1,782,820	2,369,210	33,460	98,300
Centre	1,648,730	1,747,480	37,790	72,610
Charleroi	4,227,270	4,205,050	330,190	465,050
Liège—				
Liège-Seraing	2,471,510	2,246,280	183,660	184,820
Plateaux de Herve	602,780	563 420	16,130	19 310
Namur	402,180	415,530	25,990	42,280
Total	11,135,290	11,546,970	627,220	882,370

On June 30 there were 142,850 workmen employed, an increase of 1,924 compared with the same date last year. The reduction in the output is to be accounted for by the strike in the Borinage coalfield, which lowered the production in the Mons basin by nearly 600,000 tons. The increase in the output of the Liège coalfield is likewise due in large measure to the strike which occurred there at the outset of 1911.

France.

During the first half of the present year the collieries in the Pas-de-Calais and Nord produced 1,210,030 tons of coke and 881,341 tons of briquettes, as against 135,165 tons of coke, and 828,794 tons of briquettes in the corresponding period of last year. The returns as to coal were given last week.

Germany.

Exports and Imports of Fuel.—There were imported into Germany in June 1,191,186 tons of coal, 648,993 tons of lignite, 44,968 tons of coke, 4,245 tons of coal briquettes, and 8,694 tons of lignite briquettes. The corresponding totals in June 1911 were as follow:—Coal, 1,103,651 tons; lignite, 554,350 tons; coke, 48,053 tons; coal briquettes, 5,328 tons; lignite briquettes, 9,226 tons. Imports of coal from Great Britain in June amounted to 1,048,296 tons, as against 983,767 tons. Exports in the same month were as follow (the figures for June 1911 being given in parentheses):—Coal, 2,076,699 tons (1,902,586 tons); lignite, 2,684 tons (3,855 tons); coke, 248,865 tons (323,612 tons); coal briquettes, 138,005 tons (204,922 tons); lignite briquettes, 26,262 tons (34,119 tons). There was a considerable increase in the exports of coal to France, Denmark, Italy, the Netherlands, Austria-Hungary and Switzerland, and a decline in those to Belgium. The returns for the half-year are shown in the appended table:—

	Imports.		Exports.	
Country.	1911. Tons.	1912. Tons.	1911. Tons.	1912. Tons.
Coal—				
Belgium	196,166	189,174	2,206,667	2,539,295
Great Britain	4,531,117	3,497,244	—	56,673
Netherlands	257,529	264,112	2,714,015	3,100,787
Austria-Hungary	256,448	335,620	4,385,207	5,333,143
Denmark	—	—	60,539	132 724
France	—	—	1,378,480	1,500,290
Italy	—	—	300,092	407,531
Norway	—		9,008	52,084
European Russia	—	—	556,059	712,287
Sweden	—	—	7,487	37,217
Switzerland	—	—	671,951	751,712
Spain	—	—	37,223	84,126
Egypt	—	—	63,341	41,843
Total (coal)	5,245,772	4,188,948	12,614,952	15,099,547
Lignite	3,580,414	3,583,305	27,752	25,807
Coke—				
Belgium	268,721	228,683	241,517	279,018
France	10,981	11,816	900,695	930,409
Great Britain	3,198	1,197	2,772	5,763
Austria-Hungary	13,381	13,977	361,743	455,592
Denmark	—	—	13,739	22,609
Italy	—	—	55,924	84,149
Netherlands	—	—	102,357	131,019
Norway	—	—	18,215	22,428
European Russia	—	—	109,611	161,928
Sweden	—	—	39,263	82,381
Switzerland	—	—	138,901	142,788
Spain	—	—	1,753	20,074
Mexico	—	—	33,251	19,295
United States	—	—	6,316	14,553
Total (coke)	296,854	205,670	2,102,759	2,457,667
Coal briquettes—				
Belgium	32,308	15,689	108,126	125,830
Netherlands	21,492	10,669	91,676	142,055
Austria-Hungary	47	53	29,883	27,803
Switzerland	39	56	297,357	291,685
Denmark	—	—	41,154	16,868
France			119,159	175,966
German West Africa	—	—	1,045	485
Total (coal briquettes)	55,664	26,392	877,437	1,007,071
Lignite briquettes	55,079	61,928	230,556	253,975

Production of Coal.—The following table shows the output of coal, coke, and briquettes during June and the first half of the present year:—

	June.		January-June.	
	1911. Tons.	1912. Tons.	1911. Tons.	1912. Tons.
Coal	12,331,613	13,888,848	78,666,589	84,706,380
Lignite	5,204,520	6,217,438	35,206,755	39,430,142
Coke	2,005,518	2,315,126	12,563,051	13,754,682
Coal briquettes	390,091	426,025	2,406,201	2,488,763
Lignite ditto	1,187,264	1,508,075	7,894,182	9,123,691

Disaster near Bochum.—A serious explosion occurred on August 8 at the Lothringen Colliery, at Gerthe, near Bochum, Westphalia, by which 111 men are believed to have lost their lives. The explosion is attributed to the ignition of firedamp in a cross-cut of the third level, but the precise cause of that combustion still remains a matter for conjecture. A violent explosion was followed by fire, and many of the bodies are charred and mutilated beyond recognition. In addition to giving a donation of £750 to relieve the sufferers, and despatching the Prussian Minister of Commerce and the Oberpräsident of Westphalia to Gerthe, the Kaiser hurried from Essen and was at the pithead with Prince Henry of Prussia before 5 o'clock on the following afternoon. Before returning to Wilhelmshohe, the Emperor William held long consultations with the authorities of the mine, visited the hospital, and conversed at length with several miners.

Hamburg Coal Trade.—Mr. H. W. Heidmann, of Hamburg, writes as follows:—The imports of coal into Hamburg have been in July:—

From	1912. Tons.	1911. Tons.
Northumberland and Durham	362,023	181,253
Yorkshire, Derbyshire, &c.	63,787	40,517
Scotland	125,825	89,931
Wales	9,067	8,874
Coke	109	354
Total	560,811	320,929

Ruhr Coal Market.—There is no change in the situation, which continues satisfactory. The deliveries of fuel, especially coal, are very considerable, and will probably increase during the present month, to provide against the possibility of delay in September and October owing to a scarcity of railway wagons. The iron industry is very active, and there is little prospect of any change for the worse in this connection. Exports of gas and open-burning coals are extensive, and more activity is being displayed in the enquiries for house coal. The state of the Rhine has improved again, so that consignments to South Germany could go forward without hindrance were it not that the demand is quiet, and consequently the stockyards at the Ruhr harbours are being filled up. The coke market is in the same condition as before, large deliveries being made, but not sufficient to absorb the increased production that is thrown on to the Syndicate. Briquettes sell in a fairly satisfactory manner.

Coal Market in South Germany.—The general condition of the market is satisfactory, the usual slackening of trade during the summer months not having appeared this year. Buyers are taking full deliveries under contracts, and in some cases want more; and even the increased length of time during which it has been possible to use water-power plants has not greatly affected the demand for coal. House coal is very active owing to the approaching rise in prices—anthracite nuts and broken coke being in special request; whilst dealers are taking big quantities of large bituminous nuts, though these are not subjected to any increase in price. The good harvest and general industrial activity will entail a considerable shortage of railway wagons later, which explains why many consumers are anxious to get in their coal supplies at present.

Coal Market in Upper Silesia.—The prospects for the present month are quite as good as July, if not better, since buyers are endeavouring to lay in supplies before September 1 and the new price list, the fear of a shortage of railway wagons having also a stimulating influence. This is why the house coal trade has begun earlier than usual. The smaller grades of fuel for industrial purposes are in unusually active request, and likely to continue so, in view of the busy state of the iron industry. A few stocks have accumulated in cubes and large coal, and also in gas coal, owing to the cessation of river traffic in consequence of the absence of rain. The coke market is also in a favourable condition, ironmasters and founders taking large deliveries, so that the output is fully absorbed; and other kinds, though not so eagerly sought after, receive a fair amount of attention.

Netherlands.

The area of coal lands operated by the Dutch Government has been increased by 7,534 hectares, making a total of over 26,000 hectares.

Russia.

The Prodougol Syndicate has recently secured some important foreign contracts. The Bulgarian State Railways have contracted for the delivery of 10,000 tons of Donetz coal during the present month, with the option of taking double that quantity. In Turkey the Orient and Anatolian railways have given an order for a million pouds, and sales have been made in addition to several large importers in Constantinople. The Syndicate have also sold 750,000 pouds of gas coal in Roumania. A notable extension of trade with the Baltic is also to be recorded, and 950,000 tons will be delivered this month for the needs of the ports of St. Petersburg, Reval, Riga, Libau, and Windau.

Spain.

The constitution is mooted of a coal syndicate to embrace the whole of the collieries in Asturias.

The sum of £1,050, which was voted by the trustees of the Hulton Colliery Disaster Fund to the relief of the sufferers by the Cadeby explosion, has now been received, the delay having been caused by the necessity of obtaining the sanction of the Court of Chancery to the grant. Some of the vacancies caused by the Cadeby Colliery disaster have been filled. Mr. Smith, of Ansley, Warwickshire, has been appointed manager of the Denaby Colliery in the place of the late Mr. Douglas Chambers, but so far no appointment has been made relative to the managership of the Cadeby Colliery, formerly held by the late Mr. C. Bury. The new afternoon under-manager at that pit is Mr. Bumstead, who thus succeeds the late Mr. H. Cusworth, whose body has not yet been recovered.

THE "COLLIERY GUARDIAN" STOCK AND SHARE LIST.

Share.	Paid.	Name.	Dividend.		Latest Quotations.
			Previous ½ year	Last ½ year	
		Coal.			
7	7	Addie, R., & Son, 6 p.c. Cu. Pf. Rd.	6	nil	90/
9	9	Do. Ord.	nil		6
10	10	Albion Steam Coal Co.	—	—	3¾—4
10	10	Do. Do. Cum. Pref.	—	—	6¾—7¼
10	8	Arniston Coal Co. Limited	—	—	7½
10	10	Astley & Tyldesley Colls. Ord.	20s.		29—30
10	8	Do. do. do.	16s.	—	24½—25
10	10	Atlantic Merthyr Colls. Ltd. Ord	3 for year		11—11¼
10	10	Do. 6 p.c. Cum. Pref.	6	6	8¼—8½
100	100	Do. 5 p.c. Mort. Deb.	5	5	91—93
10	10	Bell Bros. 6 p.c. Cum. Pref.	6	6	11—11½
100	100	Do. 4 p.c. Deb.	4	4	99—101
1	12s.	Bolckow, Vaughan & Co. Ord.	7	5 int	12/3—12/6
1	1	Do. do. do.	7	5 int	21/3—21/6
20	20	Do. 5½ p.c. Cum. Pf.	5	5	21¼—21½
10	10	Bowhill Coal Co.	10	20	55½
15	15	Briggs, H., Son & Co. Ltd. A	13	7 int	25—26
15	10	Do do. B	13	7 int	16—17
100	100	Brodsworth Main Colliery 5 p.c. Mort. Deb.	5	5	103¾—104¼
1	1	Broomhill Collieries Ord.	—	—	5/9
1	1	Do. 6 p.c. Pref.	—	—	11/
1	15s.	Brown, J., & Co. Ltd. Ord.	5 int	10	20/3—20/9
1	1	Do. iss. at 10/ prem.	5 int	10	26/6—27/
1	1	Do. iss. at 12/6 prem.	15	10 int	35/3—35/9
10	10	Do. 5 p.c. Pref	5	5	10—10¼
10	10	Burnyeat Brown 6 p.c. Cu. Pf.	6	6	10¼—10¾
100	100	Do. 5 p.c. 1st Mor. Deb.	5	5	99—101
8	8	Carntable Gas Coal	nil for year		5¼
1	1	Cambrian Collieries Ord.	10	10	2—2¼
10	10	Do. 6 p.c. Pref.	6	6	21/6—22/6
100	100	Do. 5 p.c. Deb.	5	5	98—100
1	1	Chinese Engin'ring & Mining Co. Ord.	1s.	1s. 6d.	1¼—1½
—	—	Do. do. 6 p.c. Deb.	8	6	100—102
1	1	Coltness Iron 5 p.c. Cum. Pref.	5	5	24/7½
1	1	Do. 5½ p.c. p. Cum. Pref.	5½	5½	24/6
1	1	Do. Ord.	12	8 int	51/9
5	5	Cory, Wm., & Sons Ltd. Ord.	6s.	4s.	5¾—6¼
5	5	Do. 5 p.c. Cum. Pref.	2s. 6d.	2s. 6d.	4¾—5¼
100	100	Do. 4 p.c. 1st Mort. Deb.	4	4	93—96
100	100	Do. 4½ p.c. Deb. Red.	4½	4½	96—99
100	100	Dalton Main Collieries 5 p.c. Db.	5	5	95—98
1	1	Davis, D., & Sons, Ltd. Ord.	10	10	28/—29/
1	1	Do. 6 p.c. Cum. Pref.	6	6	1 1/16—1⅛
100	100	Do. 5 p.c. Red. Deb.	5	5	101—103
10	10	Denaby & Cadeby Main 6 p.c. Pf.	6	6	9¾—10
1	1	Desford Coal	3s. for year		1¾—2
10	10	Dixon, Wm., 5 p.c. Cum. Pref.	5s.	5s.	10¼
100	100	Do. 4 p.c. Mort. Deb.	4	4	100¼
1	1	Dundee Coal (Natal)	9d.	6d.	—
1	1	Dunlop, J., and Co. Ord.	6 for year 1911		20/6
1	1	Do. 6 p.c. Cum. Pref.	6	6	21/6
13	10	Ebbw Vale Steel, Iron & Coal Ord	3 for 1911-12		7½—7¾
13	13	Do. do. do.	3 for 1911-12		9—9½
100	100	Do. 5 p.c. Deb. Red. 1913	5	5	98—100
1	1	Edinburgh Collieries Ord.	nil for year		22/6
1	15s.	Do. do. part pd.	nil for year		17/6
1	1	Do. 5 p.c. Cum. Pf.	5	5	18/10½
10	10	Evans, R., and Co. Ord. A	4s.	6s	7—7½
10	8	Do. do. B	3/2¾	4/9¾	5—5½
100	100	Do. 1st Mort. Deb.	4 for year		87—89
1	1	Fife Coal Company Ord	25	20	92/—93/
1	1	Do. 5 p.c. Cum. Pref.	5	5 int	24/
100	100	Glamorgan Coal 5 p.c. Red. Deb	5	5	96—98
5	5	Great Western Colliery Ord	10	10	6¾—7
5	3	Do. do. New	3s.	4s.	5¾—6
5	5	Do. do. 10 p.c. Pref.	10	10	9½—9¾
1	1	Gwaun-cae-Gurwen Coll. Co. Ord	15	5 int	27/6—28/6
1	8s.	Do. do. 7 p.c. Cu. Pf.	7	7	10/—11/
100	100	Do. do. 5 p.c. Deb.	5	5	95—98
5	5	Hall, J. & E., 6 p.c. Cum. Pref.	5	3s.	4¾—5¼
20	20	Hamstead Colliery Ord.	nil		¼—½
20	20	Do. 7½ p.c. Pref.	nil		5¾—6¼
—	—	Hokkaido Col. & Ry. 5 p.c. Deb.	6	6	99—101
10	10	Horden Collieries Ord.	5		11½
100	100	Do. 5 p.c. Conv. Db.	5	5	101
10	10	Insoles Limited 6 p.c. Cum. Pf.	6	6	9½—9¾
100	100	Do. 5 p.c. Deb. Red.	5	5	100—102
5	5	International Coal Co. Ord.	5 for year		5¾—6
10	10	Kinneil Cannel & Coking Coal Ld	5	5 int	7½
37½	24	Knowles, A., and Sons Ord.	12s.	10s.	11¼—11¾
1	1	Lambert Bros. Ord.	6 for year		14/—15/
5	5	Do. 5½ p.c. Cum. Pf.	5½	5½	3¾—4
10	10	Leeds Fireclay Ord.	—	—	¼—½
10	10	Do. 6 p.c. Cum. Pref.	—	—	20/—22/
100	100	Do. 4 p.c. 1st Deb.	4	4	50—52
10	10	Lewis-Merthyr Cols. 6 p.c. Cum. Pref.	6	6	11½—11¾
10	10	Lochgelly Iron and Coal Ord.	5s.	5s. int	18
10	10	Do. do. 5 p.c. Cu. Pf.	5s.	5s. int	10
10	10	Locket's Merthyr Colls. 6 p.c. Cum. Pref.	6	6	9¼—9¾
5	5	Do. 10 p.c. 2nd Cum. Pref.	10	10	6¼—6¾
5	2	Do Ord.	10	5	6—6¼
4	3	Lofthouse Colliery Ord.	2s	2s. 6d.	3¼—3½
10	10	Lothian Coal Co. 5 p.c. Cum. Pf.	5	5	9½
1	16s.	Lowood, J. Grayson, & Co. Ord.	2½ for year 1911-12		8/—8/6
100	100	Do. do. 4½ p.c. Deb.	4½	4½	58—68
10	10	Main Colliery Ord.	6	8	9½—10
10	4	Do. New	6	8	5½—5¾
10	10	Do. 6 p.c. Pref.	6	8	9¾—10½
1	15/	Maltby Main Colliery Ord.	nil		23/9—24/3
1	1	Manvers Main Colliery Ord.	10	5 int	1¾—1⅞
5	5	Do. 5½ p.c. Part Pref.	5½	5½	5½—5¾
10	10	Merry and Cuninghame 7 p.c. Cum. Pref.	7	7	12¾
100	100	Miller's & Cory 5 p.c. Mort. Deb.	5	5	99—101
100	100	Moss Hall Coal Co. 5 p.c. Mort. Deb.	5 for year		87—92
1	1	New Monckton Collieries Ord	10	4 int	14/—15/
1	1	Do. 6 p.c. Cum. Pref.	6	6	15/—16/
10	10	Newport-Abercarn Ord.	—	—	5—5½
10	10	Do. 6 p.c. Part Pref.	—	—	6¾—7
20	20	New Sharlston Colliery Pref.	5	5 int	16—17
20	20	Newton, Chambers and Co. Ord.	6 for 1911		16½—17½
20	20	Do. do. 6 p.c. Pref.	6 for 1911		19—20
100	100	Do. do. 4 p.c. Deb.	4	4	95—97
1½	1½	Niddrie and Benhar Coal Ord.	6d. for year		21/
100	100	Do. do. 6 p.c. Deb.	6	6	101½
10	10	Nimmo, James, and Co. Ord.	nil for year		7½
10	10	Do p.c. Cum. Pref.	5	5 int	7½
Sk	100	Do. 5 p.c. Red. Deb.	5	5	90½
100	100	North Bitchburn Coal 4½ p.c. Deb	4½	4½	100
6	6	North Brancepeth Coal	30 for year		17
5	5	North's Navigation Colls. Ord.	8	8	5 9/16—5 11/16
5	5	Do. 10 p.c. Cum. Pref.	10	10	9½—9¾
10	10	Paul, G., and Sons 5 p.c. Cu. Pr.	5	5	9½—10½
5	5	Pearson and Knowles Ord.	1s. 6d.	2s. 6d.	4¼—4¾
5	5	Do. 6 p.c. Cum. Pref.	3s.	3s.	5¼—5¾
10	10	Pease and Partners Ord.	10s.	6s.	12¼—12¾
10	10	Do. do. Def.	20s	10s.	9¼—9¾
100	100	Do. 4 p.c. Perp. Deb.	4	4	92—94
100	100	Do. 5 p.c. 2nd Db. St.	5	5	99—101
1	1	Pekin Syndicate Ord.	—	—	—
1	1	Do. (Shansi)	—	—	—
10	10	Penrikyber Colliery Ord.	10	10	11—11½
10	10	Do. 5 p.c. to 7½ p.c. Cu. Pf.	7½	7½	10¼—10¾
100	100	Do. 5 p.c. 1st Mt. Db. Rd.	5	5	97—99
1	1	Powell Duffryn Ord.	10	30	48/—49/
5	5	Do. 6 p.c. Non-Cum. Pf.	6	6	6¼—6¾
5	5	Rhymney Iron Ord.	2	3	40/6—41/6
5	2	Do. New 2½ p.c. Cred.	2	3	39/6—40/6
100	100	Do. 5 p.c. Mort. Deb.	5	5	94—96
100	100	Do. 5 p.c. 1st M. New Pits Deb.	5	5	94—96
5	5	Rickett, Cockerell & Co., 4½ p.c. Cum. Pref.	2s. 3d.	2s. 3d.	3¼—3¾
1	1	Russian Collieries, 7 p.c. Cu. Pf	—	—	—
100	100	Do. 5 p.c. 1st Mort. Deb.	5	2½	45—55
		COAL.—Cont.			
10	10	Sandwell Park Colliery Ord.	—	—	2¾—3
1	1	Do. do. Cum. Pref.	—	—	16/6—19/
1	1	Scott, W., and Co. Ord.	—	—	11/6
1	1	Do. 6 p.c. Cum. Pref.	—	6	17/
100	100	Do. 4 p.c. Perp. Deb.	4	4	78
1	1	Sheepbridge Coal and Iron Ord.	1/	6d. int	30/9—31/3
1	1	Do. do. Cum. Pref.	1/	6d. int	32/6—33/6
1	8s.	Do. do. do.	4½d. int	2½d. int	12/—12/6
100	100	Shelton Iron and Steel Co. 1st 5 p.c. Mort. Deb.	5	5	90—91
100	100	Do. 6 p.c. 2nd Mort. Deb.	6	6	93—97
1	1	Shotts Iron Co. Ord.	3/ for year		49/—50/
1	1	Do. 5 p.c. Cum. Pf.	5	5	20/—20/6
100	100	Do. 4 p.c. Red. Deb.	4	4	98
7	7	Skinner and Holford Ord.	10/	4/ int	11¼—11¾
10	10	Sneyd Collieries 6 p.c. Cu. Pf.	2s. 1½d.	6s.	9¾—10¼
100	100	Do. 5 p.c. Mort. Deb.	17s. 8d.	5	96—98
10	10	South Hetton Coal Ord.	10s.	5/	10¾—11¼
10	10	Do. 5 p.c. Pref.	5s.	5s.	9—9½
17	17	South Wales Collieries A Ord.	4	4	11¼—11¾
3	3	Do. B 10 p.c. Part Pf.	14	14	3¼—3¾
3	1½	Do. B do.	14	14	1¾—2
1	1	Stanley Bros. Ord.	—	—	6/6—7/6
1	1	Do. 6 p.c. Pref.	—	—	17/6—18/6
1	1	Staveley Coal and Iron Ord.	12½	7½ int	36/—37/
1	15/	Do. do.	12½	7½ int	26/6—27/6
20	20	Do do. 5 p.c. Pref.	5	5	22—23
1	14/	Tredegar Iron and Coal Ord. A	15	5	17/3—17/9
1	1	Do. do. B	15	5	24/6—25/6
1	1	United Collieries Ord.	—	—	4½d.
1	1	Do. 6 p.c. Cum. Pref.	—	—	6d.
1	1	Vryheid (Natal) Railway, Coal and Iron 7½ p.c. Cum. Pref	—	1/6	¾—⅞
1	1	Wath Main Colliery Ord.	7½ int.	12½	1 7/16—1 9/16
1	1	Do. 5½ p.c. Cum. Pref.	5½	5½	1—1⅛
1	1	Watson, J., Limited Ord.	8/6 int.	1/6	61/9
1	1	Weardale, Steel, Coal and Coke Cum. Pref. Ord.	7½d.	1s. 2½d.	⅞—1⅛
1	1	Do. do. Def. Ord.	1s. 2½d.	7½d.	¾—1
100	100	Do. 4 p.c. Perp. Deb.	4	4	76—80
10	9	Wells, J. and G., Ord.	—	—	1¾—2¼
10	10	Do. 6 p.c. Cum. Pref.	—	—	6¼—6¾
10	10	Wemyss Coal Co. 6 p.c. Cu. Pf.	6	6	11¾—12
10	10	Wemyss Collieries Trust, 5½ p.c. Cum Pref.	5½	5½	10¾—11¼
100	100	Do. 3½ p.c. Mort. Red. Deb.	3½	3½	96—97
1	1	West of Fife Coal Co. 6 p.c. Cu. Pf.	—	—	1/
100	100	Western Dominion Collieries 6 p.c. Mort. Deb.	6	6	73—77
10	7½	Wigan Coal and Iron Ord.	2s. 3d.	3s. 9d.	5¼—5¾
10	10	Do. do.	3s.	5s.	7¼—7¾
3	3	Wilsons and Clyde Coal Ord.	5s.	3s. int	10½
10	10	Do. 7 p.c. Cum 1st Pf.	7	7 int.	13¾
10	5	Do. do.	7	7 int.	7¼
10	5	Do. 7 p.c. Cum. 2nd Pf.	7	7 int.	7½
10	10	Windsor Steam Coal Ord.	—	—	2¾—3¼
10	10	Do. 6 p.c. Cum. Pref.	—	—	4¾—5¼
100	100	Do. 5 p.c. Deb.	5	5	78—80
1	1	Yorkshire Iron and Coal Ord.	—	—	⅛—¼
1	1	Do. 6 p.c. Cum. Pref.	—	—	2/—2/6
100	100	Do. 4½ p.c. 1st Mort. Deb.	4½	4½	67—69
		Iron, Steel & Engineering.			
100	85	Abbot, John, and Co.	—	—	—
1	1	Allen, Edgar, & Co. 5 p.c. Cu. Pf.	5	5	20/6—21/
1	1	Armstrong, Whitworth and Co. Ord.	1s.	1s. 6d.	2¼—2 5/16
5	5	Do. do. 4 p.c. Cu. Pf.	4	2s.	1½—1¾
100	100	Ashton Vale Iron Ord.	1½ for year		8—10
5	5	Avery, W. and T., Ord.	5	15	8¼—8¾
1	1	Babcock and Wilcox Ord.	2/4½ int.	3s. 2½d.	6½
1	1	Do. 6 p.c. Cum. Pref.	7½d. int.	7½d.	30/9
1	1	Baldwins 5½ p.c. Cum. Pref.	5½	5½	22/6—23/
100	100	Do. 4½ p.c. Deb.	4½	4½	103½—104½
4½	4½	Barrow Hæmatite Steel Ord.	nil		17/—18/
4½	4½	Do. do. Cum. 2nd Pf.	nil		2¼—2¾
5	5	Bayliss, Jones and Bayliss 6 p.c. Cum. Pref.	nil		1¼—1¾
100	100	Beardmore, Wm., & Co. 4½ p.c. Mort. Deb.	4½	4½	94—98
10	10	Belliss & Morcom Pref.	5	5	11¼—11¾
1	1	Bengal Iron and Steel Ord.	7½d.	4½d.	9/16—11/16
5	5	Berry, H., & Co. 5½ p.c. Cu. Pf.	5½	5½	4¼—4¾
1	1	Bessemer, Hy., and Co. Ord.	10	5 int	22/—22/6
1	1	Beyer, Peacock and Co. Ord.	1s. for year		11/3—11/9
1	1	Blaenavon Ord.	—	—	16/6—17/6
1	1	Do. 5 p.c. Cum. Pf.	5	5	16/—17/
100	100	Do. 5 p.c. Mor. Db.	5	5	87—89
100	100	British Thomson-Houston 4½ p.c. 1st Mort. Deb.	4½	4½	96—98
3	3	British Westinghouse 10 p.c. Pref.	—	—	16/—16/6
1	1	Browett, Lindley & Co. Ord.	—	—	2/—3/
10	10	Brown Bayley's Steel Wks. Ord.	15	10 int	23—23½
5	5	Do. do.	15	10 int	11½—12
5	5	Cammell, Laird and Co. Ord.	nil	nil	3¾—4
5	5	Do. 5 p.c. Pref.	2½	5	4½—5
100	100	Do. 4 p.c. Deb.	4	4	96—98
100	100	Do. 4½ p.c. Mort. Deb.	4½	4½	90—92
100	100	Do. 5 p.c. Mort. Deb.	5	5	95—96
1	1	Cargo Fleet Iron Ord.	—	1s.	⅞—1
100	100	Do. 4½ p.c. Mort. Deb.	4½	4½	87—90
10	10	Carnforth Hæmatite Ord.	8s.	12s.	14—14½
1	1	Clayton and Shuttleworth	5 for 1911		17/6—18/
10	7½	Consett Iron Co. Ord.	33⅓		35
5	5	Do. Cum. Pref.	8 for year		9¼
1	1	Consett Spanish Ore Ord.	17½		5¾
1	1	Cooke, Wm. and Co. Ord.	5 int	5	20/—20/6
1	1	Do. New	—	—	19/6—20/6
1	1	Do. 5 p.c. Cum. Pref.	5	5	20/—21/
100	100	Curtis's and Harvey 4½ p.c. 1st Mort. Deb.	4½	4½	77—79
5	5	Dalmellington Iron Ord.	5	nil int	5¼
5	5	Do. 5 p.c. Cum. Pref.	5	5	97/6
100	100	Darlington Forge 5 p.c. Deb.	5	5	103½
35	30	Davy Bros. Ord.	4 for year 1911-12		12¾—13¾
100	100	Do. 5 p.c. Deb.	5	5	97—99
1	1	Dick, Kerr and Co. Ord.	1s. for year		17/—17/6
—	—	Dominion Iron and Steel 5 p.c. Bonds	5	5	100½—102½
1	1	Dorman, Long and Co. Ord.	7½d.	6d.	15/16—1
100	100	Do. 4 p.c. 1st Mort. Deb.	4	4	88—90
5	5	Dunderland Iron Ore 6 p.c. Cu. Pf.	3/	3/	⅝—¾
100	100	Do. 6 p.c. 1st Mort. Deb.	6	6	2—7
1	1	Evans, Joseph, and Sons Ord.	—	—	2/—4/
1	1	Fairbairn, Lawson, Coombe, Barbour Ord.	6d.	1s.	21/6—22/6
1	1	Firth, T., and Sons 6 p.c. Pref.	6	6	24/3—24/9
1	1	Fletcher, Russell & Co. Ord.	1s. for year		19/—19/6
5	5	Forth & Clyde & Sunnyside Iron 5 p.c. Cum. Pref.	5 int	5	85/
100	100	Fowler, John, & Co. 4 p.c. Deb.	4	4	99—101
20	20	Fox, Samuel, and Co. Ord	11	5 int	26—26½
3	3	Fraser and Chalmers Ord.	2½	1s. 9½d.	2¼—2¾
10	10	Galloway's 5 p.c. Cum. Pref.	—	—	1¾—2¼
10	10	General Electric 5 p.c. Cum. Pf.	6 p.c. per ann.		10¼—10¾
10	10	Greenwood and Batley Ord.	8s. for year		2—2½
1	1	Guest, Keen & Nettlefolds Ord.	20	10	3—3½
5	5	Do. 5 p.c. Cum. Pref.	5	5	5 3/16—5 5/16
100	100	Do. 4 p.c. Mort. Deb.	4	4	100—102
1	1	Gwynnes Limited Ord.	6d.	5s.	¾—1¼
1	1	Hadfield's Steel Foundry Ord.	10 int	25	58/—59/
10	10	Do. 4½ p.c. Cum. Pref.	4½	4½	10 1/16—10 3/16
10	10	Hardy Patent Pick Ord.	7 for 1910-11		8—8½
10	8	Do. 7 p.c. Cum. Pref.	7 for 1910-11		8—8½
50	50	Do. 4½ p.c. Deb.	4½	4½	46—48
1	1	Harrison, Ainslie and Co. Ord.	—	—	5/16—7/16
		IRON, STEEL, &c.—Cont.			
7s.	5s.	Harvey United Steel Ord.	—	4½d.	—
10	10	Hawthorn, Leslie and Co.	6½	10	12½
5	5	Head, Wrightson and Co. Ord.	—	—	32/6
5	5	Do. 6 p.c. Cum. Pref.	6	6	4
1	1	Hill, Richd., and Co.	1s.	6d.	1¼—1½
10	8	Hornsby, Richard, and Sons	10s. for year		7¼—7¾
100	100	Do. do. 6 p.c. Pref.	£3	£3	100—102
1	1	Howard & Bullough Ord.	—	—	15/3
100	100	Hudswell, Clarke and Co. 4½ p.c. Deb.	4½	4½	79—81
100	100$	Ingersoll-Rand Co.	—	5 p.c.	118-128 dol
5	4	Jessop, Wm., and Sons Ord.	5 int.	15	5 7/16—5 9/16
10	10	Kynoch Ord.	—	—	5¾—6¼
10	10	Lanarkshire Steel Ord.	nil		8½
10	8½	Do. do.	nil		80/
10	10	Do. do. 5 p.c. Cu. Pf.	5 for year 1911		7
10	10	Do. 5 p.c. Cu. Pf. 1899	5 for year 1911		6½
3	3	Leeds Forge Co. Ord.	2/1 for year		32/—33/
3	3	Do. 7 p.c. Cum. Pref.	7	7	24/6—25/6
50	50	Do. 5 p.c. Deb.	5	5	51—52
1	1	Lysaght, John, 6 p.c. Cum. Pref.	—	7½d.	1 3/16—1 5/16
100	100	Do. 4½ p.c. 1st Mort. Deb.	4½	4½	105—107
10	10	MacLellan, P. & W., 6 p.c. Cu. Pf.	6s.	3s.	8
100	100	Manning, Wardle & Co. 5 p.c. Mort. Deb.	5	5	93—95
10	10	Marbella Iron Ore Ord.	3s.	2s. int	51/6
10	10	Marsden, Samuel, & Son Ord.			2—3
1	1	Marshall, Sons and Co. Ord.	5 int	10	1½—1¾
1	1	Mather and Platt Ord.	1s.	1s. 4½d.	37/—38/
10	10	Do. 5 p.c. Cum. Pref.	5	5	11¼—11¾
1	1	Measures Bros. Ord.	—	—	—
1	1	Midland Iron Ord.	5 for 1908-9		23/6—24/6
1	1	Do. 5 p.c. Cum. Pref.	5	5	20/—21/
100	100	Do. 4 p.c. Mort. Deb.	4	4	90—92
1	1	Millom and Askam 7 p.c. Cu. Pf.	8¾d.	8¾d.	22/
100	100	Do. 5 p.c. 1st Mt. Deb. Red.	5	5	93
1	1	Mirrlees, Watson Co. Ord.	15 for 1911		3⅝
10	10	Morgan Crucible Co. 6 p.c. Cu. Pf	6s.	6s.	11¾—12¼
5	5	Muntz Metal Pref.	nil	2/6	2¼—3
62½	62½	Nantyglo and Blaina Ironworks 6 p.c. Cum. Pref.	50s.	40s.	51—56
1	1	National Gas Engine 5½ p.c. Cu. Pref	9	9	25/—25/6
1	1	Normanby Ironworks Ord.	2½		19/
1	1	Do. 6 p.c. Cum. Pref.	nil		20/9
100	100	Do. 4½ p.c. 1st Mort. Deb.	4½	4½	86
10	10	North British Locomotive Ord.	5 for year		13¼
10	10	Do. 5 p.c. Cum. Pref.	5/	5/	10¼
100	100	North-Eastern Steel 4½ p.c. Red. Deb.	4½	4½	80—82
10	8½	North Lonsdale Iron and Steel	11/10½	10/10	8¼—8½
1	1	Palmer's Shipbuilding and Iron Ord. A	—	—	9/
1	16/8	Do. do. do. B	—	—	9/
1	1	Do. do. 5 p.c. Min. Pf.	—	—	10/
1	1	Parkgate Iron and Steel Ord.	9d.	2/3 int	37/9—38/3
100	100	Do. 4½ p.c. Deb. 1901-6	4½	4½	98—100
10	10	Pather Iron and Steel	nil for year		9¼
5	5	Pooley, H., & Son 5½ p.c. Cu. Pf.	5½	5½	4¼—4¾
1	1	Power Gas Corporation Ord.	—	—	¼—½
1	1	Pyle and Blaina Works Ord.	—	—	—
1	1	Redpath, Brown and Co. Cum. Ord.	nil	3	18/
1	1	Richardsons, Westgarth Ord.	9½d.		⅝—⅞
10	10	Robey and Co. Ord.	3 for 1911		4¾—5¼
1	1	Roberts, Wm., Ord.	10	10	33/—35/
10	10	Ruston, Proctor and Co. Ord.	4 p.c. for year		91—93
1	1	San Salvador Spanish Ore Pref.	9		22/
1	1	Scott and Mountain Ord.	6	—	2/
1	1	Sheffield Forge and Rolling Mills Ord.	10 for 1910-11		31/—32/
1	1	South Durham Steel Ord.	1/ for year		26/6
1	1	Do. 6 p.c. Cum. Pref.	7½d.	7½d.	19/6
100	100	Do. 4½ p.c. Perp. Deb.	4½ per ann.		90
10	10	Spencer, John, and Sons Ord.	—	3½	8½
10	9	Steel Co. of Scotland Ord.	6 for year 1910-11		11½
100	100	Do. 5 p.c. 1st Mort. Deb. A Red.	5	5	110
100	100	Do. 6 p.c. 2nd Mort. Deb. B Red.	6	6	110
1	1	Stephenson, R., and Co.	—	—	9d.
100	100	Do. 4 p.c. Perp. Deb.	4	4	75½
10	10	Stewarts and Lloyds Ord.	10 int	10	21
10	10	Do. 6 p.c. Cum. Pref.	6 int	6	13½
100	100	Do. 3½ p.c. Debs. Red.	3½	3½	94
10	10	Summerlee Iron 4 p.c. Cum. Pf.	4	4 int	9½
1	1	Talbot Continuous Steel Process	nil		3/6—4/
100	100	Tannett, Walker & Co. 1st Mort. Deb.	4	4	40—41
1	1	Thames Iron Works 5 p.c. Cu. Pf.	5	6d.	⅝
100	100	Do. 4 p.c. Irr. 1st Mt. Deb.	4	4	77—80
1	1	Thornycroft and Co. Ord.	—	1s.	1 1/16—1 3/16
5	5	Tinsley Rolling Mills Ord.	8 for 1911-12		4¼—4¾
100	100$	United States Steel Corp. Com.	1¼ dol.	1¼ dol.	$76—76½$
100	100$	Do. 7 p.c. Pref.	1¾ dols. for qr.		116$-115
1	1	Vickers, Sons and Maxim Ord.	10	10 int	41/6—42/
100	100	Do. 5 p.c. Non-Cum. Pref.	5	5	100—105
1	1	Do. do. do. St.	5	5	23/—23/6
100	100	Do. 4 p.c. 1st Mort. Deb.	4	4	100—102
100	100	Do. 4½ p.c. 2nd Mort. Deb.	4½	4½	101—103
100	100	Do. 5 p.c. 3rd Mort. Deb.	5	5	104—106
1	1	Vulcan Foundry	2/ for year		27/6—28/6
1	1	Walker, Maynard and Co. 6 p.c. Cum. Pref.	6	6	17/3—17/9
1	1	Walker, C. and W., Ord.	10	10	28/6—29/6
1	1	Ward, Thos. W., Cum Pref.	10	10	20/—20/6
1	1	Willans and Robinson Ord.	—	1s.	½—¾
100	100	Do. 4 p.c. Mort. Deb.	4	4	58—60
1	1	Workington Iron & Steel Ord.	—	7½d.	½—¾
1	1	Do. 6 p.c. Cum. Pref.	—	7½d.	1⅛—1¼
5	5	Wright, J. & E., Ord	10 for 1910-11		7¼—7¾
25	22	Yorkshire Engine Co.	nil		2—3
		Wagons & Rolling Stock.			
10	10	Birmingham Wagon Co. Ltd.	22½	7½	26—27
10	4	Do. Second Issue	22½	7½	9¾—10¼
10	10	Do. Pref.	6	6	11¾—12¼
100	100	Do. Mort. Deb.	4	4	96—100
10	3	Bristol & S. Wales Rly. Wagon Co. Limited	10	10	4½—5
20	10	Bristol Wagon and Carriage Works Ord.	8	6	9—10
20	2	Do. do.	8	6	2—2½
20	10	Do. 5 p.c. Part. Pref.	8	6	13½—14½
20	3	British Wagon Co. Limited	4s. int	4s.	6¼—6¾
7	7	Gloucester Wagon Co. Ltd. A	5	10	9—9½
7	3½	Do. do. B	5	10	4—4½
10	10	Lancs. & Yorks. Wagon Co. Ltd.	6/	14/	13—14
20	3	Lincoln Wagon Co. Ltd. A, B, C	10 int	16	6¼—6¾
1	1	Metro. Amal. Car. & Wagon Co.	7½ int	22½	57/—57/6
1	1	Do. A 5 p.c. Cum Pref.	5	5	23/6—24/6
1	1	Do. B 6 p.c. Cum Pref.	6	6	26/6—27/6
20	10	Midland Rly. Car. & Wagon Co.	5	—	6½—7
10	10	Do. 6 p.c. Pref.	6	6	1¾—2¼
20	5	North Central Wagon Co. Ltd.	13	12 int	10¼—11
20	5	Do. do. Second Issue	13	12 int	10¼—11
20	2	Do. do. Third Issue	13	12 int	4¼—4¾
20	2	Do. do. Fourth Issue	13	12 int	4—4½
20	1	Do. do. Fifth Issue	13	12 int	2 3/16—2 7/16
10	10	Scottish Wagon Co. Limited	6 int	6	13⅛
10	4	Do. do. New	6 int	6	80/7½
10	1	Wagon Finance Corporation	12½	12½ int	33/9—34/3
6	6	Western Wagon and Property Limited Ord.	10	10	10¼—10¾
6	2	Do. do. do.	10	10	3—3½
10	2	Yorkshire Rly. Wagon Co. Ltd.	12½	12½ int	4¼—4¾
10	1	Do. do. New	12½	12½ int	2¼—2¾

The quotations represent generally the offers respectively of buyers and sellers and the range of the principal exchanges.

THE INSTITUTION OF MINING ENGINEERS.

The Annual Meeting.

The twenty-third annual general meeting of the members of the Institution of Mining Engineers will be held on Wednesday, September 11, 1912, at 10.30 a.m. in the Lecture Theatre of the University of Birmingham, Edmund-street, Birmingham.

The members will be welcomed to the city by the Lord Mayor of Birmingham (Alderman W. H. Bowater). A reception of the members and their lady friends by the Lord Mayor of Birmingham and Mrs. Bowater will be held at the Council House, Birmingham, on the evening of Wednesday, September 11. The members and their lady friends will dine together on Thursday, September 12, at the Grand Hotel, Birmingham. Arrangements have been made for visits to places of interest, to works and collieries, and for other excursions, on September 11, 12, and 13.

At the meeting the following papers will be read, or taken as read:—"Recent Legislation in Relation to Land and Mines," by Mr. Alexander Smith, M.Inst.C.E.; "An Account of a Series of Explosions in the Bellevue Mine, Alberta, Canada," by Mr. John T. Stirling, chief inspector of mines, Alberta, and John Cadman, D.Sc.

The following papers, which have already appeared in the *Transactions*, will be open for discussion:—"Why Leave Shaft-pillars?" by Messrs. W. H. and B. H. Pickering; "Safety-devices in Connection with Electrical Machinery and Appliances for Coalmines," by Messrs. David Bowen and W. E. French; "A Rope-driven Coal-cutter," by Mr. Wilfrid L. Spence.

On the first day an excursion will be made to the mining department of the Birmingham University, Bournbrook. On the following day a visit will be paid to the Earl of Dudley's Round Oak Iron and Steel Works, and Baggeridge Colliery, and there is an alternative excursion to the Cocoa and Chocolate Works of Messrs. Cadbury Brothers Limited. On Friday, September 13, the members will visit Stratford-on-Avon, Warwick, and Leamington.

Grimsby Coal Exports.—The following is the official return of the quantities of coal exported from Grimsby during the week ended August 9, 1912:—To foreign destinations (tons): Stockholm, 2,114; Gothenborg, 3,264; Ystad, 3,522; Aarhus, 1,699; Dieppe, 649; Rotterdam, 767; Stockholm, 1,205; Larvik, 551; Hamburg, 781; Riga, 3,135; Malmo, 5,280; Helsingfors, 1,170; Middlefart, 1,429; Halmstad, 1,191; Vatueyre, 480; Cronstadt, 2,320; Gefle, 2,307; and Antwerp, 325 tons; total, 32,089 tons. To coastwise destinations (tons): Lerwick, 885. The export for the corresponding week of last year was: Foreign, 38,070 tons; and coastwise 125 tons. During the past week 20,199 tons of coal were exported from Immingham as follows: Trelleborg, 3,470; Pernan, 1,928; Cronstadt, 3,236; Kiel, 1,378; Hamburg, 5,557; Bremen, 2,924; and Rotterdam, 1,706 tons.

New Fife Coalfield.—A correspondent writes: In the east corner of Fife coal was found some years ago on the estate of Grangemuir, near Anstruther Wester. As no other coalfields are being worked anywhere near at hand, the discovery was a valuable one. Fifeshire coal is greatly in request—particularly for the Continental markets—and the new dock at Methil will make that enterprising Fife port the most important shipping port in Scotland. Although as yet the coal workings are much farther west than Grangemuir, still there is every reason to anticipate that this new coalfield may be developed into a large output. As yet very little has been done in actual working the coal, but prospects are excellent. In the preliminary stages entered upon, four seams of coal have been reached, but only the top one has as yet been worked. The property extends to about 700 acres. Bores were put down over the greater part of the lands. The Walter pit is 20 fathoms deep and the coal opened is 29 in. thick. In the Annie pit the seam is 26 in. thick. No fewer than 16 bores have been put down from time to time over the lands of Grangemuir, and from careful study of the results it is seen that various coalseams are struck, one being 36 in. thick at a depth of 29 fathoms, with sandstone above and below. In regard to the seam to which, up to the present, attention has only been given, it extends over an area of 350 acres. An estimate gives the quantity of coal, which this one seam alone should yield, at 1,137,500 tons; and after deducting 25 per cent. for barriers, loss in workings, and colliery consumption, fully 850,000 tons are left as available for sale. A great advantage possessed by this new East of Fife mineral field is that it is shallow, and could be equipped at moderate cost for a good output. As other seams are also to be worked, this Grangemuir coalfield has a promising future. Pittenweem railway station is close at hand; and for shipping purposes the harbour of Anstruther is within very easy reach. A large new harbour is to be constructed for the fishing trade of that part of Fife, and there will be every facility for rapid and economical coal shipment. Locally, the starting of the colliery will mean much in the way of cheaper coal for the factories and industries in the neighbourhood. Although nothing definite is yet done it is hoped to induce parties connected with the colliery trade to take up the development of this new coalfield; and L. C. Douglas-Irvine, of Pittenweem House, Pittenweem, Fife, is interested in the scheme.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Abstracts of Contracts Open.

Andover, August 27.—For the supply to the Guardians at Andover of about 50 tons (either more or less) of either large Cwmaman, Nixon's Navigation, or Dowlais Merthyr best steam coal.

Banbury, August 20.—For supply of coal for period ending April 30, 1913, for the Education Committee—viz.: (1) Polesworth Birch Coppice cobbles; (2) Moira cobbles; (3) Baddesley cobbles.

Birmingham, August 20.—For the supply of engine slack at their various pumping stations for seven months from September 1, for the South Staffordshire Waterworks Company.

Birmingham, August 23.—For coal and slack, for the Birmingham Municipal Technical School.

Bradford, September 2.—For best gas coal, cobbles, nuts, and cannel, for the Corporation.

Bristol, August 28.—For gas coal, for the Bristol Gas Company.

Bury St. Edmund's, September 1.—For the supply of coal and coke to the shire hall and police station at Bury St. Edmund's, amounting approximately to 50 tons of best cobbles at per ton, 30 tons of coke at per ton, for the West Suffolk County Council.

Coseley, September 6.—For coke and best quality thick coal, for the Education Committee.

Gloucester, August 26.—For rough small slack coal, for the Corporation.

Hampton, September 2.—For best Welsh double-screened steam coal, for the Urban District Council.

Haverfordwest, August 19.—For supply of about 2,000 tons of double-screened gas coal of the very best quality, for the Corporation of Haverfordwest.

Kildare, August 19.—For 45 tons best house coal, for the Joint Committee of the Infirmary.

Kinsale (Ireland), August 21.—For 120 tons of best red ash Newport coal, for the Guardians.

Linton (Cambs.), August 21.—For the supply of 150 tons (more or less) of steam coal, for the Guardians.

Newport (I.W.), August 31.—For fuel, for the Isle of Wight County Council.

Northallerton, August 20.—For supply of coal and coke from September 1912 to June 1913, for the North Riding of Yorkshire County Council Education Committee.

Nottingham.—For supply of coal and coke for 12 months, for the Notts. Education Committee.

Ottawa (Canada), August 28.—For coal, for the Department of Public Works.

Peterborough, August 21.—For coal and coke for Deacon's School, Peterborough.

Portland, September 4.—For between 800 and 900 tons of large Welsh steam coal, for the Urban District Council.

Rochdale August 28.—For 50,000 tons of best gas coals, for the Corporation.

Rochester, September 3.—For coal, for the Corporation.

Sunbury, August 31.—For about 150 tons of best Derby bright coals, for the Trustees.

Whitehaven, September 7.—For supply of fuel for ensuing 12 months, for the Whitehaven Education Committee.

Wigan, August 19.—For best quick-firing slack and (or) washed peas, for the Corporation. Estimated quantity of fuel required 12,000 tons.

York, August 24.—For coal, for the electricity generating station, for the Corporation. Quantity required approximately 10,000 tons.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Adelaide (South Australia), September 17.—*Chain Iron.*—The Commercial Intelligence Branch of the Board of Trade is notified that tenders will be received by the Chairman of the Supply and Tender Board, Adelaide, for 1,400 bars of chain iron. Forms of tender can be obtained from the Supply and Tender Board Office, Adelaide. Some further particulars can be seen by British makers at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Cleckheaton, August 19.—*Vertical Retorts.*—For a system of vertical retorts on the continuous principle, for the Urban District Council.

Hastings, September 10.—*Cast Iron Socket Pipes.*—For about 6,556 yards of 10 in. cast iron socket pipes and various irregulars, for the Corporation.

Johannesburg (South Africa), September 10.—*Boiler Tubes.*—H.M. Trade Commissioner for South Africa reports that tenders are invited by the South African Railways Administration for 58,300 charcoal iron boiler tubes and 50,850 steel boiler tubes. Copies of the specification and form of tender can be obtained at the office of the High Commissioner for the Union of South Africa, 32, Victoria-street, London, S.W.

Leeds, September 9.—*Cables.*—For paper insulated cables for the Corporation (electric lighting department).

Manchester, September 10.—*Turbo-alternator, &c.*—For (*a*) one 12,000 k.w. three-phase high-pressure turbo-alternator, pipework, valves, and condensing plant; (*b*) water-tube boilers and superheaters, economisers and coal chutes, for the Electricity Committee of the Corporation.

Regina (Canada), September 14.—*Electrical Plant.*—For one 1,500 k.w. steam turbine unit; one switchboard panel; one surface condenser for turbine; one 25 k.w. motor-driven exciter, for the City Commissioners.

Witney (Oxon).—*Suction Gas Plant, &c.*—For (*a*) suction gas plant and accessories, including vertical high-speed 75 k.w. engine and direct-current dynamo, (*b*) battery booster, (*c*) switchboard, and (*d*) cables, for the Urban District Council.

COAL, IRON AND ENGINEERING COMPANIES.

Andrews Coal and Mineral Exploitations Limited.—This private company has been registered, with a capital of £30,000 in 5s. shares, to carry on the business of coal and iron masters, smelters, engineers, founders, patent fuel manufacturers, contractors for and dealers in coal, iron and ironwork, &c. First directors, W. Andrews (chairman), and J. E. Williams (both permanent). Registered office, 7-8, Poultry, E.C.

Asquith Brothers Limited.—This private company has been registered, with a capital of £1,500 in £1 shares, to take over the business of machine makers, engineers, millwrights, metal merchants, &c., carried on by O. Asquith, Ruth Asquith, Robert Asquith and B. Asquith at Batley, Yorks, as Asquith Brothers. First directors, O. Asquith, R. Asquith and B. Asquith. Qualification, 400 shares.

Boving and Co Limited.—This private company has been registered, with a capital of £60,000 (3,000 6 per cent. cumulative preference shares of £10 each, and 30,000 ordinary shares of £1 each), to take over the business of hydraulic engineers carried on at 9¼, Union Court, Old Broad-street, E.C., by Jens Orten-Boving and Co., or any part of branch thereof, and to adopt an agreement with Jens Orten-Boving and D. Spencer. Registered office, 9¼, Union Court, Old Broad-street, E.C.

Brightside Foundry and Engineering Company Limited.—The thirty-sixth annual report of the directors for the year ended June 30, 1912, states that the operations, after providing for depreciation and all charges, resulted in a profit of £5,817, to which has to be added the amount brought forward from last year, £1,170, making £6,988. From this sum has to be deducted the interim dividend at the rate of 5 per cent. per annum for the first half of the year on £45,000 (5 per cent.) preference shares (£1,125), leaving a balance of £5,863. The half-year's preference dividend to June 30, 1912, paid on July 1, absorbed £1,125, leaving £4,738 to be disposed of. This the directors recommend shall be dealt with in payment of a dividend of 6¼ per cent., free of income tax, on 40,000 £1 ordinary shares (£2,500), placing to reserve account £1,000, and carrying forward the balance of £1,238.

British Electric Equipment Company Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to carry on the business of mining and electrical engineers, electricians, suppliers of electricity, &c., and to adopt an agreement with M. M. Gillespie and M. Beales. First directors, M. M. Gillespie (chairman) and M. Beales. Registered office, Amberley House, Norfolk-street, W.C.

Brook and France Limited.—This private company has been registered, with a capital of £4,000 in £1 shares, to take over the business of engine and pump packing manufacturers and rubber merchants, carried on by L. Brook and M. France at Tanyard, Milnsbridge, near Huddersfield, as Brook and France. First directors, L. Brook and M. France. Registered office, Tanyard-lane, Milnsbridge, near Huddersfield.

Chalun Syndicate Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to carry on the business of dealers in ores, metals, metal composition and mineral substances, &c. Registered office, Kingsgate House, 115, High Holborn, W.C.

Circuitus Power Company Limited.—This company has been registered, with a capital of £50,000 in £1 shares, to carry on the business of mechanical engineers, moulders, iron and metal founders, sheet metal workers, &c., and to adopt an agreement with P. Tonnellier for (*inter alia*) the acquisition of the British Patent Rights No. 5987 of 1911 for £15,000 (£8,000 cash and £7,000 shares). Minimum cash subscription, £7. First directors: P. Tonnellier (managing director), C. Keble, H. Cross, C. Strahelin and W. Turner. Registered office, Crown-chambers, 9, Regent-street, S.W.

Crawford's Patent Automatic Barrel Filling Crane Company Limited.—This private company has been registered in Edinburgh, with a capital of £100 in £1 shares, to acquire the business of Crawford's Patent Automatic Barrel Filling Crane Company, 212a, St. Vincent-street, Glasgow, mechanical engineers.

Fairbairn Lawson Combe Barbour Limited.—The directors have declared an interim dividend on the preference and ordinary shares at the rate of 5 per cent. per annum for the six months to June 30, 1912.

Finnieston Engineering Company Limited.—This private company has been registered in Edinburgh, with a capital of £10,000 in £1 shares, to carry on the business hitherto carried on by the Finnieston Engineering Company at 109, Finnieston-street, Glasgow. First directors: D. A. Brown and J. Brown. Qualification, £100. Registered office, 109, Finnieston-street, Glasgow.

Green (Albert) Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of wire-covering, cord, and electric cable and wire manufacturers, &c., to acquire the business carried on by A. Green at New Normanton Mills, and Agar-street, Derby, and Wirksworth, Derbyshire, and elsewhere. The first directors are A. Green (chairman) and others to be appointed by him.

Hawthorn (R. and W.), Leslie and Co. Limited.—The directors have decided to recommend to the shareholders the payment of a final dividend of 7½ per cent., making, with that of 2½ per cent. paid in March last, 10 per cent. for the year ended June 30, 1912.

Horbury Junction Iron Company Limited.—The net profits, including £2,089 brought forward, were for the year to June 30, £6,858. A dividend of 6 per cent. has been declared, and £1,000 written off for depreciation of plant, leaving £3,149 to be carried forward.

Hurd Coal-cutter and Engineering Company Limited.—This private company has been registered in Edinburgh, with a capital of £15,000 in £1 shares, to carry on business as mechanical engineers, ironfounders, boilermakers, &c. First directors, F. W. Hurd, A. Cameron and C. G. Crawford. Registered office, 188, St. Vincent-street, Glasgow.

International Coal Company Limited.—The report of the directors states that the operations of the company are not as satisfactory as the previous year, the profit being only £7,115 15s. 10d., as against £10,430 2s. for 1911. The year just closed has been very troublous owing to the continued unrest among the workmen in the coalfield, and resulted in great loss to the company and in arrangements, which will considerably increase the cost of colliery operations The gross output for the year amounted to 220,964 tons, as against 243,945 tons in the previous year ended June 30, 1911. The directors are pleased to state that a price-list has recently been agreed upon for working the new seam by the ton instead of by the yard, which settlement, it is anticipated, coupled with the provision of additional mechanical appliances for underground haulage, will secure an increased output in the near future. A powerful air-compressor is now being erected, which when completed will enable the management to deal with developments underground in an economical manner; but there are, unfortunately, considerable disturbances in the strata proved in the working of the different seams, which seriously increases the cost of the output of coal. In face of the difficulties, it was not found advisable to proceed during the past year with the further sinking and equipment of the second shaft. This subject, however, as well as the development of the new seam and the winning of coal from other parts of the taking, is receiving careful consideration, and the directors may find it necessary to raise additional capital for dealing with such works. The directors recommend that out of the profits, £7,115 15s. 10d., made during the year a dividend of 5s per share, free of income-tax, be declared, payable on the 19th inst., leaving a balance on the past year's operations of £2,865 15s. 10d. to be carried forward.

Leeds Fireclay Company Limited.—The directors report that the trading profits for the year ended June 30 were £4,425. Debenture interest absorbs £12,000, and £2,300 has been written off investments, leaving a deficit for the twelve months of £9,875, and reducing the surplus of £11,029 brought forward to £1,154.

Mynydd Maon Colliery Company Limited—This private company has been registered, with a capital of £12,000 in £10 shares, to carry on the business of colliery proprietors, miners, ironmasters, steelmakers and convertors, coke manufacturers, smelters, engineers, tin-plate makers, &c., to acquire the business carried on at Pontypool, known as the Wernhill Colliery Company Limited. The subscribers are G. W. James, Glansychan, Abersychan, colliery manager; A. H. Bailey, jun., Pontnewynydd, builder; I. James, Park View, Pontnewynydd, clerk; W. H. Taylor, Pontnewynydd, colliery manager. The governing directors are G. W. James, A. H. Bailey, jun., I. James, and W. H. Taylor (all permanent, subject to holding £500 ordinary shares).

Nuts and Bolts (Darlaston) Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of manufacturers of and dealers in bolts and nuts of all kinds, engineers, founders, makers of agricultural implements and other machinery, toolmakers, metal workers, &c. First directors, A. E. Gwen, C. W. D. Joynson, and G. F. V. Richards. Registered office, Foster-street, Darlaston, Staffs.

Oxy-Acetylene Welding Company Limited.—This private company has been registered in Edinburgh, with a capital of £500 in £1 shares, to carry on business as sheet iron workers, tinsmiths, blacksmiths, and welders by oxy-acetylene. First directors, D. A. Brown and James Brown. Registered office, 169, Finnieston-street, Glasgow.

Quality Coal Company Limited.—This company has been registered, with a capital of £1,000 in 5s. shares, to carry on the business of coal, coke and fuel merchants, colliery owners, general carriers, &c., to acquire the business of the Quality Coal Company carried on at Wallasey, Cheshire, and to adopt an agreement with C. F. Rymer and W. H. Fry. The subscribers are; W. H. Fry, 12, Elgin-drive, Liscard, Cheshire, works superintendent, and C. F. Rymer, 4, Dundee-grove, Liscard, Cheshire, accountant—one share each. The first directors are: W. H. Fry, C. F. Rymer and E. T. Browning. Registered office, 4, Dundee-grove, Liscard, Cheshire.

Steel Company of Scotland Limited—The directors, after writing off special expenditure amounting to £27,500 for the year ended July 11, recommended that £25,000 be placed to the reserve fund, and that a dividend of 10 per cent. (less income-tax) be paid on the ordinary shares, carrying forward £19,000. The preceding year was 6 per cent., with £8,277 carried forward. The reserve now amounts to £170,000

Waste Heat and Gas Electrical Generating Stations Limited.—Interim dividend at the rate of 5 per cent. per annum in respect of the half-year ended July 31, payable, less tax, on August 31.

Waterloo Main Colliery Company Limited.—This private company has been registered, with a capital of £60,000 in £1 shares, to carry on the business of miners, colliery proprietors, coal, coke and iron ore merchants, ironmasters, &c., and to adopt an agreement with G. E. Stringer. The subscribers are: G. E Stringer, Slingsby, near Malton, colliery owner, one; G. E Stringer, jun., Clayton West, near Huddersfield, mining engineer, one share. The first directors are: G. E. Stringer (chairman) and G. E. Stringer, jun., each of whom may retain office while holding 5,000 shares. Solicitors: Lamb and Stringer, Kettering.

Wath Main Colliery Company Limited.—The directors announce an interim dividend of 1s. per share.

Wentworth Silkstone Collieries Limited.—This private company has been registered, with a capital of £15,000 in £10 shares, to carry on the business of dealers in coal, ironstone, artificial fuel, &c. Qualification of ordinary directors, 100 shares. Remuneration, except managing director, £100 each per annum. Registered office, 16, Regent-street, Barnsley.

Mortgages and Charges.—The following have been registered in pursuance of the Companies Acts, 1907:—Argentine Iron and Steel Company (Pedro Vasena E. Hijos) Limited (trust deed dated June 13, 1912, to secure £350,000 debentures); Cleveland and Durham Electric Power Limited (charge dated May 29, 1912 (supplemental to agreement dated January 13, 1911), to secure £31,600 or such other sum as may be payable under the terms of the agreement); Dunvant Penlan Collieries Limited (particulars of £5,000 debentures created April 29 1912, present issue £4,500); Gloucester Railway Carriage and Wagon Company Limited (issue on June 24, 1912, of £400 debentures, part of a series; Lincoln Wagon and Engine Company Limited (issue on June 26, 1912, of £14,332 13s. 6d. debentures, part of a series to secure not more than £1,000,000); North Central Wagon Company Limited (issue on June 26, 1912, of £200 debentures, part of a series); Owners of South Medomsley Colliery Limited (debenture and agreement relating to issue thereof, both dated June 18, 1912, to secure £5,000); Torpoint Coal and Gas Company Limited (two mortgages dated June 24, 1912, to secure £300 and £175 respectively); Gloucester Railway Carriage and Wagon Company Limited (issue on July 18, 1912, of £5 050 debentures, part of a series); Hick, Hargreaves and Co. Limited (particulars of £50,000 debentures created June 26, 1912, present issue £35,000); Lancaster's Steam Coal Collieries Limited (satisfaction in full on June 29, 1912, of debentures dated August 3, 1894, securing £60,000); Midland Expanded Metal Company Limited (mortgage dated June 29, 1912, to secure £600); Power Gas Corporation Limited (agreement dated July 9, 1912, to secure all moneys, not exceeding £75,000, which the mortgagees may pay to Parr's Bank Limited, under or by virtue of a certain guarantee); Scunthorpe Foundry Company Limited (particulars of £1,100 debentures created June 14, 1912, and secured by trust deed of even date, whole amount now issued); A. Reyrolle and Co. Limited (issue on July 12, 1912, of £300 debentures, part of a series); Ellerbeck Collieries Limited (deed of indemnity dated July 12, 1912, to secure an unlimited amount, but stamped to cover £500); North Central Wagon Company Limited (issue on July 10, 1912, of £2,500 debentures, part of a series); Samuel Osborn and Co. Limited (satisfaction to the extent of £2,400 on June 29, 1912, of debentures dated March 19, 1906, securing £21,600); Carlton Main Colliery Company Limited (mortgage dated May 23, 1912, to secure £366 10s.); Galloways Limited (statement under section 12 of 1907 Act (old charges outstanding on July 1, 1908, now first registered): mortgage, secured by trust deed dated August 5, 1899, securing £150,000); Wm. France Fenwick and Co. Limited (satisfaction to the extent of £5,000 on June 1, 1912 of debenture stock dated September 6, 1909, securing £200,000).

THE FREIGHT MARKET.

Outward chartering has been of somewhat smaller dimensions this week, especially on the north-east coast, where tonnage is scarce and coal business restricted by reason of high prices and scarce supplies Generally speaking, rates from the Tyne are very firm, although some easiness is shown for near ports. At South Wales a fair amount of chartering has been done. The market for prompt loading, however, is very erratic, and loading turns are difficult of arrangement Rates for the shorter trades are harder. At Glasgow there is little doing; rates are unchanged. The Humber is steady at about late quotations. Homewards, the market is quieter. The Eastern market is dull, but steady. The Black Sea, Azof and Danube are inactive. The Mediterranean and ore ports are firm, as is also the Baltic. America is dull. The River Plate is moderately busy, and rates are fairly well maintained.

Tyne to Algiers, 3,600, 10s. 6d.; Alicante, 2,000, 11s. 6d.; Apenrade, 1,000, 7s. 6d.; Bandholm, 1,200, 7s. 6d.; Barcelona, 2,700, 11s. 9d; Cronstadt, 3,000, 6s. 6d.; 2,000, 6s. 6d.; 3,000, 6s. 3d.; Cadiz, 2,000, 11s.; Catania, 3,000, 12s.; Civita Vecchia, 3,000, 12s. 6d.; Genoa, 3,600, 12s., reported; 2,800, 12s.; 4,000, 11s. 10½d.; Hernosand, 2,000, 8s.; London, 2,500, 3s. 1½d., from Dunston; Marseilles, 6,800, 11s., from Dunston; Nice, 2,800, 11s. 9d.; Port Said 6,500, 10s. 10½d.; Palermo, 2,500, 12s. 3d., reported; Pillau, 2,300, 6s. 6d.; Rouen, 1,800, 5s.; Rochefort, 1,400, 6s. 6d.; Spezzia, 3,200, 11s. 10½d.; Swinemunde, 2,000, 6s.; Terneuzen, 1,600, 4s. 3d., from Dunston; Trapani, 2,500, 12s. 6d.

Cardiff to Algiers, 4,500, 11¾ fr., ppt.; 3,300, 12 fr., ppt.; Alexandria, 4,000, 11s., August 26; 4,000, 11s., ppt.; 5,000, 10s. 9d., August 21; Bahia Blanca, 7,000, 21s. 6d., ppt.; Barcelona, 2,000, 11s. 3d, spot; Buenos Ayres, 21s. 6d., end August; 4,800, 21s. 6d.; 5,700, 20s., September 8; Brindisi, 6,500, 11s. 6d., 500, August 19; Bergen, 200, 7s. 10½d.; Cronstadt, 2,800, 7s. 6d., 500, ppt.; Cape Verde, 5,000, 11s. 7½d., September; Corunna, 3,000, 7s. 6d.; Duclair, 750, 6s. 3d.; Derindje, 5,000, 11s. 6d., ppt.; Djibouti, 5,000, 13s. 3d., August; Devonport, 1,300, 3s. 3d., Admiralty; Falmouth, 470, 4s. 3d.; Felixstowe, 780, 4s.; Genoa, 4,300, 11s. 6d., ppt.; 4,500, 10s. 10½d., ppt.; 4,800, do.; 4,000, do.; 6,400, 11s, August 18; 6,000, 11s., August 16; 3,800, 11s., ppt.; 6,000, 11s., ppt.; 4,100, 11s. 6d; 11s., August 15; Gibraltar, 2,800, 9s.; Haida Pasha, 5,000, 11s. 6d, ppt; Havre, 1,300, 4s. 9d, ppt.; 3,800, 4s. 9d.; Liverpool, 500, 4s.; Leghorn, 4,400, 11s, ppt.; Lisbon, 2,900, 6s., 350, August 22; 2,600, 8s, 350, August 21; Malta, 2,400, 10s 6d, part cargo; 3,000, 10s. 6d, August 15; Marseilles, 5,400, 13 fr.; 4,400, 13 fr.; 5,000, 12½ fr., August 19; Monte Video, 21s.; 4,800, 21s. 6d.; 5,700, 20s., August 15; Naples, 3,100, 11s., 600, August 21; Oporto, 1,350, p.t.; Port Sudan, 12s. 9d., August; Port Said, 5,500, 10s. 6d., ppt.; 8,000, 10s. 9d, ppt.; Plymouth, 450, 5s.; Palma, 2,000, 11s. 3d., ppt.; River Plate, 4,500, 22s. 3d., ppt.; 4,000, 20s. 6d., September 1; 4,800, 21s. 6d.; 21s. 6d., September 10; 5,800, 20s., early September; Reval, 3,500, 7s 6d.; 2,800, 7s. 6d.; Shanghai, 18s., August; St. Nazaire, 2,000, 6¾ fr.; Salonica, 2,700, 12s. 9d., ppt.; St. Vincent, 5,500, 11s. 7½d.; Teneriffe, 3,300, 11s. 9d.; Tampico, 4,500, 13s.; Valencia, 3,500, 11s. 3d.; Venice, 5,500, 12s. 6d., ppt.; 12s; Vigo, 1,400, 8s, ppt.; Wei-hai-Wei, 6,000, 17s. 9d., Admiralty, August 23; Zarate, 4,500, 22s. 6d., ppt.

Newport to Gibraltar, 2,600, 7s., Admiralty terms; Bahia Blanca, 21s, August 15-25; Taranto, 5,500, 11s. 4½d., 600; Vigo, 2,000, 7s. 6d, ppt.; Lisbon, 8s.; Algiers, 3,600, 11¾ fr., August 20.

Swansea to Bona, 2,100, 16 fr., ppt.; Bayonne, 1,900, 9 fr.; Barletta, 2,200, 14s. coal, 14s. 9d. fuel; Genoa, 1,400, 12s.; Rouen, 1,500, 5s. 6d. spot; 1,750, 5s. 4½d., spot; Port Said, 4,000, 11s. 9d., August 22; Havre, 650, 5s. 3d.

Hull to Cronstadt, 3,700, 6s. 6d., spot; 1,900, 6s. 6d., ppt.; 2,600, 6s. 6d., August 15; Odense, 1,600, 6s. 9d.; Bandholm, 900, 7s. 6d.; 1,300, 7s. 6d., ppt.; Genoa, 5,600, 11s. 3d., ppt.; Pernau, 1,600, 6s. 6d., spot; 2,800, 6s. 6d., spot; St. Petersburg, 2,100, 6s. 9d. for 1,500 tons coal, 9s. 9d. for 600 tons coke, special delivery, coal 600 and coke 400.

Goole to Ghent, 700, 4s. 9d.; Inverness, 420, 4s. 3d., ppt.

Immingham to Hamburg, 2,600, 4s. 6d., ppt.

Sharpness to Sydney and Newcastle, N.S.W., sail, 17s, salt.

Blyth to Apenrade, 1,000, 7s. 6d.; Cronstadt, 3,000, 6s. 3d.; 6,800, 6s. 6d.; 2,600, 6s. 4½d.; Rouen, 1,300, 5s. 3d.; Korsoer, 1,650, 6s. 9d.; Devonport, 700, 5s. 6d.; Genoa, 4,100, 12s.

King's Lynn to Abo, 1,500, 7s. 6d.

Wear to Havre, 1,600, 4s. 6d.; Buenos Ayres, 22s. 6d., ppt.; Helsingfors, 1,900, 8s.; Cronstadt, 2,500, 6s. 6d.

Liverpool to South Africa, two ports, sail, p.t.

Hernosand to Skien, sail, 150 stds., 30 kr., staves.

Gothenburg to Dakar, sail, 100 stds., 130 fr., d.b. and h.

London to Cape, sail, 1,406 reg., £2,550.

Seaham Harbour to Nakskov, 1,300, 7s. 3d.; Ystadt, 1,300, 7s. 6d.

Hartlepool to Marseilles, 3,600, 11s. 6d.; Genoa, 3,100, 11s. 10½d.; 4,000, 11s. 10½d.

Rotterdam to Bordeaux, 3,300, 7s. 1½d. coals, 7s. 10½d. briquettes, ppt.; Porto Ferrajo, 3,700, 11s. 6d., ppt.; 7,300, 11s.; Ergasteria, 4,400, 12s. 6d. coals, 15s. coke, August 23; Libau, 1,700, phosphate, 7 r.m.; Bagooli, 7,300, 11s.

Sweden (two places not north of Nordenhamn) to Delagoa Bay, sail, 700 stds., 80s.

Boston to Abo, 1,400, 8s.

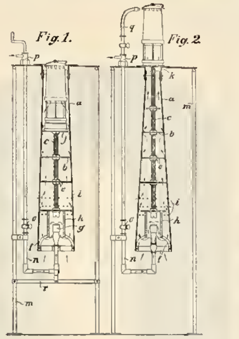
Homeward charters:—Nicolaieff, 4,500, Oslebshausen, 13s., ore, ppt.; 4,000, Cardiff, 9s. 3d., ppt.; 4,000, Antwerp, 13s. 3d., ore, 800-800, ppt.; Danube, 5,000, Naples, 12¾ fr., spot; 4,000, 13s. 6d. n.c. or any, 14s. Hamburg, spot; Poti, 2,408 net, Rotterdam, 13s. 9d., Antwerp, 14s., ppt.; 7 200, Rotterdam, 13s. 4½d., August-September; Azof, 6,400, Marseilles, 14½ fr., ppt.; 3 500, 14s. 6d. n.c. or any, 15s. Hamburg, April; 3,500, 14s., n.c., ppt.; 4,500, Antwerp, Rotterdam, Emden or Weser, 13s, Hamburg, 13s. 6d, ppt.; 5,000, Rotterdam, 12s. 9d., Emden or Weser, 13s., Hamburg, 13s. 3d, ppt.; 5,100, ten per cent., Rotterdam, 13s., Weser, 13s. 3d., Hamburg, 13s. 6d., ppt.; 5,100, do., with 3d. less barley, ppt.; 4,600, Rotterdam, Emden or Weser, 13s., ppt.; 5,000, Rotterdam, 14s., Antwerp, Emden or Weser, 14s. 3d., Hamburg, 14s. 6d., with 500 tons bran 5s. extra, days, August 25; Port Pirie, 6,500, Antwerp, 30s., August; Calcutta, 3,295 net, Dundee, 32s. 6d., September; 2,257 net, p.p. United-Kingdom-Continent, 33s. 9d., jute basis, August; Bombay, 8,000 max., United-Kingdom-Continent, 26s. 6d., two ports discharge, d.w. basis, September; 2,331 net, 27s. 6d. on d.w., two ports discharge, August-September; 25s. 6d., Northern States, ore, September; San Lorenzo, 5,300, 10 per cent., United-Kingdom-Continent, 23s. 6d. o.c., less 6d., option full cargo below bar 2s. less, August-September; 5,500, 10 per cent., 23s. 6d o.c., less 6d., ppt.; 4,400, ditto; 4,500, 10 per cent., 23s. 9d. o.c, less 6d., August 20-September 20; 5,400, 10 per cent., 22s. 9d o.c, less 6d., September; 5,400, 10 per cent., 21s. 6d. o.c, less 6d., October 25-November 25; 5,600, 10 per cent, 23s. o.c., less 6d, September 10; 6,400, 10 per cent., 22s 6d o.c., less 6d., less 2s. 6d. completing below, option full cargo below bar 20s. 6d., less 6d, ppt.; 5,500, 10 per cent., 21s. 3d. o.c., less 6d., with Northern options, October 20-November; 4,500, 10 per cent., 22s. 3d. o.c, less 6d., September 20-October 20; 4,300, 10 per cent., 22s. 6d. o.c., less 6d, October 1-31; Buenos Ayres or La Plata, 6,800, 10 per cent., United Kingdom-Continent, 21s. o.c., less 6d., September-October; 5,200, 10 per cent. 19s. 6d. o.c., less 6d., October 10-November 10; 5,500, ditto; 6,300, 10 per cent., 20s. o.c., less 6d., October 1-31; Villaricos, 7,000, Emden, 7s. 3d., ppt.; Garrucha, 2,900, Stockton, 6s. 9d, August; Algiers, 3,200, Tyne, 7s., August; Bilbao, 3,000, Middlesbrough, 6s. 10½d., ppt.; 2,600, Rotterdam, 6s. 7½d., ppt.; Talanta Channel, 3,800, Rotterdam, 8s. 6½d.; 3,200, 8s. 6d., 1,200-1,200, ppt; 1,400, Middlesbrough, 6s. 9d., ppt.; Newcastle (N.S.W.), sail, 21s., direct nitrate port, with exclusions; Gulf, sail, 16 dols., Rio de Janeiro; time charter, New York and West Coast South America, 4s., two years' delivery, November; Australia, 28s. 6d, United Kingdom-Continent, January-February Kurrachee, 7,000, Dublin and Liverpool, 21s. 6d., less 2 per cent., September 1-15; 21s. 6d., Birkenhead or Manchester, net terms; 2,236 net, Antwerp, 20s. 6d., early September; 2,393 net, 20s. 9d., September; 2,139 net, p.p. United Kingdom-Continent 21s. 6d., Havre-Dunkirk, 22s. 6d., with options, August-September; Kherson, Nicolaieff, Odessa, Novorossiisk or Theodosia, 5,000, Rotterdam 11s., Hamburg 11s. 6d., ppt.; Newcastle (N.S.W.), 2,259 net, Singapore, about 10s. 9d., September; Hornillo Bay, 3,500, Cardiff, 6s. 9d., August; Salta Caballo, 3,000, Heysham, 6s. 6d., ppt.; Smyrna, 6,000, Hull, 11s. 1½d., end August; Kherson, Nicolaieff or Odessa, 4,500, Rotterdam 11s., Hamburg 11s 6d., with 3d. extra two loading, ppt.; Novorossiisk, 4,300 max., Denmark, basis 16s. one port, oilcake, ppt.; Aguilas, 2,000, Terneuzen, 6s. 3d., ppt.; Santander, 2,100, Rotterdam, 7s., ppt.; time charter, Rotterdam to States and back to United Kingdom-Continent, 5s. 9d.; time charter, Mediterranean trades, 2,650 d.w., £900, six months; 2,050, £575, four months; time charter, American trades, 7,100, 4s. 3d., two years' delivery and re-delivery United Kingdom; Parrsboro, about 55s., West Britain or East Ireland; Odessa or Nicolaieff, 7,100, Rotterdam 11s., Hamburg 11s. 3d., option Kherson, b.d, 3d. extra, spot; Sarihoulat, 2,700, Hull, 13s. 6d., ppt.; Kustendje, 7,000, Antwerp or Rotterdam, 10s. 6d., with 3d. less barley, ppt.; Buenos Ayres, 6,300, 10 per cent., Barcelona, 22s., o.p.d., August; San Juan, 2,100, West Hartlepool, 9s. 6d.; Seville, 1,600, Dunkirk, 10s. 6d., ppt.; Gulf timber port, sail, 15¼ dols., Rio de Janeiro, September-October; Bear River, sail, 11½ dols., Buenos Ayres, option Rosario, 12½ dols.; time charter, Baltic European trade, 2,000, £550, five years; Savannah, 59s., United Kingdom-Continent, September.

New Mines Inspectors.—According to the *London Gazette* Herbert Dachy, Harold Taylor, Foster Douglas Hay, Herbert John Humphrys, Paul Salthouse Lee, Edward Sims Rees, and Frank Noel Siddall have been appointed junior inspectors of mines under the Coal Mines Regulation Acts, 1887 to 1911, and to act also as inspectors for the purposes of the Metalliferous Mines Regulation Acts, 1872 and 1875, and of the Quarries Act, 1694, and, further, to be inspectors of factories and workshops for the purposes of the Factory and Workshop Act, 1901.

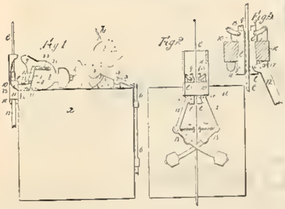
Hull Coal Imports.—According to the return compiled by Mr. W. Herbert Truman, coal inspector to the Hull Corporation, 771,363 tons of coal were imported into Hull from the collieries during July—728,007 tons being delivered by rail and 43,356 tons by river—as against 472,624 tons in July 1911. In the seven months concluded with July imports amounted to 3,769,184 tons, as against 3,560,656 tons in the corresponding period of 1911. In July 427,636 tons were exported (as against 240,395 tons last year) and 76,930 tons shipped coastwise; in the seven months 1,732,383 tons were exported (against 1,803,012 tons) and 500,692 tons despatched coastwise.

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

435 (1912). *Improved Apparatus for Testing Miners' Safety Lamps.* J. Roby, of 6, Hulme-terrace, Swindly-lane, Wigan, Lancashire, and J. Walkden, of Monument Lodge, Wigan-lane, Wigan.—This invention relates to apparatus for testing miners' safety lamps for the purpose of ascertaining whether the gauze or lamp is defective, indication of a defect being given by the occurrence of an explosion caused by the passage of flame through the defective parts. Apparatus constructed in accordance with this invention is of the kind in which the lamp or the part of it to be tested is placed on, or in, one end of a mixing chamber which is of relatively great length compared with its width, and is supplied, at the end removed from that at which the lamp is placed, with air and gas which travel along the chamber, coming in contact with baffling devices located therein. The baffling devices are, in accordance with the invention, made adjustable in the chamber so as to vary their effects on the mixture of air and gas flowing through the chamber. In the preferable form of construction the baffling members are mounted so as to be longitudinally adjustable in the mixing chamber, which has a tapering form, so that the longitudinal adjustment will vary the clearance between the baffling devices and the wall of the chamber. Fig. 1 is a central vertical section of an apparatus for testing complete lamps; and fig. 2 is a similar view of an apparatus for testing lamps without the oil containers. (Four claims.)



9659 (1912). *Improvements in Devices for Arresting the Motion of Pit Cages, Lifts and Hoists, when the Hauling Rope Breaks.* F. Alcock, of 13, Crewe-road, Haslington, Crewe, Cheshire.—This invention has particular reference to that type of apparatus in which a pair of slidable wedges or half cones are caused to grip the cage guide when the hoisting rope breaks or is slack, by being forced into a hole in a stationary bracket, the wedges being operated from connections with the hauling rope or chain. The object is to provide improvements in the aforesaid type of device and particularly of the type referred to in prior Patent No. 10209 of 1911, in which the use of pivoted weights connected with levers operating in conjunction with the hoisting rope were employed, the invention consisting in a new arrangement of the pivoted weights, means for holding the weights out of operation, means connected with the weights for holding the wedges in the inoperative position, and the use of spring-controlled weighted levers connected with the wedges or cones. Fig. 1 is a front elevation of a pit cage showing the invention applied thereto, fig. 2 side elevation of same, and fig. 3 side elevation partly in section to an enlarged scale of the wedge mechanism. When the hauling rope breaks or becomes slack the weighted levers fall inwardly so as to remove their outer arms 9 from the wedges as indicated at the left-hand side of fig. 1, thereby allowing the spring-controlled arms 13 and links 12 to act to engage the wedges *e* with the guide ropes. The wedges or cones *e* fit in a tapered or conical hole formed in the block 10 so that on rising their inner faces are brought against the rope to grip it, as will be well understood. There are employed, in conjunction with the pivoted weighted levers *r*, means for holding them in the position indicated at the right-hand side of fig. 1, when the cage is opposite a level and supported on the usual snaps, so that the wedges *e* will not be brought in contact with the guide ropes *c*. For this purpose brackets 2 are employed, secured to the top side of the cage, adapted to support bell-crank levers, each having an arm 5 coupled to one arm of a lever 3 pivoted at 18 to a bracket secured to the top of the cage, the other arm of the lever 3 being coupled to a vertical rod 6 which passes down the side of the cage, and is connected to the usual snaps. When the snaps are engaged the rod 6 is pushed upwardly, so turning the lever 3 about its pivot and bringing the arm 4 of the bell crank lever from the full line to the broken line position indicated at the right-hand side of fig. 1, where it comes in contact with the weight *r* and prevents it falling to the full line position shown at the left of fig. 1. When the cage is lifted and the snaps are released, the rods 6 and levers assume the full line position. (Four claims.)



16094 (1911). *Improvements in Reciprocating Conveyors or Screens.* B. Norton, "Castledale," Dudley, Worcestershire.—This invention relates to reciprocating conveyors or screens. It has for its object a reduction of the motive power required to cause the reciprocation, consisting of a device for absorbing the kinetic energy of the reciprocating part during each retardation period, converting it into potential energy, and later, after reversal of direction, reconverting it into kinetic energy during each acceleration period. In order to effect this a reciprocating part is connected to a piston or diaphragm, so that the motion of the part causes such piston or diaphragm to compress a volume of air, steam, or other gas within a vessel during each retardation period, thus absorbing the kinetic energy of the reciprocating part and converting it into potential energy. On reversal of the stroke the pressure of the gas reacts, through the piston or diaphragm, on to the reciprocating part, thus assisting the driving mechanism during each acceleration period of the subsequent stroke. By absorbing the kinetic energy of the reciprocating parts in the above manner, and conserving it for use during the ensuing stroke, the waste of power which always takes place when the inertia of the reciprocating part is allowed to set up friction in the parts of the driving mechanism during the retardation period, is avoided. Further saving of power is effected during each acceleration period due to the assistance afforded to the driving mechanism. In some cases it is advantageous to supply air, steam or gas to the cylinder or vessel from a source of supply at a pressure greater than atmospheric pressure. Fig. 1 is a side view wherein A is a reciprocating part, B is a stationary part, C is a cylinder (shown in section) connected to B, E is a piston secured to piston rod D, one end of which is coupled to reciprocating part A. Fig. 2 is a side view wherein A is a reciprocating part, B is a stationary part, C is a cylinder (shown in section) connecting to A, D is a piston rod attached to B, E is a piston fixed to rod D. (Five claims.)

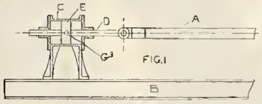


FIG. 1

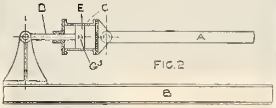
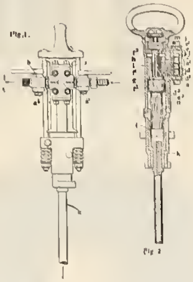
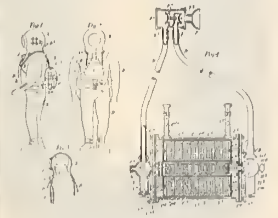


FIG. 2

16380 (1911). *Improvements in and Relating to Drilling or Boring Tools.* W. M. Treglown and W. Noble, both of 165, Queen Victoria-street, London, E.C.—This invention relates to drilling or boring tools, and especially to percussive hammer drills and the like, of the kind in which means are provided for the removal of the accumulation of chips or *débris* at the working face of the rock or other material by the passage of air or other fluid from the working cylinder of the tool through the bore of a hollow drill or cutter to the working face. It has for its object to provide simple means to effect the regulation of the blow and stroke of the piston of the tool and the periodic removal of the loose chips or *débris* from the drill or borehole, so as to give a clear working face of rock and to increase the working capacity of the tool. According to the invention there is provided on the exhaust a valve or other device independent of the means provided for controlling the supply of fluid to the tool, by means of which the piston of the tool may be prevented from operating or may be controlled in such manner as to perform its stroke in the cylinder, but without striking blows, to effect rotation of the drill or cutter, and by which the compressed air or other motive fluid may be caused to pass through the inlet ports directly to the hollow drill or cutter, so that any accumulation of chips or *débris* in the bore- or drill-hole is expelled under the relatively high pressure and volume of air passing through, by which the binding of the drill or cutter in the drill or borehole is avoided or overcome. Fig. 1 is an elevation of the drill, taken at right angles to fig. 2, showing the position of the valve by which the exhaust is throttled. Fig. 2 is an elevation in section of the drill, taken on a plane intersecting the valve-box, the air passages in the cylinder being shown displaced from their actual positions around the periphery of the cylinder to facilitate the description of the operation. (Two claims.)



16550 (1911). *Improvements in and connected with Respiratory Apparatus for use in Diving and in Working in Poisonous Atmospheres.* G. Kormode, 13, Ashley-place, Westminster, London, S.W., and G. F. Davis, 11 Court 5 House, Sherlock-street, Birmingham, Warwickshire.—This invention relates more particularly to chemical self-contained diving and respiratory apparatus of that class wherein the wearer breathes the same air over and over again. An enclosed diving dress is employed similar to that described in the Specification of Application for Patent No. 26106 A.D. 1910, but in this apparatus it is preferred to use what is known as the two-bolted helmet, having two bolts to secure the helmet to the dress. In place of the ordinary pumps and pipes and lead body weights, a single body or breast weight is employed in front and at back, and several communicating cylinders charged with the same or similar regenerating medium which will absorb CO_2, which medium may be a preparation of potassium and sodium peroxide, or, preferably, the material known as oxylithe P.S., which is a compound of 2 parts of potassium peroxide and 1 part of sodium peroxide, to which is added 2 per cent. of anhydrous sulphate of copper. According to the invention there is employed a specially constructed respiratory valve apparatus with a mouthpiece and a novel form of chemical chambers, an embodiment of which is represented in the accompanying drawings in which figs. 1 and 2 are side and front elevations respectively showing the invention applied to a complete self-contained diving dress. Fig. 3 is a section through the helmet and upper part of the dress showing a method of leading the air to the respiratory valve apparatus, and fig. 4 is a section on an enlarged scale showing the chemical regenerating and purifying chambers in connection with the respiratory valve apparatus. (Six claims.)



17458 (1911). *Improvements in Haulage Clips for Colliery and like Rope Haulage Railways.* J. W. Blundell, of 23, Glentworth-road, Radford, and A. Hemsley, of 102, Lenton Boulevard, Nottingham.—This invention has for its object to provide a clip which can be released and raised by a single angular movement of a transverse shaft in one direction, and lowered and closed by a corresponding movement of said shaft in the reverse direction. Fig. 1 is a side elevation of a haulage clip constructed according to the invention; fig. 2 is a plan of the clip; fig. 3 an end elevation, and fig. 4 a plan showing the gripping jaws and operating cams only. In applying the clip, the jaws A are lowered until a stop P just above the jaws A rests upon the haulage

(*Continued on page 356.*)

THE RECORD

840

square feet in one shift with

one "Siskol" Coal-Cutter.

INTERNATIONAL CHANNELLING MACHINES LD.,

SHEFFIELD.

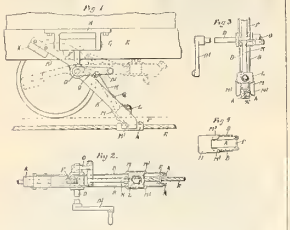
The OFFICIAL figures recently published by H.M. Home Office show that in the Manchester District, for 1910, there were 152 Coal Cutters, of eleven different types, in use, of which 81, or more than half of the total number, were "SISKOL" machines.

Is any further proof needed as to which is the best Coal Cutter?

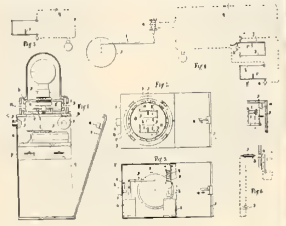
INTERNATIONAL CHANNELLING MACHINES LD.,

SHEFFIELD.

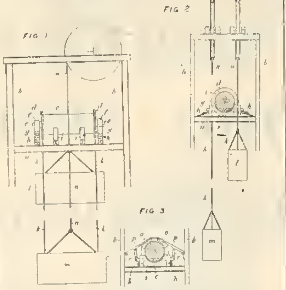
rope, a further movement of the crank handle D^1 then moves the crank arm O relatively to the arms B, and this action closes the jaws A on to the rope through the intermediary of the saddle L and cam plate M. In removing the clip, the first part of the angular movement of the transverse shaft D causes the crank arm O to move relatively to the arms B, and this movement draws back the saddle L up to, say, a stop Q on the arms B. This action releases the jaws A, and when the saddle L engages the stop Q, any further movement of the shaft D raises the arms B out of the way. The clipping and unclipping may be automatically effected, by providing fixed striking parts on the permanent way, which are adapted to engage with the crank handle D^1, or special arms provided for this purpose on the transverse shaft D, and thus operate the latter as the wagons move past the striking parts. (Three claims.)



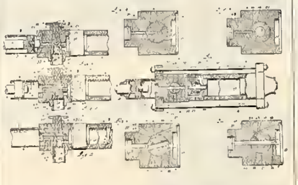
19663 (1911). *An Improved Method of and Apparatus for Ascertaining and Indicating the Presence of Gases other than those ordinarily contained in the Atmosphere for Use in Mines or other like Purposes.* A. Barry, of 44, Errol-street, Aigburth-road, Liverpool, Lancashire.—The object of the invention is to construct a simple device applicable to an ordinary electric lamp holder, ceiling rose, portable battery or the like adapted to give warning of the presence of foreign gases in the atmosphere by the flickering or total extinction of the lamp placed in said holder or attached to such ceiling rose, battery, or other circuit, or other suitable source of electric energy. According to the invention, use is made of the catalytic properties of certain metals such as platinum in an improved manner by combining such catalytic metal with a suitable source of electric power adapted to give the necessary initial heat to the metal and being placed in series with a lamp gives the necessary light under the ordinary conditions of the atmosphere. When the catalytic metal comes into contact with certain foreign gases its expansion is increased due to the increased heating which it undergoes, and this increase of expansion is utilised in any suitable manner for momentarily breaking the circuit of the lamp thereby causing the latter to flicker or for entirely breaking such circuit, thereby causing the total extinction of the lamp. Fig. 1 is a sectional elevation showing one convenient form of apparatus constructed in accordance with this invention; fig. 2 is a section upon the line A—B of fig. 1; fig. 3 is a section upon the line C—D of fig. 1; fig. 4 is a diagram illustrating one convenient arrangement of electric connections, while fig. 5 is a similar view illustrating a modification; fig. 6 is a diagrammatic view illustrating a detail. (Ten claims.)



19933 (1911). *Safety Apparatus for Mining Cages and Lifts.* C. Walton, of Orchard House, Moresby, Whitehaven.—This invention relates particularly to apparatus for the prevention of accidents due to overwinding or breakage of ropes in mines. According to this invention, the ascending and descending cages, which are connected to the main winding ropes in the usual manner, are connected to each other by safety ropes which pass over sheaves fixed at both ends of a drum mounted in the headgear; the drum bearings are resiliently supported, such as by springs, so that when the winding rope breaks the drum receives the weight of the cages and becomes depressed on to brake blocks, which gradually retard the rotation of the drum and bring the cages to rest. In the accompanying drawings, fig. 1 is a side view and fig. 2 is an end view of a safety apparatus constructed according to the invention and applied to an ordinary pit-head frame. In some cases, and as shown in fig. 3, auxiliary brake blocks *o* may be mounted upon arms *p* pivoted to the frame *b* and adapted to be brought automatically into contact with the drum *c* when the latter becomes depressed. This may be effected by links *r* or by any other suitable device. The drum with the sheaves may be made to serve as a winch to bring the cages to the surface for the release of the men, and may also be utilised for carrying out the necessary re-connection or splicing of the winding rope. (Four claims.)



20280 (1911). *Improvements in Valve Mechanism for Pneumatic Tools.* C. A. Allison, of 52, Chancery-lane, London (communicated from abroad by the Standard Rock-drill Company, of 1,730, Wazee-street, Denver, Colorado, U.S.A.—This invention relates to valve mechanism for pneumatic tools and more especially to valve mechanism for tools of this character in which a feed bar is employed for holding the steel of a hammer drill against the rock, and in which throttle valve mechanism is interposed between the feed bar cylinder and the motor and controls the supply of motive fluid to a feed chamber in direct communication with the motor, and according to the present invention the supply of motive fluid to the feed bar cylinder is caused to pass from the feed chamber back through the throttling valve to said feed bar cylinder, whereby the pressure of the motive fluid supplied to the feed bar cylinder is equal to that of the fluid which is employed to operate the hammer reciprocating in the motor cylinder. In the improved construction the motive fluid, which is fed to the drill cylinder and to the casing of the feed bar, is controlled in such a manner that it passes to a chamber interposed between the throttle valve and the cylinder valve under only such pressure as is necessary to reciprocate the hammer at the desired speed, the motive fluid passing from this chamber simultaneously to the drill cylinder and also back through the valve to the feed bar casing. Hence the pressure of the fluid which is delivered to the feed bar casing cannot be greater than that of the fluid which passes to the cylinder for reciprocating the hammer. This is a very important feature, when it is desired to run the drill slowly or to reciprocate the hammer at a reduced speed, as when when the material to be drilled is comparatively soft, and under such circumstances it is exceedingly desirable that the feed bar be actuated by the motive fluid at a pressure reduced to correspond with that which is delivered to the drill cylinder. Another feature of the improved construction consists in the employment of an auxiliary exhaust which is adapted to allow a portion of the motive fluid which has been used to propel the hammer on its forward movement to escape through the valve to the atmosphere, when the drill is running at its maximum speed. Fig. 1 is a fragmentary section taken through a hammer drill equipped with the improved throttle valve construction, a part of the hammer cylinder and a part of the feed bar construction being illustrated. In this view the throttle valve is so adjusted that the motive fluid is cut off from the feed bar and the hammer cylinder, the feed bar chamber being in communication with the atmosphere for exhaust purposes; fig. 2 is a similar view, showing the throttle valve in a different position, namely—that in which the motive fluid is delivered to the feed bar chamber, but cut off from the hammer cylinder; fig. 8 is a similar view in which the motive fluid is cut off from direct communication with the feed bar chamber, but allowed to pass to a chamber interposed between the cylinder valve and the throttle valve, the motive fluid passing from the said chamber to the hammer cylinder and feed bar chamber after being properly throttled; figs. 4 and 5 are sections taken through the throttle valve mechanism on lines 4—4 and 5—5 respectively of fig. 2, fig. 4 showing the valve in the same position as in fig. 1 and fig. 5 in the same position as in fig. 2; figs. 6 and 7 are sections taken on the line 7—7 fig. 2, showing the throttle valve in two different positions; fig. 8 is a section taken through a hammer drill cutting the throttle valve mechanism, the parts being shown in the position illustrated in fig. 7, to permit the employment of the auxiliary exhaust. (Two claims.)



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At the annual meeting of the British Foundrymen's Association at Cardiff last week, Mr. R. H. Greaves, University College, Cardiff, read a paper on "Coking Practice in the South Wales District," in which he gave a short description of the character of the coke produced in South Wales, and also the types of ovens at present in use. He said that owing to the number of additional coking plants that had been built lately, the total output of coke from the South Wales coalfield was now largely in excess of what it was 10 or even five years ago. The best Welsh coke, he held, was unsurpassed in physical condition. Its pores were small and finely divided, and in purity and freedom from deleterious substances it compared favourably with other cokes. It had proved itself eminently suited for foundry work.

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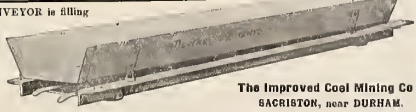

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NOTICE is hereby given, that in an action for Infringement of Blackett's Patent No. 14,093, of 1901, raised in the Court of Session, Edinburgh, at the instance of the Patentee, William Cuthbert Blackett, Mining Engineer, of Acorn Close, Sacriston, in the County of Durham, Complainer, against Dickson & Mann Limited, Engineers and Steel Founders, incorporated under the Companies' Acts, and having their registered office at Bathville Steel Works, Armadale, in the County of Linlithgow, Respondents, the Lord Ordinary (Lord Guthrie) by his Interlocutor or Order dated 17th November, 1909 (inter alia) certified the validity of the said Patent, in terms of section 35 of the Patents and Designs Act, 1907.

The Patentee hereby WARNS the trade and the public generally against making, selling, buying, dealing in or using Conveyors made in infringement of the said patent, which it is his intention to support and vindicate by all necessary means including legal proceedings. And further CAUTIONS infringers that they render themselves liable to an injunction or interdict with costs or expenses as well as to damages and delivery up of all infringing apparatus.

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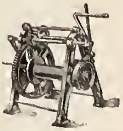

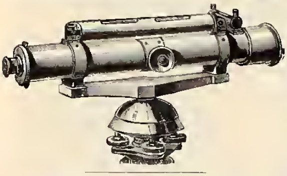

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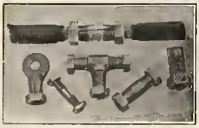

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Bonnis, Ed., and Co. Ld., Little Hulton, Bolton
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Newton Heath, Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Norton's (Tividale) Ld., Tipton
Longbotham, H. H., and Co. Ld., Wakefield
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Wood, John & Sons Ld. Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Conveyor Belts
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, R., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Conveyors and Elevators
Bonnis, Ed., and Co. Ld., Little Hulton, Bolton
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Chain Belt Engineering Co., Derby, England
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Diamond Coal-Cutter Co. Stennard Wks. Wakefield
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Head, Wrightson and Co. Ld.. Stockton-on-Tees
Heenan and Froude Ld., Worcester
Improved Coal Mining Co., Sacriston, nr. Durham
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Mather and Platt Ld., Manchester
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Primus Patents Co.. Falcon-street, Oldham
Reddaway, F., & Co. Ld., Pendleton, Manchester
Sheppard and Sons Ld., Bridgend, South Wales
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts.
Sutcliffe, R., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Yorkshire Engine Co. Ld., Sheffield
Wright, Joseph, and Co., Tipton

Corner Plates
Baker, John, and Co (Rotherham) Ld., Kilnhurst, Rotherham
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld , Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

Couplings
Bagnall, W. G., Ld.. Stafford
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Crab Winches
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Hardy Patent Pick Co. Ld., Sheffield
Renton, R. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Hyland-street Works, Birmingham

Crane Makers
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Middleton, Robert, Sheepscar Foundry, Leeds
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

Cranes
Appleby, E. G., and Co., 10, Victoria-street, Westminster
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Gt. Central Railway, 216, Marylebone-rd., London
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffiel
Youngs, Hyland-street Works, Birmingham

Creepers

Cut-off Gear
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs
Thornewill and Warham Ld., Burton-on-Trent
Wood, John, and Sons Ld., Wigan

Detonators
British Explosives Syndicate Ld.,) Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Disintegrators
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Middleton, Robert, Sheepscar Foundry, Leeds
Simon-Carves Ld., 20, Mount-street, Manchester
Yeadon, Son and Co., Albion-place, Leeds

Diving Apparatus
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Pulsometer Engineering Co. Ld., Reading
Siebe, Gorman and Co. Ld., Westminster S.W.

Docks
Gt. Central Railway, 216, Marylebone-road, N.W.

Dog Spikes
Frost, Albert, and Co., Sheffield
Renton, R. M., & Co., Midland Works, Sheffield

Double Helical Gear (Machine Cut)
Brown, David, and Sons (H'f'd) Ld., Huddersfield
Citroen, Andre, and Co., 27 Queen Victoria-street, London
Deutsche Maschinenfabrik A.G., Duisburg, Germany

Drain Cocks
Appleton and Howard, St. Helens, Lancs.
Hopkinson, J., and Co. Ld., Huddersfield

Drawing Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drawing Office Stationery
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drills (Electric)
United States Metallic Packing Co. Ld., Soho Works, Bradford

Driving Pulleys
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Duplex Pumping Engines
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Evans, Joseph, and Sons Ld., Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Pearn, F., and Co. Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Dustbins (Sanitary)
Baker, John, and Son, Bilston, Staffs
Harvey, G. A., and Co., Lewisham, London, S.E.
Lewis, Wm., and Son, Bilston
Theedam, E. C., Ld., Dudley

Dynamite, &c.
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Nobel's Explosives Co. Ld., Glasgow

Dynamos
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Sutcliffe, Richard, Horbury, near Wakefield

Ebonite and Vulcanite
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Electric Detonators and Fuses
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Electrical Engineers
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mather and Platt Ld., Manchester
Theedam, E. C., Ld., Dudley

Electrical Fault Indicators
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield

Electric Haulages
Avonside Engine Co. Ld., Bristol
Bridge, David, & Co. Ld., Castleton, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davis John, and Son (Derby) Ld., Derby
Deutsche Maschinenfabrik A.G., Duisburg Germany
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, H. H., and Co. Ld., Wakefield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Electric Meters
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Electrical Plant
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Gt. Central Railway, 216, Marylebone-rd., London
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Ward, Thos. W., Limited, Albion Works, Sheffield

Electrical Pumps
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Electrical Stores
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C., Ld., Dudley

Emery Wheels

Enamelled Plates for Notices for Mines
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Theedam, E.C., Ld., Dudley

Enamel Manufacturers (for all Metals)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalhitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Engineers (Consulting)
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Fell, C. A., Dronfield, near Sheffield
Radford, R. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

Engines (Blowing)
British Westinghouse Electric and Manufacturing Co Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Gas-Compressing)
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Hauling and Winding)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, H. H., and Co. Ld., Wakefield

Engines (Hauling and Winding)—continued.
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Nott
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, R., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

Engines (Locomotive)
Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)
Mather and Platt Ld., Manchester

Engine Merchants
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

Engines (Oil)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping) (See **Pumps**)

Engines (Rolling Mill)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany

Engines (Steam)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Exhaust Turbine Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear
Daglish, Robert, and Co. Ld.. St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld, Wigan

Fans (Ventilating
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Files
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & H., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

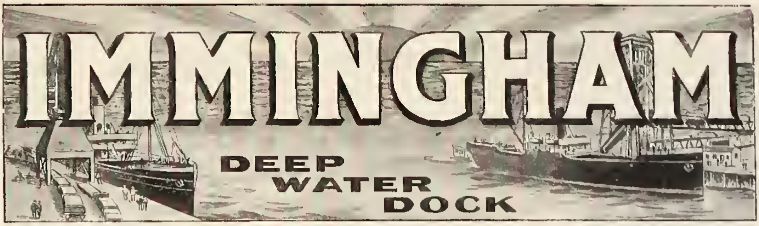
Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

Fire Appliances
Fell, C. A., Dronfield, near Sheffield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

The NEW COAL PORT



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SAM FAY, General Manager.

Purchasers' Guide to Advertisers' Specialities.—(continued).

Firelighter Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Fishplates
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

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Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

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Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

Forges
Hardy Patent Pick Co. Ld., Sheffield

Forgings
Bagnall, W. G., Ld., Stafford
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld. Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Fuel Economisers
Fell, C. A., Dronfield, near Sheffield
Pillatt and Co., Stapleford, Nottingham
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld., Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Hammerton-st., Burnley
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall

Fuses (Safety)
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Bricks

Gas Engines
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Glover, M., and Co., Holbeck-lane, Leeds
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Gas Exhausters
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Gas Plant
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Tipton

Gas Valves
Haslam and Schontheil Ld., Bristol

Gauge Glasses
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Jacobson, Richard, 70, Shoe-lane, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gear (Special for Motor Lorries Cars &c.)
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Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroën, Andre, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Nuneaton Engineering Co. Ld., Nuneaton.
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Banderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Rods Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Grant and Hickman, Wolverhampton
Triar Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
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Deutsche Maschinenfabrik A.G., Duisburg, Germany
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
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Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, B., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan

Heapsteads—continued
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Hoists
Bleichert, A., and Co., 99-100, Palmerston House Bishopsgate-street Within, 00, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Hooks or Links (Safety)
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Harvey, G. A., and Co., Leampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Hydraulic Jacks
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co. Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Ryland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hydrometers
Davis, John, and Son (Derby) Ld., Derby

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Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Beddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

Jointing Cement
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

Jointing (Sheet)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Joists (Rolled Steel)
Heenan and Froude Ld., Worcester
Benton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Keps (for Winding Cages)
Benthaus, D., 45, Bank-street, Sheffield
Wood, John, and Sons Ld., Wigan

Lamp Cleaning Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Gauze Brushes
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Glasses
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Oil Filling Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Re-Lighting Apparatus (Underground)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Arc)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
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Lamps (Electric)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
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Lamps (Electric Safety)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Rd., Ld., Belvedere Works, Belvedere, Kent
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Lamps (Miners' Safety)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Outdoor)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

Lathes
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

Leather Appliances

Lessons by Post
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

Lifting and Hoisting Tackle
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Benton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

Lightning Conductors
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Theedam, E. C., Ld., Dudley

Locknut Washers
Benton, B. M., and Co., Sheffield

Loose Collars
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster S.W.

Lubricators
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
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Tangyes Ld., Cornwall Works, Birmingham
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Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Machinery (Second-Hand)
Bute Works Supply Co. Ld., Cardiff
Foot, H. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Benton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

Machine Tools
Foot, H. G., & Co., 11, Queen Victoria-street, E.C.
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

Mathematical Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mechanical Stokers
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

Metal Perforators
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

Metallic Packing
United States Metallic Packing Co. Ld., Soho Works, Bradford

Meteorological Instruments
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mills (Grinding)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

Mining Dials
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mining Machinery
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Mining Tools
Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

Motors
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Motors—continued.
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
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Davis, John, and Son (Derby) Ld., Derby

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Avonside Engine Co. Ld., Bristol
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Frost, Albert, and Co., Howard street, Sheffield
Benton, B. M., and Co., Midland Works, Sheffield

Office Furniture and Appliances
Glover, M., and Co., Holbeck-lane, Leeds
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Oil Bottles
Baker, John, and Son, Bilston, Staffs
Theedam, E. C., Ld., Dudley
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Oil Cabinets
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Switches
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Youngs, Ryland-street Works, Birmingham

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Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
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Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Oxygen Manufacturers
British Oxygen Co. Ld., Elverton-st., Westminster
Knowles Oxygen Co. Ld., Wolverhampton

Packing (Engine)
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Green and Boulding Ld., London, E.C.
Greene, Tweed and Co., Westminster
Lancaster and Tonge Ld., Pendleton, Manchester
Beddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Paint
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Kalbitum Paint Co. Ld., Belvedere, Kent
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

Paint (Fireproof)
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent

Patent Agents
Harris & Mills, 34 & 35, High Holborn, London
Radford, H. H., Son, and Squire, Sheffield

Pedestals
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham

Perforated Plates
Barns, W., & Son, Queensland-rd., Holloway, N.
Firth, William, Ld., Leeds
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Norton's (Tividale) Ld., Tipton
Theedam, E. C., Ld., Dudley

Picks and Shovels
Baker, John, and Son, Bilston, Staffs
Fell, C. A., Dronfield, near Sheffield
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Theedam, E. C., Ld., Dudley

Pinions
Cort, Arthur & Co., 303½, Camberwell-rd., London

Pinions (Raw Hide and Paper)
Bridge, David, & Co. Ld., Castleton, Manchester
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan

Pipe Joint Paste
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Pipes (Steam and Water)
British Mannesmann Tube Co. Ld., London Wall
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Isca Foundry Co., Newport, Mon.
Lewis, Edwin, and Sons, Wolverhampton
Pulsometer Engineering Co. Ld., Reading
Russell, John, & Co. Ld., Alma Tube Wks., Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Nile-st., Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

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Heenan & Froude Ld., Worcester
Henderson and Glass, Liverpool
Lewis, Edwin, and Sons, Wolverhampton
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Spencer, John, Ld., Globe Tube Works, Wednesbury
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton

Pit Props (Wood)
Baird, J. W., and Co., West Hartlepool
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Oebeck and Co., Newcastle-on-Tyne

Pit Prop Withdrawers
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Spencer, Matthias, and Sons, Sheffield

Pit Water Gauges.
John Davis & Son (Derby) Ld., Derby

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Glover, M., and Co., Holbeck-lane, Leeds

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Theedam, E. C., Ld., Dudley

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Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Stewarts & Lloyds Ld., Birmingham & Glasgow
Stringer, John, and Son, Dept. 11, Blackburn

Points and Crossings
Bagnall, W. G., Ld., Stafford
Firth, William, Ld., Leeds
Heenan & Froude Ld., Worcester
Isca Foundry Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Ld., Albion Works, Sheffield

Portable Railways
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington

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Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Mining School, Porth, Glam.

Preservative (for Plant)
Kalbitum Paint Co. Ld., Belvedere Works, Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Publications
Colliery Guardian Co. Ld., 30 & 31, Furnival-st., Holborn, London, E.C.
Griffin, Charles, and Co. Ld., London, W.C.
Southern, T. A., Universal Mining School, Cardiff

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Youngs, Ryland-street Works, Birmingham

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Bever, Dorling and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
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Frost, Albert, and Co., Sheffield
Humble, Stephen, 9, Victoria-st., London, S.W.
Jardine, John, Deering-street, Nottingham
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Spencer and Co. Ld., Melksham, Wilts
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Spencer and Co. Ld., Melksham, Wilts
Thompson and Co., Wigan
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Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Pump Buckets and Straps
Cort, Arthur, and Co., Camberwell, London
Daglish, Robert, and Co. Ld., St. Helens, Lancs.

Pump (Packing)
Greene, Tweed and Co., Westminster
United States Metallic Packing Co. Ld., Soho Works, Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Pumps and Pumping Machinery
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Cameron, John, Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
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Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co. Ld., West Gorton, Manchester
Phillips, C. D., Newport, Mon.
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.
Wood, John, & Sons Ld., Brook Foundry, Wigan

Pumps (Turbine)

British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Tickle Brothers, Vulcan Ironworks, Wigan

Punching Shears

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Youngs, Ryland-street, Birmingham

Rail Benders

Deutsche Maschinenfabrik A.G., Duisburg, Germany
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Thedam, E. C., Ld., Dudley

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Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

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Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
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British Wagon Co. Ld., Rotherham
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Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester
Lancashire and Yorks. Wagon Co. Ld., Heywood
Lincoln Wagon and Engine Co. Ld., Lincoln
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld Midland Works Birmingham
Moy, Thomas, Ld., Railway Works, Peterboro'
Rigley, Wm., Bulwell, Nottingham
Rolling Stock Co., Darlington
Wigan Wagon Co. Ld., Springs Branch, Wigan

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Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
British Wagon Co. Ld., Rotherham
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Railway Plant (Electrical)

British Westinghouse Electric and Manufacturing Co. Ld., Manchester
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Railway Wagon Associations

Association of Private Owners of Railway Rolling Stock, Clarence Chambers, Gloucester
Chorley Railway Wagon Co. Ld., Chorley, Lancs.

Railway Wagon Financiers

Bristol and South Wales Railway Wagon Co. Ld., Bristol
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lincoln Wagon and Engine Co. Ld., Lincoln

Railway Wagon Repairers

Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, near Birmingham
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Heenan & Froude Ld., Worcester
Lancashire and Yorkshire Wagon Co. Ld., Heywood, near Manchester
Lincoln Wagon and Engine Co. Ld., 11, St Mary-street, Lincoln
Moy, Thomas, Ld., Railway Works, Peterboro'
Rigley, Wm., Forest Wagon Works, Bulwell, Nottingham

Railway Wagons (Tipping)

Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester

Rakes (Pit)

Baker, John, and Son, Bilston, Staffs
Hardy Patent Pick Co. Ld., Sheffield

Reducing Gear

Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, and Sons (Huddersfield) Ld., Park Gear Works, Lockwood, Huddersfield

Reducing Valves (Full Bore and Standard)

Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield

Refrigerators

Pulsometer Engineering Co. Ld., Reading

Refuse Destructors

Heenan & Froude Ld., Manchester

Regulating Valves (Full Bore)

Auld, D., and Sons, Whitevale Foundry, Glasgow

Rescue Apparatus

British Oxygen Co. Ld., Elverton-st., Westminster
Davis, E., 3, Aire-street, Leeds
Jacobson, R., 70, Shoe-lane, London, E.C.
Knowles Oxygen Co. Ld., Wolverhampton
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., 187, Westminster bridge-road, S.E.

Respirators

British Oxygen Co. Ld., Elverton-st., Westminster
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
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Rivets

Baker, John, and Son, Bilston, Staffs
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
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Thedam, E. C., Ld., Dudley
Ward, Thos. W., Limited, Albion Works, Sheffield

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Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
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Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Stephens, R., and Son, Carn Brea, Cornwall

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Heenan & Froude Ld., Newton Heath, Manchester
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Norton's (Tividale) Ld., Tipton
Woolton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton

Ropes (Cotton Driving)

Kenyon, Wm., & Sons Ld., Dukinfield
Wright, J. and E., Ld., Birmingham

Ropes (Driving)

Kenyon, W., & Sons Ld., Dukinfield Manchester

Ropes (Hemp and Manilla

Wright, J. and E., Ld., Birmingham

Rope Preservative

Wright, J. and E., Ld., Birmingham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Ropes (Wire)

Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Cooke, William and Co. Ld., Tinsley, Sheffield
Elliot, George, and Co. Ld., 16, Great George-st. Westminster, S.W.
Glover, Wm. Jas., and Co., St. Helens, Lancs.
Haggie Brothers Ld., Gateshead-on-Tyne
Latch and Batchelor Ld., Hay Mills, Birmingham
Thompson and Co., Wigan
Wright, John & Edwin, Ld., Garrison st., B'ham

Ropeways

Bleichert, Adolf, and Co., 99-100, Palmerston House, Bishopsgate-st. Within, 60, E.C.
Tickle Brothers, Vulcan Ironworks, Wigan

Rubber-Covered Rollers

Beddaway, F., & Co. Ld., Pendleton, Manchester

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Auld, D., and Sons, Whitevale Foundry, Glasgow
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Hopkinson, J., and Co. Ld., Huddersfield
Lancaster and Tonge Ld., Pendleton, Manchester

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Hardy Patent Pick Co. Ld., Sheffield
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Heenan and Froude Ld., Worcester
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Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

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Wright, Joseph, and Co., Tipton

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Baker, John, and Son, Bilston, Staffs
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Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Sheffield
Thedam, E. C., Ld., Dudley

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Fell, C. A., Dronfield, near Sheffield

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Bagnall, W. G., Ld., Stafford
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Benton, B. M., and Co., Midland Works, Sheffield

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Wright, Joseph, and Co., Tipton

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Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

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British Wagon Co. Ld., Rotherham
Lancaster and Tonge Ld., Pendleton, Manchester
Skinner, J. P. and Co. Ld., Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

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Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

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Fell, C. A., Dronfield, near Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan

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British Mannesmann Tube Co. Ld., London Wall
Green and Boulding Ld., 28, New Bridge-st., E.C.
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Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staffs.

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Stewarts and Lloyds Ld., Birmingham & Glasgow
Tickle Brothers, Vulcan Ironworks, Wigan
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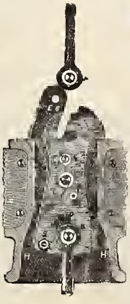

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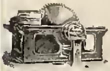

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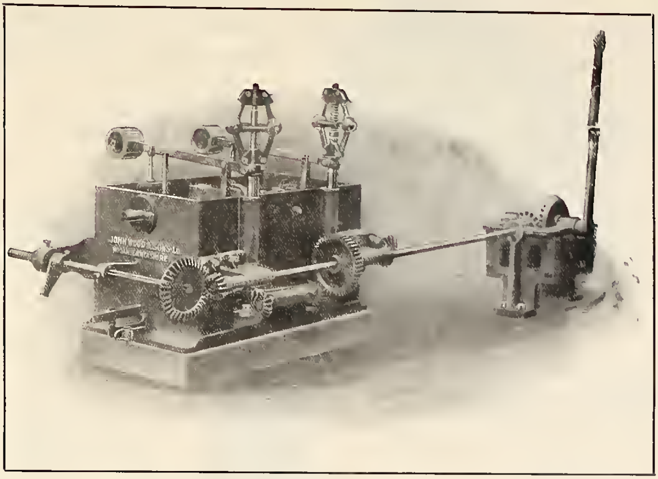

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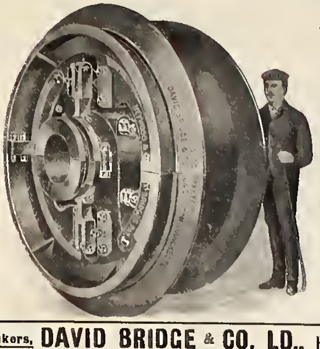

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Town Hall,
Rochdale,
August 9th, 1912.
By order,
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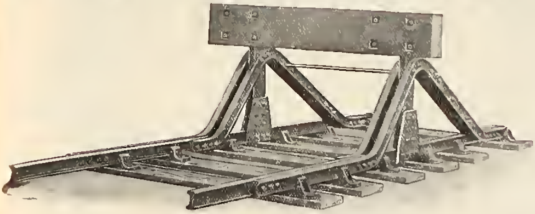

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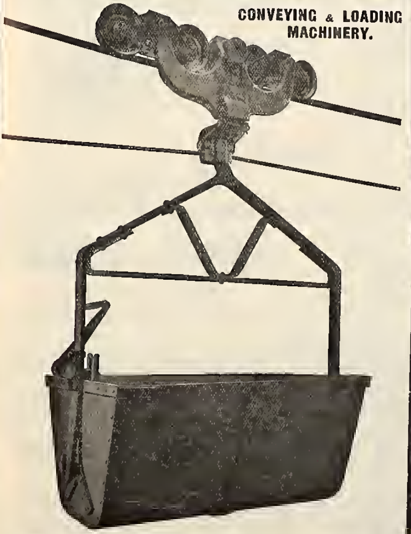

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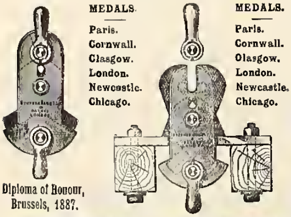

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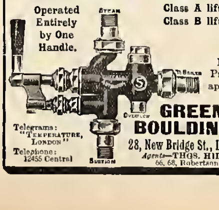

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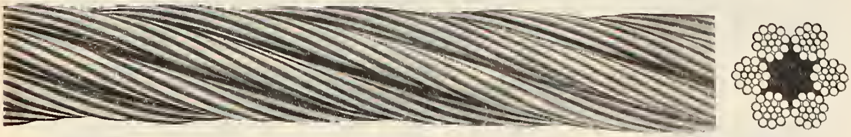

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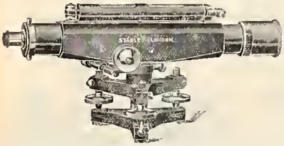

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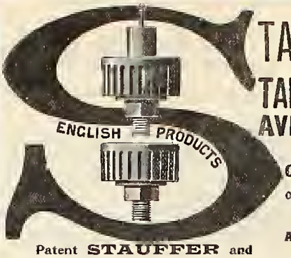

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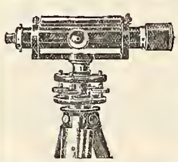

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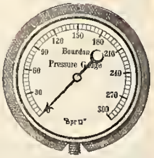

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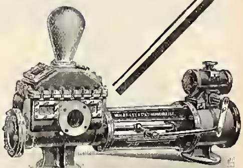

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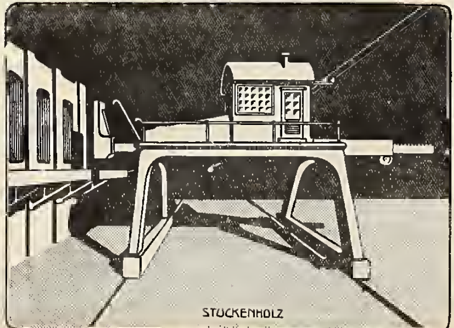

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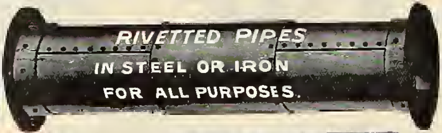

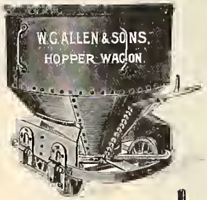

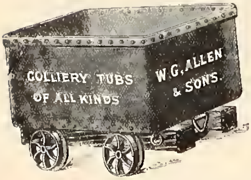

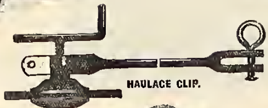

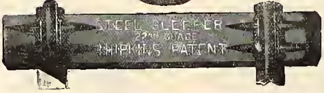

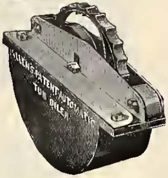

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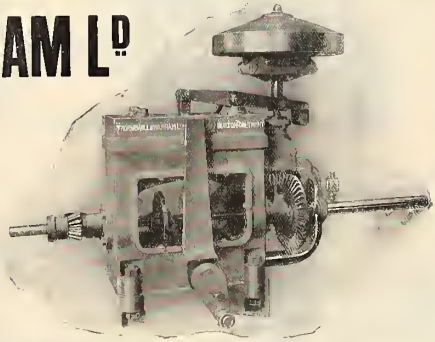

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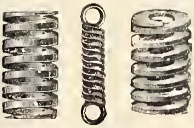

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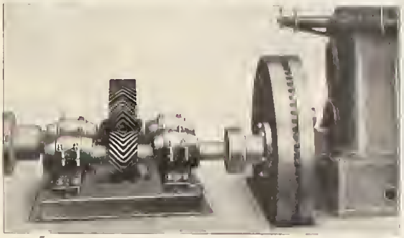

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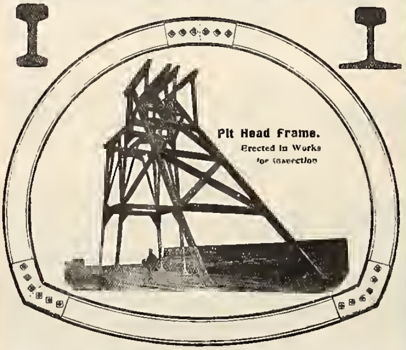
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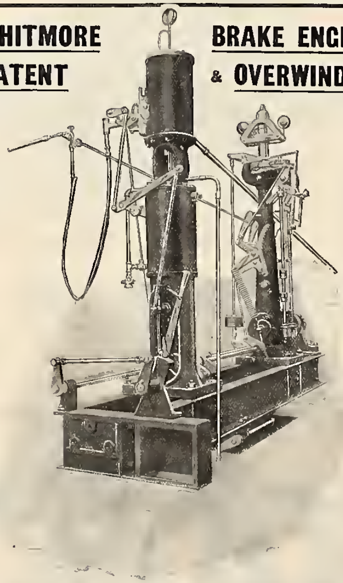

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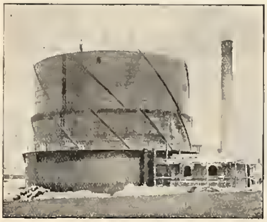

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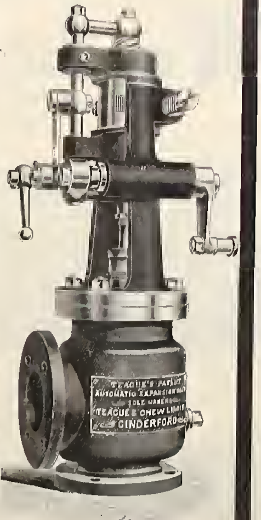

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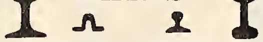

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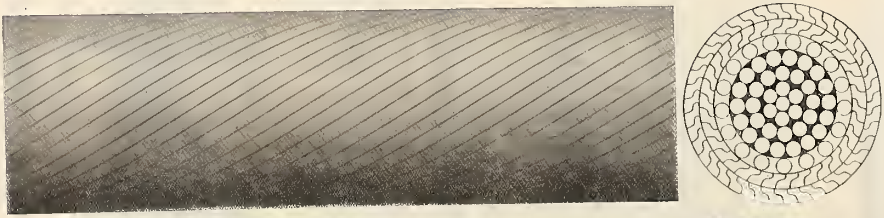

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THE COLLIERY GUARDIAN

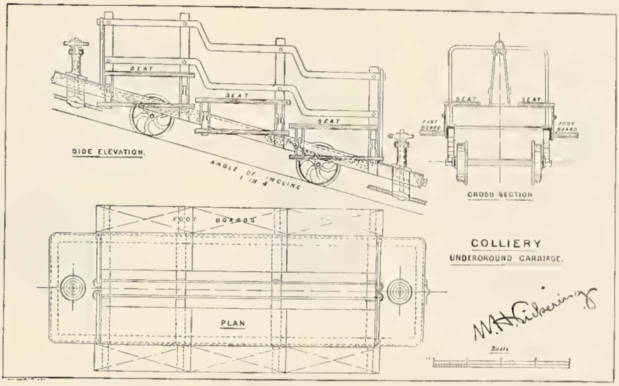
AND JOURNAL OF THE COAL AND IRON TRADES.

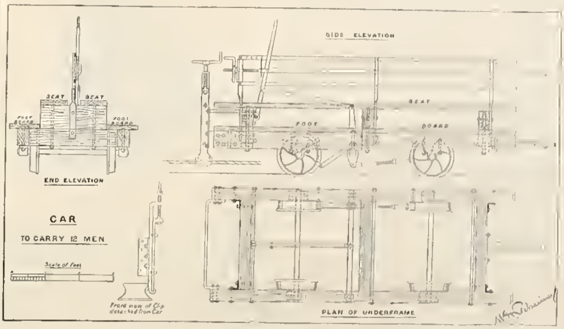
VOL. CIV. FRIDAY, AUGUST 23, 1912 No. 2695.

CONVEYANCE OF WORKMEN UNDERGROUND.

The following is extracted from the late Mr. W. H. Pickering's report on the Yorkshire and North Midland District for 1911 :—

The workings of some of the older collieries are great distances from the shafts. It is not uncommon for a miner to have to travel 1½ miles before he reaches his working place, and there are cases where the distance is over 2 miles. For the double journey, amounting to 3 or 4 miles, an average man may take from 1 to 1½ hours. If the road is rough, steep, or otherwise difficult to travel, he will expend at least as much energy as if he had been working at the face for the same length of time. The energy expended on walking is unproductive. To avoid this loss it has been the custom for generations at many mines, where the main-and-tail rope system of haulage is installed, to ride the men to and from their work in trains of empty tubs. In the Yorkshire and North Midland districts, however, the endless rope system of haulage is almost universal. It is impracticable to use this system for the conveyance of men as well as mineral in most cases. The Eight Hours Act, which limits the time a man may be underground, has made it more important than ever, both to the miner and the manager, that time and energy should not be dissipated on unproductive work. It would probably pay the management of many mines to instal light haulage specially to ride the men to and from their work. The power required would be small, and for the first morning journey, at all events, would only be used when the coal haulage was not running. Considerable capital outlay would be necessary for engines, ropes, rails, and for adapting the existing roads for haulage, or for driving fresh ones. This would be recouped by the conservation of the men's time and energy, and the greater facility for keeping the airways in order which the haulage would give. If such an arrangement were made it would be well for the management, in the interests of safety and comfort, to provide special carriages instead of ordinary pit tubs. By the courtesy of the managers of mines where such carriages are already used, Mr. Pickering has been able to give the accompanying sketches, and the following description of the arrangements at two mines:—





First Mine.

The haulage engine, used solely for the purpose of conveying men, has two cylinders, 18 in. stroke, 12 in. diameter, worked by compressed air, the pressure being between 50 lb. and 60 lb. per square inch. The rope is an endless one, ¾ in. in diameter, but only one set of rails is used. The loaded rope runs between the rails, and the return idle rope is carried along, or suspended from, the side of the road. The engine is reversible. Two tension arrangements are provided, one on each side of the driving pulley, and, in addition, at the in-bye terminus a tightening screw is arranged to take up the permanent slack. The haulage is 7,400 ft. long, with four sharp curves and a number of smaller ones. The maximum speed of the rope is 8 miles per hour, and the average speed, including stoppages, is from 5 to 6 miles per hour. The road dips continuously from the shaft at an average gradient of 1 in 31, the steepest part being 1 in 20. The ordinary three bare wire electric signalling arrangement is in use, with a bell at each terminus. Two persons are in charge of every train, one at each end, and they are each provided with an arrangement by which they can give signals whilst the train is running. Going in-bye, the front man takes charge of the clip, and the back man manipulates the brake on the varying gradients, so that the clip always exercises a slight pull. Going out-bye, the brakes are not necessary and the rear man watches the pulleys to see that the ropes are left right for the next train. Each carriage carries six men a side, sitting back to back. Six carriages are coupled together to form a train, and six trains form a "run." The total accommodation on one run is 132 men, or, making allowance for the size of boys, 150 persons. But for the out-bye journey only three trains are allowed. The ropes run for three-quarters of an hour at the beginning and termination of the shift. Each train starts directly it is full. The rope is stopped to attach and detach the trains, and the signal then given indicates that another train may be clipped on if ready. The trains are attached every six minutes on an average, and take about 15 minutes to do the journey, allowing three stops. There is a clip at each end of the train, but on account of the curves only [one] clip can be used at a time. Each carriage is fitted with a brake acting upon both sets of wheels, and controlled by a vertical lever which can be pegged in any position. All these brakes are connected by a continuous brake rod, by means of which all the brakes can be applied from any carriage in the train. The front end of this connecting rod is passed through a standard, and the screwed end is fitted with a threaded handle which can draw the rod tight and put extra pressure upon the brakes. Rapid movement is obtained by the lever and the final tightening by the screw. The couplings are rigid and strong, but if one broke, the separation of the cars would cause the brake rod to put the brakes firmly upon the detached portion, and so instantly give warning. If the brake rod failed, the detached portion could easily be pulled up by the levers. Owing to the rigid nature of the clips, the pulleys are set with their faces 1½ in. out of the centre of the road at curves towards the inner side to allow the clip to pass without touching. For the same reason the height of the rope has to be nicely adjusted at the curves to the height of the clip jaws. (*Note.*—One fatal accident happened on September 14, 1906, in connection with these cars.)

Second Mine.

The coal worked at this colliery out-crops with a steep gradient. The workings are reached by straight inclines driven to the full dip. One incline is a return and is fitted with haulage for conveying the men to and from their work. The average gradient of the road is a little over one in four, the maximum being one in three. The length of the portion used for riding is 3,000 ft. It is divided into two stages, with a space of 25 yards between. A single set of rails and an endless rope of ¾ in. diameter is used. In order to balance the rope it is crossed at the half-way point. Thus the rope which was loaded in the top section becomes idle in the lower section and *vice versâ*. Two trains are in use, one on each part of the rope, and thus they always travel in opposite directions. One starts from the top as the other starts from the bottom and they finish within 30 yards of each other in the centre. Time is allowed for the men to change cars, the motor is reversed and the journey continued. The 75-horse power driving motor at the top of the incline is reversible. It is provided with an indicator to show the position of the train. The rope drum is fitted with a footbrake of the band type, embracing two-thirds of the circumference, and a clutch to enable a steady start to be made. Tension is applied to the rope at the lower end by means of a small dead weight which acts upon the return wheel mounted upon a bogey. The riding carriages are mounted on springs and are constructed of iron and steel, with wooden seats and footboards. Twelve men ride in each carriage, six on each side. Six carriages make a train, and thus 72 men can ride at a time. A similar number of men may also ride in the opposite direction at the same time. A man is in charge of each train. He fixes a drag for the upward journey. Electric signals are used, the bells being at the centre and at the ends of the haulage. The speed of the haulage is about 4 miles an hour, and it effects a considerable saving of time and exertion on the steep gradient. No accident has occurred in connection with this system.

A new company has commenced operations at a drift, near Dearham Bridge Station, about two miles north of Maryport. The seam of coal to be worked is only about 30 yards in-bye and is from 1½ to 2 ft. in thickness. It was formerly worked by the Dearham Brick and Tile Company, before they ceased operations, and the coal was of good quality.

Manchester Coal Exchange.—The issue of the Directory for 1912, just to hand, shows that it fills a useful place in this important industry. There is a satisfactory increase to record in membership, and the advantages of the Exchange are lucidly set forth. There is a brief record of events from the opening in 1879, when there was a membership of 228 as compared with about 1,100 at the present time. Since 1879 important additions have been made, including reading and newsrooms and offices, and on the ground floor a café and restaurant, which is being well patronised by members. The most important event last year was the presentation to Mr. F. W. Hughes, who had served as president for three consecutive years, by the members, to mark their appreciation of his valuable and unremitting services, this consisting of a case of cutlery and a cigar case. A rather mournful note is struck by the appearance of the portrait of Mr. Peter Wood, who after rendering excellent service as president in 1911, died May 26, 1912. He was agent for many years for Lord Vernon's collieries at Poynton, and was highly respected by the members for his genial and kindly disposition. A feature which has not taken perhaps such hold of the trade as could have been desired is the Manchester district branch of the Coal Trade Benevolent Association, of which Mr. Miles F. Burrows is president, and Mr. R. F. Mallalieu, Coal Exchange, secretary. It is satisfactory to note that there were no claims in the Lancashire area, but during 1911 the sum of £2,129 was granted by the association for the relief of those connected with the coal trade who were unfortunately in need of help. The directory is illustrated by photographs, amongst others of Mr. Thomas Thrutchly, president, 1912; Mr. Ralph Peters, past president and treasurer since the formation of the Exchange in 1879; and Mr. F. W. Hughes, president, 1908-10. There are also some excellent views of the café and restaurant.

THE "FORS" MINER'S ELECTRIC LAMP.

The miner's electric lamp shown in the illustration (fig. 1) is one of those awarded £50 by the Home Office judges in the recent competition. This lamp, which is the invention of Mr. Henry F. Joel, A.M.I.C.E., of 134b, Kingsland-road, N.E., is of a simple and strong construction, the battery case being made of a hard aluminium alloy. The lantern is hinged to this case, and forms the cover on top of the battery; the cage of the lantern is furnished with steel pillars and glass cylinders ¼ in. thickness, such as is used in ordinary miners' safety lamps. A single-cell "Fors" patent accumulator, giving 2 volts 0·9 ampères and 10 ampère hours, supplies the electric energy, and is put in or taken out in a few seconds. A projection on the side of the cell and a corresponding slot in the top of the battery case, enables this to be done, so that the cell registers in its correct position for making the electrical contacts. There are no wire connections to undo, both the lamp and the switch contacts being made with specially designed patent taper pin and spring clip sockets, and the pins readily find their position in the socket and are self-cleaning, whilst the sockets are detachable. The provision of self-cleaning contacts is of special importance in portable electric lamps, and overcomes one of the great objections present in many lamps.

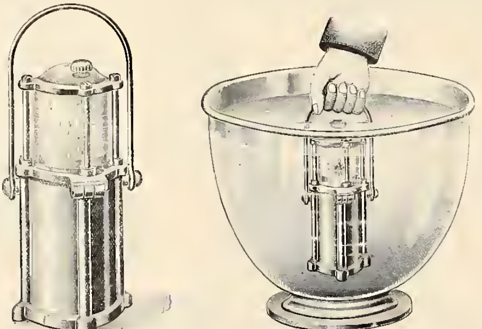


Fig. 1.—"Fors" Miner's Electric Lamp (Type 403M).

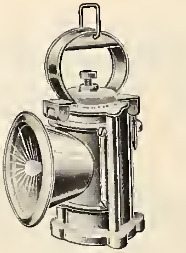


Fig. 2.—"Fors" Electric Lamp. (Type 403H).

In the "Fors" accumulator the positive electrode is cylindrical in shape, and the negative electrode concentric surrounding the positive, with a calcined asbestos porous pot separator between; the electrodes cannot possibly buckle or short-circuit, and, as there is no local action, they do not sulphate. An important feature of this battery is that it retains its charge almost indefinitely when not in use, and as the cells are all made to a standard size, a fully charged cell can be quickly put into the lamp to replace a used-up cell.

The "Fors" lamp weighs 3 lb. 8 oz., the same weight as an ordinary miners' oil safety lamp, the light is 2-candle power effective reflected light for 10 hours, and as there is no smoke or heat the glass keeps clean, giving the full light the whole time. The lamp has a metallic filament, and is also standardised and durable. The light can be turned on or off by the milled head button switch shown on the top of the lantern. All contacts are made inside the lamp case, and are hermetically sealed from the outer air, so there is no possibility of communicating the spark on making the contacts, and the lamp is safe in the most fiery mine or explosive atmosphere.

The cells are all fitted with a patent unspillable vent plug, and the lamp can be turned upside down without spilling the solution; this enables the terminals and contacts to be kept quite clean.

A special feature of the spring clip sockets and taper pin contacts is that a number of cells can be quickly connected up for re-charging by simply inserting contact pins into the sockets of the cells placed in a row in position under them; this saves much time and trouble.

The "Fors" portable electric hand lamp, type 403H shown in fig. 2, was also sent in by Mr. Joel for the competition. It is a very handy lamp for inspectors, and gives 2-candle power effective reflected light for 10 hours, and weighs about 3½ lb. The "Fors" battery used in this lamp is the same as used in the other lamp.

Mr. Joel has recently carried out some material improvements in the lamp entered for the Rotherham competition, and we have had the opportunity of inspecting a lamp in which they are embodied. In the new lamp the hinges connecting the lantern to the battery case are replaced by a form of bayonet and slot joint, which has the advantage that rotation of the members, after the removal of the plug seal, automatically disconnects the circuit and extinguishes the lamp. Means have also been provided for removing the glass chimney and bulb for the purposes of cleaning or examination more rapidly than in the type shown, without the necessity of removing nuts, as in the earlier lamp, whilst in several other particulars the construction of the lamp has been improved.

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, August 13, 1912, is as follows:—Ahus, 988 tons; Antwerp, 105; Alexandria, 15,294; Abo, 1,034; Amsterdam, 1,025; Bremen, 3,745; Burgstaaken, 1,225; Cronstadt, 12,705; Copenhagen, 204; Drontheim, 53; Dantzig, 602; Guernsey, 235; Gothenburg, 978; Genoa, 4,829; Ghent, 1,188; Harlingen, 1,159; Harburg, 3,780; Husum, 445; Kotka, 595; Kallundborg, 1,324; Kiel, 1,501; Konigsberg, 1,735; Larvik, 855; Leghorn, 124; Marseilles, 1,115; Naples, 155; Oxelosund, 3,641; Pernau, 1,873; Port Said, 4,611; Ras, 267; Reval, 2,754; Rejkjavik, 928; Rystad, 1,434; Rotterdam, 1,637; Riga, 5,931; Rouen, 1,681; Sodertelje, 1,390; St. Petersburg, 509; Stettin, 385; St. Brieux, 534; Werkeback, 1,025; Wyk, 104—total, 94,095 tons; corresponding period, August 1911, total 103,487 tons.

Grimsby Coal Exports.—The following is the official return of the quantities of coal exported from Grimsby during the week ended August 18, 1912:—To foreign destinations: Bremen, 215; Oxelosund, 2,160; Gothenborg, 1,089; Dieppe, 1,380; Esbjerg, 713; Paimpol, 174; Uddevada, 729; Arendall, 453; Hamburg, 873; Antwerp, 715; Havre, 543; Helsingborg, 4,151; Ronne, 1,018; Skive, 627; Stavanger, 545; Drobak, 452; Stugsund, 450; Malmo, 4,041; Rotterdam, 412; Cronstadt, 1,455; Gefle, 8,711; Riga, 1,689; Sodertelje-Uthamh, 1,303; and Marbylanga, 950 tons; total, 32,758 tons. To coastwise destinations: London, 97 tons. The official return of the coal exports from Immingham during the past week is as follows: Cronstadt, 13,233; Dalsbruk, 937; Gefle, 1,154; Kiel, 1,519; Oxelosund, 1,727; Pernau, 7,863; Stockholm, 1,025; Trondhjem, 2,368; and Wismar, 3,104 tons; total, 32,930 tons.

DETERIORATION AND SPONTANEOUS HEATING OF COAL IN STORAGE.*

By HORACE C. PORTER and F. K. OVITZ.

Various departments and establishments of the United States Government, particularly the Navy and the Panama Railroad Company, are heavy consumers of coal and are compelled to store large quantities under climatic conditions likely to cause deterioration. Spontaneous heating frequently occurs in heaps or bins, and the resulting fires not only waste coal but may endanger life. Hence the Government has a direct interest in any investigations concerning the deterioration of coal in storage, and the investigation by the Bureau of Mines was undertaken primarily in order to increase economy, efficiency, and safety in the use of coal by the Government.

Owing to the large number of requests that are being received by the Bureau of Mines for exact information on the deterioration and spontaneous heating of coal, this preliminary paper is published as a brief summary of the results thus far obtained in the Bureau's investigation. A complete account is being prepared for publication as a bulletin of this Bureau. The information was obtained through a letter of enquiry sent by the Bureau in January 1911 to over 2,000 of the largest coal consumers in the United States.

Deterioration of Coal: Variety of Opinions.

Not many years ago coal was commonly regarded as an extremely unstable material, subject to serious alteration and losses on exposure to the elements, but probably the great majority of chemists and engineers to-day hold no such exaggerated ideas on the deterioration of coal in storage. There is, however, a well-defined suspicion in the minds of many that the loss of volatile matter by coal and the deterioration by oxidation are large enough to be of industrial importance, and the object of the investigations described in this paper was to determine accurately the extent of the deterioration in different types of coal.

A study was made in the laboratory of the loss of volatile matter from crushed coal during storage. The coal tested was in 20 lb. samples which represented a variety of types from widely separated fields. Each sample had been broken to about ½ in. size in the mine and as quickly as possible placed in a large glass bottle for shipment to the laboratory. At the laboratory the accumulated gas was withdrawn and the volatile products were permitted to escape freely and continuously at atmospheric pressure and temperature. The results of these experiments have been published in a technical paper of the Bureau of Mines.† Suffice it to say that although several coals evolve methane in large volumes—especially in the early period after mining—the coals tested lost in one year from this cause, only 0·16 per cent. at most of their calorific value. It seems, therefore, that the loss caused by escape of volatile matter from coal has been greatly over-estimated.

At the instance of the Navy Department, which purchases 2 or 3 million dollars' worth of coal annually, and stores large quantities in warm climates for long periods of time, more elaborate tests were undertaken to determine the total loss possible in high-grade coal by weathering. The extent of the saving to be accomplished by water submergence as compared with open-air storage was to be settled, as was also the question whether salt water possessed any peculiar advantage or disadvantage over fresh water for this purpose.

In brief outline, the tests by the Bureau were carried out as follows:—Four kinds of coal were chosen—New River, W. Va., on account of its large use by the Navy; Pocahontas, Va., from its wide use as a steaming and coking coal in the Eastern States, and from its being the principal fuel used in the Panama Canal work; Pittsburg coal, as a rich coking and gas coal; and Sheridan, Wyo., sub-bituminous coal or "black lignite," as a type much used in the West. In the tests with the New River coal, 50 lb. portions were made up out of one large lot, which had been crushed to ¼ in. size and well mixed, and these portions, confined in perforated wooden boxes, were submerged under sea water at three navy yards that differed widely from one another in climatic conditions. Portions of 300 lb. each from the same original lot were exposed to the open air, both outdoors and indoors, at the same navy yards.

Test of the Pocahontas coal was made at only one point, the Isthmus of Panama, where run-of-mine coal was placed in a 120-ton pile exposed to the weather. Pittsburg coal was stored as run-of-mine at Ann Arbor, Mich., both in open 5 ton bins outdoors and in 300 lb. barrels submerged in fresh water. The Wyoming sub-bituminous coal was stored at Sheridan, Wyo., both as run-of-mine and slack, in outdoor bins that held 3 to 6 tons each. Duplicate samples were taken at each sampling, and the sampling of every lot, except the outdoor pile at Panama and the 300 lb. open-air piles at the navy yards, was done by rehandling all the coal. In the excepted cases it was not thought fair to disturb the entire lot. Therefore at Panama a vertical section of the pile, weighing 10 tons, was removed each time; eight gross samples were taken from this 10-ton portion and each of the samples was quartered down. From the outdoor piles at the navy yards a number of small portions were taken from well-distributed points in each pile, mixed and quartered down. Small lots and a fine state of division were purposely adopted with the New River coal, so as to make the tests of maximum severity.

A fact the authors wish to emphasise is that no test was made for any physical deterioration of the coal, such as an increase of friability or a slacking of lumps. Consequently the results do not show how the relative availability of heat units may have been affected by physical changes; but they do show how much the calorific value, as determined in the laboratory, was affected by the storage of the coal under the several conditions.

Table I. gives a condensed summary compiled from results of a large number of tests and determinations. The moisture, ash and sulphur contents and the calorific value of each sample were determined. A Mahler bomb calorimeter and a carefully calibrated Beckmann thermometer were used in the calorimetric work, and except for the Sheridan (Wyo.) tests, all this work was done by the same man (one of the authors) and with the same calorimeter. To eliminate the effect of incidental impurities that were not concerned in the deterioration of the actual coal substance, the calorific values are calculated to a moisture, ash and sulphur free basis, and the ash as determined is corrected for errors due to oxidation of pyrites and dehydration of shale or clay.

TABLE I.—CALORIFIC VALUE (IN GRAMME CALORIES) OF THE COAL SUBSTANCE (MOISTURE, ASH, AND SULPHUR FREE COAL) BEFORE AND AFTER STORAGE.

Kind of coal.	Storage conditions.	Place.	Calorific value.				
			As stored.	After 3 months.	After 1 year	After 2 years.	Percentage of loss in 2 years.
New River, W. Va.[a]	¼ in. coal, under sea water.	Portsmouth, N. H.	8,761	—	8,759	8,730	[b]0·39
		Norfolk, Va.	8,754	—	8,763	8,737	[b]0·40
		Key West, Fla. ...	8,747	—	8,732	8,770	—
	¼ in. coal, under fresh water.	Pittsburg, Pa. ...	8,752	8,762	8,749	8,760	—
	¼ in. coal, exposed to air indoors.	Portsmouth, N. H.	8,779	8,738	8,742	8,709	0·80
		Norfolk, Va.	8,751	8,742	8,730	8,717	0·39
		Key West, Fla ...	8,754	8,728	8,676	—	—
		Pittsburg, Pa. ...	8,769	8,736	8,710	8,720	0·56
	R. o. m. coal, exposed to air indoors.	Portsmouth, N. H.	8,754	8,758	8,748	8,734	0·23
		Norfolk, Va.	8,743	8,764	8,725	8,725	0·21
		Key West, Fla. ...	8,745	8,733	8,710	—	—
		Pittsburg, Pa. ...	8,753	8,758	8,740	8,743	0·11
	¼ in. coal, exposed to air outdoors, uncovered.	Portsmouth, N. H.	8,741	8,730	8,701	8,674	0·77
		Norfolk, Va.	8,726	8,709	8,636	8,625	1·16
		Key West, Fla. ..	8,739	8,721	8,680	8,592	1·85
		Pittsburg, Pa. ...	8,763	8,726	8,700	8,665	1·12
	R. o. m. coal, exposed to air outdoors, uncovered.	Portsmouth, N. H.	8,775	8,766	8,760	8,722	0·60
		Norfolk, Va	8,743	8,745	8,720	8,695	0·55
		Key West, Fla. ...	8,752	8,708	8,722	8,632	1·29
		Pittsburg, Pa. ...	8,752	8,740	8,716	8,696	0·64
Pocahontas, Va.	120-ton pile, r. o. m. coal, outdoors.	Panama	8,794	8,787	8,762	—	—
Pittsburg bed	4 tons r. o. m. coal in open bin, outdoors.	Ann Arbor, Mich.	8,541	[c]8,539	8,526		—
			8,541	[d]8,553	8,528		—
Sheridan, Wyo., sub-bituminous[a]	R. o. m., open bin 5 ft. deep.	Sheridan, Wyo. ...	7,370	7,174	—	7,135	[f]3·19
	R. o. m. closed bin 5 ft. deep.	Do. ..	7,370	7,202	—	7,094	[f]3·75
	R. o. m., closed bin 15 ft. deep.	Do. ...	7,370	7,303		6,982	[f]5·26
	Slack, closed bin 15 ft. deep.	Do. ...	7,355	7,166		6,990	[f]4·98

[a] Heating value of representative mine sample of coal (ash, moisture, and sulphur free), 8,768 calories. [b] On basis of original heating value of same test portion. [c] After six months' storage, entire lot in bin. [d] After six months' storage, upper 6 in. at surface of bin. [e] Each bin contained 5 to 10 tons. [f] After two years and three-quarters.

The results show in the case of the New River coal a loss of less than 1 per cent. of calorific value in one year by weathering in the open. In two years the greatest loss was at Key West, 1·85 per cent. There was practically no loss at all in the submerged samples in one year, fresh or salt water serving equally well to "preserve the virtues" of the coal. There was almost no slacking of lumps in the run-of-mine samples. In all tests the crushed coal deteriorated more rapidly than the run-of-mine. The Pocahontas run-of-mine coal in a 120-ton pile on the Isthmus of Panama lost during one year's outdoor weathering less than 0·4 per cent. of its heating value, and showed little slacking of lumps. Gas coal during one year's outdoor exposure suffered practically no loss of calorific value, measurable by the calorimetric method used, not even in the coal forming the top 6 in. layer in the bins. The Wyoming coal in one of the bins deteriorated in heat value 5·3 per cent. during storage for two and three-quarters years, and more than 2·5 per cent. in the first three months. There was bad slacking and crumbling of the lumps on the surface of the piles, but even where this surface was fully exposed to the weather the slacking did not penetrate more than 12 to 18 inches in the two and three-quarter-year period.

No outdoor weathering tests of coal of the Illinois type have been made by the Bureau of Mines, but tests of such coal have been reported by Prof. S. W. Parr, of the University of Illinois,* and by A. Bement, of Chicago,† both of whom find a calorific loss of 1 to 3 per cent. in a year by weathering. Bement reports a slacking of lumps of over 80 per cent. in one test, and of about 12 per cent. in another test of small samples. It is possible that with the Illinois as with the Wyoming coal, the slacking in a large pile would not penetrate far from the surface.

Storage under water unquestionably preserves the heating value and the physical strength of coal. But such storage practically makes necessary the firing of wet coal, and consequently the evaporation in the furnace of added moisture varying in amount from 1 to 15 per cent. according to the kind of coal. This factor is an important drawback to the underwater storage of coals, like the Illinois and Wyoming types, which mechanically retain 5 to 15 per cent. of water after draining. In the case of high-grade eastern coals, however, if firemen are permitted, as is ordinarily the case, to wet down their coal before firing, in order, as some say, "to make a hotter fire," the addition during storage of the 2 or 3 per cent. of moisture which these coals retain becomes of little consequence. Submerged storage is an absolute preventive of spontaneous combustion, and on that account alone it may be justified when the coal is particularly dangerous to store, and when large quantities are to be stored; but unless the storage period is to be longer than one year, there seems to be no ground for storing any coal under water merely for the sake of the saving in calorific value to be obtained by the avoidance of weathering.

Spontaneous Combustion.

Losses of value from spontaneous heating are a much more serious matter than the deterioration of coal at ordinary temperatures. Spontaneous combustion is brought about by slow oxidation in an air supply sufficient to support oxidation, but insufficient to carry away all the heat formed. The area of surface exposed to oxidation by a given mass of any one coal determines largely the amount of oxidation that takes place in the mass; it depends on the size of the particles, and increases rapidly as the fineness approaches that of dust. Dust is therefore dangerous, particularly if it is mixed with lump coal of such a size that the interstices permit the flow of a moderate amount of air to the interior. Coals differ widely in friability—that is, in the proportion of dust that is produced under like conditions. Ideal conditions for such heating are offered by a mixture of lump and fine coal, such as run-of-mine with a large percentage of dust, piled so that a small supply of air is admitted to the interior of the pile.

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* From United States Bureau of Mines *Technical Paper* 16.

† "The Escape of Gas from Coal." H. C. Porter and F. K. Ovitz. *Technical Paper* 2, Bureau of Mines, 1911.

* *Bulletin* 38, Univ. of Ill., Eng. Expt. Sta., 1909.

† *Chemical Engineer*, vol. 12, July 1910, p. 9.

High volatile matter does not of itself increase the liability of coal to spontaneous heating. A letter of enquiry sent by the Bureau to more than 2,000 large coal consumers in the United States brought 1,200 replies. Of the replies, 260 reported instances of spontaneous combustion, and 220 of the 260 gave the name of the coal. The 220 instances were distributed as follows:—Ninety-five were in semi-bituminous low volatile coals of the Appalachian region, 70 in higher volatile coals of the same region, and 55 in western and middle western coals. This result shows at least no falling behind of the "smokeless" type of coal in furnishing instances of spontaneous combustion, and no cause for placing especial confidence in this type of coal for safety in storage.

Strange as it may seem, the oxygen content of coal appears to bear a direct relation to the avidity with which coal absorbs oxygen; high oxygen coals absorb oxygen readily, and therefore have a marked tendency to spontaneous combustion.

The effect of moisture and the effect of sulphur on the spontaneous heating of coal are questions on which there has been a great deal of discussion and much difference of opinion. Very little experimental evidence has been brought to bear on either of the questions, and certainly neither is as yet settled. Richters has shown* that in the laboratory dry coal oxidises more rapidly than moist; but the weight of opinion among practical users of coal is that moisture promotes spontaneous heating. In not one of the many cases of spontaneous combustion observed by the authors, as representatives of the Bureau of Mines, could it be proved that moisture had been a factor. Still, the physical effects of moisture on fine coal, such as closer packing together of dust or small pieces, may in many cases aid spontaneous heating.

Sulphur has been shown by the Bureau's investigations to have only a minor effect in most instances. On a number of occasions samples of coal from the places in a pile or bin where the heat was greatest have been analysed, both for the total sulphur and for that in the sulphate or oxidised form. The difference between the two determinations—or, in other words, the unoxidised sulphur—was in no case less than 75 per cent. of the average total sulphur in the coal which had not been heated. In other words, not more than one-fourth of the total sulphur had entered into the heat-producing reaction. The possibility remains, of course, that the sulphur-bearing material that oxidised was concentrated in a pocket, possibly as moist, finely divided pyrites, and by its concentration and perhaps by its comparatively rapid oxidation sufficient heat was developed in that spot to act as an igniter. Such an explanation, however, is not plausible when judged by the many analyses of coal subjected to spontaneous heating. For example, a Boston company that uses a Nova Scotia coal containing 3 to 4 per cent. sulphur has much trouble with spontaneous fires in storage piles. Analyses of a number of samples taken by representatives of the Bureau of Mines from exposed piles in which heating had occurred showed that 90 per cent. of the sulphur was still unoxidised.

In certain laboratory experiments, in which air was passed over samples of coal heated to 120 degs. Cent., enough heat developed to bring the coal almost to the ignition point; the coal was then allowed to cool. Subsequent analysis showed practically no increase in the sulphate or oxidised form of sulphur and practically no reduction of the total sulphur in the coal. Though the results of these experiments are not entirely conclusive, they indicate that sulphur content contributes very little to the spontaneous heating of coal.

Freshly mined coal and the fresh surfaces exposed by crushing lumps exhibit a remarkable avidity for oxygen, but after a time the surfaces become coated with oxidised material, "seasoned," as it were, so that the action of the air becomes much less vigorous. In practice, coal that has been stored for six weeks or two months and has even become already somewhat heated, if rehandled and thoroughly cooled by the air, seldom heats spontaneously again.

Suggestions on Storing Coal.

With full appreciation of the fact that any or all of the following suggested precautions may prove impracticable or unreasonably expensive under certain conditions, they are offered as advisable for safety in storing bituminous coal.

1. Do not pile over 12 ft. deep, nor so that any point in the interior of a pile will be over 10 ft. from an air-cooled surface.

2. If possible, store only screened lump coal.

3. Keep out dust as much as possible; to this end reduce handling to a minimum.

4. Pile so that lump and fine are distributed as evenly as possible, not, as is often done, allowing lumps to roll down from the peak and form air passages at the bottom of the pile.

5. Rehandle and screen after two months, if practicable.

6. Do not store near external sources of heat, even though the heat transmitted be moderate.

7. Allow six weeks' seasoning after mining and before storing.

8. Avoid alternate wetting and drying.

9. Avoid admission of air to interior of pile through interstices around foreign objects, such as timbers or irregular brickwork or through porous bottoms, such as coarse cinders.

10. Do not try to ventilate by pipes, or more harm may often be done than good.

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[*] *Zeitsch. Verein deutsch Ingen.*, vol. 51, 1907, p. 755.

BOARD OF MINING EXAMINATIONS.

Arrangements for Forthcoming Examinations.

The Board for Mining Examinations gives notice that the following arrangements for the examinations for certificates of competency as manager and under-manager of coalmines, and for certificates of qualification as mining surveyor have been approved by the Secretary of State. Two examinations will be held in each year, commencing on Tuesday in the last complete week of May and in the last complete week of November respectively. Each examination will be held simultaneously at the following centres:—

District.	Centre of examination.
1. Scotland	Edinburgh.
2. Northumberland, Durham, Yorkshire (N. Riding), Cumberland and Westmorland	Newcastle.
3. York and North Midland	Sheffield.
4. Lancashire, North Wales, Cheshire, and Ireland	Wigan.
5. South Wales and Monmouth	Cardiff.
6. Midland and Southern	Birmingham.

The first examination will take place next November.

Candidates will be expected to sit for examination at the centre in the district in which they have chiefly gained their practical experience.

Copies of the rules which have been made by the Board for the conduct of the examinations and the qualifications of the candidates are being placed on sale and may be purchased either directly, or through any bookseller, from Wyman and Sons Limited, Fetter-lane, E.C., or Oliver and Boyd, Tweeddale-court, Edinburgh, or E. Ponsonby Limited, 116, Grafton-street, Dublin.

The Board desire it to be made specially known that every candidate, whether for a first or second-class certificate, will be required to possess a first aid certificate of the St. John Ambulance Association, or the St. Andrew's Ambulance Association, or other society or body approved by the Secretary of State, and a fireman's certificate under section 15 (1) (*b*) of the Coal Mines Act, 1911.

Candidates will be examined in the following subjects:

(*a*) For First-class Certificates.

1. *Winning and Working.*—Systems of laying out and working, under varying circumstances, of coal and other stratified deposits included under the Coal Mines Act. The geology of these deposits. Methods of supporting roof and sides. Boring and sinking. Blasting and general knowledge of explosives.

2. *Theory and Practice of Ventilation.* — The properties, identification and practical estimation of gases met with in mines. Sources and effects of heat in mines. Natural ventilation, fans and other ventilators. The distribution and control of the air underground. Construction, use and testing of safety lamps.

3. *Explosions in Mines, Underground Fires and Inundations, their Causes and Prevention.*—Coaldust. Spontaneous heating. Rescue operations, apparatus and organisation. Recovery of mines after explosions, fires and inundations.

4. *Machinery.* — Winding, hauling, pumping, mechanical coal-cutting and conveyors, &c. Methods of transmission of power. Strength of materials.

5. *Surveying, Levelling and Drawing.*—Determination of magnetic declination. Loose and fast needle dialling. Calculation of areas and volumes. Contour lines and levelling. Traversing with the theodolite underground and on the surface. Connecting of surface and underground surveys. Triangulation. Mine plans and sections. The use, care and testing of instruments.

Each candidate must produce a plan of a mine survey and levelling made and drawn by himself with the original notes from which the plottings have been made, and these must be certified by the manager of the mine to have been the work of the candidate.

6. *General Management and Mining Legislation.*—Organisation and surface arrangements under varying circumstances. Mines Acts. General and special regulations or orders and other legislation applicable to mines under the Coal Mines Act.

(*b*) For Second-class Certificates.

The questions set in each of the under-mentioned subjects for second-class certificates shall be of a nature suitable for practical working miners.

1. Systems of laying out and working, under varying circumstances, of coal and other stratified deposits included under the Coal Mines Act. Methods of supporting roof and sides. Boring against old workings. Shot-firing.

2. Ventilation, the properties, identification and practical estimation of gases met with in mines. Natural ventilation, fans and other ventilators. The distribution and control of the air underground. Construction, use and testing of safety lamps.

3. Explosions in mines, underground fires and inundations, their causes and prevention. Coaldust. Spontaneous heating. Rescue operations, apparatus and organisation.

4. Machinery and plant in common use in a colliery, including the use of electricity, and with special reference to safety.

5. Arithmetic (simple rules). Elementary surveying and levelling.

6. Mines Act. General and special regulations and orders. Writing of reports.

Candidates for first and second-class certificates will, in the *viva-voce* examination, be required to display a detailed knowledge of practical methods of mining in the division in which they are being examined.

(*c*) Candidates for Certificates of Qualification as Mining Surveyors

will be examined in the subjects enumerated under heading 5 for the examination for first-class certificates.

Printed instructions giving full particulars of the requirements and form of application for authority to attend the November examination and the other necessary forms will be ready for issue on September 1, and may be obtained from the secretary to the Board for Mining Examinations, Home Office, Whitehall, London, S.W.

OBITUARY.

We regret to announce the death at Rhos-on-Sea, on the 15th inst., of Mr. Thomas Mitchelhill, mineral traffic manager of the London and North-Western Railway. Mr. Mitchelhill, who was born at Newcastleton, Roxburghshire, on January 19, 1857, was in his fifty-sixth year. He entered the service of the London and North-Western Railway on July 17, 1871, serving for several years in the mineral department, at Euston, under Mr. W. Fewkes. He was appointed district goods manager at Wolverhampton in 1887 (February 1), and occupied this important position until January 1909, when he was recalled to headquarters to take up the onerous duties and responsibilities connected with the administration and direction of the mineral (coal, &c.) traffic of the London and North-Western system.

The death has occurred of Mr. James Meakin, of Westwood Manor, the lord of the manor of Cheddleton, Staffordshire, and the largest landowner in the district. Deceased, who was born in 1863, took a great interest in the development of the Shaffalong Colliery, pits being sunk on part of his estate.

News was received in Gloucester on Friday of the death in New Zealand, recently, following an attack of influenza, of Mr. John W. Howard, formerly general manager of the Gloucester Railway Carriage and Wagon Company. Mr. Howard, who was 56 years of age, in 1911 retired owing to continued ill-health.

The death was announced recently of Major Robinson, Foulsyke, Crummock Walter, who died at his residence aged 63 years. Major Robinson was Joseph Henry, only son of the late Joseph Henry Robinson, of Lowther-street, Whitehaven. His father resided in the house last occupied by the late Mr. H. M. James; and in his earlier years in the employment of the Brocklebanks, when shipbuilding was going on at Whitehaven, Mr. J. H. Robinson, senr., was latterly actively engaged in the management of the Eskett Mining Company, Lowther-street. Mr. Joseph Henry Robinson, junr., used to be in the Eskett Company's office with his father. About the year 1874 or 1875 he became a member of the Whitehaven Town and Harbour Trust, on which he did about twelve years of useful work.

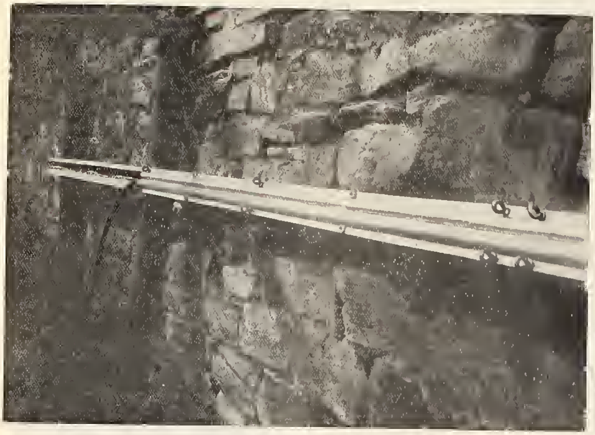
THE ARMEARTH SYSTEM OF CABLE PROTECTION.

We have had an opportunity of inspecting a new system of cable protection, which has been introduced by Messrs. the General Electric Company Limited to comply with the conditions laid down in Rule 12 of the new Home Office Rules, "Armearth," an application of which is shown in the accompanying photograph, is a steel conduit specially adapted for use with existing unarmoured cables to bring them into line with the new requirements.

It consists of 12 ft. interchangeable lengths of rolled grooved steel conduit, so designed that when the halves are bolted together they completely enclose the cable. Each length is half overlapped on to the opposite half to which it is bolted, thus giving a large area of contact and ensuring both good electrical continuity and great mechanical strength, also the ends of abutting lengths are arranged to overlap about 1½ in. The bolts used are of special construction, arranged with eyes and square nuts in such a way that they can be tightened up without spanners or special tools, thus facilitating erection. The eyes also provide the means of suspending the conduit, which must be hung on edge, either by the ordinary S hooks commonly used for cable suspension or by any other convenient means. As the conduit is hung on edge it is possible to bend it round curves of large radius without much trouble, but standard short bends can be supplied, together with 6 ft. make-up lengths. These are designed so that the minimum radius of the groove is 10 in. for 1 in. diameter and 1¼ in. diameter sizes, and 15 in. radius for 1½ in. diameter and 2 in. diameter sizes.

While "Armearth" gives considerable protection to the cable against mechanical damage, any section can be easily removed for inspection or replacement. The ease with which replacements can be made with new interchangeable lengths is a great advantage where corrosion of metal coverings is liable to be set up locally by acid mine water.

It is claimed that the cost of protecting existing cables by "Armearth" is not more than about one-quarter that of replacing them by armoured cables, depending on the size of the cable.



"ARMEARTH" RUN ALONG WALL OF A DRIFT.

At the Royal Sanitary Institute Congress, which met at York recently, Dr. H. Maclean Wilson, of the West Riding Rivers Board, discussed the pollution of streams in Yorkshire by the discharge of coal-washing water, and, having described the methods taken to prevent it, he said it was gratifying to find that the measures of purification adopted by colliery proprietors had resulted in a great saving to them. When the dirty water from the washers was discharged untreated to the streams, a much larger quantity of water was needed for washing the coal, and it carried with it a large amount of good coal in suspension, amounting in some cases to 200 tons per week. This coal was now almost always recovered and mixed with the washed coal. Dr. Wilson also contributed a paper on the pollution of streams by spent gas liquor.

GAS ANALYSIS AS AN AID IN FIGHTING MINE FIRES.[*]

By GEORGE A. BURRELL and FRANK M. SEIBERT.

When an entire mine, or a section of it, has been sealed to exclude air, the sampling of the atmosphere within the sealed area becomes desirable in order to determine the effectiveness of the stoppings or dams in excluding air. If the stoppings are tight, the fact is shown by a depletion of oxygen in the atmosphere behind them. A period of anxiety always follows sealing, and any aid that tends to allay fears as to whether the fire is spreading or enables the mine officials to act promptly in case conditions get worse, is worthy of consideration.

Another reason for the systematic collection and analysis of samples of air from the sealed area is to obtain information regarding the advisability of removing stoppings. Disastrous consequences have sometimes followed the premature reopening of sealed areas; moreover, fires have burned vigorously after external air was thought to be entirely excluded.

The burning of coal and wood in a mine fire differs in some respects from the ordinary combustion of coal or wood in a boiler furnace; yet, just as periodic analyses of the escaping gases will indicate combustion conditions in the furnace, so periodic analyses of the atmosphere within a burning mine or section of a mine will indicate combustion conditions there, although these indications are less clearly understood and will be until some features of mine fires have been studied more fully.

Changes in Mine Air During Fires.

The principal changes in the composition of the atmosphere in a coalmine during a fire are as follow:—Oxygen is consumed in the burning of coal and is absorbed by coal that is not on fire; carbon dioxide is produced; methane accumulates; and carbon monoxide and hydrogen form when the oxygen supply becomes insufficient for complete combustion.

Loss of Oxygen.—The atmosphere in a burning section of a coalmine loses oxygen not only by the combustion of the coal but by oxygen being absorbed by the coal. This absorption, which takes place at normal temperatures, appears to be mainly a chemical combination between the oxygen and certain unsaturated hydrocarbon compounds in the coal, and the rapidity with which it takes place depends upon the nature of the coal. The action may be so rapid that the fire plays only a minor part in depleting the oxygen of the air in the burning section. This is particularly the case when the area on fire is very small in proportion to the area enclosed. That such absorption takes place is fortunate, because the removal of the oxygen in an enclosed section is hastened and the atmosphere more rapidly becomes incapable of supporting combustion.

The rapidity with which coal absorbs oxygen is shown by experiments performed by Porter and Ovitz[†] in the course of their work upon the spontaneous combustion and destructive distillation of coal. Ten kilogs. (22 lb.) of coal from Connellsville, Pa., absorbed, during the first day after mining, nearly one-half the oxygen in 10 litres of air. Slightly more than one-tenth as much carbon dioxide was produced as would have been produced had all of the oxygen absorbed combined with carbon to form carbon dioxide.

Parr and Barker[*] also have shown that the absorption of oxygen by coal occurs rapidly, especially with freshly mined coal, and that the absorption is very noticeable even in samples of coal that have been mined two years.

The fact that oxygen is absorbed by the coal in mines is confirmed by the authors' analyses of many samples of mine air.

Production of Carbon Dioxide.—A very large proportion of carbon dioxide, more than 4 or 5 per cent., in the atmosphere of a sealed section of a mine is unusual except near the fire. Even in places where the oxygen has been entirely consumed, no large quantity of carbon dioxide has been found by the authors. A fire in a coalmine increases, of course, the total quantity of carbon dioxide produced, but if the samples collected from a closed section represent fire gases diluted by the atmosphere of those parts of the section that are not on fire, the carbon dioxide found is by no means proportionate to the oxygen consumed in the fire. This deficiency of carbon dioxide results from the absorption of oxygen by the coal without (as is largely the case in the combustion of coal in a boiler furnace) the formation of a proportionate quantity of carbon dioxide.

Accumulation of Methane.—In some mines methane escapes from the coal in large quantities, and under extreme conditions the atmosphere in some places may contain 50 per cent. or more of methane in a very short time after becoming stagnant. On the other hand, samples collected by the author from workings in which the air had been stagnant for several months did not contain methane enough to form an explosive mixture even if the proportion of oxygen had been sufficient.

In a mine fire methane is undoubtedly formed from the burning coal, and such methane is added to that escaping from pores and cracks in the coal not on fire; but because the area on fire may be small as compared with the total space enclosed, the proportion of methane produced by the fire may be small throughout the larger part of this space. In one instance, samples collected directly over a fire contained only about 1 per cent. more methane than samples collected behind a stopping 2,000 ft. from the fire.

Production of Carbon Monoxide and Hydrogen.—Usually the oxygen supply in a burning section of a mine is quickly reduced; then incomplete combustion begins, and hydrogen and carbon monoxide form at the fire.

Samples of gases collected by the authors near a fire, where the coal was intensely hot and the oxygen content of the mine atmosphere was only 2 per cent., contained 1·5 per cent. of carbon monoxide. The part that carbon monoxide plays in gas explosions during mine fires has aroused considerable conjecture, but the data thus far accumulated by the Bureau of Mines indicate that the danger from the formation of explosive mixtures of carbon monoxide, or of hydrogen, is subordinate to the danger from methane, because in some mines methane accumulates rapidly in any place where the atmosphere becomes still, and enough is soon present to form an explosive mixture with an inrush of air.

As the necessary proportion of carbon monoxide has not been detected in the afterdamp gases the authors have examined, they believe that the possibility of explosions from the formation of carbon monoxide and air mixtures is remote. Still a point would undoubtedly be reached at which the addition of less than an explosive proportion of carbon monoxide to a non-explosive proportion of methane would result in the formation of an explosive mixture. Experiments along this line have not been conducted.

The production of hydrogen in a fire area seems to be even less than that of carbon monoxide, hence the danger from the formation of explosive mixtures of hydrogen is still more remote.

Production of Other Combustible Gases.—Other combustible gases, such as ethylene (C_2H_4), may be produced by a fire in a mine, but seemingly they are formed in such small proportions that their value in indicating the progress of the fire, as shown by gas analysis, or their importance as factors in explosions need hardly be considered.

Extinction of Flame.—Experiments show that the flame of a candle or of a miner's open lamp is extinguished when the oxygen content of the surrounding air falls to about 16 or 17 per cent. The authors obtained the following results by placing flames in a gastight bell jar and allowing them to burn out:—

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[*] From United States Bureau of Mines, *Technical Paper* 13.

[†] "The Escape of Gas from Coal." H. C. Porter and F. K. Ovitz. *Technical Paper* 2, Bureau of Mines, 1911.

[*] "Occluded Gases in Coal." S. W. Parr and Perry Barker. *Bull.* 32, University of Illinois, 1909.

Composition of Residual Atmospheres that Extinguished Flames.

Flame.	Percentage composition of atmosphere.		
	CO_2.	O_2.	N_2.
Wolf lamp	3·00	16·50	80·50
Acetylene lamp	6·30	11·70	82·00
Natural gas*	3·25	13·90	82·85
Candle	2·95	16·24	80·81

* CH_4, 82; C_2H_6, 16·4; N_2, 1·5; CO_2, 0·1 per cent.

To determine the uniformity of composition of the residual air, three samples were taken in each experiment. One sample was taken at about the height of the flame, as soon as the flame went out; a second, at the top of the jar, immediately afterward; and a third, 10 minutes later. In each experiment the analyses of the three samples agreed within 1 per cent. The figures given in the table are the average of the three determinations. In experiments such as these a flame undoubtedly burns in atmospheres containing slightly less oxygen than would support it under mining conditions, because there is no chance for a slight gust of air or a jerk of the lamp to extinguish it prematurely. Although a mine fire that is well under way when stoppings are built may continue to burn in an atmosphere containing less than 15 or 16 per cent. of oxygen, yet the above results afford some basis for estimating the amount of inleaking oxygen required to keep a fire burning or to cause a smouldering fire to burn more strongly.

Conclusions as to the approximate length of time a sealed mine or section of a mine should remain closed after a fire has been brought under control are hard to reach, because conditions differ at different fires. However, it is certain that analysis of a sample of the atmosphere in the mine or section will show whether the fire is well sealed and will enable more intelligent conclusions to be drawn regarding the length of time that stoppings should be kept up. When the oxygen in an area is almost or entirely consumed, combustion necessarily must cease, and the question then is how long the embers can retain heat sufficient to cause them to rekindle on the admission of air.

Relief Pipes at Stoppings.

At some fires the precaution has been adopted of having a pipe, with an elbow, placed in the upper part of the dam. This pipe dips into a vessel, an open barrel or keg, continuously supplied with water from a pipe fitted with a tap. The overflow from the barrel is allowed to run off. The tap is for shutting off the water when no longer needed. By this arrangement the outflow of gas is checked gradually and is finally stopped when the pressure of the water over the outlet of the escape pipe equals that of the gas behind the stopping. The relief pipe also serves to indicate the pressure in the fire area.

Collection of Samples.

For the purpose of taking samples and determining the temperature and pressure of the imprisoned atmosphere a straight pipe provided with a valve should be placed in each stopping. Samples of gas can be collected with a small hand pump, pressures can be read with a water-gauge, and temperatures can be taken with a thermometer inserted through the pipe.

Data obtained thus at regular intervals during the entire period that the fire is sealed are valuable, but their significance is governed more or less by the distance of the stopping from the fire. If this distance be great, changes in the condition of the fire will not be quickly indicated by the atmosphere behind the dam, and a change for the worse may occur before the fire lighters become aware of it. Clearly, however, in most cases the fire can burn more vigorously only by inleakage of air through the stoppings, consequently chemical analyses of the atmosphere just behind them show whether the inleakage of air is sufficient to keep the fire burning, and thus, perhaps, permit conditions to become worse.

An Improved Gas-analysis Apparatus.

The authors have modified an Orsat gas-analysis apparatus to make a portable apparatus, as shown in fig. 1, that is easy to manipulate and is sufficiently accurate for work at mine fires. With this apparatus carbon dioxide, carbon monoxide, and methane can be determined within about 0·2 per cent. Hydrogen, if present in the gas mixture, can be determined about as accurately by calculation from the combustion data.

The modified apparatus includes a burette of uniform diameter, graduated to 0·2 cubic centimetres, and a slow-combustion pipette *d* for burning methane and hydrogen. Pipettes *a*, *b* and *c* contain glass tubes (not shown in the figure) to increase the absorption surface. The reagents used in these pipettes are: *a*, potassium hydroxide solution; *b*, alkaline pyrogallate solution; and *c*, cuprous chloride solution. The gas sample is drawn in through the three-way stopcock *e*, and measured in the burette at atmospheric pressure. It is then passed successively into the potassium hydroxide, alkaline pyrogallate, and cuprous chloride solutions for the removal of carbon dioxide, oxygen, and carbon monoxide. The residual gas is diluted with air and passed into a slow-combustion pipette which contains a coil of No. 30 (B. and S.) platinum wire supported by two glass rods; this coil, when brought to a white heat by an electric current from a storage battery, ignites the combustible portion of the gas. After the combustible gases are burned the pipette is allowed to cool and the contraction in volume is measured. Finally, the carbon dioxide formed by the combustion is absorbed by potassium hydroxide and the contraction in volume is noted.

A calculation is then made for either methane, or methane and hydrogen combined. This depends upon the combustion data—that is, the contraction and the amount of carbon dioxide. Those samples that contain a percentage of methane which might cause an explosion if the residual gas were diluted with air and passed directly into the combustion pipette, are handled as follows: The residual gas is passed directly into the slow-combustion pipette and the platinum coil therein is brought to a bright red heat. A quantity of air or oxygen sufficient to burn completely the combustible portion of the gas is then introduced from the burette at the rate of 10 cubic centimetres per minute. In this manner quiet combustion takes place as the air or oxygen enters the pipette and comes in contact with the coil and the gas. An explosion from the formation of a mixture of oxygen and methane can not follow. In order to simplify the apparatus as much as possible, water is used in the burette and in the combustion pipette. More accurate work can be performed if mercury is used, especially in the combustion pipette, but if distilled water slightly acidified with sulphuric acid is used, results of sufficient accuracy for the determination of conditions inside the fire area can be obtained. A more complicated apparatus has disadvantages when results are wanted quickly. This apparatus is so simple and portable that it can be carried from headquarters directly to a mine and set up there at any convenient place. The authors have taken it into mines and made determinations underground. A storage battery giving a current of 5 volts and 4 ampères can be used for heating the platinum coil.

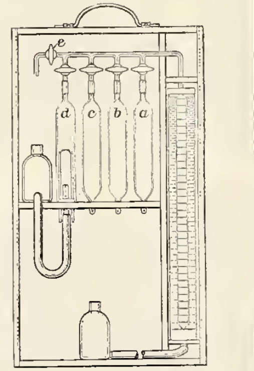

Fig. 1.—Gas-analysis apparatus for use at mine fires.

Descriptions of more accurate designs of apparatus for a wide range of gas-analysis work, including portable and laboratory forms for the determination of the constituents in mine air will be given in a forthcoming bulletin of the Bureau of Mines. The present bulletin also gives tables showing determinations actually obtained by analyses obtained from American mines.

At the annual general meeting of Messrs. Henry Briggs, Son and Co. Limited, held at Leeds on the 15th inst., Mr. Walter Geoffrey Jackson, who presided, said that although the year had been satisfactory, it must not be forgotten that consumers of coal had had a very great lesson, which they were no doubt taking to heart. They had learned that there was another source of power as well as coal. That source was oil, which would have to be eckoned with in the future.

THE "CEAG" MINER'S ELECTRIC LAMP.

Winner of the £600 Prize.

As announced last week, the judges appointed by the Home Secretary in the international competition for the best electric miner's lamp have awarded the first prize of £600 to Mr. Farber's "Ceag" lamp (The "Ceag" Electric Safety Lamp Company, 19, St. Dunstan's Hill, London, E.C.), while eight other competitors received £50 each. A short description of the "Ceag" lamp may therefore be of interest to our readers.

The "Ceag" lamp was constructed at the desire of a German mineowner following upon one of the worst mining disasters of recent years, and may therefore be said to be the offspring of practical necessity. In course of years the model has gone through many phases of improvement until the present state of safety, sound construction, simplicity, and, last but not least, cheapness has been attained.

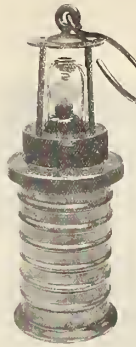

Fig. 1.—The "Ceag" Miner's Electric Lamp.

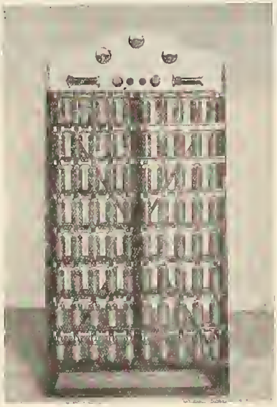

Fig. 2.—"Ceag" Charging Set.

The "Ceag" lamp consists of three parts, viz., the accumulator, the bottom part and the top part, and weighs, notwithstanding its exceptionally strong construction, only a little over 4 lb. The construction is so sound that the lamp can be thrown on a stone floor with impunity, and this experiment was made repeatedly during the practical trials by the judges.

The accumulator consists of a strong celluloid casing and two lead electrodes. The latter are screwed into the lid of the casing, and are of circular shape, by which means warping is avoided, while a considerable capacity of resistance is attained.

The lid is easily detachable, so that the electrodes can be exchanged in the simplest manner.

A novel acid-proof closing arrangement on the battery permits free egress to the gases without allowing the liquid to escape.

On both pole ends are two detachable contact pins on spiral springs which form the contact for the current to the glow lamp. This patented arrangement prevents the dangerous oxidising of the contacts, as these can easily be cleaned after using by simply putting them into warm water.

The accumulator is separated by an intermediate space from the steel casing of the lamp, and is thus protected against damage by rough usage or external force.

The bottom part of the lamp is a round stout casing of heavily tinned drawn steel plate strengthened by steel ribs pressed into it. The casing is cylindrical in shape, of somewhat conical form. On the bottom is a small furrow, which keeps the accumulator in its position, but does not interfere with its prompt removal.

The top part of the lamp is fastened with a bayonet joint on to the bottom casing, and can therefore quickly be detached in a most simple manner. The lamp is locked with a magnetic lock, which only can be opened by a strong magnet. The connection between the loose contact and the glow lamp is effected through a brass segment, which is placed in insulating material, rendering it possible to switch the light on and off by turning the top part while the lamp is locked. The glow lamp is a 1·5 candle power metal filament lamp of long life. It burns after the charging—which only takes from four to five hours—continually during 16 hours. The bulb is protected by a thick glass dome and four iron bars, and is placed between spiral springs. By this arrangement, not only is a great economy of bulb realised, but also safety against firedamp, as the circuit is broken automatically when the dome glass is shattered.

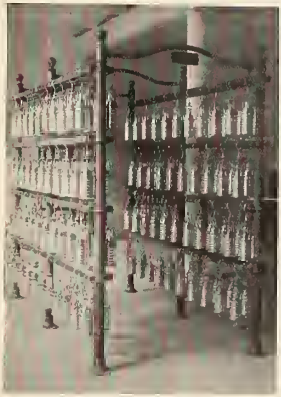

Fig. 3.—"Ceag" Lamp Racks.

Some of the advantages claimed by the makers of the "Ceag" lamp compared with the oil lamp are the following.—

> It gives a very strong and well distributed steady light—in fact, more than the double light of an oil lamp. It does not flicker, and burns in any position, and the glass never gets clouded or dull.
>
> The bright and steady light makes the miners' work easier and more remunerative with 5 per cent. higher yield. Dangerous slits, etc., can be more easily discovered in the better light.
>
> Nystagmus and other eye diseases do not occur while working with the "Ceag" lamp. The lamp burns at once with full brilliancy, which enables the miner to start work without any loss of time.
>
> The "Ceag" lamp can be comfortably handled, as it burns in every position and without developing warmth. It can be carried in most difficult places, in the pocket, on the belt, in the mouth, &c., or laid down on the floor. The "Ceag" lamp has been proved absolutely safe against ignition of inflammable gases inside or outside the lamp.

Besides all these evident advantages which have been ascertained by a practical working of many years, there is another important feature which in some cases is decisive—cheapness.

Careful calculations made during several years at a number of mines which are equipped with "Ceag" lamp cabins, show that the upkeep of these is not higher than that of oil lamps. In pits where new modern "Ceag" lamp cabins have been erected according to a new system, distinct benefits have accrued from the consequent economy of labour and essential simplicity of the upkeep. It may be mentioned that there is now a modern "Ceag" lamp cabin for 3,000 lamps in construction at the Bullcroft Main Colliery near Doncaster.

The "Ceag" lamp has been in actual practical use for a number of years, and it has, therefore, been possible to utilise the experience gained in practice; in this way the makers hold a distinct advantage over other makers who have not had the benefit of this experience.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Suggested Increase of Railway Rates on Coal—Ebbw Vale Stoppage: Decisive Action by the Manager—Exemptions of Collieries from New Act: Proposals Considered—The Allegations as to Insufficient Shipping Facilities at Cardiff—Centralisation of Miners' Union: Telling Criticism—The Outlook in Relations Between Capital and Labour.

The controversy to which we referred last week has been current for several days past—namely, as to increase in the railway rates for carrying coal. Based upon the temporary loss of dividend by local mineral lines, owing to the strike, it has brought out some striking figures, which show the difference in colliery-working results as compared with the conditions of 20 years ago. The original suggestion was that a meeting of the managers of the Taff Vale, Barry, the Rhymney, and any other of the local undertakings that chose to join, should be held; and that these should consider the practicability of a fractional increase in the charge for carrying coal to port. Without going into detail through the arguments advanced, it is enough to say that they had reference to the rate-cutting which took place over 20 years ago, at the time of the opening of Barry undertaking; and the proposition now brought forward is that the rate should be so raised as to add a charge of ¼d. per journey to the cost of carriage between pit and port. This would, of course, be but a small fraction of a penny per ton per mile; and upon this idea that "it is only so little," the proposers founded their hope of persuading colliery proprietors to accept the suggestion. One point brought forward was that the price of coal had risen so much during the interval that the trade could well bear the extra cost mentioned.

Very effective reply has been made to this suggestion of increase in rates. By comparing the selling price of 20 years ago with that of the present time, a difference of at least 3s. 6d. is shown; but the advance in price does not really compensate for the difference in working costs. Materials alone are stated at more than 1s. per ton relatively higher; whilst the perpetual requirements of new legislation make up a very heavy financial total. Beside previous increases it has been admitted by the men's side themselves that the Minimum Wage Act will give them a million sterling per annum additional wages over the coalfield. The Coal Mines Act accounts for much more, and the constant growth of inevitable expenditure in winning the coal has led to the prophecy that even to-day's price must advance from 6d. to 9d. per ton in order to meet the position.

From the other side—that is, the position of the railway companies themselves—not only would they have to satisfy the Railway Commissioners as to the necessity for a change, but they would also have to face the very conclusive argument against them that they have been earning for years past from 8 to 10 per cent. upon their capital, although because of the practice of "splitting" the stock, the real profit is concealed. The percentage of working expenses shows that as compared with 10 years ago, those of the Taff Vale and Rhymney are practically unchanged, whilst the Barry undertaking is costing over 5 per cent. more. So that it is a matter of internal administration rather than heavier demands upon customers to which the attention of the directors should be devoted.

One point made during the discussion is that the labour cost, taken separately, was in 1892 less than 7s. per ton on large coal, whereas it is now 10s.

Because about a score of men seceded from the Miners' Federation and joined the Enginemen and Stokers' Union, the whole of the colliers at Ebbw Vale stopped work, throwing the steelworks also into idleness, so that in all no fewer than 10,000 men are withdrawn. After a week, the disputants arranged their differences and decided to return to work, giving intimation to that effect to Mr. Mills, the manager of the company. It was then his turn to have a voice in the matter, and the strikers were informed, apparently to their surprise, that they were not entirely at liberty to play fast and loose with their obligations as employees.

A mass meeting of the men was informed that when their deputation waited upon Mr. Mills, the manager, that gentleman told them the situation was serious, the action of the miners having occasioned the company, as well as the community, a great deal of inconvenience. Before any work could be resumed at Ebbw Vale, there would have to be a complete understanding between himself and the miners that before a stoppage took place in the future he must be consulted, and certain formalities gone through prior to any such action being taken. That is how the requirement was reported to the men; and they then appointed a deputation to meet Mr. Mills the same afternoon. The men's representatives submitted a form of agreement to Mr. Mills, which he refused to accept; but he presented his own draft, and this was brought to a second meeting of the men, and finally accepted as the result of a long discussion.

It is worth while, in view of the numerous stoppages, to give the terms of the arrangement entered into. The document reads as follows:—

> Ebbw Vale, August 14, 1912.
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> We, the undersigned, on behalf of the South Wales Miners' Federation Ebbw Vale Branch, and of the colliery workmen under the company, have agreed with Frederick Mills, managing director of the Ebbw Vale Steel, Iron and Coal Company Limited, as follows:—
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> 1. We will exercise our utmost authority in every way to prevent unauthorised, whole or partial, stoppage of any of the company's collieries, or other workings; and will decline to support such stoppage.
> 2. We will not ourselves authorise any such stoppage, until we have sought and reasonably failed to secure an interview with the said Frederick Mills, or someone appointed by him to discuss the particular point or points at issue.
> 3. We undertake to give the customary notice in the event of it being necessary in our opinion to cause such stoppage.

Mr Mills has effected a satisfactory change in thus insisting practically that men cannot stop work and resume at their pleasure alone; and his demonstration of the unfair and improper nature of such procedure is timely.

Differentiation in rates of wages under the new Act was the subject for consideration, on Tuesday, at a special meeting of the statutory District Board, in Cardiff, Lord St. Aldwyn presiding. There had been applications from colliery owners particularly in three areas—the west, the south crop, and the eastern valleys of Monmouthshire—their desire being for exemption from paying the new minimum, or that special treatment should be accorded. Evidence was given on behalf of both the colliery proprietors and the workmen, the latter, of course, opposing the applications; but no decision was announced by his lordship, it being decided that a further meeting should be called.

As against the applications the men's arguments, stated generally, were that no precedent for differentiation could be cited, the established practice, both under the old sliding-scale system and the later Conciliation Board, having been to treat all collieries alike; that, if the less profitable collieries were to be regarded in the one direction, then in justice a higher rate than the minimum should be fixed where the collieries were very profitable; and that, as to a comparison which some owners put forward concerning competition by the Forest of Dean, they argued that the cost of living in South Wales was higher.

Col. Denniss, general manager of the Cardiff Docks, has further replied to the criticism made during the Rhymney shareholders' meeting as to the alleged inadequacy of facilities at Cardiff, so far as regards storage accommodation for coal awaiting shipment.

Really the question is one between the railway companies and the dock owners, as to which should provide the necessary sidings. Mr. Denniss insists upon the position taken up by his company for many years, that it is no part of the dock company's duty to provide sidings. There is, he says, no obligation upon the owners of the docks to provide storage sidings, for "the payment which they receive for coal shipping does not include the provision of storage accommodation," and that the railway companies are required to deliver the coal to the tip sidings.

The reply made to him by one controversialist is that the dock company have ample statutory power to equip their dock with sidings and any other appliances and conveniences that may be necessary for the trade; and that "they have statutory power to make reasonable charges for the facilities thus provided."

An amusing criticism of the reorganisation of the Federation was given at Ebbw Vale on Monday. One speaker at the miners' meeting regarded the scheme as foolish. There were, he said, 500 lodges in the Federation. Let them suppose there were two or three disputes, as there always were, in each lodge. Giving each member a quarter of an hour to report, it would take three weeks each quarter for the proposed central body to receive the reports. Each delegate was to be allowed 12s. 6d. a day, which would mean that the quarterly meeting of the conference would cost them £6,700. It is not surprising to learn that this statement evoked laughter; but none the less is it an effective exposure of the probable working of the centralisation scheme upon which the men have to vote during the next few days. Evidently the feeling of opposition to the proposal to abolish the districts and bring everything under the governance of a central body is extending and strengthening.

The circumstances of South Wales came under review in the Miners' Federation of Great Britain conference at Blackpool, and certain allegations were made as to the working of the Minimum Wage Act. It was admitted, however, that where the statutory minimum was lower than the amount previously paid, no alteration had been made; also that there had been no attempt to force men to "contract out"; that the question of arrears, too, had been amicably settled. But it is alleged that real peril to good relations arises from application of the new rules, and from changes which deprive men of position and pay; for instance, that men previously termed "colliers" are in some cases now called "fillers" in order that they shall not have the colliers' rate, and that similar changes have been made in other grades for the same purpose. The chief grievance appears to be the substitution of 24 hours' notice for the monthly contract as previously reported.

The question has been raised—none too soon—whether production in the tinplate trade is not outstripping the demand. At the present time, more mills are at work than ever before, the total number of mills being 593, which is 49 tinplate and 14 sheet mills above the figure for the corresponding period of last year.

MINING AND OTHER NOTES.

It is freely rumoured that Mr. J. W. Summers, the head of the firm of Messrs. Summers and Co., Shotton, is shortly to be offered a peerage. At present Mr. Summers is the Member of Parliament for Flint County. Mr. J. Herbert Lewis, who is member for Flint Boroughs, it is stated is going to be asked to join the Cabinet.

At the quarterly meeting of the West Riding Miners' Permanent Relief Fund at Barnsley last week, it was reported that three members of the society were killed in the Cadeby disaster, leaving one widow and two children chargeable to the fund. During the quarter the lives of five members had been lost, and there had been 730 minor accident claims. There were now chargeable to the fund 263 widows and 344 children, and during the quarter £3,884 had been paid in benefits. The membership is 16,432. Feeling reference was made to the death of Mr. Pickering in the Cadeby disaster.

Mr. Arthur Percival Firth, of Withnall-road, South Shore, Blackpool, one of the principals of the Leeds Ironworks, who died on May 27, aged 54, left estate valued at £26,429 gross, with net personalty £24,485.

The Middlesbrough Corporation Gas Department have for some time past been contemplating the adoption of a scheme for the utilisation of waste coke oven gas, and with this end in view negotiations have been in progress between the Gas Committee and Messrs. Sir B. Samuelson and Sons Limited. It is now announced that in connection with this project the gas manager and his assistant are leaving on Saturday for a visit to Germany, in order to inspect the plant at Essen for the utilisation of the waste gas supply from the coke ovens.

Important official changes have recently been made in connection with Springwell Collieries. Mr. R. B. Clark, the former manager, has been appointed sub-agent, and Mr. T. Crawford, surveyor of the collieries, has succeeded as manager.

In order that the firemen in the North Wales district should be qualified for the coming test under the Coal Mines Act, classes have been formed in the Schools of Science and Art, Wrexham. The membership was estimated to be about 60, but no less than 200 members have already enrolled, which is most encouraging. The lecturer is Mr. John Edwards, manager of the Hafod Colliery, Ruabon, who for many years past has held mining classes under the Denbighshire Education Authority, and is well known throughout the North Wales coalfield as a highly capable instructor, as well as an authority from the practical point of management.

The employees at Blantyre Collieries, Lanarkshire, belonging to Messrs. William Dixon Limited, have presented Mr. John Graham, oversman, with a handsome gold-mounted umbrella, together with a cheque for a substantial sum, in view of his retirement. Mr. Graham has been connected with Blantyre collieries for nearly 20 years. On behalf of the subscribers the gifts were handed over by Mr. J. Gillespie, the popular manager.

With the lapse of 21 years the by-laws with respect to the sale of coal made by Sheffield City Council in 1891 have become obsolete in many particulars and new by-laws have been submitted to the Board of Trade for approval. In future, hawkers will have to carry the coal "in suitable sacks which shall be kept in good condition." The by-laws more specifically define the weights to be so carried. The method of labelling them makes more clear the obligation of the seller to weigh the coal at the request of any inspector, or even of the buyer, not only on the seller's own weighing instrument, but on any which are properly stamped. The sack must also be weighed, so that the customer can know that the actual net weight is delivered. One concession has been made in the interests of the dealer. He will no longer be compelled to provide metal plates to indicate the tare weight of his vehicle, but will be permitted to state it in chalk letters on a black background on the side of the vehicle.

The directors of the Seaham Harbour Dock Company report that the total shipments of coal for the half-year were 777,500 tons, a reduction of 161,700 tons compared with the same period of 1911.

Mr. Jesse Wallwork, mining agent to the Earl of Ellesmere, has intimated to the Worsley District Council that his lordship intended to work the Crombonrke and Seven-feet Mines under Hazelhurst-road, Worsley-road and Broad Oak, the Doe and Cannel Mines under Moss-lane, Linnyshaw, Walkden, and the Five-feet Mine under Wardley-road. The surveyor to the Worsley District Council has been asked to present a report as to the number, position and condition of the disused pit shafts in the district.

Mr. Pollard presided at a special meeting of the Coal Merchants' Section of the Bradford Chamber of Trade, which was held on the 16th inst. The meeting had been convened to consider what action (if any) should be taken in opposition to the new by-laws in reference to the sale of coal which had been approved by the City Council. The by-law to which there was most opposition relates to the sale of coal in quantities from 2 cwt. to 14 lb. It provides that every seller of coal shall have securely attached to the top of the outer side of each sack a metal label which shall "clearly and legibly indicate the correct weight of coal contained in such sack." It was urged by several speakers that the proposed marking of sacks would entail unnecessary trouble and expense. After a long discussion, it was resolved to make no representations to the Board of Trade in opposition to any of the by-laws.

Recent developments at Yorkshire Main Colliery at Edlington, Doncaster, have been highly successful, and it is expected that rapid progress will be made in opening out for a large output. The coal is of excellent quality, and in due course a very large supply will be raised. The cages have been fixed, and the screens and other plant capable of dealing with from 5,000 to 6,000 tons per day are now in working order. Employment will, it is expected, be found in the near future for a large number of men. The houses already built in the new village are rapidly filling; some hundreds of houses, shops, &c., will be required to keep pace with the developments. Already there is a population of 600. A school to accommodate 1,000 children is being erected, and the church will be commenced shortly. The sewage scheme is well in hand.

James Stevenson, colliery manager, residing at Bridgend, Avonbridge, was charged, at the Falkirk Sheriff Court on Monday, with having kept 37½ lb. of gelignite and 50 detonators for sale at a small wooden erection at Hill Farm Colliery, which was an unauthorised place. He pleaded guilty, and on his behalf an agent stated that according to a recent regulation it was obligatory for mineowners to furnish a house in which to keep explosives. Mr. Stevenson had got ground for a house, and the offence was committed while they were erecting the new house to meet the requirements of the regulation. Honorary Sheriff-Substitute Hunter imposed a fine of £1 1s.

It is notified in the *Gazette* that orders were made on August 13, 1912, restoring the Letters Patent granted to Montegue Moore and Thomas James Heskett for "An improvement in the direct process of manufacturing iron and steel," numbered 17131 of 1906, and bearing date July 30, 1906; for "Improvements in apparatus for treating ferruginous ore for the manufacture of iron and steel therefrom," numbered 5041 of 1904, and bearing date March 1, 1904; and for "An improved process of and apparatus for treating ferruginous ore for the manufacture of iron and steel therefrom," numbered 4975 of 1904, and bearing date February 29, 1904.

It is reported that a new industry is to be started at Wallsend. The site to be occupied is a portion of that formerly held by the Aluminium Corporation, and adjoining the works of the Newcastle Electric Supply Company, and it is intended to carry on the industry of steel smelting.

Through the opening out of an old coal shaft at Scotswood-on-Tyne, there is every likelihood of a new colliery being established in this district. The shaft in question is what is known in old records as the Yarmouth shaft, and is situated between Scotswood and Lemington, and not far from the railway running to Wylam. The fact that there was in the neighbourhood an old pit which worked the Sugley royalties to the west, some 200 years ago, was pretty well known to local mining engineers, and especially to Mr. J. Urwin, whose father, in 1854, opened out the neighbouring Montague Pit. Mr. Urwin was therefore commissioned by a party of local gentlemen to try and find the old shaft. After excavating some 20 or 30 feet., the stone wall of the shaft was disclosed in as good state of preservation as when it was closed over 200 years ago. The shaft has been cleared to its full depth of 29 fathoms, and three seams of coal have been disclosed. The first seam, which Mr. Urwin calls the Main seam, is 2 ft. 10 in. high, and has been partly worked. This seam is only 8 fathoms from the surface. The next seam, which he calls the Kitty's Drift seam, is 12 in. in height, but there is in connection with it 2 ft. 6 in. of clay, which is more valuable than the coal. The third seam, at the bottom of the shaft, is the Beaumont seam, and is 4 ft. thick. This, like the second seam, is really a virgin seam. Underneath these again, are known to be seven other seams, and it is the intention of a new company, called the West Denton Colliery Company, to sink a shaft some 100 yards away, in order to work the whole of the ten seams, and also to use the old Yarmouth shaft for purposes of ventilation.

The will has been proved of Mr. Philip Alfred Williams (director of Partridge, Jones and Co., colliery proprietors and shippers, Monmouthshire). His death occurred in May, at the age of 82 years. Not personalty totalled £120,000.

At a meeting of the coal merchants of Newcastle-upon-Tyne, held at the Mineral Agent's office, Newcastle, on Monday, Mr. R. Ruddock (Messrs. Rutherford and Co.) presiding, a discussion took place with reference to the advisability of forming a coal merchants' association for Newcastle-upon-Tyne. The chairman explained that in view of recent legislation, such as the Shop Hours Act, the National Insurance Act, and others, such a course had been thought desirable. A resolution that an association, to be called "The Newcastle-upon-Tyne Coal Merchants' Association," be formed, was unanimously carried. The following officers were elected:—Chairman, Mr. R. Ruddock; vice-chairman, Mr. Arthur Scott; hon. secretary and treasurer, Mr. W. G. Baty; solicitor to the association, Mr. Arthur A. Johnson. A committee of management was elected, and Mr. Thomas Rutherford was elected to represent the association on the Newcastle-upon-Tyne Retail Chamber of Commerce.

The opening of the Three-quarter Main seam at Blaydon Main Colliery has enabled the management to withdraw the notices which were recently tendered to 75 of the miners employed at the colliery. The notices were given to the men in consequence of the closing of a portion of the mine.

At the half-yearly meeting of the Maryport and Carlisle Railway Company, the chairman stated that the Scotch and North-Eastern coke traffic had declined by 100,000 tons, whilst 25,000 tons less of iron ore had been carried.

Mr. Richard Bowes, mining pupil at Esh Colliery, under Mr. J. G. Crofton, manager of the Deerness group of Messrs Pease and Partners' collieries, has been appointed assistant manager and assistant surveyor at the Urpath and Onston Collieries of the Birtley Coal and Iron Company.

Mr. Douglas Hay, one of the new junior inspectors of mines, who is a son of Mr. W. Hay, J.P., the general manager of the Shirebrook Colliery Company Limited, matriculated at the London University at the age of 16, whilst a student at Retford Grammar School, and joining subsequently the engineering department of the Nottingham University College, he took his B.Sc. degree of the London University with first-class honours three years later. He has since acted as an assistant manager and surveyor at the Shirebrook Colliery, an assistant manager at the Stanton Colliery, Burton, and one of the underground managers at the Tinsley Park Collieries. Last year he read a paper before the Birmingham section of the Institution of Civil Engineers, and was awarded a silver medal for the best student's paper, whilst the Institution of Civil Engineers awarded him the Miller prize and the James Forest medal. Mr. Hay is 24 years of age and will commence his new duties in the Durham district.

RAILWAY COAL CONSUMPTION.

The cost of the locomotive coal consumed upon the 22 principal steam railways of England, Wales, and Ireland in the first half of this year compared as follows with the corresponding cost in the first half of 1911:—

System.	1912. £	1911. £
Barry	14,301	15,632
Great Central	166,479	171,615
Great Eastern	164,586	146,061
Great Northern	182,320	176,346
Great Northern (Ireland)	40,685	39,410
Great Southern and Western (Ire.)	52,715	54,130
Great Western	341,789	366,874
Hull and Barnsley	15,489	16,239
Lancashire and Yorkshire	147,865	145,100
London and North-Western	471,991	466,624
London and South-Western	215,153	180,951
London, Brighton and South Coast	122,649	119,491
London, Tilbury and Southend	28,660	17,007
Metropolitan	25,572	28,929
Midland	313,642	330,358
Midland Great Western (Ireland)	30,982	26,625
North-Eastern	202,698	204,691
North London	22,409	22,225
North Staffordshire	19,585	20,682
Rhymney	15,387	17 991
South-Eastern and Chatham	178 337	142,250
Taff Vale	30,463	32,978
Total	2,803 757	2,742,209

The aggregate distance run by trains upon the 22 systems in the two half-years was:—

System.	1912. Miles.	1911. Miles.
Barry	1,221,162	1,397 288
Great Central	8,973,460	10,446,960
Great Eastern	10,678,313	10,761,050
Great Northern	9,806,975	10,981,410
Great Northern (Ireland)	1,759,527	1,896,702
Gt. Southern and Western (Ire.)	2,916,703	2,959 096
Great Western	22,481,664	25,309,667
Hull and Barnsley	874,132	994,416
Lancashire and Yorkshire	8,136,262	8,645,201
London and North-Western	20,773,140	22,907,936
London and South-Western	8,462,225	9,513,925
London, Brighton and S. Coast	4,994,404	5,431,369
London, Tilbury and Southend	962 651	1,009,581
Metropolitan	286,626	304,455
Midland	21,255,187	23,529,918
Midland Great Western (Ire.)	1,159,553	1,246,048
North-Eastern	11,871,050	13,346,346
North London	1,020,384	1,098,393
North Staffordshire	1,315,984	1,458,442
Rhymney	1 111,520	1,317,994
South-Eastern and Chatham	6,777,288	7,322,972
Taff Vale	1,885,492	2,116,180
Total	148,723,702	163,995,349

The cost of the coal consumed in the first half of this year accordingly averaged 4·52d. per train mile run, while the corresponding average in the corresponding period of 1911 was 4·01d. per train mile run. The increase of 0·51d. per train mile run was, of course, the effect of the great coal strike, which increased the cost of the combustible consumed this year, while at the same time train mileage was considerably restricted.

Four London railway systems now depend solely upon electric traction, viz., the Central London, the City and South London, the London Electric, and the Metropolitan District. As regards the Metropolitan, we included in our recent recapitulation the cost of the coal used by steam-worked trains. A considerable proportion of the daily movement upon the Metropolitan is obtained by the use of electric current; but of this mileage we have taken no account. The cost of electric current upon the four other systems in the two periods under review was:—

System.	1912. £	1911. £
Central London	8,714	10,214
City and South London	7,182	7,842
London Electric	41,358	44,047
Metropolitan District	57,375	57,804
Total	114,629	119,907

The distance run by trains by the four companies in the two periods was:—

System.	1912. Miles.	1911. Miles.
Central London	775 816	860,877
City and South London	691,531	719,556
London Electric	2,688,949	2,728,961
Metropolitan District	1,877,464	1,642,530
Total	6,033,760	5,951,924

The average cost of electric current per train mile run in the first half of this year was, accordingly, 4·54d., as compared with 4 84d. It should be observed that we have had to include in our calculation the cost of lighting and heating trains, and some other charges varying with the practice of each company, while in referring to steam railways we only dealt with the actual cost of the coal consumed. We should add that our data generally must be regarded as close approximations only.

Dover coal having proved satisfactory for steam-raising purposes on locomotives, additional orders have been received from the South-Eastern and Chatham Railway Company.

LABOUR AND WAGES.

North of England.

On Tuesday 2,000 men and boys were idle at Heworth Colliery, near Gateshead, in consequence of an allegation that at the last pay twenty-one men had received less than the minimum prescribed under Sir Robert Romer's award. The question of abnormal places enters largely into the dispute.

The quarterly meeting of the delegates of the Cumberland Miners' Association was held at Maryport on Monday afternoon. Mr. Thomas Cape, financial secretary, read a report as to what had been done with respect to the minimum wage question, and the report of the settlements that had been arrived at by the joint committee, and intimated that further meetings were arranged for this week with the joint committee of the Minimum Wage Board. Mr. Cape then gave a lengthy statement of the financial position of the association, and said he was glad to announce that they had paid off the loans that had been incurred during the strike the sum of £620, and they were contemplating being able to pay off during this quarter what would bring the amount up to over £1,000 paid off, and he hoped that before the end of the year they would be able to meet the whole of their liabilities. The question was next discussed as to the raising of the present wage for men brought from the face to do shift work, and it was decided to ask the coalowners for a meeting to discuss the question. During the day Mr. Andrew Sharp visited the meeting, and gave a short address to the delegates, and intimated that owing to his advancing years, and the extra amount of business that had to be gone through in connection with the association, he felt that by the end of the year he would have to resign his position as general secretary. Mr. Sharp, who is 71 years of age, is "father" of the Labour movement in Cumberland. He has been general secretary of the association since its establishment some forty years ago, and, as a county councillor since the creation of that body, has played a great part in the local government of Cumberland. He is a justice of the peace, and as Labour candidate, fought a three-cornered contest at Whitehaven in 1910.

Hewers to the number of 318 were summoned at the Gateshead Police Court on Saturday by the Redheugh Colliery Company, who claimed from each 5s. as damages for an alleged breach of contract of service on July 12. It was explained that the dispute arose out of pay No. 14, which ended on July 6, 1912, under the Minimum Wage Act. It appeared that there were about 118 men who had not done sufficient work to bring them up to the minimum wage, and they maintained that they were entitled to it. The manager told them they had not complied with Rule 3. Notice was not given to an official, but he said if there were any such cases which were deserving he was willing to consider them. The pit was laid idle on Friday, July 12, the men returning to work on the following Monday. The dispute eventually went before an umpire, and 93 cases were decided in favour of the owners, and 25 were made up to the minimum wage. Since then there had been one or two sets of negotiations with a view to a settlement, but they had not been able to come to terms. The total amount claimed was £104 5s. 2d., which was the loss sustained through the pit being laid idle on the Friday. There was a similar loss for the Saturday. For the defence it was urged that the men believed that they had reasonable excuse for what they had done. Eventually an understanding was come to, to this effect: That in the 25 cases where the minimum wage was awarded to the men by the arbitrator's award, the owners would withdraw the summons with a view to an amicable settlement. The rest of the men would pay 4s. 6d., to include damages and costs, the payment to extend over two pays. Four men refused to pay, and it was decided to adjourn these four summonses for a fortnight to give the men an opportunity of reconsidering their position.

The workmen at Seghill Colliery, on Friday, tendered 14 days' notice to cease work. There are about 1,000 employed altogether at the Seghill Pit. The men's chief grievance is that the management have refused to comply with their demand for itemised pay checks, which they claim they are entitled to under the new Act. Another grievance is the refusal of the weekly pays. Although the tendering of the notices has not been sanctioned by the miners' executive, the men are stated to be determined to fight.

On Saturday night, at Spennymoor, a mass meeting of miners was held, the collieries represented being Hunwick, Hetton, Lambton, Heworth, Chilton, Croxdale, Tursdale, Beamish, Alma, Easington, Dunston, Urpeth (C), Hilton, Twizel and Mainsforth. The local collieries of Deanbank, Tudhoe, Westerton and Byers Green were not represented. A resolution was carried unanimously welcoming the movement which has for its object the improvement of the wages and conditions of the workers of the county, rejecting the recent offer of the coalowners of 2d. per man and 1d. per boy on the basis wage of the surface workers, and calling upon the executive committee of the association to push forward the demands for an increase of not less than 6d. per day on the basis wages of these poorly paid workers.

At the Durham Miners' Hall on Monday, an illuminated address was presented to Mr. J. W. Taylor, M.P. for the Chester-le-Street division, and secretary of the Durham County Mechanics' Association, by the executive and members of that society, on his completion of 21 years' service as a trades union official.

The financial position of the Northumberland Miners' Association was discussed at a joint meeting of the finance and executive committees, held on Monday at the Burt Hall, Newcastle. Members of both executive and finance committees were agreed that, whilst it is absolutely necessary that the subscriptions of members should be increased from 6d. per fortnight, it is felt that the proposal—rejected by the lodges to increase the subscription to 1s. a fortnight was too drastic. A report will be issued to the lodges.

A further reduction of £35,994 in the capital fund of the Northumberland Miners' Association is reported in the quarterly balance-sheet. The capital account in the preceding quarter totalled £81,194 9s. 3d., and for last quarter £45,200 4s. 9d. On the other hand, the strike loan from the Co-operative Wholesale Society has been reduced by £36,903 4s. 10d., leaving a balance overdraft of £31,755 5s. In order to meet the union's liabilities during the period dealt with, stock in the Northumberland County Council and the Newcastle Corporation have had to be realised, reducing the holding in connection with the County Council from £24,800 to £9,400, and in connection with the City Corporation from £28,000 to £8,000. Excepting £17,400 in County Council and Corporation stock, the greater proportion the £45,000 representing the capital funds of the association is now invested in local miners' halls and institutes and in other buildings. There has been a slight increase in the union membership so far as adults are concerned, and a slight decline in half members, the former being returned at 35,098 and the latter at 5,206. Seventy-nine collieries are affiliated to the association.

The Burradon miners have had a number of cases before the local Joint Board, and Dr. Hay, of Jesmond, the umpire mutually agreed to, has given his decision. He decided in favour that the workmen should be paid the minimum rate of wages for placeworkers for the first three days after commencing work after the strike. In respect to the interpretation of Rule 12 of the district rules, Dr. Hay gave his decision in favour of the workmen—That where sets of men are working in two places it does not constitute one cavil but two distinct places.

On Saturday afternoon a meeting of miners, convened by the "forward movement," was held at Hetton. A resolution, urging the county to reject the offer of 2d. per man and 1d. per boy per day on the basis wage of surfacemen, and calling upon the executive committee of the Durham Association to push forward the demand for an advance of at least 6d. per day, condemning the rates and rules set up by Sir Robert Romer's award under the Minimum Wage Act and calling for their speedy abolition, and urging that the rules and policy of the association ought to be altered, was carried unanimously.

The award of Mr. T. R. Guthrie, the umpire, in connection with the Northumberland Joint Board has been delivered in regard to certain questions in dispute at Wallsend. The umpire favours the men in regard to the claim that they have a right to the full minimum wage pay commencing from the first day after the strike. He favours the contention of the workmen that, after a long stoppage, the declension in the output is more in consequence of the condition of the pit than in the condition of the men. A number of claims on the part of the owners for excluding workmen from participating in the minimum wage were allowed. A point put forward successfully by the owners was that certain workmen were inefficient, because they had difficulty in getting "marrows" at the end of the quarter, the overman in such cases having to find "marrows" for them.

At Bolside a question of putters' minimum has exercised much interest; and as the owners' and workmen's representatives were unable to agree, it was left to the umpire, Mr. Mundahl, barrister, to decide. The decision was that putters over 21 must be paid 5s. 6d. per day. A number of elderly putters have been given other employment. It is thought this decision is likely to have a very important effect on the county in general, as there are thousands of putters over 21 who are working for less than 5s. 6d. per day.

The executive committee of the Northumberland Miners' Association, in a circular issued to the lodges, intimate that in case the Home Secretary agrees to receive a joint deputation from the miners and the Coalowners' Association in respect of the Explosives Order, they will raise the question of blasting off the solid where black powder is used. Lodges are asked to nominate members who desire to become students at Ruskin College for the next term, commencing in September.

Federated Area

The Coal Conciliation Board for the Federated mining districts of England and North Wales met at the Westminster Palace Hotel, London, on Tuesday, to consider the men's application for a 5 per cent. advance on the present rate of wages. Lord Coleridge, who has accepted the position of independent chairman of the Board, in succession to the late Lord James of Hereford, presided, and there were present: Messrs. F. J. Jones (South Yorkshire), president; C. Pilkington and W. H. Hewlett (Lancashire), J. J. Addy (South Yorkshire), C. B. Crawshaw and J. F. Warrington (West Yorkshire), A. G. Barnes, A. Leslie Wright, W. B. M. Jackson, and H. Westlake (Midland Counties), H. Dyke Dennis (North Wales), Col. A. H. Heath (North Staffordshire), Col. W. E. Harrison (Cannock Chase), and Sir T. Ratcliffe-Ellis, secretary, representing the coalowners; Messrs. J. Wadsworth, M.P., J. Hosking, and H. Smith (Yorkshire), S. Walsh, M.P., and J. Parkinson (Lancashire and Yorkshire), Albert Stanley, M.P. (Cannock Chase), W. E. Harvey, M.P., vice-president; H. J. Haslam, M.P. (Derbyshire), W. Carter and C. Bunfield (Notts), Levi Lovett (Leicester), E. Hughes (North Wales), and T. Ashton (Manchester), secretary. The proceedings lasted for a period of nearly four hours, and at the adjournment the following official report was presented by the joint secretaries:—

> After discussion, it was resolved that the meeting be adjourned until some date to be fixed by the joint secretaries and approved by the chairman, and that in the meantime there should be a conference between both sections of the Board.

It is understood that the basis of the men's case for a 5 per cent. advance in wages was the considerable advance in selling prices which had taken place since September 3, 1909. At that date an agreement was entered into by both parties forming the Conciliation Board that the selling price of January 1909 of 7s. 10·21d. per ton should be reached before an application for an advance of wages was made. The resolution of September 3, 1909, contained the following addendum:—

> No application shall be made for any advance in wages until the selling price exceeds 7s. 10·21d. by such amount as shall have recouped the owners for the disadvantage they shall have incurred by the present rate of wages during the period the selling price was less than 7s. 10·21d. per ton.

The men's representatives submitted that three other factors must be taken into consideration as making larger profits possible, viz., increased volume of trade, cheaper methods of production, and greater efficiency of the persons employed measured by their productive power. The upward trend of wages in all the other mining districts was further cited as evidence of the equity of the men's claim for an advance of 5 per cent. The coalowners' case was to the effect that recent legislation, notably the Coal Mines Regulation Act, the Minimum Wage Act, and the Insurance Act, had imposed heavy additional burdens upon the industry, adding materially to the cost of production, and that the basis upon which the wage had been fixed required to be readjusted. Lord Coleridge, after hearing the case of both the parties, suggested an informal meeting of the Board, without the presence of the independent chairman, with a view to their arriving at a mutual agreement on the application.

With regard to the amounts of wages which were retained by the masters in Flintshire, in connection with the "make-up," pending the decision of the District Board, Mr. T. Wightman, the umpire for the East Holywell Minimum Wage Board, has decided that the coalowners have no right to retain the wages of the workmen pending the decision of the Board.

Thirty-four employés of the Cleckheaton Colliery Company were summoned to appear at the Bradford West Riding Police-court, on the 15th inst., for leaving work without notice. Mr. F. G. Smith, on behalf of the company, stated that a deputation of the men had waited upon the manager, and asked whether the company would withdraw the summonses if the men undertook to pay the amount claimed and the costs. The summonses were therefore withdrawn. The men, it is stated, left their work on July 18 and 19, owing to having grown tired of waiting for the appointment of a Conciliation Board for the district under the Minimum Wage Act.

Scotland

A conference between Messrs. Brown and Maullin, representatives of the miners who are on strike in the Dreghorn district, and Messrs. Kenneth, the owners of the pits concerned, was held on Tuesday, with a view to an amicable settlement of the dispute.

Representatives of the Fife and Clackmannan Coalowners' Association and of the Fife Miners' Association had a conference, on Tuesday, at Dunfermline for the purpose of discussing questions that have arisen as to the "Billy Fairplay" method, the payment of wages weekly instead of fornightly, and the cost of explosives required to be used in the pit. The "Billy Fairplay" question was discussed more particularly in regard to the situation which has arisen at the Michael Pit, East Wemyss, where 800 men have voted in favour of a strike for the abolition of "Billy." No decision was come to on any of the points.

A special meeting of the Fife and Kinross Miners' Association was held at Dunfermline on Tuesday. A resolution was unanimously passed deprecating the large amount of Sunday labour that was prevalent at many of the collieries in the county, and instructions were given to the committees to take the matter up in their respective districts, with a view of stamping out the practice.

The shale miners, it is understood, have agreed to adopt a recommendation of the executive to the effect that the wages of shale miners will advance equally with and at the same time as the coalminers' wages above the present nominal point of 6s. 6d. per day, and will only fall when and to the same extent as coalminers' wages fall, with this proviso, that if the coalminers' nominal wages should fall to or below 6s. per day, the wages of the shale miners shall remain 3d. per day higher than the wages of the coalminers.

Mr. Robert Shirkie, agent and corresponding secretary of the Enginekeepers' Association of Scotland, has issued to the members a report on the legal eight hour day for winding enginemen. He says he has made all possible enquiries as to the likely date of commencement of eight hour day, and considers that a very few weeks will see the general regulations issued, and then 30 days must elapse before the provisions come into force.

A settlement has been effected in the claim by the non-winding enginemen of Scotland for an advance of wages. It was urged that what they were at present being paid was not in keeping with a recent agreement. They maintained that they were only being advanced at the same ratio as before the agreement, whereas they should be advanced in like proportion to the winding enginemen, who receive 3d. for every 6¼ per cent. increase given the miners. The matter was before the Conciliation Board recently, and it was then decided to request Sheriff Fleming to act as arbiter, but this reference has been obviated by the coalowners conceding the men's claim, together with payment of arrears.

At a meeting of the executive committee of the Lanarkshire Miners' Association, on the 14th inst., it was reported that several miners at one of the collieries in the county had been suspended from employment until they would sign an agreement contracting out of the Minimum Wage Act. It was decided to protest against the action of the company in question, and to take steps to protect the interests of the men. It was agreed to send a number of compensation cases to the Miners' Federation of Great Britain with a view to appeal.

Mr. Robert Brown, the Labour candidate for Midlothian, opened his campaign on Monday night by addressing a large meeting of miners at the village of Newton Grange. He claimed that the hope of salvation for the workers was with the Labour Party, and declared that the Minimum Wage Act was leading to nothing but chaos and would cause more dispeace in the ranks of the mining community than anything that had been done in the last 30 or 40 years.

Having decided that they would not resume work after the Musselburgh Fair holidays unless a settlement satisfactory to themselves had been arrived at on the question of the weekly wage and "lying time," 1,300 Musselburgh district miners employed at the Carberry and Wallyford pits of the Edinburgh Collieries Company Limited were idle on Monday. The men asked for a weekly pay each Friday, no Saturday work, and only three days, "lying time." The men, however, the same day, decided to go back to work and wait the the investigation by the Mid and East Lothian Federation Board of the coalowners' representatives.

Miners' Federation of Great Britain.

The deliberations of the Miners' Federation of Great Britain were concluded on Friday of last week at Blackpool. Mr. Robert Smillie, the president of the Federation, was in the chair, and the conference considered the reports which had been sent in respecting the working of the Minimum Wage Act. The following official report was issued:—

> The conference to-day considered the reports that were presented yesterday, after which the following resolution was unanimously carried:—
>
> That this conference, after considering the reports from the districts on the working of the Minimum Wage Act and the rates and the rules in connection therewith, expresses its strong dissatisfaction with the same, specially in regard to—
>
> (*a*) With few exceptions no award has provided for paying 5s. per day to low-paid adult workers, and that in many instances the independent chairmen have not had a reasonable regard to the average wages of the said workers in fixing the minimum wage;
>
> (*b*) Those awards which require 100 per cent. of attendances at work to qualify for the minimum wage;
>
> (*c*) The serious delay of many owners to pay arrears of wages due under the awards; and, further, it strongly condemns the action of those owners who are coercing or bribing the workmen to contract out of the provisions of the Act, either by promising them or offering increased tonnage rates or percentages.
>
> We therefore instruct districts to keep the general secretary fully informed of the further working of the Act in their respective areas, such information to be supplied by him to the districts, after which the executive committee shall be empowered to convene a conference to deal with any difficulties that may exist. In the meantime it shall render all possible assistance to any district that may be resisting any attempts on the part of owners to violate or evade the provisions of the Act.
>
> The conference concluded with thanks to the chairmen for presiding.

The Cnppee Coke Ovens and By-product Plants.—We have received from Messrs. the Coppée Company (Great Britain), Limited, of King's House, Kingsway, London, W.C., an exceptionally handsome catalogue, which they have just issued, illustrating some interesting examples of their coke ovens and by-product plants, and coal screening and washing plants. The catalogue is illustrated by numerous photographs, and contains 13 large plates showing various processes and installations. In addition there is a complete list of all the modern plants that have been erected by the Coppée Company in various countries. As is well known, two types of ovens are constructed to the Coppée specifications, of the regenerative and waste heat type respectively, and there are illustrations in the catalogue of important installations answering each description. It also gives full descriptions of the Coppée direct sulphate recovery process—a feature of which is the arrangement whereby the gas passes direct into the saturator without being reheated—tar distillation plant, and arrangements for supplying coke oven gas for town lighting, as well as a comparison (illustrated) of various methods of loading coke, including the Coppée coke screening and loading machine. The illustrations of the by-product plant at Willebroeck, near Brussels, are of special interest, owing to the growing use of coke oven gas for town lighting. According to the system recommended by the Coppée Company, the battery is built with two hydraulic mains instead of one, into one of which the poor gas only is passed, whilst the other is used for the rich gas evolved during the middle coking period. The former is treated for ammonia and benzol and used for heating the ovens, whilst the richer portion is passed through a separate by-product plant where only the ammonia is extracted, thus leaving in the gas all the hydrocarbons which are high in illuminating power. It is estimated that a battery of 50 ovens approximately will in this way supply the needs of 100,000 inhabitants at a cost delivered at gasholders varying from 9·9d. to 11·5d. per 1,000 cubic feet. It is impossible to enumerate the whole of the more recent plants erected or under construction by the Coppée Company, but the following coke ovens and by-product installations in this country may be briefly mentioned: Messrs. Guest, Keen and Nettlefolds, Cwmbran, 50 ovens; Bolckow, Vaughan and Co., Dean and Chapter Collieries, 120 ovens; Pinxton Collieries Limited, 52 ovens; ditto (repeat order), 15 ovens; Lancaster's Steam Coal Collieries Company Limited, Cwmtillery, 45 ovens; Hardwick Colliery Company, Heath, 50 ovens; Welsh Navigation Steam Coal Company Limited, Llantrisant, 60 ovens. Coal-washing and crushing plants have been supplied (in addition to the foregoing firms) to the Pyle and Blaina Works Limited, Clifton and Kersley Coal Company Limited, Moresby Coal Company Limited, Wright, Butler and Co. Limited, the Great Western Colliery Company Limited, Newport Abercarn Steam Coal Company Limited, Cory Brothers and Co. Limited, Danyderi Coal and Coke Company Limited, Tredegar Coal and Iron Company Limited, Hulton Colliery Company Limited, St. Helens Colliery Company Limited, Bowling Iron Company Limited, Fletcher, Burrows and Co. Limited, the Blaenavon Company Limited, the Cambrian Coke Company Limited, North's Navigation Collieries Limited, James Dunlop and Co. Limited, the Wigan Coal and Iron Company Limited, the Ebbw Vale Steel, Iron and Coal Company Limited, the Briton Ferry Works Limited, Plean Colliery Company Limited, and Pease and Partners. Benzol plants have been supplied to the Hardwick Colliery Company, the Pinxton Collieries and the Welsh Navigation Steam Coal Company.

THE COAL AND IRON TRADES.

THURSDAY, AUGUST 22

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week, 145,836 tons of coal and 2,029 tons of coke were despatched from Tyne Dock, an increase of 60,820 tons of coal and 1,007 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 61,751 tons of coal and 1,594 tons of coke, an increase of 10,892 tons of coal and 350 tons of coke. The Blyth shipments totalled 97,081 tons of coal and coke, an increase of 29,716 tons. The following important sales of coal and coke are announced this week:—5,000 tons of Broomhill steam smalls, for delivery until the end of April next, at 9s. 9d. f.o.b.; parcels aggregating 120,000 tons of Durham unscreened bunkers, for delivery over next year, at 12s. 4½d. f.o.b.; 5,000 tons of another quality, for like shipment, at 12s. 3d.; 25,000 tons, for similar shipment, at 12s. 6d. f.o.b. Dunston (the others are for Tyne Dock shipment, of course); 11,000 tons of Durham gas coal, for shipment on behalf of the Magona Works to Porto Vecchio over the next two months, at 25s. c.i.f.; 50,000 tons of best blastfurnace coke, for delivery at Middlesbrough over next year, at 23s. per ton delivered; moderate quantities of Northumberland bunkers, for next year's delivery, at from 11s. 3d. to 11s. 6d. f.o.b.; 40,000 tons of best South Durham blastfurnace coke, for delivery at Workington over the next four, five and six months, at from 25s. to 26s. 6d. per ton delivered; and 30,000 tons of best Durham unscreened bunker coal, for delivery over next year, at 12s. 9d. f.o.b. Tyne Dock. The brands of Durham bunkers which have been so heavily sold include Marley Hill, Lambton and Sacriston. Bunkers are in exceptionally heavy demand for forward delivery, but it is stated that, so far as the supply of fuel for the coaling stations is concerned, there is a tendency on the part of steamship lines to revert to South Wales for their supplies, owing to the highness of the prices of north-country bunkers. It is alleged, also, that it is now possible to bunker steamers at Hamburg with north-country coal more cheaply than it can be done on the Tyne. That fact, however, is merely an indication that stores of bunkers, purchased before prices were quite as high as they are now, are not yet quite exhausted, and that holders of bunkers there are missing an excellent opportunity of making increased profits. The local coal market has been rather quiet this week, and there is some ease in prices. After a period of very heavy buying, purchasers are now holding off as far as possible, in the hope of being able to "bear" the market by their abstinence. With colliery bookings so exceedingly good, however, the demand is likely to recur before any serious fall in prices can take place. Quotations for prompt shipment are as follow:—Best steams, Blyths (D.C.B.), 13s. 9d. to 13s. 10½d. per ton, f.o.b., a decline of 1½d. on the week; Tynes (Bowers, &c.), 14s., unaltered; seconds, Blyths, 12s. 3d. to 12s. 6d., a fall of from 3d. to 6d.; Tynes (Hastings or West Hartleys), 12s. 6d. to 13s., from 6d. to 9d. down; unscreened, 11s. 3d. to 12s., weaker; smalls, Blyths, 9s. 3d. to 9s. 6d., from 3d. to 6d. reduced; Tynes, 8s. 9d., 3d. decreased; specials, 9s. 6d. to 10s., from 3d. to 6d. fallen; smithies, 12s. to 12s. 6d., unchanged; gas bests (New Pelton or Holmside), 12s. 9d. to 13s., 3d. lower; seconds (Pelaw Main or similar), 12s. to 12s. 6d., 3d. to 6d. less; specials, 13s. 6d., no change; unscreened bunkers, Durhams, 11s. 6d. to 12s., 1s. fallen; Northumbrians, 11s. 6d. to 12s., easier; coking coal, 12s. to 12s. 6d., unaltered; smalls, 12s., unchanged; households, 14s. 6d., steady; coke, foundry, 23s. 6d., firm; blastfurnace, 21s., well maintained; and gas coke, 20s., stronger. A contract for 80,000 tons best Durham gas coal, for delivery over next year, has been arranged at 12s. 6d. per ton, f.o.b.

Sunderland

COAL.

The exports from Sunderland last week amounted to 94,545 tons of coal and 695 tons of coke as compared with 91,290 tons of coal and 565 tons of coke for the corresponding period of 1911, being an increase of 3,255 tons of coal and 130 tons of coke. The coal market is somewhat affected by the poor arrival of steamers. Collieries are well booked ahead, and little free coal is available for shipment. The market is steady and values are well maintained. Gas coals keep firm, and are likely to remain so for some time to come. Coking and bunker coals are also very strong; there has been a fairly large amount of forward buying of these classes of coal at prices varying from 12s. 3d. to 12s. 6d. per ton. There is, however, at present a pause in this speculative class of business, as merchants hesitate to commit themselves to the high prices asked. Several contracts have been made for large quantities of Durham unscreened bunkers over next year at prices ranging from 12s. 4½d. to 12s. 9d. per ton free on board, and 50,000 tons of best furnace coke is reported sold at 23s., with delivery at the Teesside works over next year. The following are the market quotations f.o.b.:—Special gas, 13s. 6d. to 14s.; seconds, 12s. to 13s.; household, ordinaries, 14s.; bests, 15s.; coking unscreened, 12s. 3d. to 12s. 9d.; smalls, 11s. 9d. to 12s.; smithies, 12s. 6d. to 13s. 6d.; peas and nuts, 13s. to 13s. 6d.; foundry coke, 23s. to 24s.; gas house coke, 20s.; blastfurnace coke, 21s. to 22s. delivered Middlesbrough. Current bunker quotations are: Pease's, South Derwent, Framwellgate, 13s.; Priestman's, Consett, Burnhope, 13s. 3d.; Morrison's Marley Hill, 13s. 6d.; South Hetton, Washington, 12s. 9d.; Bearpark, Brancepeth, 13s.; Ryhope, 13s. 6d.—all free on board South Dock. The outward freight market is firm, the rate to London being 3s. 6d. to 3s. 9d., Hamburg 3s. 9d., Havre 4s. 6d. To the Baltic rates are about the same, Cronstadt paying 6s. 3d. to 6s. 6d., with Swinemunde 6s. Bay is steady at 7s. for Bordeaux. Mediterranean is strong on the basis 11s. 6d. to 12s. for Genoa, with Naples at 12s., Venice 12s. 9d., Alexandria 11s. 7½d. and Port Said 10s. 10½d.; and owing to the scarcity of tonnage, these good rates are likely to continue for some time.

Middlesbrough-on-Tees.

COAL.

Good enquiries are reported for all descriptions of fuel. Demand for gas coal is improving, and best Durhams range from 13s. to 13s. 6d. f.o.b., whilst second qualities are 12s. to 12s. 6d. A plentiful supply of bunker coal meets the very large requirement, and unscreened kinds are 12s. 6d. to 13s. f.o.b., with special kinds up to 14s. Household coke is in slow demand. Coking coal is well taken up both for local use and for shipment, and prices are well maintained. Coke is strong, with a heavy local consumption. Average blastfurnace quality is quoted 21s. and upward delivered at Teesside works. Foundry coke for shipment runs from 23s. to 24s. f.o.b. Gas coke is in the neighbourhood of 20s.

IRON.

Holiday-making is general on Teesside, as is usual during the local race week, and as a result very little business is passing, but the situation altogether is highly satisfactory. Trade is genuinely good, and values are steadily advancing. Small lots of Cleveland pig iron have this week sold at higher rates than have been quoted for over five years, and buyers are expected to come forward very freely so soon as the holidays are over. No. 3 g.m.b. Cleveland pig has changed hands at 62s. f.o.b., and nothing below that price is now named for the ruling quality; whilst No. 1 has been advanced to 67s.; No. 4 foundry has become 61s. 10½d.; No. 4 forge, 61s. 9d.; and mottled and white iron each 61s. 3d.—all for early delivery, rather higher rates being asked on forward account. Some improvement in east coast hæmatite pig can be reported, as was only to be expected with all the consuming industries so full of orders and with cost of production increased by advances in fuel and ore. For mixed numbers, delivered to the end of next month, fully 74s. 6d. has to be paid, and for delivery further ahead nothing under 75s. is named. Higher freights have carried up values of foreign ore, though there is no business doing. Market quotations are now on the basis of 23s. ex ship Tees for rubio of 50 per cent. quality, and freights Bilbao-Middlesbrough are up to 7s. 6d. Practically all the manufactured iron and steel works are closed this week, but many firms are so full of work that they would gladly have remained open if they could have induced the men to work through the holiday week. Prices are strong, and values of several descriptions are expected to be advanced at any time.

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South-West Lancashire.

COAL.

There is a considerable improvement in the buying of household coals for the inland trade, and, indeed, in many grades the orders coming in are quite sufficient to take away the available output. Probably some of this may be due to the anticipation that the summer prices will soon cease, and already some producers who were rather under the usual list have toned up the prices; otherwise, there is no change. Steam coal is fairly active; excursion steamers and liners are taking full quantities, but outside contracts no great volume of business is being done. There is a fair amount of enquiry, but difficulty in being able to find freight in some cases precludes business. Prices of screened Lancashire steam coal remain about the same, from 11s. 3d. f.o.b. to 12s. 3d. for better qualities. In the coastwise and cross-Channel trade the enquiry for household coal is quite as much as can be coped with, and prices have a tendency to harden. For best coal at the moment the price rules at about 15s. 6d. per ton net f.o.b. Garston, with good seconds at 14s. or 14s. 3d. In consequence of the annual holidays coming on at the manufacturing towns, slack at the moment is rather on the easier side in point of demand, but whatever little temporary surplus there is, is willingly put down at the pit mouth as, indeed, forming only the necessary stand-by. List prices remain at from 9s. 9d. to 10s. for rough slack, with good medium grades 9s. to 9s. 3d., and the commoner and smaller sorts at 8s. 6d. or thereabouts—all into wagons at the pit.

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South Lancashire and Cheshire.

COAL.

There is a better demand for house coal and prices are firm, there having been a partial lining-up by sellers who for some time have been selling under the general list. Best house coal is 16s. to 16s. 9d., good medium qualities 14s. 6d. to 15s. 6d., and kitchen qualities 11s. 9d. to 12s. 9d.—all at the pit. Furnace coal is still brisk, and the price steady at about 12s. 6d. per ton at the pit. There is a little more stirring in shipping coal, and the price is steady at about 12s. to 14s. f.o.b. Partington. Slack continues in good call, in spite of local annual holidays being held at different places. Prices are 9s. to 9s. 9d. for best, with seconds at 8s. to 8s. 6d., into wagons at the pit.

IRON.

There was a good attendance on 'Change and prices are very firm. Agents and merchants do not appear to have much to sell; at any rate certainly not for prompt delivery. Good No. 3 pig iron is now quoted at 67s. to 68s. delivered. Forges are extremely busy and very backward with deliveries, the associated iron bars remain at £8 5s., with second quality £7 15s., hoops £8 7s. 6d., sheets £9 5s. Steelworks are extremely busy on bars at £8 to £8 5s., less 2½ per cent., and billets £6 net. Textile machinery makers are very busy. Heavy engineers are not too busy, neither are the boilermakers. Ironfounders could do with more orders. Wagon works are very busy.

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Yorkshire and Derbyshire.

Leeds.

COAL.

Although the attendance on the market on Tuesday was limited owing to the holiday season, the tone all round was cheerful, and a considerable amount of fresh business was dealt with. In addition to a very strong demand for steam and manufacturing coal, there were more enquiries for house-fire qualities, whilst the demand for gas coal was reported to be unusually good. The pits in West Yorkshire have worked nearly full time this week, and the output has been cleared for the various markets daily. The house coal trade has benefited considerably by the cold inclement weather, and at many pits stocks of house coal have been cleared from the sidings. Business with London and the eastern and southern counties has shown a decided improvement during the week, merchants and factors having taken good supplies of the standard qualities, both in private and railway wagons. A number of additional contracts are reported at from 1s. 6d. to 2s. per ton advance on the figures quoted a year ago. Reports from London indicate a much better state of things in the retail trade, and it is expected locally that lowest summer prices will be withdrawn this week and an advance of probably 1s. per ton declared. Pit prices are very firm and may be summarised as follow:—Haigh Moor selected, 14s.; Wallsend and London best, 13s.; Silkstone best, 13s. (special qualities, 13s. 6d. to 14s.); Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. to 11s. 6d. The coastwise trade has been hampered through lack of suitable tonnage, and freights are high. A good business is being done with Thames merchants and also on the south coast. It is reported that a fairly large contract for medium quality Silkstone house coal has been booked for shipment for the south coast at 14s. 9d. per ton f.o.b. Hull. For fairly prompt shipment at Hull the following f.o.b. figures are quoted:—Haigh Moor best, 15s. 6d. to 16s. 0d.; Silkstone best, 14s. 9d. to 15s. 6d.; Silkstone house, 14s. to 14s. 6d.; large house nuts, 12s. 9d. to 13s. 6d. West Riding merchants report a better state of things at the depots. Best coal sells more readily, but the chief demand runs on the secondary sorts. The following pit prices are well maintained:—Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. 6d. to 16s.; Silkstone house, 14s. 6d. to 15s. 6d.; ordinary house coal, 14s. to 15s.; secondary qualities, 12s. to 13s. 6d. All descriptions of manufacturing fuel are in good demand with pit prices steady, and supplies rather more plentiful. Current quotations:—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slacks, 8s. to 9s.; small slacks, 7s. to 7s. 6d.; coking smalls, 6s. 6d. to 7s. The price of washed furnace coke tends upwards, best qualities realising 16s. 6d. per ton at the ovens, with average qualities about 16s. The output is much below market needs, and there are no stocks. The gas coal pits are working full time, and no difficulty is found in selling the output. Buyers are showing more willingness to place contracts at about 2s. per ton advance on coal and 2s. 6d. advance on nuts. Current pit prices:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal 9s. to 10s. The demand for gas coal for export is even better than last week. Fairly prompt shipments realise the following f.o.b. Hull figures: Screened gas coal, 12s. 6d. to 13s. 6d.; gas nuts, 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d. to 12s. 6d.

Barnsley.

COAL.

Though the annual holiday for the town has fallen this week, very few collieries have been affected, and the men generally have attended regularly, so that about an average output has been made. This is satisfactory in view of the active state of trade which almost without exception is again experienced. The vigorous demand on export account is unabated, though considerable delay has been felt at Hull owing to the difficulty of vessels landing promptly, and to some extent trade has been diverted to the new Immingham Dock particularly from collieries situated nearer to Doncaster which gives them a direct access to the new outlet. Buyers continue in their enquiry for forward delivery, and the brisk state of the home trade enables sellers to hold prices very firm; but so far as the best quality steams are concerned, slightly higher prices than a week ago are spoken of, and generally little has been done to arrange for deliveries forward. Where prompt delivery can be given, the best large steams are making 12s. 6d. per ton pit. and in the case of secondary sorts up to 11s. 6d. per ton is being made, but there is some slight indication that the latter figure cannot be obtained for short contracts to the end of the shipping season. There is no change to record in regard to the smaller class of steam coal, the output of which is generally well cleared for home purposes. The best quality washed nuts are selling at from 9s. 6d. to 10s. 6d. per ton, secondary sorts 8s. 9d. to 9s. 3d. per ton, best quality slacks 7s. 9d. to 8s. per ton, and rougher sorts from 6s. 6d. per ton. The house coal trade continues to benefit from the colder weather, and buyers now realise that there is little prospect of present quotations being reduced, and are seeking to lay in stocks to avoid the usual winter advance of 1s. per ton, which will probably be enforced at an earlier date than usual. Though the collieries are kept at full work, stocks of house coal are only small, and sellers are in an unusual strong position to command higher prices. For the present quotations are:—Best Silkstone 13s. 6d. per ton, Best Barnsley softs 12s. 6d. per ton, seconds 10s. 6d. to 11s. 6d. per ton, house nuts from 9s. to 10s. per ton. The situation in regard to gas coal contracts is being cleared up more quickly than of late, and there is no doubt that gas companies by delaying the question of renewing contracts have done much to weaken the position of the coalowners. Stocks have become somewhat troublesome, and the unity which was supposed to exist in demanding from 2s. to 2s. 6d. per ton advance has not been maintained. Of late competition to secure substantial contracts has been keen and it is now stated that renewals have been obtained at from 1s. to 1s. 6d. per ton, though no doubt the finer qualities of fuel suitable for this purpose have commanded the higher rate of increase. The business done in coke continues to be of a very active character, and producers have no difficulty in disposing of the output at the higher prices which have ruled of late—namely, about 16s. per ton.

Hull.

COAL.

The market throughout the week has been characterised by great firmness, and prices generally show an advance on those of the previous week. The prompt demand is very strong indeed, and 15s. 6d. has been freely paid for best Yorkshire steam hards to complete cargoes, while the sellers' price to-day on the Exchange was advanced to 15s. 9d. The exceptionally brisk demand applies to nearly all kinds, exporters who lagged behind in the early part of the year now being very busy completing their arrangements to the end of the Baltic season. There is very little forward business doing, the prices asked by the colliery proprietors being considered too high and precluding negotiations at present. There is a little more enquiry for house coal, and gas coal is still in strong request. This has been another very busy week at the docks, exceedingly large quantities having been shipped for foreign destinations. There has been a big call upon the appliances, and turns have not been very prompt. Nevertheless, despatch generally has been fairly good, and leaves little to complain about, at what is always a very busy period. One effect of the waiting for turns has been seen in the dulness of the freight market, charterers holding off apparently till some of the pressure has been removed. The docks are also congested with timber vessels recently arrived from the Baltic and White seas. These when discharged as a rule take coal for the return journey and keep up the supply of tonnage so much needed. Rates are considerably easier on the week, Hull to Cronstadt being quoted at 6s. to 6s. 3d.; while the near Continental ports, Hamburg and Rotterdam, are worth 4s., and Danish ports 7s. 6d., at which latter rate a 1,000-ton steamer was fixed for Nakskov. There is little doing in the Mediterranean direction yet awhile. The following are the approximate prices ruling for prompt shipment f.o.b. at Hull:—South Yorkshire. Best steam hards, 15s. 3d. to 15s. 9d.; washed double screened nuts, 13s. 6d.; unwashed double screened nuts, 12s. 9d.; unwashed single screened nuts, 12s. 9d.; washed smalls, 11s.; West Yorkshire: Hartleys, 12s. 9d. to 13s.; rough slack, 10s. 3d. to 10s. 6d.; pea slack, 8s. 3d.; best Silkstone screened gas coal, 13s.; best Silkstone unscreened gas coal, 12s.; Derbyshire and Notts: Best steam hards at Hull, 14s. 6d. to 14s. 9d.; best steam hards at Grimsby, 14s. 3d. to 14s. 6d.; Derbyshire nuts (doubles) at Hull, 12s. 6d. to 13s.; Derbyshire nuts (doubles) at Grimsby, 12s. 6d.; Derbyshire large nuts at Hull, 13s.; Derbyshire large nuts at Grimsby, 12s. 6d. to 12s. 9d.; Nottinghamshire hards at Hull, 14s. 6d.; Nottinghamshire hards at Grimsby, 14s. 3d.

Chesterfield.

COAL.

For the time of the year, the amount of business that is passing in the house coal branch of the trade is satisfactory, and justifies the belief that there will be an active condition of things during the approaching autumn and winter months. Prices are firm, on the basis of the recent improved quotations. Orders are coming to hand in satisfactory numbers. Stocks are low at the collieries. Fuel for manufacturing purposes continues in great demand, and the smaller qualities, such as cobbles and nuts for gas-producers, are in particularly active request. Prices are still moving upwards. Slack for steam-raising moves freely; the demand is stronger than it has been for many years, and prices are correspondingly higher. Considerable difficulty is experienced by consumers in obtaining the supplies which they require. Stocks are completely exhausted on colliery premises, and consumers have little or no slack on hand as a reserve. Steam coal for locomotive purposes is in great demand, owing to the increasing consumption on all the railway systems, which is an encouraging sign. Railway companies readily avail themselves of any extra supplies. The export trade is in a state of considerable activity, and heavy shipments of steam coal are being made. Prices are firm, with a hardening tendency. Cobbles and nuts are in good demand for near Continental ports, but the supply is by no means plentiful. Washed nuts and washed slack are much wanted, and prices are higher than they have been for several weeks past. The coke market maintains the strong position which has of late characterised it. The demand is much in excess of the supply. Coking fuel continues scarce and dear. Quoted prices are as follow:—Best 13s. 6d., seconds 12s., cobbles 11s., nuts 10s., slack 8s.

IRON.

In all branches of the iron trade there is considerable activity. The demand for pig iron and manufactured bars is very great, and much difficulty is experienced in satisfying customers' requirements. The amount of work on hand is such as to keep the plant of the district engaged to its full capacity certainly to the end of the present year.

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Nottingham.

COAL.

Business in the house fuel section of the coal trade in Nottinghamshire has shown an improvement during the last few days. Sales at the landsale depots have been better, whilst local merchants have had increased orders. This improvement is attributable in a great measure to the exceptionally cold and rainy weather which has prevailed of late, and caused householders to resort to fires. Nevertheless, the demand has not so far been sufficient to make a material reduction in the stocks at collieries, most pits turning this class of fuel still working short time. With the supply being abundant, values are not firm, and some owners are selling at prices slightly under the 2s. 6d. per ton advance on last summer's rates. Generally speaking, pit prices are practically the same as a week ago, hand-picked brights making 12s. 6d. to 13s. per ton, good households 10s. 6d. to 11s. 6d., nuts from 9s. to 11s., cheap kitchens 7s. to 8s. 6d. For steam coals the demand is consistently active, and most of the pits are fully employed. Orders on export account are coming to hand freely, and there is a good demand in the home market for industrials. Prices are firm, best steams being quoted at 11s. to 11s. 6d. per ton; seconds, 9s. to 10s. Gas fuel is in moderate request. The position of slacks is fairly satisfactory.

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Leicestershire.

COAL.

The improvement in business noted last week has further developed. Buyers have been operating more freely, and a fairly good amount of new business has been placed during the week. There has been a brisker demand for household coals of all qualities, the better kinds being in considerably greater request. Small household coals have also improved. This market is showing a distinct tendency to revive. The demand for steam coals continues undiminished. Cobbles are in good demand, and there is a brisk enquiry for special slacks; these, which usually in the summer season have declined, have this year continued in request with little alteration. The usual run of slacks are also wanted. There is a distinctly better tone in the market and deliveries have been heavier. Some collieries are holding very little stock indeed and, generally, the amount of coal on the pit banks is not heavy. No doubt the inclement season is being felt by local merchants, who are generally busier than they have been for some weeks. There is not any appreciable movement in market rates, prices are fully upheld and business is only done at full late rates. Prospects for the near future, at any rate, appear quite encouraging.

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South Staffordshire, North Worcestershire and Warwickshire.

Birmingham.

COAL.

The coal trade is beginning to move. Next week it is expected that new lists will be issued announcing an advance in price from September 1, probably of 1s, as a preliminary to another advance a few weeks later. In that case the price of household fuel will be about 3s. a ton above that of September last year. Meanwhile, merchants have been buying heavy quantities for stock at present prices in view of a brisk autumn demand, and householders are largely anticipating the advance by purchasing now. For the time of year, therefore, the household department is quite good. All kinds of works fuel are in active request, in keeping with the activity prevailing in consuming industries, and prices are firm.

IRON.

The weekly meeting of the South Staffordshire iron trade showed that the general conditions throughout the district continue satisfactory. True, the fresh business concluded did not reach to a large amount. We are between seasons as regards buying, and the uncertainty of the harvest prospects is also a factor. But the general tone underwent no weakening. Plenty of business is already booked, and the enquiries for additional business point to a larger trade. With all the consuming works operating at full pressure to execute current orders, producers of pig iron have no stocks, and are scarcely able to comply with the ready calls of customers. They could easily sell their output for some months ahead, but the prospect of dearer fuel makes them hesitate. Already furnace coke is 20s. and 21s. a ton, the latter figure being the more general. Naturally, users are anxious to secure themselves against possible further advances, but sellers are careful, and recently have been quoting slightly increased rates. South Staffordshire common fetches 58s. 6d., and Northamptonshire 61s. to 62s., these being the brands mostly consumed in the district. Bar iron makers are experiencing a steady flow of business, and prices remain at £9 10s. for standard qualities, and £8 5s. for common bars. A steady demand for black sheets attests continued activity in the galvanised sheet branch. The basis price of the latter is now £12 2s. 6d. a ton f.o.b. Liverpool, but for good export orders £12 is still accepted. Gas strip and hoops remain unchanged, and the works are fully occupied. The steel mills are as busy as can be, and customers keep clamouring for deliveries. For billets and sheet bars quotations are £6 and £6 2s. 6d. for Bessemer and Siemens qualities respectively. The heavy industries of the district—such as railway carriages and wagons, boilers and tanks, roofs and colliery appliances, chains and anchors—are in full activity. Copper sheets are £95 a ton, a figure at which they have stood for the last fortnight.

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Forest of Dean.

Lydney.

COAL.

The house coal trade of this coalfield has been developing a firmer tendency during the past few days, and many of the pits have put in five days' work without adding to stock. Buying is likely to increase before the month closes, as many merchants will probably take advantage of the present prices to lay in good stocks. Shipments have been well maintained during the week, and the inland merchants are ordering more freely of late. Quotations continue on the basis of—block 15s. 6d. at pit, and 17s. 3d. f.o.b. Lydney or Sharpness, with the other qualities as given last week. All steam coals are in good request, and the collieries are turning out very satisfactory outputs. There are no stocks

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THE WELSH COAL AND IRON TRADES.

Thursday, August 22.

North Wales.

Ruabon.

COAL.

Following upon the settlement of the Birkenhead dockers' strike, all the dockers are now in full work. There are a number of vessels which have coaled there during the past week, and this has helped the North Wales collieries materially, and the general condition of the coal market in this district has greatly improved. The continued strike had caused the output from the collieries to be reduced, and stocks had accumulated, but these have been cleared during the past week, and at the time of writing there is scarcely a single colliery of any note that is holding any quantity of fuel on hand pending enquiries and orders. This slight boom has caused the prices to harden somewhat, and increased prices to the extent of 1s. to 2s. per ton for steam fuel are being asked, and easily obtained. The future outlook is also bright. Colliery proprietors are growing quite confident that times are going to be better in the near future, and considerably increased prices will be obtained. In the hopes of this being so the merchants' contracts are not being sought; in fact, merchants who insist, so far as they are able to do so, on having a contract, are having to pay a matter of 2s. per ton over and above ruling prices for house coal, and there appears to be little or no difficulty in obtaining this advance. The household coal trade has improved with the other departments. Landsales are increasing, and the price obtained is, on the average, the same as previously quoted—viz., an average of 18s. 4d. per ton. Railway companies are taking large quantities of steam fuel against their contracts, and so are the gas companies. The latter have now commenced on their new contracts, and at the annual meetings of the various gas companies in this locality which have recently been held special attention has been paid to the advanced prices which they have had to pay in renewing their contracts for coal—the result of which is, in many cases, an immediate advance in the price of gas to the extent of 2½d. to 3d. per 1,000 cubic feet. Evidently the gas companies do not mean to stand the brunt of the advance, and once more the public will have to pay ultimately. The manufacturing works in clay and iron are working full time, and are taking good quantities of the smaller and cheaper fuel. Steam coal (large) which is sold outside of contracts to-day is being sold at 12s. to 12s. 6d., smaller sorts 1s. per ton less. Best quality large household coal is finding a fair market at prices up to 16s. per ton, and seconds 1s. to 1s. 6d. per ton less than this figure. Slack is well sold at the steady figure of 7s. per ton for good rough quality, and all the nuts made are disposed of at an average price of 11s. per ton f.o.r. Gas coke does not vary in price, and 15s. is still the standard figure.

Monmouthshire, South Wales, &c.

Newport.

COAL.

The conditions subsisting in the local steam coal trade remain much as last week, a dominating firmness prevailing throughout the market. Quotations for the present month are well maintained despite the fact that tonnage is not so plentiful as shippers desire, while for further ahead, sellers remain very firm in their quotations. Buyers are by no means in agreement with them as to the probable course of events, and are holding off for a time in the hope of seeing prices take a downward trend. The effect of recent legislation upon costs of colliery outputs must not, however, be forgotten, and few people interested in the trade expect ever again to see such low prices as during the last two or three years even. Here and there a small parcel of large coal may be secured at a clearing price, but smalls maintain their position firmly. Patent fuels are a shade higher, while house coals are beginning to interest buyers. Pitwood continues to arrive in less quantities than buyers desire, and the present high values will probably be upheld until the conclusion of the French harvest releases labour to expand the export of wood from across the Channel. Latest approximate ruling quotations may be taken as follow, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 9d. to 16s.; western-valleys, ordinaries, 14s. 9d. to 15s. 3d.; eastern-valleys, best, 14s. 3d. to 14s. 9d.; other sorts, 13s. 9d. to 14s.; colliery smalls, best, 9s. to 9s. 3d.; seconds, 8s. 9d. to 9s.; inferiors, 8s. to 8s. 6d.; screenings, 9s. 3d. to 9s. 6d.; house coals, best, 18s to 18s. 6d.; seconds, 18s. 6d. to 17s. 6d.; through coals, 10s. 9d. to 11s.; nuts, best washed, 11s. 3d. to 11s. 6d.; patent fuel, 18s. to 18s. 3d. Coke: Furnace, 22s. to 25s.; foundry, 26s. to 30s. Pitwood: Best French fir, 24s. to 25s. ex-ship.

IRON.

The local iron and steel trades maintain the firmness which has been the outstanding feature of the past month. Steel bar makers continue busily employed and being well booked with orders quote very firmly for any new business. Welsh bars are now listed £5 12s. 6d. to £5 15s. Bessemer, and £5 15s. to £5 17s. 6d. Siemens. Imports of both German and American bars continue to arrive in large quantities, being consigned both to local mills and Midland destinations. Rails continue firm and mills are busily employed. The pig iron market manifests a strong tone, a brisk demand prevails and Welsh hæmatite is now quoted 80s. to 82s. 6d., delivered to works in the district. Coke continues scarce and very dear, the local make being insufficient for requirements, and enquiries are being thrown out for supplies from other sources. A general rise in the galvanised sheet trade may be confidently expected, as present rates do not accurately represent the cost of production, for both here and in the tinplate trade the values of raw materials have greatly increased of late. Tinplates nominally remain unaltered, but makers, being well booked, are not accepting further orders, except at their own values, which are in excess of official quotations, which are based upon 14s. 9d. for 1 C's 20 × 14 × 112 Bessemer or Siemens. Finished blackplates remain at £11 10s. per ton.

Cardiff.

COAL.

The situation in the coal market this week may be described as that of simply marking time, both on the part of buyers and sellers, neither showing the slightest indication to modify their views as to the future. Shipments for the week were not at all satisfactory, only amounting to a little over 280,000 tons, but the meagreness was no doubt due in great measure to so many miners being on their holidays. The tonnage in dock has been fairly uniform, the record each day being from 200 to 220 vessels. For the present all the best collieries have practically full stems, but once more the difficulty of obtaining tips has manifested itself both at Cardiff and Barry. In some cases vessels had had to wait days before being able to get beneath a tip, and this notwithstanding the fact that the coal was practically on the dock quays awaiting shipment. There is no doubt that this question of tipping accommodation is going to be a very pressing one, as it is pretty certain that the outputs of the collieries in the near future will be so great as to render it almost impossible for the dock companies without extra accommodation to deal with them. Whenever this happens it will mean either that the collieries will have to resort to frequent stoppages, or trade will be directed to other ports, where the same difficulties as regards loading are not experienced. Another point which appears to be lost sight of is that the construction of another dock would take years to complete—the Queen Alexandra dock, though authorised in 1894, was not available for traffic until 13 years afterwards—and if similar delay occurred again, long before the necessary accommodation could be provided, a large number of new collieries will be producing coal on a scale that will seriously hamper them. As is well known to all experts, modern collieries are laid out now with the object of producing considerably larger outputs than the older collieries were ever able to accomplish. This, of course, would accentuate matters. Although there has been a steady supply of tonnage the last few days, freights still keep at a high level. There are temporary fluctuations, of course, but the average level maintained is much higher than is usual at this time of the year. Many contractors profess to believe that a fall in rates must sooner or later inevitably take place, but that is not the view entertained by shipowners. They are looking forward with great confidence to next year, and are confident that freights will continue high for a considerable time to come. It is true that a large number of new vessels are in course of construction, but when the returns for the shipbuilding yards are analysed it is found that, comparatively speaking, the number of cargo boats on the stocks is small. The principal steamers being built are tank steamers, for the use of the oil trade, passenger boats, and unfortunately men-of-war. As an indication of the probable course of the freight market in the future, it may be mentioned that a contract has been arranged over the whole of next year from Cardiff to Genoa at no less than 10s. 6d.—a figure that is almost if not absolutely without precedent. As the current rate is now from 11s. to 11s. 3d., it represents only a difference between that and the extended contract of 6d. to 9d. Chartering lately has not been on an extensive scale, the tonnage taken up last week amounting only to about 244,000 tons, and it is anticipated that the tonnage question will be very difficult for at least a couple of months to come. With regard to prices, there is not much change to report. Best steam coals are 17s. 3d. to 17s. 6d. The best collieries, in the majority of cases, are obtaining the latter figure. Superior Admiralty seconds are 16s. 9d. to 17s., whilst ordinary seconds are 15s. 9d. to 16s. 3d. per ton. The White Star Steamship Company are reported to have covered their requirements for the greater part of next year. These amount to about 250,000 tons, which has been divided in fairly equal proportions between the Lewis Merthyr collieries, the Powell Duffryn collieries, and Messrs. Mann, George and Co. What price has been obtained has not been disclosed, but it is understood to range from 16s. 3d. to 16s. 9d., f.o.b. Coalowners continue to take a very serious view of the enhanced cost of production over next year. From what has been allowed to transpire of the deliberations of the Miners' Federation of Great Britain, it is evident that the delegates were by no means satisfied with the action of the Wages Boards formed under the Act; but as the reports sent in from the various districts only covered operations up to about the middle of July, it is probable that a very different complexion will be given to the situation when the next reports are received. This will be at the annual conference to be held at Swansea in October. The sacrifices entailed by the late strike are almost sure to have a sobering effect on the delegates. During the six weeks that that strike lasted, it is estimated that the loss in wages amounted to nearly £7,000,000. The Federation, therefore, have not the wherewithal to carry on another campaign, and in this fact lies the hope, notwithstanding the threats of drastic action to which utterance has been given, that no serious trouble will be encountered. It would indeed be a pity if anything should occur to retard the epoch of prosperity which appears to be in progress. From the Bristol Channel last month the shipments to foreign countries amounted to 2,801,866 tons, as against 1,756,083 tons in the corresponding month of last year, being an increase of 1,045,783 tons. Taking the returns for the seven months from January 1 last, there is still a deficit of 899,148 tons as compared with the same period last year, but before another month passes that difference is almost certain to be wiped out. From Cardiff alone last month the exports were 1,770,649 tons, an increase of 725,075 tons. From Newport there was an increase of 90,534 tons; from Port Talbot one of 90,412 tons; and from Swansea one of 139,989 tons. The *Cardiff Journal of Commerce* publishes a table showing the average declared price per ton of coal exported from the chief British ports during the month of June. The following relates to the Welsh ports:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	16	3	15	3	17	0	15	8
Through-and-through	12	9	11	4	10	1	10	3
Small	8	5	10	2	7	11	8	10
Large anthracite	21	8	29	4	15	5	16	9
Household	16	7	—		—		18	1

For the month of June last year, the prices were:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	15	5	14	5	15	3	13	7
Through-and-through	11	8	11	11	9	8	9	11
Small	8	9	10	0	7	3	8	6
Large anthracite	—		—		12	0	16	4
Household	17	7	—		15	3	15	9

The following table shows the exports to the chief countries of the world as compared with July 1911:—

	June 1911. Tons.	June 1912. Tons.
Russia	38,806	107,393
Sweden	14,162	30,693
Norway	6,758	15,723
Denmark	4,599	5,468
Germany	23,492	31,708
Netherlands	9,580	18,955
Belgium	30,316	53,521
France	348,243	589,295
Algeria	34,654	51,056
Madagascar	4,809	5,754
Portugal	29,379	60,300
Madeira	7,472	9,091
Spain	70,051	112,067
Canary Islands	48,095	80,519
Italy	407,797	601,434
Austria-Hungary	17,668	24,012
Greece	34,007	14,623
Roumania	19,487	32,826
Turkey (European)	10,227	16,481
,, (Asiatic)	19,651	22,455
Egypt	153,429	193,676
Tunis	4,007	16,525
Peru	635	6,827
Chili	20,872	45,311
Brazil	85,633	100,851
Uruguay	31,035	51,150
Argentine Republic	156,801	293,173
Channel Islands	3,491	8,505
Gibraltar	9,109	12,120
Malta	19,554	32,304
Aden	11,669	12,169
British India	1,796	5,985
Ceylon	11,362	31,759
Canada	4,029	5,529
West Africa (French)	17,867	12,575
,, (Portuguese)	24,821	48,286
,, (British)	6,532	1,910

The largest increase was to France, namely 241,052 tons; to Italy the increase was 193,637 tons; to the Argentine Republic 136,372, to Russia 68,587, Spain 42,016, Egypt 40,247, Portugal 30,921, Belgium 23,205, Sweden 16,531, Canary Islands 32,424, Chile 24,439, Brazil 15,218, Uruguay 20,115, Ceylon 20,397, and Portuguese West Africa 23,465 tons. The small coal market keeps very firm, best bunkerings realising from 11s. 3d. to 11s. 6d., best ordinaries 10s. 9d. to 11s., cargo qualities 10s., lower grades 9s. 6d. per ton. Washed nuts are 15s. 6d., and washed peas 13s. 6d. A steady trade is doing in Monmouthshire coals. There is very little free coal about, but sellers hold out for the top values over the remainder of the month. Best Black Veins are 15s. 9d. to 16s., western-valleys 15s. to 15s. 3d., and eastern-valleys 14s. 3d. to 14s. 6d., in each case f.o.b. Cardiff. It is reported that the Midland and Great Western Railways of Ireland, who were in the market recently for 120,000 tons of coal, have contracted with Messrs. Partridge, Jones and Co. for the supply. Bituminous coals are quoted:—No. 3 Rhondda large 17s. 3d. to 17s. 6d., through-and-through 14s. 6d. to 15s., and small 12s 6d. No 2 large 13s. to 13s. 3d., through-and-through 11s. 6d., and small 9s. 9d. to 10s. per ton. The patent fuel market is very firm, Crown brands still realising 19s., and other qualities 18s. to 18s. 6d. per ton. Shipments for the week exceeded 30,000 tons, the Crown company exporting 9,800 tons, other Cardiff firms 6,100, Swansea 12,050, and Newport 2,570 tons. In coke there is practically no change. Special foundry is 27s. 6d., ordinary 25s., and furnace 20s. per ton. Pitwood is 24s. per ton.

IRON.

There is at present a record number of sheet and tin-plate mills at work. No fewer than 503 are in operation, being an increase, as compared with the corresponding period of last year, of 63. The shipments last week amounted to 165,440 boxes, being 79,468 boxes in excess of the receipts from works, and stocks are now down to 102,832 boxes. Although a fair number of orders are coming forward, manufacturers find great difficulty in enforcing better prices, and Bessemer standard cokes are in some cases still selling at 14s. 7½d. and oil sizes at 14s. 9d. to 15s. per box. The breakage of machinery at the Morriston Mills will, it is believed, keep the six sheet mills idle for several weeks to come. There is an excellent demand for steel bars. Owing to several furnaces being out for repair, the local supply is quite inadequate to meet the wants of consumers, and large quantities still continue to come forward from Germany and America. Bessemer bars are £5 12s. 6d. to £5 15s., and Siemens £5 15s. to £5 17s. 6d. In some cases, where delivery is urgent, a premium of 2s. 6d. is obtainable. The bar mill workers at the Dyffryn Steelworks, Morriston, are under notice, but there is no dispute between the employer and his men, the warning being due entirely to the prospective changes incident to the transfer of the operations from the old mill to the new and more extensive one now nearing completion. The galvanised sheet trade continues to improve, the shipments for last month showing an increase of 57,162 tons. Makers are stiffening their quotations, which for 24-gauge corrugateds are now £12 per ton, but that is still considered too low in view of the enhanced cost of production. Welsh pig iron continues to advance, mixed numbers being now 78s. 6d. to 79s. f.o.t. An active demand has set in for rubio iron ore for delivery next year. Ore with 50 per cent. basis is now 20s. 6d. to 21s. Scrap metals are somewhat fluctuating. New steel crop ends are 60s. to 61s.; heavy steel, 55s.; old steel rails (mixed sections), 57s. 6d.; heavy wrought, 53s.; and cast scrap, 57s. 6d. per ton. Double-headed iron and steel rails are down to 62s.

Swansea.

COAL.

Last week the trade of the port was again of a favourable nature. Both the coal and patent fuel trades were brisk, the shipments amounting to 92,583 tons. There was an average attendance on 'Change this morning, but the anthracite coal market showed little sign of activity. Collieries, however, were well provided with stems. The quotations for best large were upheld and Swansea Valley large continued strong. Red Vein qualities were steady. Machine-made cobbles were difficult to secure, with prices very firm, whilst machine-made nuts and beans remained in good demand, and peas were steady to strong. A slight easiness was noticeable in the demand for rubbly culm and duff. In the steam coal market qualities of large were in good demand and prices slightly hardened. Enquiries for through-and-through were not pressing; consequently, prices were a little easier. The closing quotations were approximately as follow:—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 17s. to 19s., less 2½ per cent.; Red Vein large, 13s. to 14s. 6d., less 2½ per cent.; machine-made cobbles, 22s. to 24s.; Paris, French, and German nuts, 23s. to 25s. 6d.; beans, 21s. to 23s. 6d.; machine-made large peas, 13s. to 14s. 6d.; ditto fine peas, 11s. 6d. to 13s., all net; rubbly culm, 7s. 6d. to 8s., less 2½ per cent.; duff, 5s. 6d. to 5s. 9d., net. Steam: Best large, 18s. 9d. to 19s.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 18s. 6d.; through-and-through, 16s. to 16s. 6d.; small, 12s. 6d. to 13s. 3d., all less 2½ per cent. Patent fuel, 17s. to 18s., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

During the past week the steel trade was in a flourishing condition, and there was ample demand for locally-produced bars. There was an average yield of pig iron, and a continuance of activity was observable at the tin-plate works throughout the district. The full complement of hands were regularly employed at the Mannesmann Tube Works. The shipments of tin-plates last week were 165,440 boxes, receipts from works 85,972, whilst stocks remaining in the dock warehouses and vans were 102,832 boxes.

Llanelly.

COAL.

The coal market in this district is in a very satisfactory position and the outlook is quite cheerful. There is every appearance of the coming winter being busier than for several years past, and buyers are doing all they can to book up over the next few months. There is a scarcity of several kinds, and it is increasingly difficult to get anything like prompt delivery. Shipments during the past couple of weeks have been exceedingly heavy, and as boats are getting more plentiful collieries will be kept very busy for some time to come. The position is very promising in the anthracite market for all coals, and it is expected that there will be an unusual demand over the next six to nine months. Large of all kinds are going well at higher figures and the machine-made qualities are improving. It looks as though the horticultural market will get very firm during the coming months. The machine-made sorts, culm and duff have a good enquiry. The steam and bituminous market is stronger than it has been for some months and there is every prospect of prices getting higher during the next few weeks. Prices this week are:—Best malting large, 21s. to 23s.; second malting large, 20s. to 22s.; Big Vein large, 16s. 6d. to 18s. 6d.; Red Vein large, 13s. 6d. to 14s. 6d.; machine-made large cobbles, 21s. to 23s.; German nuts, 22s. to 23s.; French nuts, 22s. to 24s.; Paris nuts, 22s. to 24s.; machine-made large beans, 22s. to 24s.; ditto second quality, 20s. to 22s.; machine-made large peas, 14s. to 15s.; rubbly culm, 8s. to 8s. 6d.; duff, 5s. to 5s. 6d.; large, 13s. to 14s.; through-and-through, 10s. 9d. to 11s. 3d.; small steam, 8s. 6d. to 9s. 6d.; bituminous small, 10s. 6d. to 11s.—all f.o.b

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⁂ *For other Miscellaneous Advertisements see Last White Page.*

Forthcoming Annual Meetings.

Institution of Mining Engineers—
Provincial Meeting (Birmingham) September 11, 12 & 13, 1912
Midland Counties Institution of Engineers Sept. 1912
Manchester Geological and Mining Society, Oct. 8, 1912
North Staffordshire Institute of Mining and Mechanical Engineers ... ... October 14, 1912
South Staffordshire and Warwickshire Institute of Mining Engineers ... October 1912 (2nd week)
Iron and Steel Institute—
Autumn Meeting ... ... September 1912
Association of Mining Electrical Engineers—
October 4 & 5, 1912 (Provis.)

The Colliery Guardian.
LONDON, FRIDAY, AUGUST 23, 1912.

With this issue of the *Colliery Guardian* we present our annual supplement giving in an abridged form the reports of the divisional inspectors of mines for 1911.

The special conference of the Miners' Federation of Great Britain concluded at Blackpool on Friday afternoon. A resolution was unanimously carried, on the recommendation of the Business Committee, expressing strong dissatisfaction with the rates and rules under the Minimum Wage Act, especially in regard to the fact that with few exceptions no award had provided for paying 5s. per day to low-paid workmen, and that in many instances the independent chairmen have not had a reasonable regard to the average wages of pieceworkers in fixing the minimum wage, also with those awards which required 100 per cent. attendance at work to qualify for the minimum wage, and the serious delay of many owners to pay arrears of wages due under the awards. This conference also strongly condemned the action of those owners who were coercing or bribing workmen to contract out of the provisions of the act. The executive committee was empowered to convene another conference to deal with any difficulties that might exist at a future date.

A meeting was held on the 19th inst. of the South Wales District Board, under the presidency of Viscount St. Aldwyn, to consider special claims for consideration put forward by several groups of colliery owners. His lordship deferred his decision.

A meeting of the Miners' Conciliation Board for the Federated area was held at Westminster Palace Hotel on Tuesday to consider the application of the men for an increase in wages of 5 per cent. Lord Coleridge, who has accepted the post of independent chairman, rendered vacant by the death of Lord James, presided for the first time. It was resolved that the meeting be adjourned until some day to be fixed by the joint secretaries and approved by the chairman, and that in the meantime there should be a conference between both sections of the Board.

At a late hour on Monday night, a miner and his drawer were killed and two others were more or less seriously injured by a fall in the Dunfermline Splint section of the Fife Coal Company's Kinglassie Colliery.

Mr. Andrew Sharp, the general secretary of the Cumberland Miners' Association, has announced his impending resignation owing to advancing years and ill-health. Mr. Sharp, who is 71 years of age, is the "father" of the Labour movement in Cumberland, and has been secretary of the association since its establishment 40 years ago.

Part I (District Statistics) of the Chief Inspector of Mines' General Report on Mines and Quarries has been issued.

One of the rescue team from the Manvers Main Colliery engaged in recovery work at the Cadeby Main Colliery, lost his life on Sunday night through the mouthpiece of his apparatus accidentally becoming detached.

The Board for Mining Examinations has issued a notice, reprinted in this issue, relating to the arrangements under the Coal Mines Act, 1911, for the examinations for certificates of competency as manager and under-manager of coalmines and for certificates of qualification as mining surveyor which have been approved by the Secretary of State. Two examinations will be held in each year, commencing on Tuesday in the last complete week of May, and in the last complete week of November respectively. Each examination will be held simultaneously at the following centres: — Edinburgh, Newcastle, Sheffield, Wigan, Cardiff, and Birmingham. An order to this effect has also been issued.

Nationalisation of Mines.

Nationalisation of mines has for many years been the big gooseberry of the Miners' Federation, and it will probably serve a like purpose for many a long day. At the moment interest centres in the Bill which has been drafted by the executive of the Miners' Federation of Great Britain, certain details of which have been made known, by which it appears to be proposed that the State should take over the mines at a valuation by means of Government stock, carrying a fixed dividend of 3 per cent. per annum, the present owners being given the option of taking it up. Before, however, anything can be said as to the feasibility of such a proposition, it is necessary to know more about the basis upon which the proposed valuation would be made. It is stated that one of the provisions of the bill would enable the Government to take the necessary surface and work any royalty they might require for mining purposes, but it is not proposed to purchase the royalties. If this is so, the so-called valuation would be a farce. It would be confiscation pure and simple, upon the Socialist plea that minerals ought not to be the property of any individual since no money has been invested in placing the mineral where it happens to be. Such an argument is obviously unsound. The proved minerals of this country have in many cases been bought and sold several times over. Mineral rights have been a marketable asset for generations. It is therefore absurd to argue as if existing owners had acquired these rights without effort or outlay, or as if their lands had become subsequently impregnated with minerals by some dispensation of Providence without their knowledge.

If the proposition of the executive of the Miners' Federation is that the State shall purchase merely the present market value of the colliery plant and other items upon which the capital of the concern has been expended, and confiscate the royalties and wayleaves, it may well be that the purchase price would not reach an impracticable figure, but we do not think the country has yet advanced so far upon the road to communistic socialism as to sanction such an obviously unjust proceeding.

The subject of nationalisation of mines came up for discussion last week at the annual conference of the Scottish Miners' Federation, and further light was then thrown upon the Socialistic view of the question. One of the arguments put forward in favour of State ownership was that by this means the earnings of the rich seams could be set off against the deficiencies of the poorer ones. Thus the poor mines could be worked at the expense of the rich. But we are not told what effect such a policy would have upon the 3 per cent. profit which would have to be made upon the whole capitalisation. It looks rather as if too much is claimed from this Utopian scheme, in which all incentive to business energy and enterprise is to be replaced by a general levelling down to a uniform standard of wages irrespective of any consideration whatever.

One of the greatest arguments in favour of nationalisation is the supposed gain to the community that would result from the prevention of strikes. The notion, however, that State miners would be debarred from striking did not altogether find favour amongst the Scottish delegates, some of whom were shrewd enough to see that even State ownership would not secure all the advantages they have been led to expect.

Passing next to the Syndicalist view, some pertinent remarks were made upon this subject by Mr. W. Forster Brown, deputy gaveller, at the half-yearly gale rent audit in the Forest of Dean. He showed the absurdity of the belief held by this school that by making the cost of production so high that no profits could be earned, the State would be able to take over the mines for the benefit of a few misguided individuals. Ruined industries are not usually sought after as State enterprises in these practical days.

Mr. Frank Brain, speaking on the same topic, suggested that the Forest of Dean coalfield would be an admirable locality in which the experiment of State ownership could be tried, and he more than hinted that mineowners in that district might not be found to be very reluctant to hand over their responsibilities to the Government.

We do not, however, think there is the remotest prospect that any Bill for the nationalisation of mines will enter the domain of practical politics at the present time.

Trade Summary.

The London coal trade has shown signs of a considerable revival, and prices are much firmer for practically all qualities. One quality (stove coal) has been advanced 1s. per ton in retail prices. A general advance is now confidently looked for in the very near future. A scarcity of wagons is causing uneasiness in many cases. Seaborne coals are in good demand, but a very small tonnage is reported as coming to the Thames just now.

The market at Newcastle is rather quiet, with prices easier. There is, however, an exceptionally heavy forward demand for bunkers. House coal is steady, and coke is firm.

The export branch of the Durham coal trade has been adversely affected by the non-arrival of tonnage, but the collieries are well booked, and the market all round is strong.

There has been more buying of Lancashire house coals. Steam coals are fairly active. Slack is somewhat easier than of late.

There have been more enquiries for West Yorkshire house coals, and the demand for steam and manufacturing sorts is strong. Coke prices are stiffening.

In South Yorkshire the strong demand on export account is maintained, and small coals find ready buyers. House coal is steady. Coke is active.

The Derbyshire house coal trade continues active, and stocks are low. The strength of the manufacturing demand is unabated.

The situation at Cardiff is practically unchanged, buyers and sellers being indisposed to modify their attitude. Small coals are firm. Monmouthshire coals are steady. The patent fuel market is very firm.

The Scottish coal trade has improved considerably, business being active in all departments.

An Interesting Wages Case in Yorkshire.—An interesting mining case was decided by Judge Dodd at the Barnsley County Court, on Wednesday. A miner, employed at Earl Fitzwilliam's Elsecar Main Colliery, sued to recover 14s. 6d. balance of wages. Mr. Ellison, instructed by Messrs. Raley and Sons on behalf of the Yorkshire Miners' Association, was for the plaintiff, and Mr. Gichard for the defendant. The point of the case was whether the plaintiff was entitled to be paid for getting certain coal at 1s. 5d. per ton "bord on" or at the rate of 1s. 7d. per ton "end on," according to the price-list at the colliery. When the plaintiff resumed work after the strike, the roof of his working-place had fallen in, and he contended, in order to recover his working face, he had to get the coal "end on," and he claimed the 2d. extra per ton. The defence was that the working face was "bord on," and the work he did was only liable to be paid for at the 1s. 5d. per ton rate. In support of the plaintiff's contention, evidence was given by Prof. W. Galloway, consulting mining engineer, Mr. Barnett, mining engineer, and Mr. H. Smith, president of the Yorkshire Miners' Association. For the defence, evidence was given by Mr. R. H. Richardson, mining engineer, Mr. St. John Durnford, mining engineer, Mr. Newbould, general manager, and Mr. Atkinson, certificated manager. His Honour decided that the work which was done formed part of the work already going on, and though there was a great deal in the contention on behalf of the man it was illfounded, and, according to the price-list, the plaintiff should only be paid on the lower scale. Judgment was given for the defendant, with costs.

MINERAL STATISTICS FOR 1911.

The first part of the General Report on Mines and Quarries, with Statistics for 1911, by the Chief Inspector of Mines, has been issued as a Blue Book [Cd. 6340]. This part, as hitherto, sets forth the district statistics for the year and contains figures relating to the number of persons employed, output, accidents and deaths in mines and quarries. Comparative tables are included, giving under similar heads the figures relating to mines for the years 1873 to 1911, and to quarries for the years 1895 to 1911.

Persons Employed.

The total number of persons employed in and about all the mines of the United Kingdom was 1,096,238, of whom 1,067,213 worked at the 3,325 mines under the Coal Mines Act, and 29,025 at the 652 mines under the Metalliferous Mines Act.

Compared with 1910 there is an increase of 17,806 persons at the mines under the Coal Mines Act, and an increase of 349 persons at the mines under the Metalliferous Mines Act.

Of the 1,067,213 persons working at the mines under the Coal Mines Act, 863,512, or 80·9 per cent., were employed below ground. Of the 203,701 surface workers, 6,279, or 3·08 per cent., were females. There is an increase of 58 females as compared with 1910.

The number of young persons under 16 employed below ground in these mines was 54,720, or 6·3 per cent. of the underground workers; the total number of surface and underground workers under 16 was 71,156, or 6·95 per cent. of all workers.

At the mines under the Metalliferous Mines Act, 17,490 persons, or 60 per cent., worked below ground, and of the 11,535 surface workers, 181, or 1·57 per cent., were females.

At the quarries under the Quarries Act there were 82,863 persons employed, of whom 52,053 worked inside the actual pits or excavations, and 30,810 outside. Compared with 1910 there is a decrease of 2,355 in the number of the inside workers, and of 619 in the number of the outside workers, making a total decrease of 2,974 in the number of persons employed at quarries.

The persons employed *occasionally* at quarries are not included in the above figures.

Output of Minerals.

The total output of minerals at the mines under the Coal Mines Act was 285,912,232 tons, of which 271,878,124 were coal, 2,482,846 fireclay, 7,886,898 ironstone, 3,116,803 oil shale, and 577,561 sundry minerals.

Adding 13,775 tons from open quarries, the total output of coal was 271,891,899 tons, which is an increase of 7,458,871 tons on that of the previous year, and the greatest output yet recorded.

The increase of the coal production of the several districts, including the small quantities obtained from quarries, is as follows:—

	Tons.
Scotland	309,031
Newcastle	2,150,100
Durham	1,814,393
York and North Midland	1,195,176
Manchester and Ireland	25,075
Liverpool and North Wales	227,055
South Wales	1,580,745
Midland and Southern	157,296
Total increase	7,458,871

It is noticeable that every district shows an increased output. This is most marked in the cases of Newcastle, Durham, York and North Midland, and the South Wales districts. The causes that chiefly contributed to this increase were probably briskness of trade, as evidenced by the increase in the number of persons employed (17,806), and comparative freedom from strikes.

In the previous year there was a considerable stoppage of work in the northern coalfield due to difficulties in connection with the readjustment of shifts following the bringing into force of the Eight Hours Act in Durham and Northumberland.

Another contributory cause was the fact that the question of a national strike of coalminers was under discussion, which conduced to much greater activity in the coal trade during the latter half of the year 1911.

The average output of mineral at mines under the Coal Mines Act was 331 tons per person employed underground, an increase of 3 tons on the preceding year.

The total output of minerals at the mines under the Metalliferous Mines Act was 3,222,950 tons, of which 1,823,795 tons were iron ore.

The total quantity of stone and other minerals obtained from the quarries under the Quarries Act was 45,810,766 tons, of which 5,316,525 tons were iron ore. Adding to the produce of mines and of quarries over 20 ft. deep 492,206 tons obtained from shallow open workings, we arrive at a total output of iron ore of 15,519,421 tons.

Fatal Accidents.

At the mines under the Coal Mines Act there were 1,212 separate fatal accidents, causing 1,265 deaths. Compared with 1910 there is a decrease of 30 in the number of accidents and of 510 in the number of deaths. But in the year 1910 occurred the two unusually great colliery disasters of Whitehaven and Hulton, in which respectively 136 and 344 persons lost their lives. Of the 1,265 persons killed, 78 were under 16 years of age, as against 114 in the preceding year.

At the mines under the Metalliferous Mines Act there were 41 fatal accidents, which caused 43 deaths. Compared with 1910, there is an increase of three in the number of fatal accidents, whilst the number of deaths is the same.

At the quarries under the Quarries Act there were 96 fatal accidents, which resulted in 99 deaths. Compared with 1910 there is an increase of 16 in the number of accidents and of 15 in the number of deaths.

Non-fatal Accidents.

The returns under section 1 of the Notice of Accidents Act, 1906, show that the total number of non-fatal accidents occurring during the year which disabled for more than seven days was 166,153 at mines under the Coal Mines Regulation Act, by which 166,616 persons were injured; at mines under the Metalliferous Mines Act, 1,730, by which 1,744 persons were injured; at quarries under the Quarries Act, 5,167, by which 5,189 persons were injured.

Compared with 1910, there is an increase of 7,574 in the numbers of persons injured at mines under the Coal Mines Act, of 148 at mines under the Metalliferous Mines Act, and of 14 at quarries under the Quarries Act.

The non-fatal accidents reported to the inspectors during the year were, in mines under the Coal Mines Act, 5,510 (an increase of 78 as compared with 1910); under the Metalliferous Mines Acts, 217 (a decrease of 64 as compared with 1910); in quarries under the Quarries Act, 1,170 (a decrease of 215 as compared with 1910).

It should be noted that in the case of accidents due to explosions of firedamp or coaldust or of any explosive, or to electricity or overwinding, all such accidents are reportable to the inspector when causing any injury whatsoever.

Death-Rates from Accidents.

The death-rate of the underground workers at the mines under the Coal Mines Act was 1·29 per 1,000 persons employed, as against 1·91 in 1910; the death-rate of the surface workers was 0·73 per 1,000 employed, as against 0·76 in the previous year. The death-rate of the underground and surface workers as a whole was 1·19, as against 1·69 in 1910.

The death-rate per 1,000 young persons under 16 years of age employed underground at mines under the Coal Mines Act was 1·24, for surface workers 0·51, and for underground and surface workers 1·05 for the year 1911. The corresponding figures for 1910 were 1·77, 1·03 and 1·58 respectively.

At the mines under the Metalliferous Mines Act, the death-rate of the underground workers was 2·06 per 1,000 persons employed, and of the surface workers 0·61 per 1,000. The corresponding figures for 1910 were 2·16 and 0·52 respectively. The death-rate of the underground and surface workers as a whole was 1·48, whilst that of 1910 was 1·50.

At the quarries under the Quarries Act, the death-rate from accidents of the workers *inside* the actual pits or excavations was 1·56 per 1,000, and of the persons employed at factories and workshops *outside* the quarries, but connected with them, 0·58 per 1,000. The corresponding figures for 1910 were 1·38 and 0·29 respectively. The death-rate of the inside and outside workers as a whole was 1·19 in 1911, as against 0·98 in the previous year.

The total number of deaths from accidents at mines under the Coal Mines Regulation Acts is the lowest since 1907, and from explosions the lowest since 1904. The number of deaths from falls of ground, viz., 617, or 19 less than in 1910, is the second highest on record. The ratio of deaths per 1,000 persons employed is the proper criterion of comparison to adopt, and the death-rates from all accidents underground and from surface and underground combined for the year 1911 are the lowest on record.

At its monthly meeting, under the presidency of Admiral Sir G. D. Morant, the committee of the Royal Humane Society made the following awards:—Silver medals and certificates to W. D. Woolley, colliery manager, A. T. Winborn, James Leach, and Llewellin Howells, all of Tredegar, for descending the shaft of the Markham Colliery, Hollybush, near Newport, after the gas explosion on May 8.

Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

FIREMEN'S CERTIFICATES.

Sir,—The Government, in their excessive haste and eagerness to pass legislation in reference to safety and the reduction of the death-rate from explosions and ignition of gas in mines, have unwittingly created the greatest blunder it is possible to imagine when they introduced section 67, clause 2, in reference to the testing of percentages of inflammable gas. As a result, the students at mining schools and classes—now organised for the purpose of giving this information to colliery firemen to qualify for their certificate under the Act—consist, in many instances, of something like 80 per cent. of working colliers, who are inexperienced in a fireman's duties and responsibilities. These schools and classes have to give practical tests in determining the percentage of inflammable gas present, upon the flame of a safety lamp, with the result that a great proportion of this 80 per cent. are now given a desire to practise on their own and show their fellow-workmen in the face "caps," by pulling down a sheet or opening a door in their working-place in the absence of the responsible official, which, before the passing of the Act, they would have had no object in doing. A lamp is given to a workman to see by, not to test for the presence of inflammable gas. There are always a number of careless and inexperienced youths and men in a mine. The fireman has a huge responsibility upon his shoulders under this clause alone. Not one coalmine in the United Kingdom wherein inflammable gas is found, even in small quantities, is now safe to life and limb; and I venture to predict that the death-roll, owing to burns and explosions, in 1913 and onwards will materially increase. Colliery Official.

Treherbert, August 17, 1912.

LAW INTELLIGENCE.

SCOTTISH COURT OF SESSION.

OUTER HOUSE.—August 7.

Before Lord Skerrington.

Wrongful Working.

Brownrigg Coal Company v. R. Sneddon.—Judgment has been issued in the action by the Brownrigg Coal Company Limited, 224, St. Vincent-street, Glasgow, against Robert Sneddon, coalmaster, Hillhouserigg, Shotts, for payment of £9,717 The defender, who is the proprietor of the lands of Dykehead and Currieside, until recently carried on business as a coalmaster at Currieside Colliery. The pursuers have rights under a mineral lease relating to the lands of Hawkwoodburn, in which a pit was sunk in 1907, the bores showing that the coal was entire and in good condition. They alleged that the defender, taking advantage of the proximity of his own workings, had removed a large quantity of coal from the northern part of Hawkwoodburn, the quantity removed being 5,184 tons, in respect of which they claimed £2,592, being at the rate of 10s. per ton. The pursuers also claimed damages for flooding, and £7,000 in respect of additional expenses, and restitution of output to Martinmas 1929, when the lease expires. The defender maintained that the coal was lawfully wrought by him as tenant, with the full sanction and knowledge of the proprietrix. The smithy coal which was in dispute was worked by him solely for fuel for the colliery engine in working gas coal, and none was sold by him. After negotiations between the proprietrix and the defender in 1891 and 1892, the defender worked the gas coal of part of Hawkwoodburn. The return made by him to the proprietrix included the smithy coal worked by him.

Lord Skerrington has awarded the pursuers £1,000 in respect of injury to the smithy coal and the rest of the leasehold in consequence of flooding due to the defender's working, and found the pursuers entitled to expenses.

His lordship, in the course of his opinion, said the burden of proving that the defender had no authority to work the smithy coal lay upon the pursuers, and it was all the heavier because of the stale character of the claim, the death or absence of material witnesses, and the fact that the charge made against the defender was one of dishonesty. It was also material that the delay in making the claim was primarily due to the failure of the proprietrix of Hawkwoodburn to use ordinary care and vigilance to protect her own interests Her negligence did not entitle the pursuer to defraud her, but when the question was whether the defender acted honestly or dishonestly one could not shut one's eyes to the fact that if she had not refrained from making due enquiry either the defender would have been prevented from working the smithy coal or his working would have been discovered at a time when it could have been demonstrated that he had or had not exceeded his rights, and that he had acted either fraudulently or innocently. With reference to the alleged illegal operations in the disused gas coal workings, his lordship said the defender had persistently concealed the nature and extent of his operations. When charged with having blasted under the lands of Hawkwoodburn, he sheltered himself behind a general denial, and he gave a vague and misleading account of his operations, which he falsely stated to have been confined to a particular mine. His lordship held it proved that the defender's wrongdoing was wilful and deliberate; that his operations in the pursuers' gas coal wastes were material and extensive; and that he thereby altered the flow of the underground water in a way which could not now be rectified, and which was prejudicial to the pursuers. His lordship awarded the pursuers £300 in respect of injury to the smithy coal, and £700 in respect of the rest of the leasehold.

IRON AND STEEL INSTITUTE.

In accordance with previous announcements the autumn meeting of the Iron and Steel Institute will be held at Leeds on Monday, Tuesday, Wednesday, Thursday and Friday, September 30 and October 1 to 4, 1912. An influential reception committee has been formed with Lord Airedale as chairman, the Hon. Rupert Beckett, D.L., as treasurer and Mr. J. F. Walker (Lord Mayor's secretary) as honorary secretary.

The provisional list of papers expected to be submitted is as follows:—

1. "On Nitrogen and Iron," by J. H. Andrew (Manchester).
2. "On the Solubility of Cementite in Hardenite," by Dr. J. O. Arnold (Sheffield) and L. Aitchison (Sheffield).
3. "On the Solubility or Diffusion of Hardenite in Ferrite," by Dr. J. O. Arnold (Sheffield) and C. Chappell (Sheffield).
4. "On the Gases Evolved on Heating Steel to its Melting Point in a Vacuum," by G. Wesley Austin (Birmingham).
5. "On Allotropy in General and that of Iron in Particular," by Dr. C. Benedicks (Stockholm).
6. "On a New Type and Method of Construction of Large Gas Engines," by A. E. L. Chorlton (Manchester).
7. "On the Thermal-Magnetic Transformations of 25 per cent. Nickel Steel," by Dr. E. Colver-Glauert (Sheffield) and Dr. S. Hilpert (Charlottenburg).
8. "On a New Method for the Improvement of the Soundness of Steel Ingots by the Aid of Thermit," by Dr. Hans Goldschmidt (Essen/Ruhr).
9. "On a Method of Producing Sound Ingots," by Sir Robert A. Hadfield, F.R.S. (Sheffield).
10. "On a New Method of Revealing Segregation in Steel Ingots," by Sir Robert A. Hadfield, F.R.S. (Sheffield).
11. "On the Magnetic Properties of Manganese and Nickel Steels," by Dr. S. Hilpert (Charlottenburg) and Dr. W. Mathesius (Worcester, Mass., U.S.A.).
12. "On the Question of the Existence of Commercial Hyper-Eutetic White Iron Free from Manganese," by Dr. H. M. Howe (New York).
13. "On Steelworks Yields," by P. Longmuir (Sheffield) and W. H. Robinson (Sheffield).
14. "On Some Aspects of Wire Drawing," by P. Longmuir (Sheffield).
15. "On the Manufacture of Open-hearth Steel, with reference to Improvement in Yield," by F. W. Paul (Glasgow).
16. "On Rolling-Mill Practice in the United States," by J. Puppe, D.Ing. (Breslau).
17. "On the Growth of Cast Irons after Repeated Heatings. Parts V. and VI." by Prof. H. F. Rugan (New Orleans, U.S.A.).
18. "On the Iron Ores and Mineral Resources of Chili," by Charles Vattier (Santiago, Chili).

Visits will be paid to the following works:—Messrs. Kitson and Co. Limited (Airedale Foundry), Messrs. John Fowler and Co. Limited, Messrs. J. Buckton and Co. Limited (Wellhouse Foundry), Messrs. Hathorn, Davey and Co. Limited (Sun Foundry), the Hunslet Engine Company Limited, Manning, Wardle and Co. Limited (Boyne Engine Works), Messrs. Hudswell, Clarke and Co. Limited (Railway Foundry), Messrs. J. and H. McLaren (Midland Engine Works), Messrs. Walter Scott Limited (Leeds Steelworks), the Coghlan Steel and Iron Company Limited (Hunslet Forge), the Monk Bridge Iron and Steel Company (Whitehall-road), the City Electric Lighting Power Station, the Farnley Iron Company Limited (Farnley), Messrs. Greenwood and Batley Limited (Albion Works), Messrs. W. Johnson and Sons Limited (Castleton Foundry), Messrs. Fairbairn, Lawson, Coombe and Barbour Limited (Wellington), Leeds City Tramway Power Station, the Crigglestone Collieries and Coking Plant of Messrs. the Otto Coke Oven Company Limited, near Wakefield, and Messrs. Taylor Brothers and Co. Limited (Clarence Iron and Steel Works, South Accommodation-road, Hunslet). An excursion will also be made to North Lincolnshire and Immingham, and other places of interest are included in the programme, whilst a number of other works will be accessible to visitors.

CONTINENTAL MINING NOTES.

Belgium.

A Commission has been appointed to investigate the conditions in the Campine district with regard to public health, education and industrial organisation generally.

The following shows the exports and imports of fuel during the first seven months of the present year:—

	Exports.		Imports.	
	1912. Tons.	1911. Tons.	1912. Tons.	1911. Tons.
Coal	2,877,604	3,050,673	4,021,001	4,260,836
Coke	551,414	590,828	530,775	395,211
Briquettes	614,394	313,146	247,119	214,308

During July there were exported 425,851 tons of coal, 88,008 tons of coke, and 41,119 tons of briquettes; imports included 736,152 tons of coal, 76,402 tons of coke, and 45,824 tons of briquettes.

France.

It is announced that the Sluiskil Canal, which has been constructed by the ironworks in Meurthe-et-Moselle, is almost completed, and two batteries, each containing 80 ovens, will be placed in operation at an early date. English and German coking coal will be delivered by the canal, and the coke distributed in the Longwy district in 40-ton wagons, these returning with iron ore from the Briey basin. Additions to the coking plant are already under consideration.

At a meeting of the executive of the Pas-de-Calais Miners' Syndicate at Lens on the 10th inst. it was decided to apply for an increase in wages. In a statement issued by the mining companies in the Nord it appears that the following average wages were paid during the first half of the present year: Persons employed below ground, 5·72 fr. per day; on the surface, 4·13 fr.; all workmen, 5·26 fr. Each man employed below ground produced on the average 896 kilogs. of merchantable coal per day, whilst 2,368 kilogs. of coal were handled by each workman on the surface. On the basis of the tonnage each man employed below ground received 6·37 fr. per ton raised, or taking all workmen, 8·08 fr.

Germany.

Ruhr Coal Market.—Traffic keeps very active, buyers being anxious, in the light of past experience, to cover their requirements before the needs of the agricultural industry lead to a shortage of railway wagons. Though this simply means an anticipation of the autumn sales, nevertheless the Syndicate's expectations of renewed activity in the coal trade would appear to be justified, in view of the busy state of the iron industry and the prospect of increased demands for house coal as the season advances. Again, whilst English coal is coming forward as a competitor again and is displacing Ruhr coal in some instances, it is too dear to compete for the house coal trade of South Germany. Of the various grades of fuel, those for industrial purposes naturally meet the greatest sale, whereas house coal, gas coal, and open-burning gas coal are not yet in full swing; and coking coal is having to be stocked in some cases. The coke market is not at all satisfactory, the small kinds being in poor request, though blastfurnace and foundry coke go off well. Briquettes are unchanged.

Coal Market in Upper Silesia.—Although the low state of the Oder retards business, the stoppage of delivery is only a temporary affair, and the state of the market is decidedly favourable. The volume of traffic is rather lower than before, the troubles on the river having caused certain grades to be stocked for awhile, but this is unimportant, stocks generally being low at the pits, and none of the men have to go on short time. Industrial coals are selling best, but the house coal trade is improving; and coking coals are in active request, the output being almost entirely absorbed at once. Russian-Poland and Austria-Hungary are again taking heavy consignments of fuel; and the coke trade is very busy, both blast-furnace and foundry coke being taken as quickly as they can be produced.

THE LONDON COAL TRADE.

THURSDAY, AUGUST 22.

The London coal trade during the past week has shown considerable activity and both merchants and collieries report a much better demand for all descriptions of coal. The special prices for spot lots being offered a short time ago to clear colliery sidings, have now practically all been withdrawn, and in several cases an advance has taken place in prices from collieries, especially in kitchen and stove qualities. Merchants report a better demand at the depots and a greater interest in the filling up of cellars from customers who previously would not consider the matter at all. The demand for the cheaper qualities has strengthened to such an extent that on Friday last the merchants decided to advance the price of stove coal 1s. per ton. In view of the fact that September is now so close at hand, with its usually cooler evenings acting as a gentle reminder to people who have not got their cellar replenished, and also a hoped-for advance in retail prices, the majority of collieries are only quoting prices from day to day, and it is difficult to obtain prices for forward delivery in the near future. The pressure to sell is removed and many salesmen report that they do not require any more orders this month. Practically all qualities of coal have felt the improved demands and, even small nuts and slacks, which have been easier for a time, now show a stiffening tendency. Contracts are still being renewed, as buyers now realise that the prices quoted are the lowest likely to be in force for some time to come, and the future is so uncertain that it is wise to cover for a portion, if not all, of their requirements. Silkstone, Derby brights and bright nuts have stiffened considerably in price, and there is a good demand. Bakers' nuts and kitchen cobbles are firm, with a quiet enquiry, but the cheaper cobbles and nuts have a good sale at slightly better prices. Steams are quietly steady. There is, however, some uneasiness felt as to the scarcity of wagons, and fears are entertained in some quarters as to what the position will be when a real pressing demand sets in. The seaborne market rules steady, with a fair enquiry, and the small quantities available on the open market find a ready sale at former prices. Only six cargoes are reported, however, as arriving in the Thames since Monday last.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, August 16.—There were no Durham or Yorkshire seaborne house coal cargoes on offer to-day. Best (Durham) 20s., seconds 19s. Cargoes 23.

Monday, August 19.—There was no alteration to report in the seaborne house coal market to-day, the only enquiries for cargoes being at reduced prices. Best (Durham), 20s., seconds 19s. Cargoes 38.

Wednesday, August 21.—The seaborne house coal market for Durham was unchanged to-day, but Yorkshires were in good demand at slightly higher prices. Best (Durham) 20s., seconds 19s. Cargoes 6.

THE SCOTCH COAL AND IRON TRADES.

THURSDAY, AUGUST 22.

Glasgow and Lanarkshire.

COAL.

The volume of business in the Scotch coal trade has shown considerable further increase since last report. The aggregate clearances at the Scottish ports in the past week reached 380,888 tons, being 8,766 more than in the preceding week, and showing an increase compared with the corresponding week of last year of no less than 50,970 tons. The foreign shipments have bulked exceedingly well, and the prospects of this branch of the trade appear satisfactory, notwithstanding that freights are still high compared with former seasons. From Glasgow 61,090 tons were sent abroad, and 37,300 coastwise, the total of 98,390 tons comparing with 85,951 tons in the preceding week, and 86,208 in the corresponding week of last year. The ready supplies of coal from the collieries have greatly facilitated the work of shipment, and at the same time tended to check the upward movement in prices. The trade appears to be in a very sound condition, and the large amount of business doing keeps parties well employed, and so moderates the force of competition. There has been rather more doing in steam coal, which on the whole may be said to find a ready market. Business in splint coal continues on an extensive scale, both for home consumption and export, and an active demand exists for ell coal and nuts. The quotations f.o.b. at Glasgow are for steam coal 11s. 6d. to 12s. 6d., ell coal 12s. to 12s. 6d., splint 12s. 6d. to 13s., washed treble nuts 13s. to 13s. 6d., doubles 12s. 6d. to 13s., and singles 11s. 6d. to 12s. per ton. The home departments of the coal trade are fully occupied, and the demand is improving for household sorts, which are now retailed in Glasgow, at 10d. to 1s. per cwt. delivered in bags, these prices being 1d. to 2d. per cwt. higher than at the beginning of the month. All kinds of coal suited for manufacturing purposes are in strong request at steady to firmer prices.

IRON.

The Glasgow pig iron warrant market has been very strong since last report, and though occasionally reactions have occurred, the prices have again touched a higher level than formerly. The demand appears to be largely of a legitimate nature, although the element of speculation has also considerable influence on the course of the market. Since last report, business has been done in Cleveland warrants at 61s. 3½d. to 61s. 11½d. cash, 61s. 4½d. to 62s. 2½d. one month, and 61s. 11d. to 62s. 6d. three months. Transactions have also been noted at 61s. 1d. to 61s. 8½d. for delivery in October. Cumberland warrants have sold at 77s. cash and eight days, 77s. 8d. one month, and 77s. 6d. three months, these rates being 10d. to 1s. higher than former prices. There is a strong demand for Cleveland iron in Scotland. The arrivals in the past week at Grangemouth from Middlesbrough and district amounted to 8,343 tons, which showed a marked increase over those of the corresponding week. The Scotch iron trade continues very active. There are 88 furnaces in blast, compared with 82 at this time last year. The output of these is believed to be going fully into consumption, and some of the special brands are reported to be scarce. G.m.b. iron has not shown much change, but special brands have been tending higher. F.a.s. at Glasgow, Govan and Monkland Nos. 1 are quoted 69s. 6d., Nos. 3, 68s.; Carnbroe, No. 1, 73s. 6d., No. 3, 69s. 6d.; Clyde, Calder, and Langloan, Nos. 1, 76s. 6d., No. 3, 71s. 6d.; Summerlee, No. 1, 76s. 6d., No. 3, 72s. 6d.; Gartsherrie, No. 1, 77s., No. 3, 72s.; Coltness, No. 1, 93s. 6d., No. 3, 73s. 6d.; Eglinton at Ardrossan or Troon, No. 1, 69s. 6d., No. 3, 68s. 6d.; Glengarnock at Ardrossan, No. 1, 78s., No. 3, 73s.; Dalmellington at Ayr, No. 1, 71s., No. 3, 69s.; Shotts at Leith, No. 1, 76s., No. 3, 72s.; Carron at Grangemouth, No. 1, 77s., No. 3, 72s. per ton. The shipments of pig iron at Scotch ports in the past week were 2,847 tons foreign and 3,168 coastwise, the total of 6,015 tons showing an increase of 2,487 tons over the quantity despatched in the corresponding week of last year. The steelmakers of the West of Scotland have received considerable additional contracts, and they are now reported to have sufficient work on their books to keep them going for twelve months. Pressure for delivery is very strong, especially in the case of shipbuilding material. Prices of Siemens steel are on the basis of £8 2s. 6d. for ship plates, less 5 per cent. for Clyde delivery. Scotch hæmatite pig iron is in very active request by steelmakers, and prices are raised 1s., merchants now quoting 81s. for West of Scotland delivery. The malleable iron trade is busy, with prices on the basis of £8 2s. 6d. for crown bars.

Renfrew, Ayr and Dumbarton.

COAL.

There is an active business doing in the various departments of the coal trade, but the shipments are not up to those of the preceding week in amount, material decreases having occurred at Ayr and Greenock as well as Troon. The quantity of coal shipped abroad was 5,458 tons, and the coastwise shipments amounted to 26,870 tons, these latter figures including the trade with Ireland. At Bowling 391 tons were cleared, Greenock 861, Irvine 1,336, Ardrossan 4,139, Troon 8,911, and Ayr 16,690, the total 32,328 tons comparing with 40,805 in the preceding week, and 42,005 in the corresponding week of last year. Prices of coal are generally steady to firm. The demand for manufacturing purposes at home is large, and house coal is also more wanted owing to the advance of the season and indifferent weather.

Stirling, the Lothians and Fife.

COAL.

The shipments at Firth of Forth ports are about 10,000 tons behind what they were a week ago, the falling off having taken place at Leith and Grangemouth. The foreign shipments from the four ports, Granton and Bo'ness, in addition to the two already mentioned, amounted to 89,997 tons, and the quantity despatched coastwise to 26,724 tons. At Granton 8,341 tons were shipped, Bo'ness 21,329, Leith 38,452, and Grangemouth 48,601—total 116,723 tons, compared with 126,792 in the preceding week and 78,147 in the corresponding week of last year. Best steam screened steam coal is quoted at Leith 12s. 6d. to 13s., secondary qualities 11s. 9d. to 12s. 3d., treble nuts 13s. 6d. to 14s., doubles 12s. 9d. to 13s., and singles 12s. 3d. to 12s. 9d. per ton. The shipments from Fife ports are fully 14,000 tons better than in the preceding week. Work has been proceeding more steadily at the collieries, and while present trade with northern Continental ports is busy, enquiries are reported to be coming into the market for next season's delivery. The shipments have been at Burntisland 61,300 tons, Methil 67,274, Dysart 1,852, Wemyss 1,502, Charleston 610, Tayport 619, Alloa 200—total 133,447 tons, compared with 118,574 in the preceding week, and 123,558 in the corresponding week of last year. First-class screened navigation coal is quoted at Methil and Burntisland 15s. 6d. to 16s. 6d., unscreened 13s. to 13s. 6d., steam coal 11s. 6d. to 13s., treble nuts 13s. 6d. to 14s. 6d., doubles 13s. to 14s., and singles 12s. 6d. to 13s. per ton. Dross is bringing the high rates of 9s. to 10s. The demand for house coal for home use is increasing.

Gas Companies and the Coal Strike.—At the half-yearly meeting of the South Metropolitan Gas Company, held on Wednesday, Mr. Charles Carpenter, referring to the coal strike, stated that for the past four years they had amplified their practice with regard to the carrying of coal stocks. Instead of being satisfied with a mid-winter stock of from 100,000 to 130,000 tons, they increased it to nearly 250,000 tons. Such a proceeding was costly, as a good deal of money had to be found to make the purchase. Moreover, coal did not improve in quality by storing; and extra cost was also incurred owing to the fact that all coal stored had to be handled twice at least before it was carbonised in the retorts. The directors, however, considered the course a wise one in view of the change which had been brought about by the federation of all underground workers throughout the coalmines of the United Kingdom. The company's coal contracts ran out normally at the end of March every year, and in the spring of 1911 they bought sufficient for their purposes up to June 30 last. They were not, however, able to obtain delivery of that quantity, mainly owing, they were told, to the bad working on the part of the miners. He feared that, to a large extent, the substitution of hard-and-fast legislation for give-and-take arrangements between masters and men was very largely responsible for the shortage of output. When the strike was declared the company had a sufficient stock for rather more than two months' consumption instead of three months'. They replenished their supplies from abroad, and maintained the quality, the purity, and the pressure of their gas as if nothing were happening. That course, however, was costly, but the results had justified the directors' expectations. As regarded its supply of gaseous fuel and solid fuel in the form of coke, South London was unconscious of the strike. The official auditor, before whom the facts were laid, raised no obstacle to the proposition that the company's insurance fund should be debited with the major part of the cost, and £75,000 was considered the proper amount with which the fund might be debited. He might say that they urged the Premier that when the "life-blood of the country" again began to circulate, its first flow should be retained for the sorely-stricken industries of Great Britain by the prohibition of exportation until those industries were again fairly started. They received an acknowledgment of their letter, but nothing more; and as soon as the stoppage came to an end they had the mortification of knowing that ships destined for France, Italy, Germany, and Scandinavia were being loaded with the precious freight which our own industries needed. The present position with regard to fuel prices was entirely artificial, resulting naturally out of the dislocation of business arising from a complete cessation of output by the largest coal-producing country in the world.

THE IRISH COAL TRADE

Thursday, August 22.

Dublin.

The local trade is not quite so active this week, although transactions are still a good average for the time of year, owing to unsettled weather. Merchants are now buying very extensively in order to increase their stocks for winter, and inland markets are also getting large supplies. No advance has been made in Scotch coals in the city, although they are 1s. per ton higher across the water. The prices of steam coals are unchanged, being from 20s. per ton upwards. House coals stand as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; best coke, 23s. per ton; "ball" coal, 1s. 5d. per sack. There continues to be a good demand for the coal raised at Wolfhill, Queen's County, in the inland districts, about 17s. 3d. per ton being the price as supplied for contracts. There is a good import trade, the coaling vessels arriving during the week totalling 46, as compared with 52 the week previously, chiefly from Garston, Troon, Neath Abbey, Saundersfoot, Ayr, Liverpool, Irvine, Workington, Point of Aire, Partington, West Bank, Whitehaven, Newcastle-on-Tyne, Manchester, Preston, Campbeltown, and Ardrossan.

Belfast.

There has been no particular change during the week, but a slightly improved demand for steam coal is appearing, and householders are laying in supplies earlier than usual owing to rumours of an early advance in prices. House coals in the city are unchanged, as follow:—Best Arley coal, 25s. per ton; Hartley, 24s.; Orrell nuts, 24s.; Wigan, 23s.; Scotch, 21s.; best Orrell slack, 21s. Prices of steam coals are keeping fairly firm, quotations ex-quay being about 15s. 6d. to 16s. 6d. per ton for Scotch steam; navigation steam, 15s. 6d. to 16s. 6d.; Welsh steam coal, 16s. 6d. to 17s. 6d.; Scotch household, 18s. per ton; best Arley house coal, 21s. 4d. per ton. Consumption of gas coal has materially increased with shorter days, and the wet summer has been favourable to the retail house coal trade. There is a plentiful supply in the port, cargoes arriving during the week being chiefly from Garston, Ayr, Irvine, Glasgow, Girvan, Troon, Whitehaven, West Bank, Newport, Ardrossan, Neath Abbey, and Lydney.

COAL, IRON AND ENGINEERING COMPANIES.

Andersons (Liverpool) Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to carry on the business of mechanical and electrical engineers, &c., and to adopt an agreement with S. Anderson, who is governing director.

Antrim Iron Ore Company Limited. — Dividend of 1s. per share, free of tax, on the A and B shares for the half-year.

Astley and Tyldesley Collieries Company Limited.—For the half-year the directors have declared dividends of 15s. per share and bonus of 5s. on the fully-paid (£10) ordinary, and 12s. per share, with 4s. bonus, on the £8 paid ordinary shares, all free of tax. They carry forward £11,734.

Brecknell (Charles W.) and Co. Limited.—This private company has been registered, with a capital of £500 in £1 shares, to take over the business carried on by C. W. Brecknell at 35, Seymour-street, Balsall Heath, and to carry on the business of steel and brass founders, general metal workers, engineers, &c. First directors, C. W. Brecknell, J. W. Wilcock and R. Wilcock. Qualification, £1.

British Canadian Brick Company Limited.—This private company has been registered, with a capital of £2,000 in £50 shares, to carry on the business indicated by the title. The directors are P. A. Warden, Bonehill Lodge, near Tamworth; R. Lawton, Boothorpe, Woodville, near Burton-on-Trent.

British Steel and Wire Company Limited.—On Tuesday, at the Board of Trade Offices, Carey-street, London, the statutory meeting was held of the creditors and the shareholders under the compulsory liquidation of the company. A statement of affairs was submitted showing liabilities £29,072, of which £6,544 were expected to rank, and an estimated surplus of £41,922 with regard to the creditors. In relation to the shareholders, however, a deficiency of £158,084 was disclosed. A difference of opinion arose with reference to the appointment of a liquidator, and it was stated that the matter would be referred to the Court.

Blair Open Hearth Furnace Company Limited.—This company has been registered, with a capital of £105,000 (100,000 £1 cumulative participating preference and 100,000 1s. ordinary), as furnace constructors, ironmasters, steel makers, founders, boiler makers, &c., and to adopt an agreement with the Cue Consolidated Finance Company Limited.

Brooks and Doxey Limited.—At the annual meeting, held in Manchester, Mr. S. H. Brooks (chairman) said there was a profit from trading account for the year of £4,016. This was more than swallowed up by the payment of £4,000 for debenture interest and £800 for directors' fees. The directors, however, felt justified in recommending that £5,000 should be released out of their profits previously earned to pay one year's dividend on the 5 per cent. cumulative preference shares. Although this payment would still leave the large balance of profit of £37,485 to carry forward, they did not feel justified in paying out the further £2,500 still due on the preference shares or any dividend on the ordinary shares at present. The report was adopted.

Crossley Brothers Limited.—The directors have issued a statement saying they regret that, owing to the dislocation of business caused by the serious strike in the company's works during the half-year and to the unsettled state of labour in general, they do not consider it advisable to pay an interim dividend on the ordinary shares. The preference dividend will be paid as usual.

Dalmellington Iron Company Limited.—The directors announce a dividend on the ordinary shares of 7½ per cent., free of income tax, for the year ended June.

Denbigh Engineering Company Limited.—This private company has been registered, with a capital of £5,000 in £1 shares, to take over the business carried on by J. Cash as the Denbigh Engineering Company, at Horseley Heath, Tipton. J. Cash is governing director.

Gloucester Carriage and Wagon Company Limited.—The report for the year to June 30 last states that the profit on the year's trading, after making the usual provision for depreciation, is £40,055, and the disposable balance, after deducting the interim dividend, paid March 1 last, amounts to £32,992. The directors propose to transfer £10,000 to the reserve fund, which will then amount to £140,000, and recommend the payment of a dividend for the past half-year at the rate of 10 per cent. per annum, less income tax, making 7½ per cent. for the year, and that the balance (£4,598) be carried forward.

Guest, Keen and Nettlefolds Limited.—The report of the directors for the 12 months ended June 30, 1912, states that after making provision for bad and doubtful debts, the accounts show a profit of £395,586 0s. 9d., to which must be added the amount brought forward from last year, £181,241 11s. 9d., making an available balance of £576,827 12s. 6d. Deducting from this the amount paid for debenture interest for the 12 months, and interim dividend on the preference and ordinary shares, amounting altogether to £160,952 3s. 4d. (as detailed in the balance-sheet), there remains a sum of £415,875 9s. 2d., which the directors recommend should be appropriated as follows:—To pay a dividend on the preference shares at the rate of 5 per cent. per annum, free of income-tax, for the six months ended June 30, 1912, £43,000; to pay a dividend on the ordinary shares at the rate of 10 per cent. per annum, free of income-tax, for the six months ended June 30, 1912 (making 10 per cent. for the year), £48,250; to pay a bonus on the ordinary shares of 1s. per share, free of income-tax, £48,250; to place to the accident and fire insurance fund, £20,000; to place to reserve, £50,000; to carry forward, £206,375 9s. 2d.

Henley's (W. T.) Telegraph Works Company Limited.—The directors have declared an interim dividend on the ordinary shares at the rate of 10 per cent. per annum, free of income-tax, for the half-year ended June 30.

Jessop (William) and Sons Limited.—Dividend of 2s. per share, tax free, on the ordinary shares for the half-year.

Keswell, Faulkner and Hamlyn Limited.—This private company has been registered, with a capital of £6,000 in £1 shares, to carry on the business of manufacturers of electric fittings and appliances, metal workers, toolmakers, iron and steel converters, machinists, mechanical engineers, &c., and to adopt an agreement with H. H. Kerswell and S. W. Hamlyn. First directors: H. H. Kerswell, J. H. Faulkner and S. W. Hamlyn (all permanent). Qualification, £500. Registered office, Hanway-street Works, Hanway-street, Tottenham Court-road, W.

Lewis (G.) and Son Limited.—This private company has been registered, with a capital of £5,000 in £1 shares (2,000 preference), to carry on the business of manufacturers of agricultural implements and other machinery, iron and brass founders, metal workers, &c., and to adopt an agreement with T. Lewis and A. Lewis. First directors: T. Lewis (managing director), F. T. Lewis, C. F. Lewis and P. L. W. Lewis (secretary). Qualification £50. Remuneration, £10 each per annum.

Lofthouse Colliery Company Limited.—Dividend of 2s. 6d. per share on the ordinary for the half-year.

Munzing (H.) Limited.—This private company has been registered, with a capital of £75,000 in £1 shares (70,000 preference), as ironfounders, mechanical engineers, toolmakers, manufacturers of and dealers in agricultural implements and metal goods, boilermakers, &c., to acquire certain of the assets of the business of H. Munzing carried on at 90-96, Union-street, Southwark, S.E. H. Munzing is permanent governing director. Registered office, 90-96, Union-street, Southwark, S.E.

New Monckton Collieries Limited.—The directors recommend a final dividend of 4 per cent. on the ordinary shares, making 6 per cent. for the year.

Roberts (Charles) and Co. Limited.—The directors' report and statement of accounts states that, after paying interest on debentures and maintaining the buildings, machinery and wagons in an efficient state, entirely out of revenue, the profit and loss account stands as follows:—Amount brought forward from last year £459, and profit for this year £5,811, making a total of £6,270. This the directors recommend be appropriated as under: Interim dividend paid March 1, 1912, 3 per cent. (£1,080), dividend to be paid September 1, 1912, 5 per cent. (£1,800), to depreciation of buildings, machinery and wagons, £3,038; and carry forward to next account, £352.

Robertson (George) and Sons Limited.—This private company has been registered in Edinburgh, with a capital of £10,000 in £1 shares, to acquire and carry on the business of George Robertson and Sons, brass founders and metal workers, Paisley. First directors, Geo. Robertson and James Robertson. Registered office, Snawdown Works, Paisley.

Sakhalin Oil Fields Limited.—This company has been registered, with a capital of £355,000 (£1), as miners, oil, peat and coal merchants, colliery proprietors, &c., and to adopt an agreement between the Second Sakhalin Syndicate Limited, Baron Felix Chazal, and W. S. S. Taylor for the acquisition of all or any of the concessions or claims referred to therein. First directors, Sir Richard D. Awdry, K.C.B., Right Hon. Lord Ffrench, Comte de Seguier, W. D. Oelsner, and Baron Felix Chazal. Registered office, 30, Great St. Helen's, E.C.

Scott (Walter) Limited.—The directors, in their report for the year ending June 30 last, state that the profits of the steelworks, collieries, &c., for the 12 months amount to £55,552 8s. 5d., to which must be added the balance of profit brought forward from last account, £5,027 7s., giving a total of £60,579 15s. 5d. Out of this the following amounts have been provided:—Directors' fees, for year to June 30, 1912, £1,500; interest on 4 per cent. debenture stock for year to June 30, 1912, £12,000; amount carried to special reserve account under section 104 of Articles of Association, £7,531; additional amount carried to general reserve account for depreciation, £2,893 13s. 4d.; dividend on 6 per cent. preference shares for year to June 30, 1911, £18,000; leaving to be dealt with £18,655 2s. 1d. The directors propose to pay the dividend on the cumulative 6 per cent. preference shares for the year to June 30, 1912, £18,000, and to carry forward to next account £655 2s. 1d. The directors point out that the profits of the past year are sufficient to provide for the payment of all arrears of dividend on the preference shares. The steelworks have been well and profitably employed during the year, with the exception of the period covered by the railway strike in August last year, and the national miners' strike in March and April this year; but the trade disturbances mentioned have very seriously affected the production at the collieries, and in a lesser degree the smaller departments of the business. The prospects for the current year, however, are much more hopeful, and in the absence of further labour troubles a fairly prosperous period appears to be in view.

South Durham Steel and Iron Company Limited.—The directors announce a second interim dividend of 5 per cent., less tax, on account of the year ending September 30 next.

Walton and Clough Limited.—This private company has been registered, with a capital of £8,000 in £1 shares (5,000 5 per cent. preference), to take over the business of electrical, mechanical, mining and general engineers carried on by Messrs. C. C. F. Walton and C. H. Clough at Horton Works, Beckside-road, Bradford, as Walton and Clough. The persons named are the first directors.

Weldon and Co. Limited.—This private company has been registered, with a capital of £3,000 in £1 shares (2,000 preference), to take over the business of metal workers, &c., carried on by C. E. Welstead and T. Hoare at the Idealic Works, Croydon, as Weldon and Co. First directors, C. E. Welstead and T. Hoare (life directors). Qualification, two shares. Remuneration of first directors, £200 each per annum. Registered office, Idealic Works, Aurelia-road, Croydon.

West Lancashire Wagon Company Limited. — The directors announce a dividend at the rate of 6 per cent. per annum for the past half-year.

Wigan Coal and Iron Company Limited.—Dividend at the rate of 4 per cent. per annum for the six months ended June 30 last.

Witbank Colliery Company Limited. — The directors declare a dividend of 15 per cent. (3s. per share) for the six months ending August 31.

Workington Iron and Steel Company Limited.—The report states that the accounts for the third year's trading are disappointing in view of the opportunity presented 12 months ago for a good year's work. Never have the circumstances in respect of labour troubles been so bad. The year opens with excellent trade prospects, and if labour troubles can be avoided the directors anticipate a most satisfactory year. The year's profit is £86,730, which, with £19,108 brought forward, gives £105,839 for disposal. Of this amount £60,000 goes to preference shareholders, £25,000 is written off property, £5,000 off formation expenses, and £15,839 is carried forward. The investments in Harrington and Workington ports and Beckermet mine have been remunerative. The new capital has been spent largely on the colliery, which is giving greatly improved results.

THE TIN-PLATE TRADE.

Liverpool.

There has been a very fair enquiry during the week, but the volume of business done was not large, owing to the fact that makers are asking higher prices for forward delivery than buyers, in many instances, care to pay. Raw materials rule very firm. Coke tin-plates for shipment over the next six months are quoted:—I C 14 × 20 (112 sh. 108 lb.), 14s. 9d. per box; I C 28 × 20 (112 sh. 216 lb.), 29s. 4½d. to 29s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 1½d. to 15s. 3d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 14s. 10½d. to 15s. per box; I C 14 × 19¼ (120 sh. 110 lb.), 14s. 10½d. to 15s. per box; I C 20 × 10 (225 sh. 156 lb.), 21s. 3d. to 21s. 6d. per box; I C squares and odd sizes, 15s. basis for approved specifications. Ternes are firm at 26s. 3d. to 26s. 6d. for I C 28 × 20, 112 sheets. Charcoal tins are in fair demand at 17s. basis and upwards according to tinning. Finished blackplate rules firm at £11 per ton for 30-gauge rectangles. Coke wasters: There is a steady demand, and prices stand firm as follows:—C W 14 × 20, 13s. 9d. per box; C W 28 × 20, 28s. 3d. per box; C W 14 × 18¾, 13s. 9d. per box; C W 14 × 19¼, 14s. per box; C W 20 × 10, 19s. 6d. per box—all f.o.b. Wales, less 4 per cent.

THE BY-PRODUCTS TRADE.

Tar products:—The market as a whole is steady. Benzols and naphthas keep firm. Toluol and Pitch much about the same. Crude carbolic is on the advance, though there is no change in crystals. Creosote is very firm. Nearest quotations are:—

Benzols, 90's, 1s.; ditto 50's, 9¾d.; toluol, 10½d.; carbolic acid, crude (60 per cent.), 2s. 8d.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 1s. 0½d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 3½d. for ordinary qualities; pitch, 51s. 6d. to 52s. 6d. f.o.b. east coast; ditto, 50s. 6d. to 52s. f.a.s. west coast; ditto, 55s. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—The firmer feeling that has peeped out during the last few weeks has been fully manifested in the advance for spot. The forward market is very firm. The position has doubtless been fortified by the striking export figures for July, which show an increase of some 60 per cent. on last year. Nitrate of soda has also advanced. Closing prompt prices are:—

London (ordinary makes), £13 10s.; Beckton, £14; Liverpool, £14 10s.; Hull, £14 6s. 3d.; Scotch ports, £14 10s. to £14 12s. 6d.; nitrate of soda (ordinary), 11s. 4½d. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER *and* LAST WHITE *pages.*

Abstracts of Contracts Open.

ANDOVER, AUGUST 27.—For the supply to the Guardians at Andover of about 50 tons (either more or less) of either large Cwmaman, Nixon's Navigation, or Dowlais Merthyr best steam coal.

BIRMINGHAM, SEPTEMBER 11.—For slack, for the Guardians.

BLAIRGOWRIE, AUGUST 31.—For coal, for Strathmore Hospital.

BLANDFORD (DORSET), SEPTEMBER 7.—For coal and coke, for the Guardians.

BORRISOKANE, AUGUST 26.—For 6 tons of double screened Orrell or Wigan coal, for the Guardians.

BRADFORD, SEPTEMBER 2.—For best gas coal, cobbles, nuts, and cannel, for the Corporation.

BRISTOL, AUGUST 28.—For gas coal, for the Bristol Gas Company.

BURY ST. EDMUND'S, SEPTEMBER 1.—For the supply of coal and coke to the shire hall and police station at Bury St. Edmund's, amounting approximately to 50 tons of best cobbles at per ton, 30 tons of coke at per ton, for the West Suffolk County Council.

COSELEY, SEPTEMBER 6.—For coke and best quality thick coal, for the Education Committee.

ERITH, SEPTEMBER 5.—For about 5,500 tons of coal, for the Urban District Council.

EXETER (DEVON), AUGUST 28.—For coal (screened and delivered) and dry broken coke, for the Devon County Council.

GLOUCESTER, AUGUST 26.—For rough small slack coal, for the Corporation.

GREAT YARMOUTH, AUGUST 26.—For best household coals, for the Great Yarmouth Hospital

HAVERFORDWEST.—For coal, for the Pembrokeshire Education Authority.

HAMPTON, SEPTEMBER 2.—For best Welsh double-screened steam coal, for the Urban District Council.

KILDWICK, SEPTEMBER 4.—For the whole or part of 4,000 tons of screened or unscreened gas coal, for the directors of the Kildwick Parish Gas Company.

LEYTONSTONE, N.E., SEPTEMBER 12.—For coal and coke, for the West Ham Guardians.

LONDON, AUGUST 26.—For the whole or any portion of about 150,000 tons of gas coal, for the South Suburban Gas Company.

LONDON, AUGUST 28.—For coke, for the St. George Guardians.

LONDON, SEPTEMBER 10-11.—For the supply of coal, coke and gas coal, for the Holborn Guardians.

LONDON, SEPTEMBER 19.—For coke, for the Stepney Guardians.

MORLEY, AUGUST 26.—For gas coal, for the Gas Committee.

NEWPORT (I.W.), AUGUST 31.—For fuel, for the Isle of Wight County Council.

NEWTOWNARDS, AUGUST 27.—For 3,000 to 4,000 tons of good coking coal, nuts or slack (washed or otherwise), for the Urban District Council.

OTTAWA (CANADA), AUGUST 28.—For coal, for the Department of Public Works.

PORTLAND, SEPTEMBER 4.—For between 800 and 900 tons of large Welsh steam coal, for the Urban District Council.

RATHMINES, AUGUST 29.—For coal, for the Rathmines and Pembroke Joint Hospital Board.

ROCHDALE AUGUST 26.—For 50,000 tons of best gas coals, for the Corporation.

ROCHESTER, SEPTEMBER 3.—For coal, for the Corporation

ROSCOMMON, AUGUST 31.—For 42 tons of best Wigan coal, double-screened and free from slack, for the County Council.

ROTHERHAM, AUGUST 31.—For coal and nuts, for the Corporation.

SCULCOATES, AUGUST 27.—For house coal, for the Guardians.

SHEERNESS, SEPTEMBER 17.—For about 300 tons of good, large north-country steam coal, free from dust, for the Sheerness Urban District Council.

SOUTHEND, SEPTEMBER 4.—For coal, for the Corporation.

STANHOPE, SEPTEMBER 4.—For coal and coke, for the Weardale Guardians.

SUNBURY, AUGUST 31.—For about 150 tons of best Derby bright coals, for the Trustees.

SUNDERLAND, SEPTEMBER 2.—For coals, for the Committee of Visitors of the Sunderland Borough Asylum.

TIPTON, SEPTEMBER 2.—For thick coal and best rough slack (chiefly the latter), for the Tipton Urban District Council Education Committee.

TORQUAY, SEPTEMBER 2.—For 3,500 tons of coal, for the Town Council.

WARRINGTON, AUGUST 31.—For supply of fuel to their pumping stations, for the Water Committee.

WHITEHAVEN, SEPTEMBER 7.—For supply of fuel for ensuing 12 months, for the Whitehaven Education Committee.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

BLACKBURN, AUGUST 24.—*Castings, &c.*—For the necessary castings, valves, &c., required for the Parsonage reservoir, for the Waterworks Committee of the Corporation.

BRADFORD, AUGUST 28.—*Rotary Converter.*—For one 300 kw. and one 15,000 kw. rotary converter, for the Corporation.

DROITWICH, SEPTEMBER 10.—*Concrete Coal Store, &c.*—For a reinforced concrete coal store and covering for purifiers, for the Corporation.

HOLLINGBOURNE, SEPTEMBER 4.—*Boiler, &c.*—For a new Cornish steam boiler and boiler house, for the Guardians.

LONDON, AUGUST 28.—*Tie-bars.*—For wrought iron bars, for the directors of the East Indian Railway Company. Mr. C. W. Young, secretary, Nicholas-lane, London, E.C.

LONDON, SEPTEMBER 3.—*Steel Rails, &c.*—For the following, for the directors of the Madras and Southern Mahratta Railway Company Limited:—(1) About 4,860 tons steel rails, (2) about 161 tons steel fish-plates, (3) about 64 tons steel coach screws, (4) about 2,110 tons steel sleepers, (5) about 635 tons steel material, in accordance with the specifications, which can be seen at the offices of the company. Mr Percy A. Cory, 91, York-street, Westminster, S.W.

MANCHESTER, SEPTEMBER 10.—*Turbo-alternator, &c.*—For (*a*) one 12,000 kw. three-phase high-pressure turbo-alternator, pipework, valves, and condensing plant; (*b*) water-tube boilers and superheaters, economisers and coal chutes, for the Electricity Committee of the Corporation.

MELBOURNE (AUSTRALIA), SEPTEMBER 3.—*Transformers.*—For six 60 k.v.a. transformers, for the Corporation. Messrs. McIlwraith, McEacharn and Co., Ppty., Limited, Billiter-square Buildings, London, E.C., agents for the Melbourne City Council.

MELBOURNE (AUSTRALIA), OCTOBER 2.—*Rotary Pumps.*—For two vertical sets of electrically-driven rotary pumps, for the Corporation. Specification, &c., can be obtained on application to Messrs. McIlwraith, McEacharn, and Co., Ppty., Limited, Billiter-square Buildings, London, E.C., agents for the Melbourne City Council.

MINSTER, NEAR SHEERNESS, AUGUST 27.—*Air Lift Pumping Plant.*—For an air lift pumping plant, for the Sheppey Guardians.

ROCHDALE, AUGUST 28.—*Motors, &c.*—For surface condensing plant, direct current motors, electrical sundries, cast iron pipes, for the Guardians (Engineers' Department).

ROTHERHAM, AUGUST 28.—*Cast Iron Mains.*—For supply of 310 yards of 12 in. diameter, and 200 yards of 4 in. diameter cast iron mains, for the Corporation.

SYDNEY (AUSTRALIA), OCTOBER 16.—*Travelling Cranes, &c.*—Tenders for the supply for the Randwick Workshops of (1) two 5-ton electric travelling cranes (Specification No. 365), and (2) machine tools, pneumatic tools, wheel press, grinders and jib crane (Specification No. 367), will be received at the offices of the Chief Commissioner, N.S.W. Government Railways, Sydney. A copy of the specification may be seen at the offices of the Agent-General for New South Wales (Engineer's Department), 64, Victoria-street, London, S.W.

TORQUAY, SEPTEMBER 2.—*Turbo-alternator.*—For a 1,000-kw. single-phase turbo-alternator, condensing plant, and switchgear, for the Corporation. (Contract 84.)

WESTON-SUPER-MARE.—*Cast Iron Water Pipes.*—For about 185 tons of 5 in. and 4 in. cast iron socketed water pipes, for the Urban District Council.

THE FREIGHT MARKET.

With a shortage of tonnage and a very quiet coal market, chartering on the north-east coast has been inactive this week. Fixtures are based on the following approximate figures from the Tyne:—Coasting, 3s. 6d. to London and 3s. 9d. to Hamburg; Baltic, 6s. 3d. to 6s. 6d. to Cronstadt; North France, 5s. to Havre; Bay, 7s. to Bordeaux; and Mediterranean, 11s. 6d. to Genoa. At South Wales the volume of business done has been less than usual. Rates for all directions are firm, with a rising tendency, especially for the River Plate. There is a good enquiry for boats for the nearer trades. At the Clyde business is quiet, and rates show little alteration. The Humber is dull and unchanged. Homewards, the amount of chartering done has been moderate. Eastern markets are quiet and unaltered. The Black Sea, Danube and Azof are dull. The Mediterranean and ore trades are steady. The Baltic is active and firm. There is a brisk demand from America, and the tone is firm. The River Plate is steady and fairly busy.

Tyne to Antwerp, 1,800, 4s.; Aalborg, 2,000, 6s. 6d.; Barcelona, 3,000, 11s. 9d.; 2,300, 12s., from Dunston; Cronstadt, 2,000, 6s. 6d.; 3,000, 6s. 3d.; Genoa, 4,000, 11s. 6d.; Gefle, 1,700, 7s. 6d., 350; Havre, 1,800, 5s.; Hamburg, 2,700, 3s. 8d.; London, 2,100, 3s. 6d.; 2,600, 3s. 6d.; Norresundby, 1,800, 6s. 3d.; Port Said, 4,500, 10s. 6d.; Porto Ferrajo, 6,000, 11s. 6d., ppt.; Pillau, 1,800, 6s. 4½d.; Rotterdam, 3s. 3d., voyages over three months; Rouen, 2,700, 5s. 1½d.; San Remo, 2,150, 13s. 6d.; Terneuzen, 1,750, 4s. 5d.

Cardiff to Aden, 6,200, 12s. 6d., August 26; Algiers, 4,800, 11¾ fr., early September; Brindisi, 3,800, 11s., 800, ppt.; Barcelona, 3,700, 11s. 3d., ppt.; 3,700, 11s. 3d., August 26; Bahia Blanca, 5,000, 21s., ppt.; Cronstadt, 3,000, 7s. 9d., ppt.; 4,200, 8s., ppt.; 1,700, 7s. 10½d., ppt.; Dieppe, 1,200, 5s. 4½d.; Devonport, 2,200, 3s. 7½d., Admiralty; Genoa, 11s., ppt.; Granville, 680, 5s. 6d.; Havre, 1,700, 5s., ppt.; Honfleur, 1,350, 5s. 6d.; Invergordon, 3,100, 5s., Admiralty; Liverpool, 300, 4s. 3d.; La Pallice, 3,300, 6½ fr.; Marseilles, 5,000, 12¾ fr., August 23; 4,900, 12¾ fr., ppt.; Milford, 400, 3s. 9d., f.d.; Madeira, 4,200, 11s. 6d.; Oxelosund, 1,700, 7s.; Port Mahon and Gibraltar, 3,600, 8s. 6d., ppt., Admiralty; Portland, 2,000, 3s. 9d., Admiralty; River Plate, 5,000, 21s., ppt.; 5,000, 22s., ppt.; 5,800, 20s.; Rouen, 750, 6s.; Rio de Janeiro, 5,000, 19s. 9d., August; 5,500, 19s. 6d., August 25; 5,600, 19s. 6d., 300; Reval, 2,200, 8s. 3d.; St. Nazaire, 1,800, 7 fr., ppt.; 3,300, 6¾ fr.; Torre Annunziata, 3,800, 11s., 800, ppt.

Wales to Iquique, sail, 20s., fuel; 20s. 6d., September; Pisagua, sail, p.t., Iquique-Pisagua, sail, 21s., December; West Coast South America and home to United Kingdom-Continent, sail, 44s. 6d., in and out, and 45s. stiffened; River Plate, 21s., ppt.

Rotterdam to West Coast South America, direct copper port, sail, 1,695 net, 21s. 3d., coke; Leghorn, 6,000, 11s.; Venice, 4,600, 12s. 4½d.; La Rochelle, 1,500, 6s. 9d., ppt.; Rochefort, 1,500, 6s. 10½d., ppt.; Porto Vecchio, 4,000, 12s. 3d., ppt.; Bordeaux, 3,300, 6s. 6d. coal, 7s. 3d. fuel, ppt.; Marseilles, 5,000, 13 fr. coal, with 300 tons coke at same freight, August 26; 5,000, 13¾ fr. coal, 14¼ fr. fuel, ppt.; Bilbao, 2,600, 10s. 6d., coke, August 31; St. Nazaire, 3,000, 6s. 3d.; Alexandria, 5,000, 11s. 3d. coal, 12s. fuel, 13s. 3d. coke, August 24.

Newport to Oran, 1,850, 12½ fr.; Cork, 400, 4s. 6d.; 400, 4s. 9d.; Gibraltar, 1,300, 9s. 9d., ppt.; Lisbon, 1,800, 8s. 1½d., 350, ppt.; 1,800, 7s. 10½d.

Port Talbot to Lisbon, 1,900, 8s., 350, ppt.; Rouen, 1,550, 8s.

Swansea to St. Nazaire, 1,750, 7¼ fr.; Genoa, 2,200, 11s. 6d.; 3,200, 11s. 6d.; Savona, 3,200, 11s. 6d.; Rouen, 1,350, 6s.; 2,200, 6s. 3d.; Dieppe, 1,150, 6s.; Stettin, 1,300, 7s. 6d.; Cherbourg, 1,180, 6s. 3d.; Caen, 750, 6s. 6d.; Havre, 1,500, 6s.

Hull to Cronstadt, 2,500, 6s. 6d.; 3,400, 6s. 4½d., ppt.; Genoa, 4,500, 11s. 3d., August 24; Cagliari, 2,800, 13s., ppt.; Rouen, 1,400, 5s. 3d.

Goole to Portsmouth, 1,800, 5s., ppt

Blyth to Cronstadt, 3,000, 6s. 4½d.; Palermo, 2,700, 12s. 3d., 400; Swinemunde, 2,200, 6s.; Fairwater, 900, 6s. 3d.; Havre, 1,300, 5s.; 1,300, 5s. 4½d.; Plymouth, 600, 5s. 6d.; Helsingborg, 2,000, 7s. 7½d.

Wear to Gefle, 1,700, 7s. 6d.; London, 1,700, 3s. 6d.

Garston to Genoa, 4,000, p.t., end August; Naples, 4,000, p.t., end August.

Seaham Harbour to Carlscrona, 1,000, 7s. 9d.; Gefle, 1,700, 7s. 6d., 350; 2,200, 7s. 6d.

Glasgow to River Plate, 22s., ppt.

Sundswall to Newcastle, N.S.W., sail, 62s. 6d.

Grangemouth to Wisby, 1,100, 9s.

Leith to Halmstadt, 1,800, 8s. 1½d.

Homeward charters:—Kherson, Nicolaieff, Odessa, Novorossisk or Theodosia, 6,500, Rotterdam 11s. 7½d., Weser 11s. 10½d., Hamburg 12s. 1½d., August 20; Kherson, Nicolaieff or Odessa, 6,000, Rotterdam 11s. 9d., Weser or Hamburg 12s., ppt.; 4,500, Rotterdam, 11s. 6d., ppt.; 5,500, London or Rotterdam 11s. 7½d., Hamburg 12s. 1½d., ppt.; 7,200, London or Rotterdam 11s. 6d., Hamburg 12s., with 3d. extra two loading ports, ppt.; Azof, 4,500, Leith, 13s., end August; 4,000, West Italy, basis 14¼ fr., one port, ppt.; 3,850 max., 15s. n.c., ppt., 3,000, 10 per cent., 16s. n.c. or any, 15s. 6d. Hamburg, September 20; 5,800, Rotterdam 13s., Emden or Weser 13s. 3d., Hamburg 13s. 6d., with 3d. less barley, ppt.; 6,400, Rotterdam 12s. 9d., Antwerp, Emden, Weser 13s., Hamburg 13s. 3d., with 3d. less barley, ppt.; 6,000, 14s., n.c., ppt.; Port Pirie, 2,870 net, Dunkirk or Antwerp, 30s., ore, August-September; Bombay, 2,584 net, Dunkirk, 25s. 6d., ore, September; Huelva, 3,500, Rotterdam, 6s. 10½d., 1,000-1,000, ppt.; 5,300, 6s. 9d., September 10-25; 6,300, Boston, Mass., 10s. 6d., Tinto terms, August; 1·90 dols., New York or Carteret, Tinto terms; Buenos Ayres or La Plata, 5,800, 10 per cent., United Kingdom-Continent, 20s. 6d. o.c., less 6d., September-October; 5,800, 10 per cent., one port Mediterranean, 22s., no reduction, ppt.; 6,200, 10 per cent., United Kingdom-Continent, 20s. 6d. o.c., less 6d., October 1-31; San Lorenzo, 5,000, 10 per cent., United Kingdom-Continent, 21s. 6d. o.c., less 6d., October-November; 5,200, 10 per cent., 21s. 6d. o.c., less 6d., October 15-November 15; not above, 4,300, 10 per cent., 21s. 6d., less 6d., October 10-November 20; 6,000, 10 per cent., 21s. 9d. o.c., less 6d., option Mediterranean, 24s., September; 4,100, 10 per cent., 21s. 9d., o.c., less 6d., October 15-November 15; 5,300, 10 per cent., 23s. 3d. o.c., less 6d., August-September; 4,200, 10 per cent., 21s. 9d. o.c., less 6d., October-November; 6,000, 10 per cent., 22s. 6d. o.c., less 6d., option Buenos Ayres or La Plata 21s., or Bahia Blanca 21s. 6d., September 1-30; Santa Fé, 3,800, 10 per cent., United Kingdom-Continent, 24s. 6d. o.c., less 6d., completing San Lorenzo, 23s. 6d., September 10-October; Calcutta, 30s., p.p., United Kingdom-Continent, net, d.w., September; 3,539 net, 30s., d.w. basis, October; Parrsboro, 59s. 9d., West Britain and East Ireland; Kurrachee, 2,607 net, 20s. 6d., p.p. United Kingdom-Continent, net, September; 2,299 net, Hull, 20s. 3d., option 2,000 tons barley, Harwich 6d. extra, net terms, September; Wilmington 45s., Liverpool or Bremen, 47s. 6d. Havre, September; time charter, Canadian trade, 63s., delivery London, spot; Poti, 4,300, Rotterdam 13s. 6d., 700-700, ppt.; Nicolaieff, 4,200, Rotterdam 9s. 9d., 2,500-2,500, ppt.; Bunbury, 2,700 net, Bombay, 32s., September; New York, 3,322 net, Australia, four ports, lump sum equal to 45s. 11d., September; Odessa, 5,300, Rotterdam 12s., Antwerp 12s. 3d., with 3d. less barley, ppt.; Danube, 6,100, Rotterdam, 13s. on d.w., spot; Nicolaieff or Odessa, 6,000, London or Rotterdam 11s. 9d., Antwerp or Hull 12s.; Hamburg 12s. 3d., August 22-31; Hornillo Bay, 3,200, Dunkirk, 8s. 9d., ppt.; Carthagena, 4,700, Middlesbrough, 8s., ppt.; Bilbao, 3,600, Middlesbrough, 7s. 3d., ppt.; nitrate ports, sail, 26s. 9d., United Kingdom-Continent; 27s., next year; time charter, American trade, 6s., one Cuban round, delivery Bremerhaven, September; Virginia, 25s., Rio de Janeiro, September; Eupatoria, 4,700, Libau, 20s., salt, ppt.; Poti, 3,500, Rotterdam, 13s. 6d., 600-600, ppt.; Kherson, Nicolaieff, Odessa, Novorossisk, Theodosia or Sulina, 3,750 tons, 14s. 6d., n.c., September 5-20; South Japan, 2,723 net, Singapore, 3·50 dols., ppt.; Finland, 1,800 fathoms, Cardiff, 45s. 6d., props, September; Nantes, 900, Swansea, 3s. 10½d., ppt.; Mobile, sail, about 18 dols., Rosario; Puget Sound or Columbia River, sail, 52s. 6d., Sydney, N.S.W.; Gulf timber port, 15 dols., Rio de Janeiro, November-December; Gray's Harbour, sail, 70s., Lahu; time charter, American-Australian trade, six months, delivery States, re-delivery Australia, 6s. 9d.; Delagoa Bay, 8s., Bombay, coal.

On Tuesday last a somewhat peculiar case was heard at Wrexham Police Court, when a collier named Richard J. Hughes, of Coedpoeth, was charged, at the instance of the Treasury, with obtaining a second-class certificate under the Coal Mines Regulation Act, 1887, by means of a false declaration that he was 23 years of age on his last birthday. An anonymous letter was sent to the Board of Examiners, and when he presented himself for examination he was questioned as to his age, and he then said he was 22. For the defence, Mr. Wynn Evans submitted that defendant had not infringed the law, as the Act contained no reference as to the age of candidates; nor was there any reference to the age in the rules. Under the new Coal Mines Act, which came into operation after defendant made the declaration, the age of 23 was fixed. The only age mentioned in any previous Act of Parliament was in that dated 1872, in which the age was fixed at 21. Defendant was under the impression that he could sit for the examination when he was 21, and he made the declaration because he could not find anything in the Act of 1877, under which he was charged, as regards age. The magistrates decided to commit defendant to the Quarter Sessions, bail being allowed.

COLLIERY REPORT BOOKS & FORMS.

New Forms, &c., recently issued under the Coal Mines Acts.

This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c., as issued.

☞ ISSUED SINCE THE LAST APPEARANCE OF THIS LIST.

Registered No. Please quote when ordering.	NEW FORMS, &c., RECENTLY ISSUED.		
	Statutory Rules and Orders, &c.		
H.O., 228	Qualifications of Surveyors (February 27, 1912): Coal Mines Act, 1911	1d. each.	By post 1½d.
H.O., 347*	Rescue and Aid Order. 1912. Memorandum, May 4, 1912	1d. each.	By post 1½d.
H.O., 450	Form of Certificate of Qualification of Fireman, Examiner, or Deputy (May 2, 1912): Coal Mines Act, 1911	1d. each.	By post 1½d.
H.O., 497	Testing Horses for Glanders Order of 17th May, 1912	1d. each.	By post 1½d
H.O., 510	Search of Workmen for Prohibited Articles Order of 21st May, 1912	1d. each.	By post 1½d.
H.O, 511	Explosives in Coal Mines Order of 21st May, 1912 (revoking all previous "Explosives" Orders). Pamphlet Form	4d. each.	By post 5d.
C.G., 69.	The same (without Schedules). Pamphlet Form	4d. each.	By post 5d.
H.O., 34	The same (without Schedules). In Sheet Form for posting	1d. each.	By post 1½d.
H.O., 634	Procedure for Ascertaining and Certifying the Views of Workmen. Order dated 22nd June, 1912	1d. each	By post 1½d.
	Firemen's Examiners' and Deputies' Certificates. Memorandum	½d. each.	By post 1d.
C.G., E.	Special Rules for the Installation and Use of Electricity in Mines. Sheet Form (H.O., 12)	3d. each.	By post 3½d.
C.G., K.	Pamphlet Form (H.O., 11)	2d. each.	By post 3d.
C.G., L.	Coal Mines Act, 1911. Pamphlet Form	9d.	By post 11d.
C.G., L. (Abs)	Coal Mines Act, 1911, Abstract. Sheet (26 in. by 34 in.) (H.O., 2)	3d. each.	By post 4d.
C.G., M.	Coal Mines (Minimum Wage) Act, 1912. Pamphlet Form	1½d.	By post 2d.
☞ Cd. 6340.	Mines and Quarries: General Reports, &c. Part I. District Statistics	6½d.	By post 8d.
C.G., F.	Directions as to the Restoration of Persons suffering from Electric Shock (Silvester or Schafer). Sheets (20 in. by 30 in., and 10 in. by 15 in.)	4d. each.	3s. per doz.
	Mounted on Cardboard	6d. each,	carriage extra.
	Do. and Varnished	1s. each,	do.
	On Enamelled Iron Plates (10 in. by 15 in.)	3s. 2d. each	do. (Reduction on a quantity.
	PRESCRIBED FORMS.		
H.O., 11A	Electricity Rules: Daily Log Sheet	1s. 6d. per 100	
H.O., 11B	Do. Do. Book	4s. each.	By post 4s. 8d.
H.O., 11C	Do. Notice to Inspector of the District under Rule 2 (ii.)	1d. each.	By post 1½d.
H.O., 11D	Do. Notice to Inspector of the District under Rule 2 (iii.)	1d. each.	By post 1½d.
H.O., 20	Form of Register of Boys, Girls and Women Employed—Section 94	4d. each,	postage extra
H.O., 36	Form of Report Book for Inspection on behalf of Workmen—Section 16	9d. each	do.
H.O., 37	Form of Book for Record of Measurements of Air Currents—Section 29 (2)	7d. each,	do.
H.O., 38	Form of Book for Daily Record of Damage to Safety Lamps—Section 34 (1) (ii)	1s. 6d. each	do.
H.O., 39	Form of Report of Thorough Examination of Steam Boiler—Section 56	1d. each	do.
H.O., 40	Form of Book for Report on Quarterly Internal Examination of Steam Boilers—Section 56 (1) (*c*) and (3)	6d. each	do.
H.O., 41	Form of Book for Daily Report on Condition of Roads as to Coal Dust—Section 62 (5)	1s. 3d. each	do.
H.O., 42	Form of Report Book for Firemen, Examiners or Deputies—Sections 64 and 65	1s. each	do.
H.O., 43	Form of Book for Daily Report of Examination of External Parts of Winding Machinery, Guides, &c.—Section 66 (*a*)	1s. 6d. each	do.
H.O., 44	Form of Book for Weekly Report of Machinery, Gear and other Appliances (other than Winding Machinery, Gear, &c.)—Section 66 (*b*)	1s. 3d. each	do.
H.O., 45	Form of Book for Weekly Report on State of Shafts in which Persons are Lowered or Raised—Section 66 (*c*)	1s. 3d. each	do.
H.O., 46	Form of Book for Weekly Report on State of Airways—Section 66 (*d*)	1s. 3d. each	do.
H.O., 47	Form of Book for Reports on Places from which Workmen have been Withdrawn Section 67	9d. each	do.
H.O., 48	Form of Notice of Accident Causing Loss of Life or Serious Personal Injury to be sent to Representative of Persons Employed—Section 80 (1)	1d. each	do.

Continued on Page 399.

THE COLLIERY GUARDIAN COMPANY LIMITED,
30 & 31, Furnival Street, Holborn, London, E.C.

COLLIERY REPORT BOOKS and FORMS.

New Forms, &c., recently issued under the Coal Mines Acts.

This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c.

Continued from Page 398.

NEW FORMS, &c., RECENTLY ISSUED.

Registered No. Please quote when ordering.			
H.O., 49	Form of Notice Specifying the Period of Employment and Times Allowed for Meals of Boys, Girls and Women—Section 93	1d. each,	postage extra
H.O., 50	Form of Book for Horsekeeper's Record and Daily Report of Horses under his care—Schedule III. (13)	2s. 6d. each,	do.
H.O., 51	Form of Annual Return of Horses Used Underground in the Mine—Schedule III. (16)	1d. each	do.
H.O., 52	Form of Book for Daily Record of Shots Fired—Explosives in Coal Mines Order	9d. each	do.

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"COLLIERY GUARDIAN" SERIES.

C.G., 15	Report on Electric Power Plant. Books containing 100 Forms of Report, with duplicates perforated	6s. each.	By post 6s. 5d.
C.G., 15A	Report on Electric Power Plant. Books of 100 Forms of Report, with duplicates perforated	6s. each.	By post 6s. 5d.
C.G., 20	Overman's Daily Report. Books of 200 pages	4s. each.	By post 4s. 5d
C.G., 24	Report of Inspection of Ventilation, &c. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 27	Foreman Enginewright's Daily Report to Manager. Books of 200 pages ..	4s. each.	By post 4s. 5d.
C.G., 31	Authority to Fire Shots and carry and use Detonators. Books of 100 Forms, with rules on back	8s. each.	By post 8s. 6d.
C.G., 32	Authority to have charge of Detonators. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 1d.
C.G., 34	Appointment of Deputy, Fireman, &c. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 1d.
C.G., 35	Workmen's Contracts and Workmen's Deductions. Books of 200 pages, Forms 35A and 35B combined	4s. each.	By post 4s. 5d.
C.G., 35A	Workmen's Contracts. Books of 200 pages..	4s. each.	By post 4s. 5d.
C.G., 35B	Workmen's Deductions. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 47	Veterinary Surgeon's Weekly Report. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 49	Accident Report to Manager. Books of 50 Reports and duplicates	4s. each.	By post 4s. 5d.
C.G., 50A	Abstract of all Persons Employed, to facilitate the making of the Annual and other Returns. Books of 96 pages	3s. each.	By post 3s. 4d.
C.G., 50B	Register of Officials, with Particulars of Engagement. Books of 96 pages ..	3s. each.	By post 3s. 4d.
C.G., 50C	Register of Persons Employed, with Particulars of Engagement. Books of 96 pages..	3s. each.	By post 3s. 4d.
C.G., 50D	Book made up of 48 pages 50A; 24 pages each 50B and 50C; indexed for easy reference	3s. each.	By post 3s. 4d.
C.G., 51	Coal-cutter's Daily Report. Books of 200 pages	4s. each.	By post 4s. 5d.

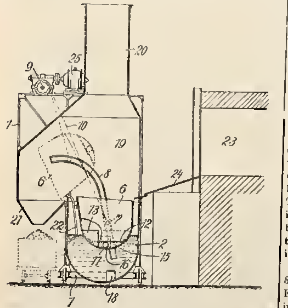
Forms under the Quarries Act, 1894.

C.G., 20Q	Daily Report by Foreman. Books containing 100 Forms of Report.. .	4s. each.	By post 4s. 5d.
C.G., 25Q	Reports of Examination of Machinery, &c. Books of 200 pages	4s. each.	By post 4s. 5d.

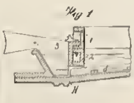
THE COLLIERY GUARDIAN CO. LTD., 30 & 31, Furnival Street, Holborn, London, E.C.

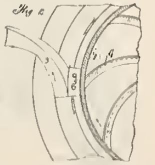
ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

9269 (1912). *Improvements in or relating to Apparatus for Quenching Coke.* Berlin-Anhaltische Maschinenbau-Aktien-Gesellschaft, Reuchlinstrasse 10/13, Berlin, N.W., 87, Germany.—A construction of the coke-quenching apparatus according to this invention is illustrated by way of example in the accompanying drawing, which is an end elevation in central vertical section. In the construction illustrated, it has been assumed that the coke, as it is discharged from the retort 23, passes through a shoot 24 into the tank 6. The weight and the dimensions of the coke tank 6 are calculated according to this invention in such a manner that, before being charged, the tank floats in the quenching liquid of the tank 2—that is to say, occupies the position shown in full lines in figs. 1 and 2. In that position, the lateral cheeks 13 of the bottom 11 of the tank 6 project above the quenching liquid, so that the quenching liquid is cooling the bottom portion of the coke tank only from the outside, without having access to the interior. When the coke tank 6 is charged with incandescent coke, it sinks, owing to the increasing load, until the quenching liquid flows over the upper edge of the lateral cheeks 13 and passes through the spaces 14, 15 and the perforated bottom 12 into the interior of the tank 6, whereby the coke contained therein is quenched. When the coke tank 6 is fully loaded it takes up the position shown by dotted lines in fig. 2, in which the slides 17 are opened by striking against the stops 18. When the tank 6, with the quenched coke, is withdrawn from the quenching liquid by operating the winch 9, the excess of liquid can escape from the tank 6 through the openings 16. The tank 6 is tipped in the manner shown and discharges its contents through the hopper 21—for instance, on to a truck placed below. Before the tank 6 is dipped into the tank 2 for another quenching, its slides 17 are closed again in a suitable manner. (Four claims.)

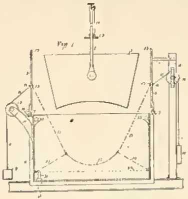


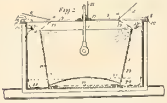
17368 (1911). *Improvements in connection with Rotary Fuel Supports for Gas Producers Utilising Brown Coal and Lignite.* K. Koller, of Barczika, Hungary.—This invention consists in an improvement in the apparatus described in the specification filed with Application for Letters Patent No. 7330, A.D. 1911, and its object is to provide such apparatus with efficient means for automatically removing the separated slag from the fuel support. A fixed guide helically curved in the sense opposite to that of curved cutting ribs on the top surface of the rotary fuel support is disposed at the outer circumference of the circular space swept by the said ribs, so that the latter sweep the slag up against the said guide plate, which deflects the slag over the edge of the fuel support. The invention is illustrated in the accompanying drawing. (One claim.)



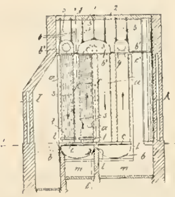


20982 (1911). *Improved Methods of and Means for Quenching Coke.* E. Asthury, of Linacre Gasworks, Bootle, near Liverpool. In carrying out this invention the tank in which the skip of hot coke is lowered is made with a hinged lid or lids, preferably two in number, hinged to the sides of the tank and counterbalanced as by outside counterbalance weights suspended on chains or the like carried over guide pulleys from said lids, so that in their normal positions the lids stand up open. Means are provided and connected to the lids and so arranged that when the skip of hot coke is lowered between the lids into the tank the skip closes the lids upon itself in the tank so as to practically prevent any escape of steam from the tank during the quenching process. The lids are by preference arranged to meet at the centre of the tank, and the meeting edges are recessed at two or more points to form holes when the lids are closed up, through which holes the suspender of the skip passes. The coke is quenched in the enclosed tank by steam or by water, or by steam and water combined, the tank by preference containing a certain depth of water from which steam is generated by the immersion of the hot coke therein, the tank being provided with one or more internal pipes adapted to spray water under pressure or to direct jets of steam on to the hot coke in the skip. Fig. 1 is a sectional end elevation of a coke-quenching apparatus constructed in accordance with this invention, this figure showing also the suspended skip of coke ready to be lowered into the tank; fig. 2 shows the same parts as fig. 1, with the skip lowered into the tank and the lids closed thereon as whilst the coke is being quenched. (Five claims.)

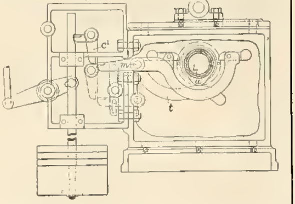




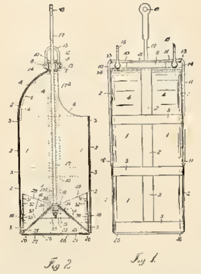
21420 (1911.) *Improvements in and Connected with Tubular Regenerators and like Heat-exchange Apparatus.* W. Mathesius, of 10, Carmer Strasse, Charlottenburg, near Berlin, Germany.—This invention relates to improvements in tubular furnace regenerators and like heat-exchange apparatus for utilising the heat of waste gases and the like, and has for its object to provide an improved construction thereof which will enable the utilisation of the heat from large quantities of such gases. The apparatus is especially applicable for use as a regenerator in metallurgical works, and particularly in combination with Cowper stoves where extraordinarily large quantities of waste gases often escape into the chimney at a temperature of about 500 degs. Cent. According to the invention the tubes are arranged in parallel rows transversely to the flow of the hot gases and in parallel rows in a direction inclined at a small acute angle to the direction of the flow of the gases in such a manner that lines joining the centres of any two tubes of one row, and the centre of the intermediate tube of the next row form an irregular acute-angled triangle. The tube scraper device, which is adapted to be vertically movable between each pair of the parallel inclined rows of tubes, preferably comprises a frame surrounding each group of tubes and having cross supports intermediate each pair of inclined rows of tubes, suitable tube scrapers being carried by said cross supports so as to surround the tubes, and said frames being supported by suitable chain and chain wheel mechanism and balanced against one another. The transverse scrapers preferably comprise chains of any suitable type arranged on the floor of the apparatus and adapted to be moved between each pair of transverse rows of tubes. The accompanying drawing is a vertical section through the regenerator. (Five claims.)



24896 (1911). *Improvements in Gear for the Prevention of Overwinding and for Controlling the Speed of Winding and Hauling Engines and the like.* J. R. Shaw, of Welburn Hall, Kirby Moorside, Yorks. (administrator of the late John Shaw). —This invention relates to an improvement in or modification of the invention described in specification of prior Patent numbered 14927 and dated June 21, 1910, to which Patent of Addition numbered 306, and dated January 5, 1911, also relates. The present invention, as applied to an overwinding gear of the type described in said prior specifications and of the particular design shown in said prior specification No. 306/1911, is illustrated in the accompanying drawing, which is a partial side elevation (partly in section). According to the invention, upon the shaft *m*, or upon an extension thereof, is keyed a curved lever *t* passing underneath the rotatable slotted tube L which encloses the fixed screw. On the said tube L is fastened a cam u, the projection of which, at each revolution of the tube, comes into contact with the curved lever *t*, pressing it down, thus ensuring the vertical catch lever C¹ being kept in full trip, and making it impossible for a partial overwind to set the trigger so finely that it could be liberated by means of any extra vibration or in any manner accidentally. (One claim.)

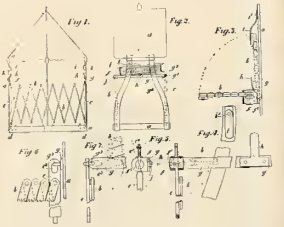


25779 (1911). *Improvements in Bottom Discharge Buckets, Boxes, Skips, and the like, for Handling, or Receiving and Discharging, Coal, Grain and other Materials.* G. A. P. Provay, of Post Office Box 321, Lourenco Marques, Portuguese East Africa.—This invention has especial reference to that type of bottom discharge receptacle for use with double cranes and other equivalent hoisting apparatus, comprising a shell or casing and a guided movable bottom of pyramidical or conical form, which latter is attached to and carried by a rod or bar, by means of which the bucket is suspended in such a way that the casing or shell may be raised or the bottom lowered independently of each other to empty the bucket of its contents. The bottom discharge bucket is applicable for receiving the material from a hopper, chute or the like, and for discharging the same at any point within the range of movement of the crane or like apparatus. It is especially suitable for transferring coal from a bin or bunker into the hold of a ship, or for loading a ship or steamer with ore, grain or other cargo or ballast, and for other analogous purposes. The objects of the invention are an improved construction of bottom for such receptacles and improved guiding means for same, consisting of vertical plates having cross plates on their outer edges engaging in guides fixed to plates on the casing. Fig. 1 is an elevation of the bucket as seen from the back; fig. 2 is a sectional side elevation, or a section taken at right angles to the plane of fig. 1; fig. 4 is a part sectional side elevation illustrating a modified form of the invention; and fig. 5 is a plan of fig. 4. Referring to the construction illustrated in figs. 1, 2 and 3, 1 represents the body, casing or shell of the bucket, 2 being vertical strengthening straps or pieces, and 3 horizontal strengthening straps placed and riveted or otherwise suitably secured upon the outside of the casing or shell 1. The body, casing or shell 1 is partly closed in on one side at the top by means of a hood or cover 4, which serves to prevent spilling of the material as it is being delivered into the bucket; 5 are pieces of angle iron placed in the corners formed between that portion of the shell or casing which forms the hood or cover 4, and the adjacent sides of the shell or casing; 6 represents the opening opposite the hood or cover 4 through which the material enters the bucket. This construction is especially applicable for receiving the coal or other material from a chute, the width of which is slightly less than the width of the opening 6. In using the bucket it is first filled at the loading station by admitting the charge through the opening 6, the body, casing or shell 1 then resting upon the movable bottom. When filled, the bucket is swung into the desired position for discharging its contents, if necessary being raised through the medium of the rod or bar 17 to place it in such position, the body, shell or casing 1 meanwhile resting upon the movable bottom. To empty the bucket the side or light load gears of the crane can be used to raise the body, shell or casing 1 off the bottom, and so allow the material to fall gently down the inclined sides obtained by the pyramidical configuration of the bottom. Instead of raising the body, shell or casing 1, the latter may be held stationary after the bucket has been brought into position for emptying, and the bottom can be lowered by means of the rod or bar 17 to allow the material to fall out of the bucket. (Three claims.)



26692 (1911). *Improvements in the Manufacture of Fuel Briquettes.* H. Faraday, 59, Vine-street, Hulme, Manchester. —This invention relates to improvements in the composition of what are known as briquettes, the object being to minimise or reduce to a large extent the smoke arising during combustion. For this purpose there are mixed in proportionate quantities and in the manner hereinafter described fine coal or slack, tar, and sulphite of sodium. The coal or slack is ground or crushed until it is as fine as required, when sulphite of sodium is added in or about the proportion of 1¼ parts or ounces of sodium sulphite to 22 parts or ounces of coal, and thoroughly mixed; tar is then added in the proportion of 4¾ parts or ounces; the mixture is then formed into briquettes, which may be perforated by a machine in the ordinary manner. (One claim.)

27183 (1911). *Improvements in Pit Cages.* W. Brown, of Cathkin View, Mill-road, Halfway, Cambuslang, Lanarkshire.—This invention relates to pit cages provided with safety gates capable of being put into operation when the cage is conveying miners and others up or down the shaft, whilst, when desired, the gates can be put out of operation and moved clear of the floor space in such manner as not to obstruct same in any way. Under the invention each cage is preferably provided with two gates, one at the front and the other at the back, and these gates are of a collapsible type, preferably such as are used in connection with elevators or hoists, and are so pivoted or hinged that when collapsed they are capable of being moved upwards and supported in the up position so as to give a clear floor space. Fig. 1 is a front view of a cage closed, the front gate being shown in the extended position; fig. 2 is a side view of the cage open, the front gate being collapsed and turned upwards and inwards; figs. 3, 4 and 5 are detail views; figs. 6 and 7 are detail views of part of a gate standard and gate with modified means for turning same upwards and inwards. When the cage is being used for the conveyance of miners or others up and down the shaft, each gate *b* is closed after the men are on board by extending the collapsible portion thereof so that the lower ends of the vertical standards *c*, *c* can be inserted in the holes or recesses or sockets *d* formed in the floor of the cage, whilst by means of a suitable locking device such as g^2 the gates can then be securely retained in the closed position. To open either gate, it is only necessary to undo the locking device and move the standard *c* clear of the reduced part g^1 of the cross bar *g*. The vertical standard *c* can then be lifted out of the hollow or recess or socket or such like *d* formed in the floor of the cage, whereupon the gate can be collapsed on its other standard. When it is desired to use the cage for the conveyance of minerals and the like, the gates *b* are moved entirely clear of the lower part of the cage *a*, and this can be readily done after the gate is collapsed by raising the second standard *c* clear of the floor. As the upper end c^1 of the standard *c* is slidably fitted in the rotatable cylindrical central part f^1 of the socket or its equivalent *f* and said socket or its equivalent *f* is pivotally secured to the cross bar *g* by means of its reduced part *j*, the collapsed gate *b* can now be raised or moved upwards and inwards, as indicated at fig. 3, in such manner that it can be placed over the supporting bracket or its equivalent *h* fitted in connection with the cross-bar *g*. The gate *b* is now retained in the raised position clear of the floor of the cage *a* and at right angles to its original position when in use, as shown at fig. 2, thereby leaving the floor and the lower part of the cage clear for the reception of the hutches and such like. When the gate *b* is moved into the raised position, the



BRUSSELS EXHIBITION: "GRAND PRIX." ALLAHABAD, 1910.
ROUBAIX EXHIBITION, 1911: "GRAND PRIX"

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PATENT

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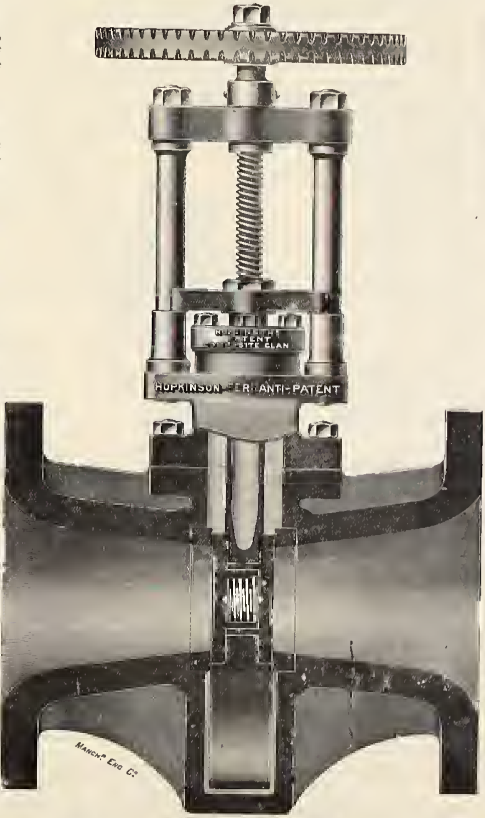

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locking catch *i* is momentarily moved round on its centre *i*¹ until the gate *a* is placed in position on the supporting bracket *h* whereupon the locking catch is released and immediately falls into the vertical position, thereby retaining the gate *b* in the raised position. To bring the gate *b* once more into the operative position it is only necessary to raise it clear of the supporting bracket *h* and lower or move it downwards and outwards so that the vertical standards *c*, *c* can be again inserted in the openings in the floor. (Four claims.)

NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

18464. Method of coal-cutting by air-driven machines. F. G. Herdman and T. E. Thain.
18483. Combined chair and rail joints. F. J. Prosser.
18490. Dressing of tin-bearing ores and the like. H. Bailey.
18508. Reduction and refinement of metallic ores and metals. G. L. Fogler.
18515. Means for stopping runaway skips and the like. H. Phillips.
18516. Method of and apparatus for ascertaining and indicating the presence, and for measuring the percentage of gases, other than those ordinarily contained in the atmosphere of mines, or for other like purposes. A. E. Culley and A. Barry.
18523. Open-fired furnaces for boiling or melting purposes. L. F. Tooth.
18524. Gas-regulating valves. L. F. Tooth.
18533. Apparatus for burning pulverulent fuel. S. F. Steckard.
18539. Ropes. R. Leach and G. Wood.
18540. Cranes and lifting machinery of like nature. R. Gill.
18587. Treatment and utilisation of peat. J. W. Leadbeater.
18588. Hydraulic apparatus such as lifts, hoists, cranes. R. F. Carey.
18598. Treating ores. E. Kerr.
18599. Pumps for air and other fluids. J. J. Horrocks and A. J. Roxburgh.
18614. "Riders" for steadying "bowks" or "kibbles" in pit shafts. E. A. Davies.
18639. Means for stoking fuel on furnaces. J. A. Hope and A. H. McDiarmid.
18651. Steam power installations. Soc. d'Exploitation des Appareils Rateau.
18669. Fans. M. Piehler.
18670. Tube cooler for multi-stage gas compressors. Porkony and Wittekind Maschinenbau Akt.-Ges. and Leopold K. Pick.
18671. Process for increasing the yield of chromium in alumino-thermic production of carbon-free ferro-chromium from chrome iron ore. Th. Goldschmidt (firm of).
18680. Fusible plugs for air-compressors. C. B. Hodges and T. McCaffrey.
18685. Manufacture of hollow metal bars or rods. T. Rowlands.
18686. Furnaces for steam generators, hot water apparatus, hot air heating apparatus and analogous apparatus. M. M. Richard.
18687. Means for preventing accidents due to overwinding of mine cages and the like. B. Harris.
18699. Means for automatically controlling and regulating winding engines or the like. Butterley Company Limited and C. E. Drabble.
18700. Automatic weighing apparatus. R. R. Gibbs and S. H. Johnson.
18701. Steelyard weighing apparatus or the like. R. R. Gibbs and C. McSykes.
18707. Method of and means for the prevention of the danger and inconvenience caused by the presence, in mines, of coal and other dust. W. Clarkson.
18718. Gas producers. K. I. Crossley and J. Atkinson.
18736. Manufacture of fuel briquettes, ovoids, and the like, from waste products. A D. Furse.
18739. Rotary pumps or meters. W. G. Potter.
18758. Gear for operating pumps working by means of compressed air. W. N. Rowell.
18798. Respiratory apparatus for use in unbreathable atmospheres. D. J. Lewis.
18801. Preparation or composition for rendering coal and other dust non-explosive. J. Arnott and F. W. Goodall.
18860. Mine props. R. W. Cuthbertson.
18861. Beams or girders and the like supports, more particularly such as are employed in mining operations. R. W. Cuthbertson.
18870. Lubrication of and bearings of cutter discs of cutter machines for use in mining coal and other minerals. Mavor and Coulson Limited, and M. S. Moore.
18871. Face pieces and head coverings for respiratory apparatus for use in unbreathable atmospheres. D. J. Lewis.
18872. Double-acting hydraulic pumps. A. Whatley, A. H. Whatley, and W. H. Whatley.

Complete Specifications Accepted.

To be published on September 7.

1911.

15964. Methods of and apparatus for treating carbonaceous materials for the production of coal or like gas and water gas. Royston.
18063. Coking stills and the method of and means for heating them. Weiser.
18249. Weighbridges. Hipkins.
18371. Fluid-pressure engine, compressor, or the like. Donaldson, Seabrook, and Berry.
18406. Refining molten pig iron for steel-making and other purposes. Twynam.
18478. Valves for compressors or pumps dealing with gaseous or fluid substances. Workman, and Murray, Workman, and Co.
18712. Apparatus for burning finely-divided fuel. Babcock and Wilcox Limited.
18724. Valves and valve seats. Lamb and Clegg.
19030. Steam engines having a superheater. Fowler and Livesey.
19880. Apparatus for raising and forcing water and other liquids. Cardella.
19808. Weighing apparatus. Poupard.
22865. Air-compressing devices. Mann.
24408. Apparatus for washing coal, ores of the precious metals, and other ores and minerals. Dodds.

1912.

7132. Liquid-fuel furnaces. Dahl.
7354. Heating furnaces. Nico.
9613. Rotary blowers or pumps. Green.
12029. Steam superheaters. Schmidt'sche Heissdampf-Ges.
12030. Steam superheaters. Schmidt'sche Heissdampf-Ges.

Complete Specifications open to Public Inspection before Acceptance.

1911.

20971. Rolling mills. Gatte.

1912.

18254. Rotary pumps and motors. Baudot.
18276. Process of rendering soluble by fusion ores and smelting products. Geb. Borchers (Firm of).

GOVERNMENT PUBLICATIONS.

⁂ Any of the following publications may be obtained on application to this office at the price named post free.

Consular Reports: Aleppo Vilayet, 4½d.; Düsseldorf, 4½d.; Hawaii, 4½d.; Kinkiang, 4d.; Mengtsz and Soumao, 5d.; Stettin, 3d.; Bilbao, 6½d.; Chungking, 4d.; Iquique, 5½d.; Galveston, 3d.; Caracas, 6d.; Madagascar, 3½d.; Honduras, 4½d.; Samoa, 1½d.; Chefoo, 1½d.; Wuchow, 3½d.

Returns *re* Housing of Working Classes, 2d.

Monthly Trade and Commerce, Foreign, to July 31, 5½d.

National Insurance: Special Exclusion Order (Unemployment), 1½d.

Boiler Reports: No. 2144, Explosion Water-tube Boiler at Middle Duffryn Power Station, 5½d.

MINES REPORT, PART I: DISTRICT STATISTICS, 8d.

PUBLICATIONS RECEIVED.

Permissible Explosives Tested prior to January 1, 1912, and Precautions to be Taken in their Use. By Clarence Hall. Washington: U.S. Bureau of Mines (Miners' Circular 6).

[This circular states the conditions under which explosives classed as permissible explosives are accepted for testing, the tests the explosives have to pass, and the names of the explosives that have passed these tests. It also calls attention to some of the dangers that should be avoided in storing and using explosives generally in the form of "don'ts." During the past year 24 explosives have been withdrawn and 31 new explosives added to the list. A new test for determining sensitiveness to frictional impact (a glancing blow) has been adopted by the Bureau. The complete list now includes 32 explosives in the ammonium nitrate class (sub-class A), and one in sub-class B, seven in the hydrated class, three in the organic nitrate class, and 34 in the nitroglycerine class. Sub-class B to Class I includes explosives with a sensitiser that is not in itself an explosive. It is stated that nearly all the ammonium nitrate explosives after six months' storage at the Pittsburg station have either failed to detonate or have detonated incompletely when retested. Attention has been paid to the rate of detonation, and American manufacturers have devised explosives with rates ranging from 4,750 to 14,560 ft. per second.]

The Behaviour of Nitroglycerine when Heated. By W. O. Snelling and C. G. Storm. Washington: U.S Bureau of Mines (Technical Paper 12).

[It is found that nitroglycerine begins to decompose at 50 to 60 degrees Cent., and the temperature at which ebullition begins at normal atmospheric pressure is 145 degs. Cent., explosion being brought about at 218 degs. Cent. It is proposed to test the behaviour of nitroglycerine when heated in the presence of normal constituents of dynamite, stabilisers, &c., and to determine the explosion points of a considerable number of organic nitrates and nitro-substitution compounds.]

Gas Analysis as an Aid in Fighting Mine Fires. By G. A. Burrell and F. M. Seibert. Washington: U.S. Bureau of Mines (Technical Paper 13).

[This important monograph will be referred to more fully.]

Spontaneous Combustion of Coal. By the Chief Engineer Surveyor to Lloyd's Register of British and Foreign Shipping. London: Lloyd's Register.

[Extracts from this report have already appeared in the *C.G.* (July 26, 1912, p. 178.)]

Business Men at Home and Abroad. A Biographical Directory of Partners, Principals, Directors and Managers of Important Business Firms and Institutions at Home and Abroad, 1912-13. With an Introductory Note by Herbert H. Bassett, F.S.S. London: 16, St. Paul's-chambers, Ludgate Hill, E.C. Price: cloth, 15s. net; library edition, 20s. net.

[This tastefully compiled work, the scope of which is amply described in the sub-title, should prove exceedingly useful to the business man. We regret to notice, however, after a casual inspection, a number of inaccuracies and errors, for which the difficulties inherent in the compilation of such works should, perhaps, provide an excuse.]

Mining Conditions under the City of Scranton, Pa. Reports and Maps by William Griffith and Eli T. Conner, with a Preface by Joseph A. Holmes and a Chapter by N. H. Barton. Washington: U.S. Bureau of Mines (Bulletin 25).

[An important report offering suggestions for the extraction of the rich anthracite seams underlying Scranton, and the prevention of surface subsidence by flushing and other processes. It contains a variety of tests of materials, &c., and is accompanied by elaborate maps and plans of workings.]

Swedish Chamber of Commerce in London Year Book, 1911. London: Hampton and Co.

[A handsome production, which contains a mass of valuable information for the Baltic trader. Amongst other features, there are short reports on the Hull, Newcastle, Scotch and South Wales coal trades.]

The Use of Oxygen Breathing or Rescue Apparatus, By A. T. Winborn. Newport: Committee of the Monmouthshire Colliery Owners' Rescue Association.

Year Book of the Michigan College of Mines, 1912-1913. Michigan: The College.

North Country Coal and Shipping Annual for 1912. By Joseph Davies and Graham Wallis. London, Newcastle, Cardiff: Business Statistics Company Limited. Price 7s. 6d. net.

Journal of the Municipal School of Technology, Manchester, Vol. 5. Manchester: The Education Committee.

South Wales Coal and Iron Companies, 1912. Seventh edition. Cardiff: Business Statistics Company Limited.

Note sur des Experiences relatives au Classement des Gisements de Poussieres. By M. J. Taffanel. Paris: Comité Central des Houillères de France (Station d'Essais de Liévin). Price 2 fr.

Report on Mining Operations in the Province of Quebec during 1911. Quebec: L. V. Filteau (printer).

Canada Department of Mines—"Mica, its Occurrence, Exploitation and Uses (No. 118)." By Hugh de Schmidt, M.E. Second edition. Ottawa: Government Printing Bureau.

Canada Department of Mines Bulletin No. 8, "Diamond Drilling at Point Mamainse." By Alfred C. Lane, Ph.D. Ottawa: Government Printing Bureau.

Deterioration and Spontaneous Heating of Coal in Storage. By Horace C. Porter and F. K. Ovitz. Washington: United States Bureau of Mines (Technical Paper 16).

Mathieson's Half-Yearly Highest and Lowest Prices. July edition, 1912 issue. London: F. C. Mathieson and Sons. Price 2s. 6d.

Kohlen-Untersuchungen 1911: im Auftrag des Vereins fur Feuerungsbetrieb und Rauchbekampfung in Hamburg. Thermochemische Prufungs- und Versuchs-Anstalt Dr. Aufhauser. Hamburg: Boysen and Maasch.

[Contains a large number of valuable analyses of English, German, and other coals and cokes.]

"Statistics for July 1912, South Africa Mines Department"; "Annales des Mines" (tome 1, Part 7, 1912); "Mining Magazine" (August); "Bulletin de la Société de l'Industrie Minérale" (July 1912); "Bulletin of the American Institute of Mining Engineers" (July, No. 87); "Bulletin de la Société Industrielle du Nord de la France" (July 1912, No. 182); "Cassier's Magazine" (August 1912); "Engineering Magazine" (August 1912); "Le Mois Scientifique et Industrielle" (July 1912, No. 155); "Journal of the Chemical, Metallurgical and Mining Society of South Africa" (June 1912, Vol. 12, No. 12); "Revue Universelle des Mines" (July 1912, Vol. 39, No. 1); "Journal of the Western Society of Engineers" (April and June 1912, Vol. 17, Nos. 4 and 6); "Mining and Metallurgical Abstracts" (May 1912); "Records of the Geological Survey of India" (Vol. 42, Part 1, 1912); "Transactions of the Institution of Mining Engineers" (Vol. 43, Part 4).

A trade correspondent says the action of the Salford Corporation in declining to publish coal prices is exciting growing and more bitter criticism throughout the Salford district, and local ratepayers' associations are calling public meetings to protest against such action.

Gas Residuals.—In the House of Commons, on August 5, Mr. Whitley moved a resolution declaring that it was expedient that a Joint Committee of Lords and Commons be appointed to consider and report whether any, and, if any, what restrictions should be imposed on gas authorities with respect to the purchase and manufacture of the residual products resulting from the manufacture of gas by other gas authorities, or of other chemical products, and that a message be sent to the Lords to communicate this resolution, and to desire their concurrence. Some private Bill committees during this session had inserted clauses of a retrospective character placing restrictions on the purchase of residuals by gas authorities, and therefore it was necessary for the proposed Committee to enquire into the whole question. It was proposed that both parties to the dispute should appear before the Committee by counsel if they so desired, and in all probability the procedure of private Bill committees on this subject would follow the recommendations of the Joint Committee. The motion was agreed to.

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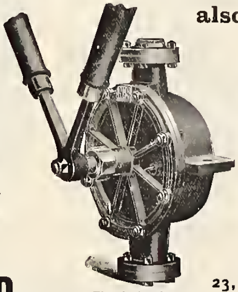

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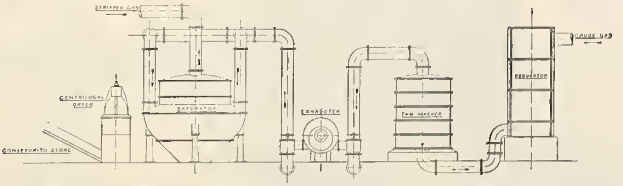

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Daglish, Robert, and Co. Ld., St. Helens, Lancs.

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Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

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Pulsometer Engineering Co. Ld., Reading
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Mather and Platt Ld., Manchester
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Wood, John, & Sons Ld., Brook Foundry, Wigan

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Youngs, Ryland-street Works, Birmingham

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Theedam, E. C., Ld., Dudley
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Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mining Engineering Co. Ld., Sheffield

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Head, Wrightson and Co. Ld., Stockton-on-Tees
Renton, B. M., and Co., Sheffield
Wood, John, and Sons Ld., Wigan

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Jardine, John, Deering-street, Nottingham

Bellows
Hardy Patent Pick Co. Ld., Sheffield
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

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Smallman, J. W., Nuneaton
Theedam, E. C., Ld., Dudley

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Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

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Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
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Sutcliffe, R., Horbury, near Wakefield
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

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Tickle Brothers, Vulcan Ironworks, Wigan

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Wood, John, and Sons Ld., Wigan
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Mining Engineering Co. Ld. (The), Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

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Mining Engineering Co. Ld. (The), Sheffield
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Coke Oven Construction Co. Ld., Sheffield
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Gt. Central Railway, 216, Marylebone-rd, London
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Simon-Carves Ld., 20, Mount-st., Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Coal Heading Machines
Davis, John, and Son (Derby) Ld., Derby
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International Channelling Machines Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
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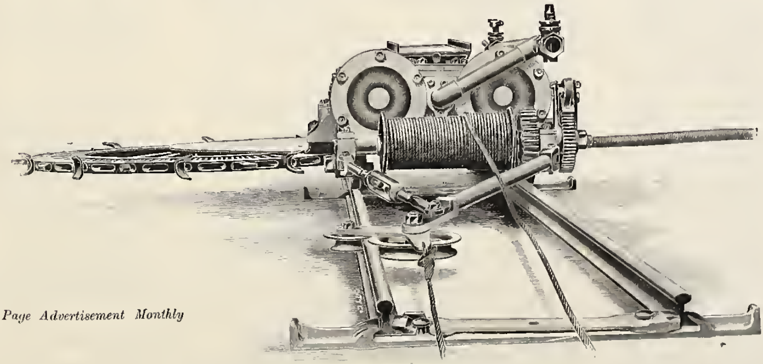

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Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

ENGINES (MARINE TYPE)
Mather and Platt Ld., Manchester

ENGINE MERCHANTS
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

ENGINES (OIL)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

ENGINES PUMPING) (See PUMPS)

ENGINES (ROLLING MILL)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany

ENGINES (STEAM)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

EXHAUST TURBINE REDUCING VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

EXHAUST TURBINE SAFETY VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow

EXHIBITIONS

EXPANSION GEAR
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

EXPLOSIVES
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

EXPLOSIVES (PERMITTED)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

FANS (AIR PROPELLER)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

FANS (EXHAUST)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

FANS (VENTILATING
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

FEED-WATER FILTERS
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

FEED-WATER HEATERS
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

FILES
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & R., & Barber, Bridge-st., Sheffield

FILTERS (OIL)
Pulsometer Engineering Co. Ld., Reading
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'gham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

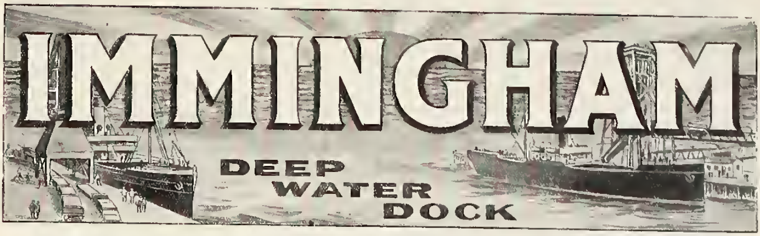
FILTERS (WATER AND GREASE)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

FIRE APPLIANCES
Fell, C. A., Dronfield, near Sheffield
Jannbson, Richard, 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'gham

FIRECLAY GOODS
Witton Firebrick Co. Ld., Darlington

FIREWOOD MACHINERY
Glover, M., and Co., Holbeck-lane, Leeds

The NEW COAL PORT



Officially Opened by the King, July 22nd, 1912.

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Immingham Dock has eight coal hoists capable of shipping 5,600 tons per hour.

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SAM FAY, General Manager.

Purchasers' Guide to Advertisers' Specialities.—(continued).

Firelighter Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Fishplates
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

Fittings (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

Forced Draught
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

Forges
Hardy Patent Pick Co. Ld., Sheffield

Forgings
Bagnall, W. G., Ld., Stafford
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld. Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, H. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Fuel Economisers
Fell, C. A., Dronfield, near Sheffield
Pillatt and Co., Stapleford, Nottingham
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld., Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Hammerton-st., Burnley
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall

Fuses (Safety)
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Bricks

Gas Engines
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Glover, M., and Co., Holbeck-lane, Leeds
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Gas Exhausters
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Gas Plant
British Westinghouse Electric and Manufacturin Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Tipton

Gas Valves
Haslam and Schontheil Ld., Bristol

Gauge Glasses
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Jacobson, Richard, 70, Shoe-lane, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gear (Special for Motor Lorries Cars &c.)
Brown, David, & Sons (Hudd.) Ld., Huddersfield

Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroën, Andre, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Nuneaton Engineering Co. Ld., Nuneaton.
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Rods Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Guest and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, R., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan

Heapsteads—continued
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Hoists
Blcichert, A., and Co., 99-100, Palmerston House Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Hooks or Links (Safety)
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Harvey, G. A., and Co., Lewisham Vale, Lewisham.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturin Co. Ld., Manchester

Hydraulic Jacks
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Re[illegible]ing
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Ryland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hygrometers
Davis, John, and Son (Derby) Ld., Derby

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MANCHESTER Great Marlborough Street.
SHEFFIELD Celtic Works, Savile Street.
NEWCASTLE-ON-TYNE .. Boyd Street.
GLASGOW Rosehill Works, Polmadie.

Purchasers' Guide to Advertisers' Specialities—(continued).

Incline Rollers
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Reddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Hyland-street Works, Birmingham

Jointing Cement
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

Jointing (Sheet)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Joists (Rolled Steel)
Heenan and Froude Ld., Worcester
Benton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Keps (for Winding Cages)
Benthaus, D., 45, Bank-street, Sheffield
Wood, John, and Sons Ld., Wigan

Lamp Cleaning Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Gauze Brushes
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Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Glasses
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Oil Filling Machines
Ackroyd and Best Ld., Morley, nr. Leeds
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Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Re-Lighting Apparatus (Underground)
Ackroyd and Best Ld., Morley, nr. Leeds
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Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Arc)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
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British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

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British Insulated and Helsby Cables Ld., Prescot
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Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

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Ackroyd and Best Ld., Morley, nr. Leeds
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Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

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Lathes
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

Leather Appliances

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Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

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Deutsche Maschinenfabrik A.G., Duisburg, Germany
Benton, B. M., and Co., Sheffield
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Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Hyland-street Works, Birmingham

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British Insulated and Helsby Cables Ld., Prescot
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Davis, John, and Son (Derby) Ld., Derby
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Theedam, E. C., Ld., Dudley

Locknut Washers
Benton, B. M., and Co., Sheffield

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Bridge, David, & Co. Ld., Castleton, Manchester
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Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
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Machinery (Second-hand)
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Marple & Gillott Ld., Coronation Bldgs., Sheffield
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Benton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

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Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

Mathematical Instruments
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Thornton, A. G., Ld., King-st. West, Manchester

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Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

Metal Perforators
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

Metallic Packing
United States Metallic Packing Co. Ld., Soho Works, Bradford

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Davis, John, and Son (Derby) Ld., Derby
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Thornton, A. G., Ld., King-st. West, Manchester

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Hardy Patent Pick Co. Ld., Sheffield
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Mining Dials
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Stanley, W. F., & Co. Ld., 286, High Holborn, W.C
Thornton, A. G., Ld., King-st. West, Manchester

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Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
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Davis, John, and Son (Derby) Ld., Derby
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Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

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Benton, B. M., and Co., Midland Works, Sheffield

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Glover, M., and Co., Holbeck-lane, Leeds
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Theedam, E. C., Ld., Dudley
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Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

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Brown, David, & Sons (Hudd.) Ld., Huddersfield
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Deutsche Maschinenfabrik A.G., Duisburg, Germany
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Walker Brothers (Wigan) Ld., Wigan
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Wright, Joseph, and Co., Tipton

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Greene, Tweed and Co., Westminster
Lancaster and Tonge Ld., Pendleton, Manchester
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

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Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Kalbitum Paint Co. Ld., Belvedere, Kent
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

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Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent

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Theedam, E. C., Ld., Dudley

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Spencer, John, Ld., Tube Works, Wednesbury
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Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

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Heenan & Froude Ld., Worcester
Henderson and Glass, Liverpool
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Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Spencer, John, Ld., Globe Tube Works, Wednesbury
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton

Pit Props (Wood)
Baird, J. W., and Co., West Hartlepool
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Osbeck and Co., Newcastle-on-Tyne

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John Davis & Son (Derby) Ld., Derby

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Firth, Wm., Ld., Water-lane, Leeds
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Stringer, John, and Son, Dept. 11, Blackburn

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Railway and General Engineering Co. Ld., Notts
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Ward, Thos. W., Ld., Albion Works, Sheffield

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Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
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Griffin, Charles, and Co. Ld., London, W.C.
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Pulley Blocks
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Frost, Albert, and Co., Sheffield
Humble, Stephen, 9, Victoria-st., London, S.W.
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Spencer and Co. Ld., Melksham, Wilts
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Wood, John, & Sons Ld., Brook Foundry, Wigan

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British Wagon Co. Ld., Rotherham
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Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester
Lancashire and Yorks. Wagon Co. Ld., Heywood
Lincoln Wagon and Engine Co. Ld., Lincoln
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld., Midland Works Birmingham
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Wigan Wagon Co. Ld., Springs Branch, Wigan

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British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Bute Docks, Cardiff
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Heenan & Froude Ld., Worcester
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Heenan & Froude Ld., Worcester
Lancashire and Yorkshire Wagon Co. Ld., Heywood, near Manchester
Lincoln Wagon and Engine Co. Ld., 11, St Mary-street, Lincoln
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Bigley, Wm., Forest Wagon Works, Bulwell, Nottingham

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Allen, W. G., and Sons (Tipton) Ld., Tipton
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British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester

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Hardy Patent Pick Co. Ld., Sheffield

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Pulsometer Engineering Co. Ld., Reading

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Knowles Oxygen Co. Ld., Wolverhampton
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., 187, Westminster bridge-road, S.E.

Respirators

British Oxygen Co. Ld., Elverton-st., Westminster
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Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., Westminster

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Ward, Thos. W., Limited, Albion Works, Sheffield

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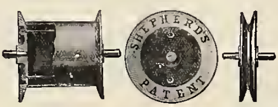

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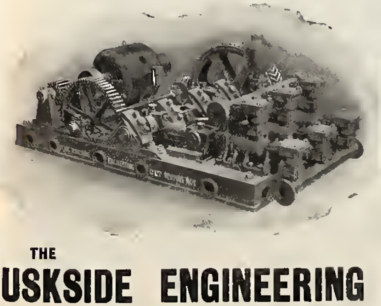

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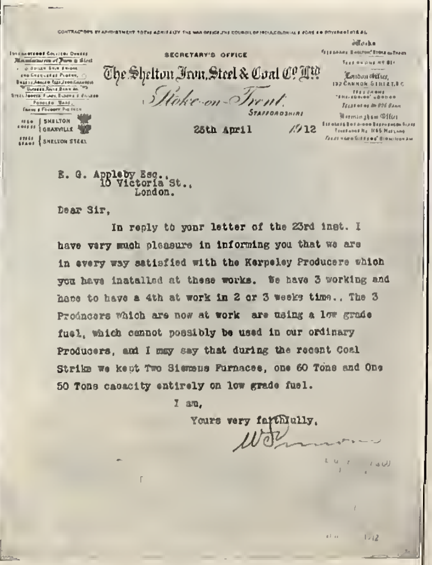

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SHELTON STEEL

London Office,
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25th April 1912

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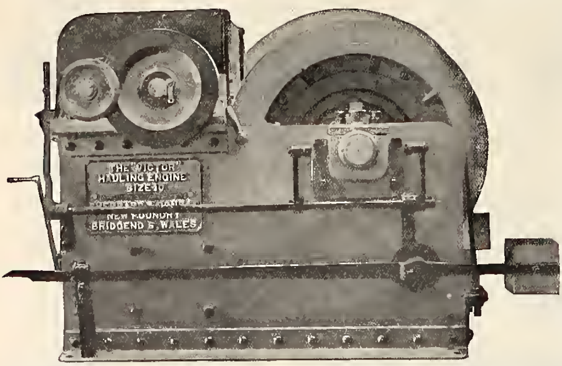
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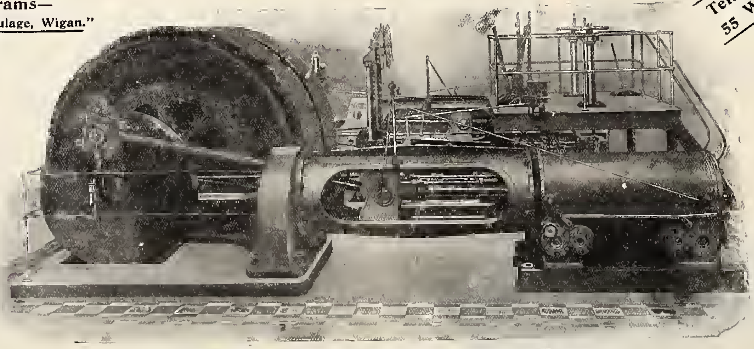

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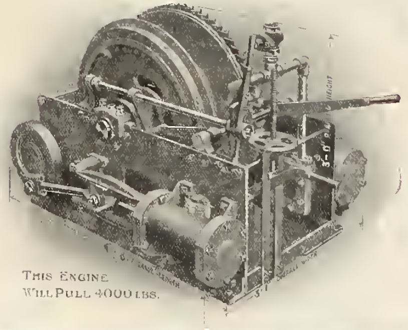

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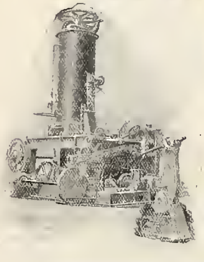

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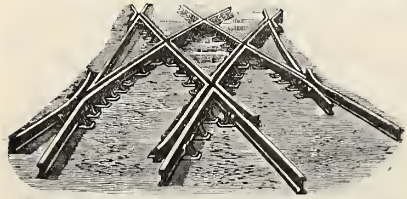

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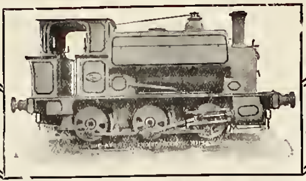

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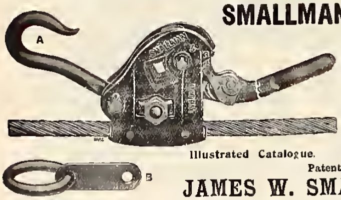

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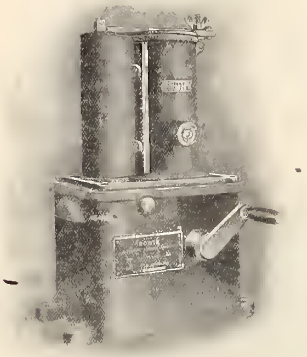

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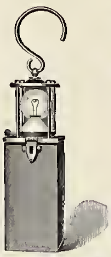

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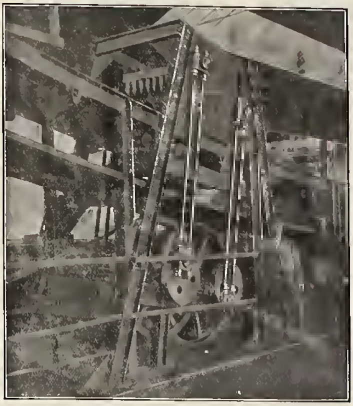

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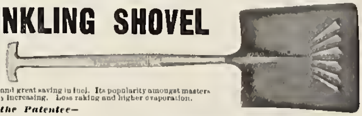

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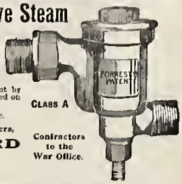

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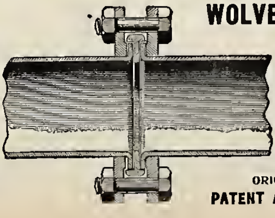

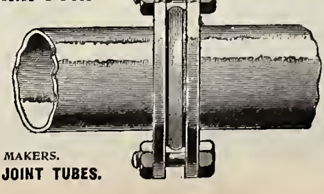

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*** *For* later **Advertisements** *and* **Scale of Charges,** *see* **Page 392 (Leader Page).**

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Supplement to THE COLLIERY GUARDIAN, August 23, 1912.

COAL MINES INSPECTION

1911.

The *COLLIERY GUARDIAN* Digest of the Reports of
H.M. Inspectors of Mines.

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COAL MINES INSPECTION IN 1911.

INTRODUCTION.

As in former years, this supplement to the *Colliery Guardian* gives abstracts from the annual reports of H.M. divisional inspectors of mines. It is necessary to repeat that the abridgments given deal purely with the returns under the Coal Mines Regulation Acts, which, to adopt the official designation, comprise all mines of coal, stratified ironstone, shale and fireclay, including works above ground where the minerals are prepared for use or sale by screening, washing, &c. The statistics relating to workings under the jurisdiction of the Metalliferous Mines and Quarries Acts are consequently not included.

1.—Scotland District.

Mr. W. Walker, in his report under the Coal Mines Regulation Act for 1911, states that during the year all the mines both under the Coal and Metalliferous Mines Acts have had at least one underground inspection made at them, and some have been inspected as many as ten times. The clerical work continues to grow. Jointly the members of the inspectorate in the division made 1,989 inspections at mines and quarries, of which 1,162 were underground. The coal trade of the division was, at the beginning of the year, dull and listless, but as the year advanced it improved, and for the greater part the collieries worked full time, and both owners and workmen were able to recoup themselves for the slacker period they had previously experienced. A valuable deposit of stratified iron ore has been discovered in the island of Raasay. It is similar in nearly every respect to the seam in the Cleveland district of the county of York and of the same geological age; it will be developed and worked by Messrs. Wm. Baird and Co. Limited, of Glasgow. A small quantity, as a sample, was worked during the year under notice, but in future years a considerable output of the ore will be worked and used at the company's blast furnaces at Gartsherrie. Prospecting for the same seam is being carried out in the Isle of Skye with prospecte of success and of finding it in workable quantities and quality. The discovery of this ore is one of great importance to the iron trade of Scotland and will afford employment to a considerable number of workmen where little, if any, now exists.

Persons Employed.—The total number of persons employed in and about the mines under the Coal Mines Acts during the year was 138,377, being an increase of 504 as compared with 1910. Underground there was a small decrease of 6, but there were 510 more surface workers employed, 465 males and 45 females, than in the previous year. Below ground there was an increase in the following counties, viz., Dumfries 91, Inverness 3, Ayr 364, Edinburgh 395, and Linlithgow 258, but there were decreases in Argyll 1, Kinross 5, Sutherland 1, Clackmannan 36, Dumbarton 31, Fife 68, Haddington 191, Lanark 585, Renfrew 49, and Stirling 150, thus making a net decrease of 6. Above ground, Argyll had an increase of 2, Dumfries 13, Ayr 201, Clackmannan 25, Fife 25, Lanark 77, Linlithgow 231, Renfrew 13, and Stirling 85, but there was a decrease of 9 in Kinross, 7 in Dumbarton, 80 in Edinburgh, and 66 in Haddington, so that the net increase of surface workers was 510. The following table shows the number of persons employed:—

County.	Mines at work.	Persons employed. Below ground. Males.	Persons employed. Above ground. Males.	Persons employed. Above ground. Females.	Below and above ground.
Argyll, Dumfries, Inverness, Kinross, Peebles & Sutherland	9	1,119	250	20	1,389
Ayr	84	12,042	2,403	20	14 465
Clackmannan	6	995	346	1	1,342
Dumbarton	9	1,713	459	26	2,198
Edinburgh	28	8 809	1,946	62	10,817
Fife	59	22,454	3,930	1,011	27,395
Haddington	13	2,482	523	21	3,026
Lanark	218	45,055	9,472	1,213	55,740
Linlithgow	38	8,264	1,803	246	10,313
Renfrew	10	926	231	—	1,157
Stirling	44	8 341	1,987	207	10,535
Totals in 1911	518	112,200	23,350	2,827	138,377
Totals in 1910	509	112,206	22,885	2,782	137,873

County.	Coal.	Fireclay.	Ironstone.	Oil shale.	Other minerals.	Total.	Increase (+) or decrease (−) as compared with 1910.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Argyll, Dumfries, Inverness, Kinross, Peebles and Sutherland	493,634	—	1,550	110	—	495,294	+ 51,145
Ayr	4,204 813	79,744	273,728	—	918	4,559,203	+ 180,194
Clackmannan	414,746	4 061	—	—	—	418,807	+ 8 892
Dumbarton	559,121	27,634	12,834	—	3,930	603,519	+ 11,674
Edinburgh	3,038 868	2,751	28,219	709,906	4,065	3,783,809	+ 26,607
Fife	9,037,790	70,840	1,473	—	39,009	9,149,112	+ 367,980
Haddington	1,021,169	8,189	—	—	15,467	1 044,825	− 60,510
Lanark	17,504,906	283,881	136,960	93,404	29,620	18,048,771	− 406,158
Linlithgow	2,178,827	47,947	22,284	2,313 383	21,787	4,584,228	+ 124,318
Renfrew	151,350	26,682	166,667	—	126,651	471,350	− 27,547
Stirling	3,112,939	200,224	42,324	—	33,979	3,389,466	+ 65,246
Total in 1911	41,718,163	751,953	686,039	3,116,803	275,426	46 548,384	+ 342,832
Total in 1910	41,335,132	758,294	648,415	3,130,280	333,431	46,205,552	—

Output of Mineral.—The total output for the year was 46,548,384 tons, as compared with 46,205,552 tons in 1910, or an increase of 342,832 tons. The output of coal was 41,718,163 tons, or an increase of 383,031 tons. The increases and decreases of the various minerals raised and also for the counties are given in the above table.

The average output per person employed below ground was 415 tons—Ayr 378, Edinburgh 429, Fife 407, Haddington 421, Lanark 401, Linlithgow 555, Stirling 406. The average quantity of mineral raised per person below and above ground is 336 tons, or 1 ton per person more than in the previous year.

From the table given below it will be seen there is a large increase both in the number of coal-cutting machines at work and the quantity of mineral obtained by them as compared with the previous year. The increase in the number of machines is no less than 95, and of the quantity of mineral obtained by them 1,097,191 tons. The total quantity was 6,970,646 tons, and of this 5,713,391 tons were obtained by 501 machines driven by electricity, and 1,257,255 tons by 175 the motive power of which was compressed air. Compared with 1910 there is an increase in the number of machines driven by electricity of 76, and in the quantity obtained by them of 1,096,504 tons, and in the number of machines driven by compressed air and tons cut by them of 19 and 687 respectively. The machines were distributed as follows:—Ayr 48, Clackmannan 6, Dumbarton 4, Dumfries 3, Edinburgh 32, Fife 113, Haddington 14, Lanark 350, Linlithgow 33, Renfrew 2, and Stirling 71. The number of conveyors at work at the coal face—82—is 10 less than in the previous year. This decrease is due to local conditions at the coal face, such as faults, condition of roof, &c., and the number, owing to these and other causes, is liable to fluctuate from year to year.

Coal-cutting Machines.

Description.	Number driven by Electricity.	Number driven by Compressed air.	Statute tons cut by Electricity. Coal.	Statute tons cut by Electricity. Other minerals.	Statute tons cut by Compressed air. Coal.	Statute tons cut by Compressed air. Other minerals
			Tons.	Tons.	Tons.	Tons.
Disc	336	128	3,855,904	18,976	1,136,366	2,024
Bar	149	—	1,532,753	218,407	—	—
Chain	16	—	87,351	—	—	—
Percussive	—	47	—	—	118,865	—
Rotary heading	—	—	—	—	—	—
Totals	501	175	5,476,008	237,383	1,255,231	2,024

Accidents.—During the year 186 separate fatal accidents occurred in and about the mines classed under the Coal Mines Regulation Acts, causing 194 deaths, or a welcome decrease of nine in the number of accidents and of 15 in the number of lives lost as compared with 1910. There were five accidents which caused the loss of more than one life; two were caused by explosions of firedamp, one by a fall of roof, one by falling part way down a shaft, by which four men were killed, and one by an outburst of gas displacing a large quantity of coal by which three men were buried and suffocated.

The following is a summary of fatal and non-fatal accidents, classified according to place and cause:—

Place and cause.	Fatal accidents. Separate accidents.	Fatal accidents. Deaths.	Non-fatal accidents reported to inspector.* Separate accidents.	Non-fatal accidents reported to inspector.* Persons injured.†	All non-fatal accidents disabling for more than 7 days. Separate accidents.	All non-fatal accidents disabling for more than 7 days. Persons injured.
Explosions of firedamp or coaldust	13	15	67	108	62	92
Falls in mine	72	73	278	290	5,610	5,625
Shaft accidents	22	25	19	33	98	106
Miscellaneous underground	57	59	310	323	9,694	9,710
Total underground	164	172	674	754	15,464	15,533
On surface	22	22	100	101	1,263	1,265
Gross total in 1911	186	194	774	855	16,727	16,798
Total in 1910	195	209	794	839	16,348	16,399

* Includes (*a*) accidents causing fracture of head or limb, or dislocation of limb, or any other serious personal injury; (*b*) accidents caused by explosion of gas or dust, or any explosive, or by electricity, or by overwinding, and causing any personal injury whatever.

† Including those injured in accidents which proved fatal to their companions.

The death rates from accidents per 1,000 persons employed during the year were (*a*) below ground 1·53, (*b*) above ground 0·84, and (*c*) below and above ground 1·40. The figures for the preceding year were (*a*) 1·65, (*b*) 0·93, and (*c*) 1·51. Per 1,000,000 tons raised the death rate was 4·17, as compared with 4·52 in 1910. In Clackmannan the death rate per 1,000 persons employed was 2·25, in Dumbarton 0·87, and in Lanark 0·07 higher than in the previous year, but all the other counties show a marked reduction in this respect. The rates were as follow:—Ayr 1·17, Edinburgh 1·47, Fife 1·27, Haddington 0·66, Lanark 1·58, Linlithgow 1·26, Renfrew and Stirling 1·14.

By explosions of firedamp or coaldust 15 deaths resulted from 13 accidents, and 108 persons were injured during the year under review. There is an increase of two in the number of fatal accidents and deaths, and of 12 in the number of persons injured as compared with 1910. When it is remembered that regulations were adopted at the latter part of the year 1910, with a view to reducing the accidents under this head, this record is very disappointing, and says little for the management of some of the collieries concerned. At the mines where these regulations have been carried out in the spirit in which they were framed, explosions of gas have been prevented, but at many collieries their true meaning has not been grasped. Ignitions have occurred because miners, when cutting through faults, have hung up safety lamps in the highest part of a road, or because, after men have been out of a place for periods ranging from 10 to 20 minutes, the lamps have not been used for the purpose intended by the regulations. It is not sufficient to hang up a safety lamp and expect it will give evidence of the presence of gas, as has been done. With the exception of one accident at a mine in which safety lamps were in use, the cause of which may either have been one of the men striking a match after his safety lamp was extinguished by gas, or by the gauze of the safety lamp becoming so hot by its burning with a full-sized flame in firedamp that the gas outside was ignited, all the accidents were caused by naked lights. Several accidents have occurred owing to workmen entering places in which gas has been found by the fireman on making his inspection before the shift commences, and which they have been instructed not to enter. Such places as these are not fenced by the fireman at the time the gas is found, as it has not been the custom to do so, and the Special Rules do not require it. Scotland is unlike all the other districts in this respect. In many cases even rudimentary and simple precautions would have prevented many of the accidents. Too little is thought of gas being ignited, and it is looked upon, at the present time, as being an incident to mining of no consequence. In a case in which a fireman was killed by an explosion of gas at North Motherwell Colliery, belonging to Messrs. Merry and Cuninghame, on April 30, deceased, although the mine was worked exclusively with safety lamps, had in his possession a pipe, tobacco, and part of a match. An accident in the Main coalseam of Meiklehill Colliery, belonging to the Woodilee Coal Company Limited, on August 19, was due to two boys being allowed to be in the return airway with naked lights when a large waste was, by diverting the air current, being cleared of gas which had accumulated during a period of 19 years. Where the boys were working when the explosion occurred is beyond the station, under General Rule 4 of the Coal Mines Act, 1887, but no inspection had been made of it by a competent person within two hours of their commencing work, as required by the rule. An accident occurred at Dechmont No. 3 Colliery, belonging to Messrs. Archibald Russell Limited, on October 15, causing the death of a strapper and injury to four other workmen. The explosion occurred in the rise section of the Upper Ell coalseam. This seam is reached by a cross-cut stone mine driven to the dip from the Splint coalseam at No. 3 shaft bottom. The holing of the coal in this section is done by means of coal-cutting machines actuated by electricity. The electric current was not on, and, so far as could be ascertained, it had not been switched on or used for any purpose. One of the theories of the cause of the explosion was that one of the men was using a naked light for some illegal purpose, and that the broken glass of a safety lamp was caused by the lamp being thrown by the force of the explosion against the side of the road, but whilst this might be so, Mr. Walker was able to satisfy himself that the broken lamp glass was not the cause. He thinks it is quite possible the lamp in question had been burning in gas, and the heat resulting therefrom broke the glass and caused the explosion. The accident would not have occurred if ordinary precautions had been taken, and the provisions of the General and Special Rules had been complied with. The men themselves went past the meeting station under General Rule 4 to find the fireman, and the latter took them in with him instead of leaving the men at the station until he had made his inspection and found it was safe for them to be admitted into the section, and made his report as required by General Rule 4. But, having illegally taken them in, he should at once have withdrawn them under General Rule 7 and Special Rule 38. Instead of doing this, he actually left them where the gas was and returned to the surface. The fireman of the incoming shift did not appear to realise the serious state of affairs, because he began to lift a screen when men were in the section—a most improper proceeding. A repairer was fatally injured by an explosion of firedamp in the turf seam of Annandale Colliery, belonging to Messrs. the Auchlochan and Caprington Colliery Limited, on October 26. The investigation of the accident disclosed the fact that the inspection prior to the repairing shift commencing had not been made for some time. The firemen alleged that their other duties had become so great that they were unable to travel the whole of the places during the specified time, but they had not made any complaints of this to the manager, or informed him that any places were not inspected, and there was nothing in the reports they signed to indicate that any were being missed. There was no oversman at this colliery, and it had been the custom for the day shift to leave a note at the end of the shift for the night shift repairers, giving details of the work to be done by them. If there had been an oversman, in addition to the manager, in direct touch with the details of the work and repairs, the accident would not have happened. The manager had been appointed only a few days before, and he, therefore, could not be held responsible for the deficient organisation of the official staff, and it was difficult to get evidence that the old manager had any knowledge that the statutory inspections were not being made. The owners, through the agent, agreed to appoint an oversman, and also to reorganise the work of the firemen, so as to make it impossible, if the firemen did their duty, for such a regrettable state of affairs to occur again. There is not the slightest doubt that this unfortunate man's death was due to the inspection not having been made by the fireman prior to the shift commencing. An accident occurred at Holytown Colliery, belonging to Messrs. James Nimmo and Co. Limited, on November 3, and caused the death of a surveyor's apprentice 10 days later, and injury to a fireman. The barometer was very low, and had been falling for some hours, and it is probable the gas accumulated between the inspection being made and the accident occurring. Mr. Walker observes that surveyors should not be allowed to go into workings which are temporarily stopped, with naked lights, as was done in this instance. Seeing that, in order to get places surveyed up to date, it may be necessary for them to go into places which are not efficiently ventilated, it is essential that they should be provided either with safety lamps or portable electric lamps.

Thirty-three notices were received during the year under notice of cases of ignition of gas where no persons were injured, or 16 more than in the previous year—27 being caused by naked lights and six by shotfiring.

From falls of roof and sides there were 72 accidents causing 73 deaths. In the previous year there were 86 fatal accidents and 89 deaths, so that there is a marked decrease of 14 accidents and 16 deaths. It is gratifying to report this decrease and also to be able to say it has been brought about by the supports to the roof being more systematically set. Even with the better results obtained, several accidents were caused by want of care and precautions not being taken, such as not setting temporary supports when removing broken baulks or crowns of timber. The middle prop should always be set. Another source of accident results from men withdrawing the timber set to break off the stone at the roadhead, in order to put the stone blown down by the shots into buildings or packs after brushing shots have been fired. Cases have occurred during the year where men have withdrawn practically all the timber for this purpose, leaving a large area of roof stone unsupported, and falls have occurred and killed the person working under it. It is urged often by both officials and the persons employed that in a thin seam it would be impossible to work unless this were done, on account of the cramped space in which they have to work. If, however, a system of setting strong hardwood crowns on each side of the road, or iron or steel bars or girders parallel to the road and building, with props set under them at small intervals, to break the roof stone off were adopted, and only the props in the centre were withdrawn, to allow of the stone being passed through to the building, and there were never less than say four props under the crown, many of these accidents would be prevented. Flat or corrugated iron bars would be advantageous for this purpose in thin seams as they occupy little room and are not much heavier than ordinary crowns, and, therefore, easily handled. The first cost would probably be more than in the case of timber, but as they could be used frequently and be straightened when bent, they would be more economical in the end.

Mr. Walker still finds that the miners do not understand the notice posted under the timbering rules in this district, and his colleagues and he have prevailed upon the managers to add in bold type the words "which means that roof supports must be set at a not greater distance than . . . feet." This, he thinks, is appreciated by the men, and the inspectors find that where these words have been added to the notice, more men are able to tell them what the distance fixed by the manager under the rule is. The inspector again urges upon both officials and workmen the necessity of resorting more frequently to temporary supports, and also to good lids or crowns being set in every instance on the tops of the props. Not only is a greater area of roof supported, but the lid, by acting as a cushion when the first crush or weight comes on, saves the prop and prevents its being suddenly broken. In some faces with a thick sandstone as a roof where conveyors are used, he finds the waste so tightly packed that the weight is thrown on to the face, with the result that breaks or gullets are caused over the coal head. This, in his opinion, is a great mistake—while the face is adequately protected by timber and square blocks placed off and on at stated intervals, space should be allowed back in the waste for the roof to get vent and thus cause the weight to "sit" on the packs and not on the coal face. The control of a roof of this kind requires most careful studying to obtain the best results, both as regards safety and the working of the coal to the best advantage. Where the weight is only thrown on to the face so as to cause breaks along and parallel to it, the gradual squeeze is not brought to bear on the seam, and there is a great risk of large stones being forced out of the roof where the men are working. Straps or crowns set systematically in rows at right angles to the face and moved forward as the face advances and the conveyors are moved forward, should also be used.

By shaft accidents 25 persons were fatally injured by 22 accidents, as against 18 accidents and 25 deaths in 1910. It is a record which does not reflect credit on anyone concerned, and could, with the exercise of more care and better and improved working appliances, be considerably reduced. No less than 14 of the deaths were caused by men falling from landings at mid-shaft. In four cases the bottomers were pulling the hutch in to the side they thought the cage was at, whereas it was at the opposite side, and in one three men were on a scaffold in a shaft when the winch, to which the rope was attached, was so badly damaged that the rope ran off, and in falling it caught another man on a kettle hanging in the shaft and knocked him off, and he and the three men were precipitated to the bottom of the shaft and killed. Two men were killed by passing under the descending cage to get to the opposite side of the shaft. Whilst good progress has been made during the year in the provision of better light at mid-landings and shaft bottoms, there are still some mines where there is room for improvement in this respect, and where it is found, on an inspection being made, that the only provision for lighting the inset is the man's own lamp carried in his cap. In these cases attention is called to the matter, and the owners or managers are asked to provide a good fixed light, so as to show whether the cage is opposite the landing or not. The provisions of the new Mines Act, requiring the sides of the cages to be completely closed and protected by rods or gates at the ends, should effect a saving of life in the division. Two lives were lost during the year from the want of such protection. An overwinding accident occurred at Hamilton Palace Colliery, belonging to Messrs. the Bent Coal Company Limited, on October 4, causing the death of an oncostman and injuries of a more or less serious nature to seven men who were in the descending cage. The depth from the surface to the seam to which these men were being lowered is 95 fathoms. The winding engineman had previously been employed at a shaft 160 fathoms in depth, and in a moment of forgetfulness allowed the engine to run as if he had been at the deeper shaft. Neither a detaching hook nor an automatic controlling device to prevent overspeed was in use. An accident occurred at Blairhall Colliery, belonging to Messrs. the Coltness Iron Company Limited, on April 4, by which four sinkers lost their lives. Two shafts have recently been sunk to the lower seams at this colliery, one being 22 ft. by 10 ft. 6 in. and the other 19 ft. by 10 ft. 6 in. The lowest or Dunfermline Splint seam was reached at a depth of about 1,992 ft. At the time of the accident cages had already been put into one of the shafts, one of which ran to a hanging-on at 1,020 ft., and the other to one at 1,350 ft. from the surface, and preparations were being made for guides in the other. In the shaft in which the accident occurred a scaffold had been suspended at 2 p.m. on the day of the accident by means of a rope from a steam winch at 1,794 ft. from the surface, for the purpose of removing a partition; three men were on it, and the fourth was in the kettle when the accident happened. The man at the winch stated that he had received a signal to lower the scaffold, and he did so to a distance of about 6 ft. when he received a signal to stop, with which he complied. In pursuance of further signals he lowered it first 4 ft. and then 6 ft., and was in the act of stopping the winch when something happened—he could not say what—the drum of the winch became free and the rope ran off it. The three men on the scaffold were, in consequence, precipitated into the sump at the bottom of the shaft in which there was water to a depth of 18 ft. The rope, which had become liberated from the winch, in falling down the shaft became entangled with that from the winding engine attached to the kibble and evidently caused the man on the kettle to be knocked off. He also fell into the water at the bottom and was drowned. Owing to the cages in the second shaft not running to the same depth as the men were at after the scaffold fell away, nothing could be done to rescue them until another rope was put down the shaft from another winch. The winch (*see* fig. 1) was actuated by steam and fitted with two cylinders, each 8 in. in diameter by 11 in. stroke, and it was geared so that it could be used on the second or third motion. The steam pressure was from 65 to 70 pounds per square inch and a foot brake was fitted to rim, cast on the large toothed wheel which was in the same shaft as the drum; the lever to apply it passed up and down in a guard through which there were holes for a pin to be placed in order to pin the brake down. There were three clutches worked by levers and rods. The levers were provided with clamp screws on a guard or quadrant to keep the clutches in position. The two clutches A and B were in as the scaffold was being lowered, and both these and the teeth of the wheels in connection with them were not damaged. The spur wheel and the pinion wheel E, however, were badly damaged, the whole of the teeth, spokes and brake rim of the former were broken, and all but five of the teeth in the latter were stripped. The man who was driving the winch stated that he did not take out the clutch of the pinion A, but there is little doubt, Mr. Walker thinks, that it had come out, either by his inadvertently taking it out, because it had not been properly put in, or through the lever working it having become loose, which caused the pinion E when the drum was running free to become engaged, thus producing the smash. The brake is of the hand type and was sufficient to hold the winch when full steam was applied. The weight of the scaffold, rope and men was about 1 ton 5 cwts., and as the winch was built for a load of 10 tons it does not appear that the accident was caused by excessive weight, nor, as the metal at the fracture appeared to be of good quality, was it due to any latent defect in the winch or its fittings. The driver of the winch began at 7 a.m. and worked until 2 p.m. as a pitheadman, when he took charge of the winch, and had, when the accident occurred, been at work 8½ hours, but it was intended, if nothing had occurred, that he should continue at it until 10 p.m., thus making the period from the time he began in the morning to the time he would have finished 15 hours. This is too long a shift for a man to work who has charge of a winch to which a scaffold in a shaft is attached, and should under no circumstances be allowed. As, however, the accident occurred when he had been employed 8½ hours, it can hardly be held to be the cause of the accident in this instance. At the enquiry under the Fatal Accident Inquiry (Scotland) Act, the jury returned a formal verdict, with a recommendation that the colliery owners should see that an experienced man should be employed at the winch when men were being raised or lowered on a scaffold in the shaft. There was no allegation that the man who was at the winch when the accident occurred was inexperienced; on the other hand, the evidence showed that he had been driving similar winches for more than two years without mishap. The following points were brought out in evidence:—

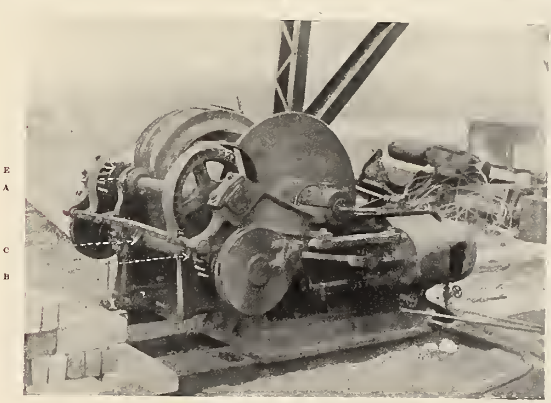

Fig. 1.—Winch at Blairhall Colliery.

1. That it is neither desirable nor safe for men to be on a scaffold when it is being raised in a shaft, and that they should be taken off in a kettle before this was done.

2. That the accident was caused by—(*a*) the second motion pinion clutch coming or being taken out, and the first motion pinion clutch becoming engaged when the spur wheel was revolving, with the result that the pinion, spur wheel and brake were smashed; or (*b*) the spur wheel and brake rim, which was in the spur wheel, broke when the brake was applied.

If either of these things occurred the drum would be free, and the rope would be dragged off by its weight and that of the scaffold. The former theory, as already stated, is the more probable cause of the accident, because the teeth of the first motion were stripped. If the second had taken place, those of the second motion pinion would have been shattered, as that wheel would be engaged for the accident to be caused in that way, and it was not damaged. Small winches such as this are unsuitable for use at deep shafts.

By explosives there were four fatal accidents causing the same number of deaths, and 82 accidents injuring 94 persons, as compared with 9 fatal accidents and deaths and 71 non-fatal accidents and 77 persons injured in the previous year. The decrease in fatal accidents is satisfactory, but the increase in the number of persons injured by non-fatal accidents is to be deplored, for if more care had been taken by the officials in seeing that the workmen paid more heed to obvious precautions, and the persons employed had taken such precautions, the list of accidents under this head would have been very much less. A fruitful source of accident is the dangerous practice which prevails of several holes being charged, stemmed, and lighted at one time. The shots are usually fired by means of fuses, and one or more men light them. After one or two are lighted it frequently occurs that they are under the impression they have not succeeded in lighting all the fuses, and that after the number they think they have lighted have exploded they return to the face, and are close to it when the shot supposed not to have lighted explodes and causes serious injury to them. The persons firing the shots where the kind of accident described occurs invariably return too quickly to the place. A fatal accident occurred at Limefield oil shale mine, belonging to Messrs. Young's Paraffin Light and Mineral Oil Company Limited, on November 20, and caused the death of a miner. The deceased was driving a level, when a shot fired in an upset approaching it at right-angles from a lower level blew through, and the shale projected by it caught and killed him. A signal, it is alleged, was given to deceased by the man who was about to light the shot, by knocking, and he returned it. This is a recognised method of warning men working in places which are likely to be affected by the firing of a shot, to retire to a place of safety. It is, however, most unsatisfactory, and in practice has resulted in many accidents, owing to the signal being misunderstood, or men failing to retire when it has been given. Mr. Walker took up the matter with the owners of this mine, and also with the Broxburn Oil Company Limited, with the result that the following regulation has been put into force at all their mines:—

Notice Regarding Shotfiring

> When an upset is approaching a level, or any two places are within 15 ft. of each other, no shot shall be fired unless the person about to fire the shot has examined the place into which the shot may blow through, and satisfied himself that any persons working in it have retired from it, and are in a place of safety. On no account must shouting or chapping be resorted to for the purpose.
>
> Miners and other workmen must also see that all roads leading to such places are carefully guarded immediately before and for five minutes after a shot or shots have been lighted.

Three accidents caused the death of three persons from suffocation by natural gases. One of them occurred at Dechmont No. 3 Pit, belonging to Messrs. Archibald Russell Limited, on April 21, and caused the death of the under-manager through foolishly going up a stone mine to take off the canvas screen nearer the face in order to give the air a free passage.

Thirty-five haulage accidents caused the same number of deaths; this is an increase of six accidents and seven deaths as compared with the previous year. Two were caused by a rope and a chain breaking, 20 were due to men and boys being run over or crushed by trams and tubs, and 13 come under the head of other haulage accidents. The number of haulage accidents is too high, and if greater care were exercised would be reduced. Three were caused by hutches being improperly or carelessly coupled. In one of these cases the jock or back stay had not been put on and the person whose duty it was to fix it on the rake of hutches was, through his omission, killed. A satisfactory feature in connection with accidents under this head is the reduced number of fatal accidents from runaway tubs. The number in 1911 was four as against 12 in the preceding year. This result is due to the adoption of devices to prevent accidents from runaways, such as stop blocks, monkeys, runaway switches and back stays, also better supervision by the officials and greater care by the workmen. Several accidents have been caused either by the wheel tree at the top of self-acting inclines breaking, or, owing to being improperly set, being pulled out. These trees are too often made of ordinary soft pit wood, and, as a consequence, are easily broken. Nothing but hard wood of ample dimensions should be used for this purpose, and the trees should be firmly let into the roof and pavement, with a crown or bar in front of the top and a sleeper at the foot of them.

Four persons were killed and six injured by the same number of accidents below ground by electric shock during the year. As compared with 1910 this is a decrease of one fatal accident and six non-fatal accidents, but as a fatal accident, which is described, also occurred on the surface from this cause, and none occurred in the previous year, the result in each year of deaths due to the use of electricity in and about the mines is the same. Several of the accidents, if certain means had been taken by the officials, or more care had been exercised by the persons in charge of, and working, the machinery, would, in all probability, have been prevented. At a number of collieries periodical insulation tests of cables and electrical apparatus are being made with good results. These should be the rule rather than the exception. From the point of view of economy alone such tests are desirable, as they enable an electrician to anticipate and prevent breakdowns, thus obviating loss of work. At the same time, if a satisfactory standard of insulation is adopted and maintained, the risk of accident is thereby greatly reduced. Two of the fatal accidents, those at Bredisholm and Bardykes collieries, bring prominently forward the question of whether a pressure which would be unlikely in case of accident to have fatal results should not be used for all portable motors wherever it is possible. Both accidents took place on medium pressure alternating current systems, and in both cases if the pressure had been transformed to, say, 200 volts at the nearest convenient point to the portable motors, and if the neutral point of the transformer windings on the secondary side had been earthed, the persons who were unfortunately killed could not have received shocks of more than 130 volts to earth, and, therefore, would probably not have been killed. The two fatal shocks were, in fact, received from three-phase alternating current systems of 550 volts in one case and 500 volts in the other. Mr. Nelson, H.M. electrical inspector of mines, when making inspections in the division, has recommended this system, and Mr. Walker has also suggested that it should be adopted at several collieries, but objections have been raised that the size of the coal-cutting machines would be increased and that the trailing cables would be so heavy as to become unwieldy. Careful enquiries have been made from the makers of coal-cutting machines, and he is told that the increase of size would be trifling. As the height of the machine in particular would not be affected, it appears that this objection is not well grounded, and need hardly be considered. The objection that the cables would be heavy and unwieldy could be met by making them shorter, coupled with the use of a greater number of gate-end boxes in a given length of face. This latter would, in many cases, be an advantage rather than the reverse, as, instead of a long length of trailing cable dragging along the pavement of a face, a greater length of the cable would be in gate roads where it could be properly suspended.

The first fatal accident occurred at Devon Colliery belonging to Messrs. the Alloa Coal Company Limited, on February 28, and caused the death of a repairer. The electric plant at this colliery is used for pumping and coal-cutter power. The current is generated at 650 volts and is three-phase, entirely insulated from earth. The generator is designed for 420 ampères, but at the time of the accident the output was 350 ampères at 630 volts, and this was taken underground by armoured cable. From a distribution box near the shaft a three-core unarmoured dialite cable (33/17) size was carried into the Splint seam to a distribution and switch box. From this box three single core unarmoured dialite cables (7/16 size) are carried to two gate end boxes in two sections or districts where coal-cutting machines are in use for serving the coal-cutters. There is an earthing system in the splint seam from each of the coal-cutters, and from the distribution box to a point on the main level. The coal-cutter frames were earthed through a four-core cable (one of them the earth wire) to the gate end boxes, and from these a 7/16 galvanised iron wire with soldered joints was carried from each section and joined up near to the distribution box, thence by one wire of same size to the point on the main lead, where it was bolted by a lug on to a copper plate 2 ft. by 2 ft. by ¼ in., which formed the earth plate. The plate was placed in a clear water hole 6 ft. by 4 ft. by 3 ft. deep, and a good flow of water passed over it on its way to the shaft. On the night of the accident two sets of repairers were at work in the Splint seam roads. The deceased and another man were on a horse road 100 yards inbye from the distribution and switch box, and two others were on a top level in one of the coal-cutting sections 5 yards out from the cable heading and 60 yards from the coal face. The man working with deceased had taken the three cables down and protected them with timber; the earth wire, however, was behind the props, and was, therefore, not taken down, and he and the deceased were preparing for timber 4 yards inbye. The deceased went out, but his mate was not aware for what purpose, as he was not paying attention. His oil flask was found afterwards close by, and it is probable that he went for it. He heard the deceased shout, and on looking saw him twisted with his arm over the earth wire. This man knew it might be dangerous to touch the deceased, and he therefore rushed out to switch off the current. On his way out he saw sparking along the earth wire. A fireman happened to be at the box, and switched off. The other party of repairers had also taken down the three cables and protected them. No part, however, was on the ground; they were hanging in a "belly," the inner end of which was at a prop at the bottom of the heading, where the cables were attached behind and turned back. Apparently they had not noticed that the cables were all in close contact with the prop, and that one of them was hanging on top of the earth wire. On examination a bare patch ¾ in. by ⅜ in. was found on one of the cables at the prop, and the earth wire in contact with it was nearly fused through. Next day three electricians tested the earthing system for continuity by galvanometer and the cables for insulation resistance by megohmeter, and obtained good continuity and insulation resistance, except, of course, when the cable and earth wire were in contact. One of them put his hand in the water, felt the earth connection on the copper plate and thought it was all right; the plate was afterwards taken out of the water, examined, and reported to be sound. On the day following, or two days after the accident, Mr. Masterton found the cable had a hole ¾ in. by ¼ in. in it, and the copper was pitted, the insulation was also burned. A galvanometer test on the earth wire gave continuity, but the galvanised wire which was in the water hole at the earth plate was extensively corroded. There were 9 ft. of wire under water and some parts were worse corroded than others. He broke off one strand in bending the wire, the length of which was about 3 in., but the worst and the vital part was close to the lug as four of the strands were eaten through and the remaining three looked less than $\frac{1}{16}$ in., one of them being nearly half eaten away. The accident was due to the earth wire not being of sufficient capacity to disperse the leak without danger. The earthing system would have been more satisfactory if the earth cables had had greater conductivity (a 7/16 galvanised steel wire is about equal in conductivity to a single 16 copper wire), and if, in addition to the earth plate below ground, the cables had been taken to a plate sunk at the surface. Some time before the accident the management of the colliery had decided to do this, and the material was at the colliery when the accident occurred. The question of unskilled persons handling cables also arises from this case. The men who took them down were doing so by instructions either direct or through the fireman and contractor, and were taking steps to protect them to the best of their skill and knowledge, but repairers and brushers should not be allowed to take down or fix up any cable. A person with even a rudimentary knowledge of the dangers of electricity would not have allowed cables to sag and drag over an earth wire as these men did.

The second accident occurred at Auchengeich Colliery, belonging to Messrs. James Nimmo and Co. Limited, on June 1, and caused the death of a miner. The coal in the section of the coking coal seam in which the accident occurred was undercut by a coal-cutting machine actuated by electricity, three-phase current at 440 volts. The main and trailing cables were armoured, and the earthing system was intended to be by means of the armouring to an earth plate sunk at the surface, but it transpired afterwards that owing to a mistake on the part of a workman, and a lack of supervision on the part of the officials, no efficient earthing system existed. A fault developed at a joint in one of the cables, and, in consequence, the armouring became alive. Deceased, who was pushing a loaded tub, came in contact with it and was killed. On investigating the accident it was difficult at first to discover why the earthing system did not carry away the leakage and thus prevent an accident. It was, however, afterwards found that a workman when cutting a drain, at the beginning of May, to take away the sludge water from the boilers, had come across a wire or cable, and as it crossed the path of the drain he cut it with his shovel. He had no idea it was in any way connected with the earth plate, but thought it was a piece of old cable which had been thrown amongst the rubbish, and therefore did not mention the matter to anyone. This cable was the earth wire for the whole system at the colliery, and after it was cut the safeguard of earthing ceased to exist, and this accident was the result. The accident was either due to carelessness and lack of supervision or to a lack of appreciation of the importance of maintaining a proper earth connection. To avoid accidents of this character in future, there should be some arrangement by which the resistance to earth can be tested daily by the person in charge of the installation, the results being entered in a book kept for the purpose.

The third accident occurred at Bredisholm Colliery, belonging to the United Collieries Limited, on November 30, and caused the death of a coal-cutting machineman. Mr. Nelson, H.M. electrical inspector of mines, was in the district when it occurred, and at once made an inspection and investigation of the circumstances. The supply at this colliery is on the three-phase system, at a pressure of 3,000 volts. From a sub-station at the top of No. 2 pit the current is carried below ground to a transformer at the shaft bottom, where it is reduced in pressure to 500 volts. It is conveyed at this pressure in-bye, a distance of about 600 yards, to a coal-cutting machine. It was at this coal-cutter that the accident occurred. The deceased was killed by an electric shock, received probably from the coal-cutter haulage rope. At the time of the accident there were two faults on the 500-bolt distribution system, (*a*) a fault on one phase due to a breakdown of insulation a few feet from the transformer at the shaft bottom, (*b*) a second fault on a second phase due to the same cause at the coal-cutter. The apparatus was new and had only been at work a few weeks. The coal-cutter frame was earthed by means of the armouring of the trailing cable and that of the main cable to earth plates sunk at surface, and there was a set of fuses at the gate end box in the coal-cutter circuit set to blow at about 80 ampères. The resistance of the armouring of the trailing cable was, when tested after the accident, found to be 6 ohms. The first of the two faults probably set up or accelerated the appearance of the second by making the system temporarily a system with one phase at earth potential. The fault near the transformer made a connection to earth of some resistance, probably a very low one. The fault at the coal-cutter caused another phase to be earthed and the resistance between the two faulted phases would be made up of the resistance to earth of each of the faults plus the resistance of the armouring of the cable to the gate end box plus that of the armouring of the trailing cable. The resistance of 50 ampères of the trailing cable in armouring alone was found to be such that with a fault current passing from the fault near the transformer through the cable armouring to the fault at the coal-cutter, a pressure of 300 volts or more may have arisen on the coal-cutter frame, a condition of affairs which clearly explains the accident. The remedy for such an accident is to limit the resistance to earth of all earthed outer covers, so that a dangerous pressure is not likely to occur on an outer cover anywhere in the mine. It is obvious that if the resistance of the earth wire to the coal-cutter had been a fraction of an ohm, say 0·6 ohm instead of 6 ohms, the fuse protecting the circuit would have been called into operation, and almost certainly without danger to the men, as the fuse would have blown before the pressure on the coal-cutter frame could have become dangerous. The owners have, since the accident, earthed the neutral point of the system. If this had been done prior to the time it occurred, the circuit breaker would, in all probability, have come into operation when the first fault developed, and thus prevented the accident.

The fourth accident occurred at Bardykes Colliery belonging to Messrs. the Summerlee Iron Company Limited on December 20, and caused the death of a repairer. The electric current is generated at this colliery on the three-phase system at 500 volts, and armoured cables are used throughout except for trailing cables. The latter are, however, provided with a fourth core for the purpose of earthing the frame of the coal-cutter and the armouring of the cables. On the night in question a coal-cutting machine was being moved from one part of the mine to another, and for this purpose was placed on a special bogie. It had just reached its destination and been removed from this bogie, using its own power for this purpose, when the accident occurred. The machine was left standing for about 15 minutes with the end to which the trailing cable is attached directly under a break in the roof from which a small stream of water was falling on to the trailing cable plug or attachment to the machine. This caused a breakdown in the insulation of the leads and the casing of the machine to become "live," and the deceased man, who at the time was in contact with it, received a fatal shock. The plug was of the usual type made of wood, in two halves, bolted together. A brass facing plate on both sides of it made the earth connection between the trailing cable and the frame of the coal-cutter; it was held in position by an iron pin passing through the cover of the box, the plug, and finally into the casing of the machine. This pin was provided with a collar, and when screwed down, as it should have been, this collar was in direct contact with the brass plate on one side of the plug, and the plate on the other side was in contact with the frame of the machine. The pin in use at the time was, however, too long, and could not be screwed tight against the casing of the machine. The earth connection for this reason was not efficiently made, and as soon as the fault developed the accident occurred. On the efficient connection between the brass facing plates and the machine the safety of the men, in case of a breakdown in the insulation at the machine, wholly depended, and it is to be regretted that in this instance a clamp pin which could not be screwed down tight was in use. These are matters which should be constantly enquired into by the higher officials and electricians. The plug of the machine should not have been allowed to be under the stream of water. Any unearthed machine frame not perfectly watertight would become alive in these circumstances, and those in charge of its removal should have taken steps to protect the machine from the water by temporary means, or, if that were impossible, they should at once have switched the current off.

Six accidents caused injuries to the same number of persons. A brusher was sent out from the face to bring in a trailing cable from a gate end box to a coal-cutter, and instead of taking it in and returning to switch on the current, he, in order to save himself the trouble of the double journey, switched it on at the gate end box, and was carrying the "live" cable in. The terminals came in contact with the pavement and the resulting flash burned his hand. Such work as bringing in trailing cables should only be done by the machinemen themselves. A coal-cutter driver received a severe shock from a coal-cutter driven by direct-current 500 volt, with concentric cable and earthed outer. The circuit breaker on the surface was thrown out by an overload on the coal-cutter, and, when the machine stopped, he leaned forward to switch off and received the shock. An examination of the machine afterwards showed that the negative connection was 2½ turns slack and loose. The cause of the shock was, no doubt, due to this bad negative connection. A coal-cutter chargeman was burned on the back of his neck owing to the machine becoming charged and an earth connection not having been made by the injured man. The gate end box was earthed to a water pipe, and the coal-cutter to the box by an additional wire in the trailing cable attached to the box by a lug and screw, and he failed to attach this wire. The leads ran along the bottom to the opposite side of the coal-cutter, and as they were liable to be damaged, the manager had them put into an iron pipe, and this necessitated a large hole being made into the controller box. This hole had not been bushed and the vibration of the machine caused the edge of it to cut through the insulation of the leads, resulting in a short. A coal-cutter machineman received a shock owing to a small spring of a switch breaking and allowing the live tongue of the switch to come in contact with the casing of the machine and make it "live." The machine was not earthed and the current was at once switched off. The injured man was unconscious and it was not until artificial respiration had been kept up for three-quarters of an hour that he regained consciousness. The current was alternating-current at 400 volts.; at the time of the accident preparations were being made to earth the frames of the machine to the surface, and the neutral point of the system has also been earthed. The accident shows the necessity of efficiently earthing the frames of all apparatus and, further, of maintaining artificial respiration for a long period in cases of supposed death from electric shock.

Three fatal accidents by machinery occurred and caused the death of the same number of persons. This is a decrease of six accidents and deaths as compared with the previous year. A coal-cutter attendant was caught and fatally injured by the revolving bar of a coal-cutting machine when the machine was being moved along the face and was not undercutting the coal. In the previous year the deaths of five persons were due to this cause, but since that time devices similar to those described in Mr. Walker's report for the year 1910 have been fitted to some of the machines of this type, and all new machines, in accordance with an undertaking the makers of these machines gave, are provided with a device by which the bar can be put out of gear when the machine is being transported along the face. The seams are, as a rule, thin, and the space limited; the clothing of the men working at the machines is very liable to be caught by the bar and the result, when this occurs, is invariably fatal. Another coal-cutting machineman was putting wedges under the skids of a machine, to keep it level, when the sleeve of his vest became entangled between the rope by which the machine was hauled along the face and the drum round which it was being coiled. It is not always a simple matter to protect the drum, at the point the rope is wound on to it, by means of a shield, but it should always be done The accident would not have occurred if the deceased had stopped the machine before attempting to put the wedges in below the skids, and all persons working in close proximity to machines should not have sleeves in their vests, or any loose clothing which can be caught by the machinery.

Ten persons were killed by eight miscellaneous accidents. An accident of an unusual character occurred at Valleyfield Colliery, belonging to Messrs. the Fife Coal Company Limited, on March 9, and caused the death of three miners. The colliery is situated about five miles west of Dunfermline, and the sinking of both pits had just been completed. A cage was put in the No. 2 shaft and rapid progress was being made in the work of forming the pit bottom and driving the roadways. The guides were fixed in the No. 1 or downcast shaft, but as the pulley wheels were being put on for the cages, this shaft was not available at the time of the accident. The upcast, or No. 2 shaft, is 430 yards deep, and cuts the Five-feet Seam, in which the accident occurred, at a depth of 400 yards. Two levels had been turned out of the shaft in this seam, one to the north-west and the other to the south-east. An outburst of gas occurred at the face of the south-east level in the Five-feet seam, about 100 yards from the No. 2 shaft, displacing more than 190 tons of coal, and the men were overcome and suffocated by it. Six men were working on the south-east side of the pit, three in the heading nearest to the shaft, and three in the face of the level, the latter being suffocated by the coal displaced by the outburst. The face of the level was not reached until some days later, when it was found that a small rise fault crossed about 7 ft. in advance of its original position, and that the face of the level had been blown out or advanced for 12 ft., in addition to which a hole, some 30 ft. long and running parallel with the fault, had been formed on the upper side where the seam rises 1 in $1\frac{1}{4}$, whereas at the shaft the inclination is 1 in 2·8. The coal next the fault was burnt, and further back was sooty and soft. Burnt coal is often found in the coalmines in Fife and in the deeper measures—as a rule, close to faults. It is caused by the obtrusion of whin beds, which, by being thrust up, appear to have burnt the coal after it was deposited. Through movement of the surrounding strata, patches or pockets of the coalseam have been disintegrated, and being filled with gas at high pressure, when the intervening solid coal between it and the face of the workings (as in this instance) becomes too weak to resist the pressure, it bursts away, and the small coal pours out like running sand. This disintegrated coal, containing gas, appears to be in patches which are local, or in small areas. The south-east level appears to have been driven against one of these pockets, or patches of disintegrated coal and gas, with the result that upon the face reaching within 7 ft. of the fault the pressure overcame the resistance of the coal and blew it out with such force that the men had no chance to escape. Fortunately safety lamps had been introduced, otherwise the loss of life would have been considerably greater, as an explosion of gas would, as happened at Glencraig Colliery in 1902, have followed the outburst. After the accident, Mr. Walker, along with Mr. Robinson, one of the senior inspectors, met the agent and discussed with him what precautions should be taken to prevent similar accidents. He undertook that boreholes should be kept at least 40 ft. in advance of the faces of the levels and headings, and this was done. Since these boreholes began, the rods on one occasion were blown out of the hole, and gas at high pressure continued to be given off for some hours, and the holes have frequently been choked with small coal. At times this small coal has been blown out in clouds of fine dust to such an extent that boring had to be discontinued until the gas served off and the pressure decreased. In order to prevent such outbursts as this causing loss of life, it is necessary, in addition to boring in advance, to have experienced men, such as firemen-in-charge, always on the watch for any movement in the coal face. The same workmen should be kept in such places, and strict instructions given to them to retire from the place if there is any sign of the coal working more easily or moving towards them, and as soon as a patch or pocket is located the face should be riddled with holes in order to liberate the gas contained in the pocket near it.

The number of fatal accidents and deaths on the surface was 22, or a decrease of two accidents and deaths as compared with 1910. Nine were caused by machinery, five occurred on railways or tramways, one was caused by electricity, and seven were due to miscellaneous causes. One person was injured by electricity on the surface, and two persons were injured by explosives.

The electrical accident occurred at Polton Colliery, belonging to Messrs. the Lothian Coal Company Limited, on February 13, and caused the death of an engineer's labourer. He was attempting to make an electric connection between the cables of a lighting circuit and a lathe in the fitting shop in order that the man working it should on the following day receive a shock, when he was electrocuted. His intention clearly appears to have been that the man who worked the lathe and oiled the machinery should get a shock when at work next day. Deceased, partly hidden by the belt pulleys, probably leant further over than where he was found, and opened part of the rubber insulation of the joint, as one end of the insulation was hanging down for 3 in. after the accident. He had with him a length of $\frac{1}{16}$ in. single wire insulated cable jointed to a 3 ft. 7 in. length of 3/20 two-strand naked wire, and was grasping the insulated wire with the bared end formed into the shape of a hook, over the bare live lighting wire. The free end, which was uninsulated, was lying on an iron grating and zinc sheet partly under him and in contact with each other. These became charged, but he would feel no shock until he drew himself back, when his face touched the bracket, which was in direct contact with earth, and in consequence he received a 500-volt direct-current shock. Recently it has come to Mr. Walker's knowledge that a man employed at a coal-cutting machine underground had been giving men shocks by switching the current on at the gate box and then placing the trailing cable in contact with the frame of the machine, and thus causing men working near it to receive a shock. Fortunately no one was hurt. The Special Rules do not provide for the punishment of offences of this kind, and it was not possible to do anything except dismiss the man in question from his employment at the colliery.

An accident occurred at Bowhill Colliery, belonging to Messrs. the Fife Coal Company Limited, on May 5, and caused the death of an air compressor engineman. The air was compressed to a pressure of 40 lb. per square inch and then passed from the air cylinder through two ports each 6 in. in diameter to a receiver 4 ft. diameter by 8 ft. 8 in. long between the cylinders under the floor of the engine house. The delivery pipe from this receiver was 6 in. in diameter, and was provided with a safety valve outside the engine-house 45 ft. away. The air cylinders were lubricated by ordinary engine oil, and as the outlets to the receiver were at the bottom of the cylinders, a considerable quantity of the oil was forced with the air through them, with the result that thick layers of carbonised oil adhered to the sides of the receiver. The compression of the air raised the temperature to a high point, and this, no doubt, caused the oil to vaporise and ignite; an explosion occurred which burst the receiver, and the resulting flame set fire to the engine-house. Without taking into consideration the small size of the receiver and the inlets and outlets to and from it, the use of this class of oil in any cylinder in connection with an air compressor, however low the pressure, is attended with grave risk of an explosion and fire, and in this case it is extraordinary that one had not occurred before. After this occurrence Mr. Walker drew the attention of all the users of air-compressing plant to it and also to the necessity of only using a lubricant with a high flash point, and the provision of adequate cooling devices.

Eighty-six notices under the heading of dangerous occurrences were received during the year. Thirty-three were ignitions of gas; four were fires on the surface; 11 were fires underground; 24 were breakages of ropes, chains, or other gear used for lowering and raising persons; 13 were cases of overwinding; one an inrush of water; and one an outburst of gas. One of the cases of fire on the surface was proved to be undoubtedly due to incendiarism, and another was alleged to be due to the same cause, but investigation showed the electric lighting wires of the portion of the pithead which was not burned were in such a condition as to suggest that if those about the other portion were in the same condition, the cause probably was due to an arc or short circuit being formed between two wires in contact with timber. There is a great improvement at the majority of the mines in this respect, the wires being carried in tubes or casing or on to insulators, and kept more than the distance stipulated by the Electricity Special Rules. Many of the pitheads are built of thin dry boards in close proximity to the shaft, which are very liable to take fire, and, being inflammable, there would be little or no chance of saving them, and if the men were in the mine at the time they might easily be prejudicially affected.

One of the fires underground was caused by a failure of the electric plant at East Parkhead Colliery, belonging to Messrs. Wilsons and Clyde Coal Company Limited, on October 24. The supply of current at this colliery is on the concentric system at 500 volts, and the installation was an old one, predating the Electricity Special Rules. The origin of the fire was traced to fusing in a four-way junction and fuse box, which was nailed to two props on the side of the haulage road about a quarter of a mile from the shaft bottom. An examination of the junction box after the occurrence showed it was a very probable cause of the fire. There were clear signs of frequent arcing both on the side of the box and inside the cover, and it is likely that an arc caused by the blowing of a fuse was formed to the side of the box, and that this was maintained until the insulation of the cable, and then the supporting timber, caught fire. One of the cables was damaged by a fall of stone on the in-bye side of the junction box, and also on the in-bye side of a fuse, which was inserted in the cable nearer the gate end box just before the fire was noticed. It is probable that this fall caused the fuse in the junction box to blow. The fuse on the in-bye side of the junction box should have protected the latter, and that it failed to do so points to its having been the heavier fuse of the two. When Mr. Nelson made his inspection and investigation it was estimated to be 2/18, and, if so, was about 300 per cent. in excess of the working current, whereas the Special Rules require that it should not be more than 200 per cent. The fire, in all probability, would have been prevented if the fuse had not been too heavy for its circuit. This is a matter of importance, as arcing may continue for some time before causing the means provided to open the circuit to operate, as apparently happened in this case, if the means provided are slower in action than is required. The load on the coal-cutters was 40 to 50 ampères, whereas the fusing current of 2/18 copper wires, according to Preece's table, is 200 amperes. The junction box would probably have been safe if used for fuses of a small size, and to increase the size indefinitely, as appears to have been done, was not fair to the apparatus. The fire, which might have had more serious consequences and led to loss of life, draws attention to the protection of electric circuits, the importance of ample clearance in fuse boxes, and the danger of fastening the boxes to inflammable material. All these considerations do not appear to have received the attention they should have by the management.

Prosecutions.—In all 137 convictions were obtained out of the 150 cases taken against workmen, 120 persons were fined, the total penalties amounting to £91 9s. 6d.

Board for Examinations.—The examination for certificates was held in Edinburgh on May 4, 5, and 6, when 251 presented themselves for examination, viz., 150 for first-class, of whom 54 passed and obtained certificates, and 98 for second-class, of whom 54 satisfied the examiners. In Glasgow the examination took place at the Technical College on November 24 and 25. The number of candidates for first-class certificates was 44, and 13 were successful in obtaining them, and for second-class 46 were examined and 21 passed.

Coal Mines (Eight Hours) Act, 1908.—This Act has worked fairly satisfactorily during the year. Many complaints have been received, chiefly from the persons appointed under section 2 (2) for the purpose of checking the times of lowering and raising the shifts of workmen, in regard to men being kept longer underground than the time specified in the Act. On investigation it was found at times that there were circumstances which brought the case under the provisions of section 1 (2) and the detention was legal, and in others, either owing to the officials not being sufficiently alert to see that the workmen did not contravene the provisions of the Act, or the men themselves not complying with its requirements, the men had been underground for more than the legal period. Some managers endeavour to make such terms as "mechanic" embrace workmen they were never intended to apply to. At one colliery the manager was construing the term to include the men who were employed to move the conveyors at the working face forward as the face advanced, with the result that they worked 10 to 12 hours every shift, and Mr. Walker accordingly gave him formal notice that this class of workman did not come under the definition of "mechanic," and they must not in future be employed more than eight hours in any consecutive 24, except for purposes set out in section 1 (2). Mr. Walker observes that he asked for instructions as to the meaning of "mechanic" as used in the Act. The Home Secretary's decision was as follows:—

> "The term 'mechanic' is intended to cover the case of men employed as mechanics mainly at the surface, but who go underground at odd times to carry out repairs to machinery and apparatus; in the case of such men the provisions of the Act would have been impracticable nor were they required. The term is not applicable to a person who is employed solely below ground."

Rescue Stations.—There have been no additions to the rescue stations in Scotland during the year. The only station completed is one erected by the Fife and Clackmannan Coal Owners' Associations at Cowdenbeath. The Ayrshire coalowners have purchased the site for one in Kilmarnock, but nothing has yet been done towards the erection of a building or training of men. At the Cowdenbeath station the work of training has been carried on regularly during the year, and at the end of the year 36 brigades of five men each had passed through the full course of instruction and training. Arrangements have been made for an additional 12 brigades being trained, and when this training is completed it is intended that each of the 48 brigades will have a day's actual underground work at their own collieries. For the purpose of this instruction the station superintendent will take out to each colliery five sets of apparatus by motor car, and, after consultation with the manager of the colliery, will arrange a two hours' programme underground. On completion of the exercise the apparatus will be taken back to the station for inspection and recharging. The equipment of the station comprises the following:—20 sets of the improved Weg apparatus; six sets of smoke helmets with bellows and pipe connections; two sets of Pulmotor or oxygen inhaling apparatus for restoration purposes; 20 electric lamps of the "Float" type and a supply of oxygen and caustic potash; a motor car is also provided at the station.

Safety Lamps.—According to information supplied by the owners, there were 33,098 safety lamps in use, a decrease of 369 as compared with the preceding year, due to a colliery in which safety lamps were largely used having been abandoned in the latter part of 1910. The number of lamps locked by means of screws shows an increase of 428. This increase is not due to new lamps having been introduced fitted with this undesirable lock, but to the fact that old lamps have, for various reasons, been brought into use during the year. Over 44 per cent. of the safety lamps in this division are not provided with bonnets or shields. It is sometimes urged in favour of this type of lamp that it burns much better than a bonneted one, and also that it is impossible for a lamp to be sent into a pit without the gauze or gauzes being in position. There is, however, little in these contentions. If the ventilation is brisk and satisfactory there will be no difficulty in getting a bonneted lamp to burn satisfactorily. Often the cause of lamps not burning brightly is not the bonneted shield, but the inadequacy of the ventilating current either in quantity or quality. Recently an explosion of gas, by which two men were killed, was most probably caused by the use of unbonneted safety lamps. The use of an unshielded lamp is, in Mr. Walker's opinion, attended with great risk, especially in well ventilated mines, and should be prohibited. At three mines electric lamps have been introduced, and have given satisfaction. There is, in Mr. Walker's opinion, a great future for such lamps, and he trusts one of this description will be devised and adopted which will meet all the conditions it is claimed the Scotch lamp at present does, without the danger it possesses of igniting small quantities of firedamp, owing to its being carried in the miner's cap. Of the total number of lamps in use, 10,344 were locked by lead rivets, 7,924 by magnetic locks, 14,807 by screws, and 23 by other means; 22,245 were lit by opening, 8,392 by electricity, and 2,461 by internal igniters. The kinds of illuminant used were as follow:—Colza or colza and petroleum 7,743, petroleum 6,168, volatile spirit 18,818, electricity 135, other illuminant 234.

Explosives.—There is a decrease of 143,836 lb. of explosives used, and of 304,429 in the number of shots fired, as compared with the previous year. The average quantity of explosives used per shot is 11·3 oz., and the total quantity of mineral raised and explosives used gives an average of 4·68 tons per shot. The quantities of the principal explosives used were as follow:—Abbcite, 49,433 lb.; ammonal, 29,468 lb.; arkite, 515,938 lb.; bobbinite, 59,064 lb.; celtite, 49,334 lb.; Cornish powder, 51,514 lb.; gelignite, 1,815,390 lb; gunpowder, 4,069,583 lb.; M.B. powder, 51,950 lb.; rippite, 54,846 lb.; saxonite, 91,282 lb.; stowite, 59,962 lb.; swalite, 24,212 lb.; the total being 7,011,368 lb. Of the total number of 9,931,641 shots fired, 1,228,804 were fired by electricity, 7,136,185 by fuse, and 1,566,652 by squibs.

Use of Wire Ropes in conjunction with Timber as Roof Supports.—When making an inspection recently of a mine in Lanarkshire, Mr. Walker was much impressed with the manner in which old wire ropes were being utilised in conjunction with timber as aids to the support of the roof on a haulage road. The seam in which this was being done is shallow, varying in depth from 24 to 84 feet from the surface, and it is owing to this close proximity to the surface that some difficulty has been experienced in its working. The general nature of the strata above the coalseam, at a depth of 60 to 84 feet, is fakey blaes, but nearer the surface the roof is composed of irregular blaes, boulder clay and surface clay, and in wet weather, owing to its becoming saturated with water, is difficult to support and maintain. Formerly much timber was used, its life was short and very little could be withdrawn or restored, and the management were induced after a short paper read by Mr. Sam Mavor, before the Mining Institute of Scotland in 1908, describing a method of supporting roofs in Silesia by means of timber strengthened by old ropes, to give the system a trial. Their experience has been satisfactory, and it has been found that not only was the saving of timber and labour considerable, but the roof of a main haulage was much more efficiently supported. Crowns or bars, in places where previously it was necessary to renew them in six months, have not been renewed since the new method was adopted three years ago. The method of fixing the rope on to the crowns is as follows:—The crown is carefully examined and after it is decided which is the better side to put the rope on, a small piece of the thick end of the crown is flattened, and a small V-shaped notch is cut in the end of it, the rope is then laid in the groove and an iron staple driven down on to the rope to keep it in position; the rope is drawn straight and tightened along the underside of the crown to within about 12 inches of the small end, and a staple driven down over the rope to prevent its moving. The rope, being in position, is further secured by the addition of staples along its length at intervals of about 20 inches, the end of the rope is turned back over the end of the crown and secured on the upper side by means of other staples. The other end of the crown is left unfinished in case the length requires to be reduced, and is, in this condition, sent down the pit, and the man putting the timber in position, finishes the uncompleted end in the same way as the other after he finds the exact length which is required.

Great care is necessary in the choice of the rope to see that only the best is used and that there are no broken wires at the time or likely to be any as long as it remains in position, as broken wires would be dangerous to the persons and animals travelling the road.

The method is not new, but the application of wire ropes to this and other purposes has not received the attention it deserves, and Mr. Walker commends it to the consideration of colliery managers as being worthy of trial and experiment. In removing or renewing timber, ropes could be advantageously used as an aid to support the broken and insecure strata during the operation, and it is probable, if the question was gone into thoroughly and methodically, that a wider sphere for their use in connection with mining, than has hitherto been thought possible, would be discovered with good results, both from a safety and economical point of view.

II.—Newcastle District.

Mr. J. B. Atkinson, in his report on the Newcastle mines inspection district for 1911, states that at least one underground inspection has been made at nearly all the mines in the district; many of the large mines have been visited underground on several occasions.

Persons Employed.—The following table shows the number of persons employed:—

County.	Mines at work.	Persons employed. Below ground. Males.	Persons employed. Above ground. Males.	Persons employed. Above ground. Females.	Below and above ground.
Cumberland	39	7,905	2,253	420	10,578
Durham (North)	77	42 994	9,874	41	52,909
Northumberland	128	47,866	10 412	17	58,295
Total in 1911	244	98,765	22,539	478	121,782
Total in 1910	240	96,143	22,607	482	119,232

Output of Mineral.—The next table shows the quantity of mineral raised:—

County.	Coal.	Fireclay.	Brick shale.	Ganister.	Total.
	Tons.	Tons.	Tons.	Tons	Tons.
Cumberland	2,296 254	44 496	16,291	295	2 357,336
Durham (North)	13,812 819	95,707	—	—	13,908,526
Northumberland	14,682 427	191,439	6,211	—	14,880,077
Total in 1911	30,791,500	331,642	22,505	295	31 145,939
Total in 1910	28,635,362	298,037	28,215	885	28 962,499

There is a large increase in the output, amounting to 2,183,440 tons, made up principally of coal, which shows an increase of 2,156,138 tons. The reason of the increase is two-fold: first, there were no strikes, such as in 1910 accompanied the inception of the Eight Hours Act; and second, the three shifts of hewers introduced at many collieries in consequence of the Eight Hours Act has increased the output.

The output of mineral per person employed below ground was 315 tons, and above and below ground 256 tons, as compared with 301 tons and 243 tons respectively in 1910. The output per person employed below ground was in Cumberland 298 tons; Durham (North) 324 tons; and Northumberland 311 tons.

Below are given particulars of the coal-cutting machines in use:—

Description.	Number driven by Electricity.	Number driven by Compressed air.	Statute tons cut by Electricity.	Statute tons cut by Compressed air.
Disc	22	38	204,785	344,257
Bar	12	—	177,665	—
Chain	11	—	129,194	—
Percussive	1	226	1,505	788,458
Total	46	264	513,149	1,135,014*

* Includes 2,299 tons of fireclay.

In Northumberland three machines were at work, in Durham 50, and in Northumberland 212. There were 35 conveyors employed at the coal face—29 in Durham and six in Northumberland.

Accidents.—One hundred and sixteen fatal accidents resulted in 122 deaths, all being single fatalities except four cases of falls of ground causing the loss of two lives in each case; a case of suffocation by natural gases while using rescue apparatus causing the loss of two lives, and a case of drowning in a pit pond causing the loss of two lives. Of the fatal accidents, 19 causing 20 deaths occurred in Cumberland; 46 causing 49 deaths occurred in Durham (North), and 51 causing 53 deaths occurred in Northumberland. The death-rate from accidents per 1,000 persons employed during the year 1911 is as follows:—(1) Below ground, 1·07; (2) above ground, 0·69; (3) below and above ground, 1·00.

A summary of fatal and non-fatal accidents, classified according to place and cause, is given on next page.

The only fatal explosion of firedamp occurred in the Low Main seam at West Pelton Colliery, and was caused by deceased going past a fence with a lighted candle into a disused place which inclined upwards at about 8 in. per yard and terminated at the leader of a

SUMMARY OF FATAL AND NON-FATAL ACCIDENTS

Place and cause.	Fatal accidents.		Non-fatal accidents reported to inspector.*		All non-fatal accidents disabling for more than 7 days.	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.†	Separate accidents.	Persons injured.
Explosions of firedamp or coaldust	1	1	8	10	6	7
Falls in mine	58	62	117	121	6,368	6,387
Shaft accidents	8	8	6	9	36	36
Miscellaneous underground	34	35	194	205	12,178	12,185
Total underground	101	106	325	345	18,588	18 615
On surface	15	16	41	43	1,049	1,049
Gross total in 1911	116	122	366	388	19,637	19,664
Total in 1910	106	242	340	360	17 291	17,350

* and † *See* footnotes on p. iii.

trouble which threw the Hutton seam, which was goaved, nearly level with the Low Main seam. Gas had not been observed before the explosion. All of the eight non-fatal accidents were due to the use of naked lights except one at Springwell Colliery, which was caused by a defective safety lamp, the gauze of which was riveted to a copper ring by three rivets, one of which had dropped out, leaving a hole about $\frac{1}{16}$ in. diameter. One case of ignition of firedamp, causing no injury, was reported.

Of the accidents from falls of roof and side, 39, causing 42 deaths, occurred at the working face. An unusual feature was that four of these accidents were double fatalities. In only one case did there appear to have been some neglect; some delay in forwarding timber from the flat to the working-places was disclosed at the inquest.

Eight fatal accidents in shafts caused as many deaths; this is double the number that occurred during the previous year, and is above the average. At one of the West Pelton pits timber was being sent down a shaft on the cage top, and deceased was accompanying it when a prop, which had probably been fixed to hold back one of the doors enclosing the top of the shaft, in some way fell down the shaft and struck deceased. At Bomarsund Colliery a man attending a pump was alone at an upper level, and appears to have put his head over a gate fencing the shaft and was caught by the cage. At Ouston, Felling and Roachburn collieries persons ascending or descending fell from the cages; in one of these cases it appeared that a glass bottle, carried by a lad in his pocket, had projected and caught a bunton. At Ravensworth Colliery a sinker engaged in enlarging a shaft fell down the shaft while attempting to climb on to a cradle. At Choppington Colliery a horsekeeper fell down the shaft, owing to the cage into which he was stepping being suddenly moved by the engineman, who mistook the signal given. At Hylton Colliery a ladder placed in the shaft bottom tilted, and a shaftman fell into the sump.

Of the accidents with explosives, five led to the death of the same number of persons, whilst 73 men were injured in 65 separate non-fatal accidents. Of the five fatal accidents three were due to persons not taking sufficient cover, knowing a shot would shortly explode; in another case a person travelling along the face was buried under stone blown down from the roof at the face of a gateway just as he arrived at the point, and the jury recommended that more care should be taken to guard all approaches to a shot; another case was that of a man, knowing a shot was lit up, approaching it to remove his clothes and bait tin.

Underground haulage accidents accounted for 19 deaths and injury to 108 persons. Fifteen were killed while engaged in haulage operations, and one while walking in-bye or out-bye to or from his work. One person was killed and two injured while illegally riding, and two persons were injured by going in front instead of behind tubs while moving them by hand on inclined roads.

Both the fatal accidents caused by electricity occurred underground, and were similar in character in two important respects; in both cases a switchbox became alive owing in one case to a countersunk screw having worked up and come in contact with the metal covering, and in the other a broken ammeter carried current to the casing. Neither of the accidents would, however, have occurred had the apparatus been properly earthed—in one case the earth wire had been accidentally removed, and in the other case there was no earth wire; the installation being new, it had not been attached.

Two persons lost their lives in old workings at Felling Colliery while using breathing apparatus. The old workings were unventilated, and as Mr. Palmer, the manager, had several sets of the Draeger apparatus at the mine and men trained in their use, he thought it would be a good opportunity of practising some of the trained men under actual mining conditions, and at the same time afford some information as to the state of the old workings which were about to be holed into from the existing workings. Some work had been done before the day of the accident with the apparatus, and on the day of the accident the two deceased men, accompanied by Mr. Booth, the surveyor of the colliery, were in the unventilated workings, and were on the point of leaving at the end of a two hours' shift when the accident happened. Mr. Padbury, the local agent for the Draeger apparatus, had on a mouthpiece of his own contriving, the other two persons had on the ordinary helmet. Robson collapsed, and he was attended to and his helmet removed by Mr. Padbury, and Mr. Booth stated they used the pipe from his oxygen supply to attempt to revive him, and that there was a supply of oxygen left in the receptacle then in use, and it was afterwards found that there was half-hour's supply of oxygen in the other receptacle, which, however, was not in use. Robson not recovering, Mr. Padbury left to go for help, but had not proceeded more than a few yards when he either collapsed or slipped, and fell and displaced the mouthpiece he wore. Mr. Booth, finding he could do nothing, went to the shaft and got help. The bodies were not recovered, with the assistance of members of the Elswick Rescue Brigade, until some hours had elapsed, as although Mr. Booth returned shortly with another man they found they could not remove them. The apparatus appeared to be in good order and the oxygen supply was nearly pure.

Two fatal accidents occurred in connection with oil engines underground. At Bullocks Hall Colliery the products of combustion were not carried away and two men were overcome; one managed to struggle some distance from the engine, and although found unconscious eventually recovered, the other man was found dead near the engine. At Netherton Colliery an oil engine appears to have run some time without exploding the contents of the cylinder, which collected in the return, and eventually became ignited and caused a somewhat smart explosion; the flames appear to have burned the attendant and set his clothing on fire, and he succumbed to his injuries a day or two later.

Accidents on surface railways or tramways led to nine deaths and injury to 16 persons. In addition to the ignition of firedamp already referred to, four cases of underground fires, three cases of overwinding, 12 cases of accidents to winding apparatus, and two cases of inrush of water were reported under the head of "dangerous occurrences." Legal proceedings were taken in four cases against managers or under-managers, and there were 159 prosecutions by owners against workmen.

Explosives.—In the district, 1,310,466 lb. of permitted explosives and 4,858,318 lb. of ordinary explosives were used, the quantities of the principal explosives consumed being as under:—Abbcite 46,656 lb., arkite 130,509 lb., bellite 56,986 lb., bobbinite 125,674 lb., britonite 42,251 lb., carbonite 30,813 lb., celtite 22,005 lb., Cornish powder 116,321 lb., fracturite 34,528 lb., monobel powder 151,099 lb., permonite 73,030 lb., rexite 59,746 lb., rippite 86,734 lb., St. Helens powder 20,826 lb., samsonite 214,886 lb., stowite 33,562 lb., westfalite 33,686 lb., gelignite 40,588 lb., gunpowder 3,467,327 lb., polarite 37,712 lb. Of the estimated number of shots fired—9,862,275, there were fired by electricity 3,017,760, by fuse 690,493, and by squibs 6,154,022.

Safety Lamps.—The total number of safety lamps in use in the district was 61,864. The method of locking was:—Lead rivet 21,294, magnetic 21,143, screw 19,288, other 139. The kind of illuminant was:—Colza or colza and petroleum 46,916, petroleum 10,534, volatile spirit 3,543, electricity 871. Of the above lamps, 24,107 were lighted by means of electricity, 36,715 by the ordinary method of opening, and 171 by means of internal igniters.

Board of Examinations.—At the annual examination held in Newcastle-on-Tyne on January 2 and 3, 1912, of 84 candidates for first-class certificates, 36 were successful; and of 104 candidates for second-class certificates, 41 were successful.

Eight Hours Act.—This Act appears to be working fairly satisfactorily

Rescue Stations.—There is at present only one rescue station in the district—namely, Elswick, but the establishment of others are in contemplation to meet the requirements of the recent Order.

III.—Durham District.

Mr. Nicholson, in his report on the Durham district, states that the total number of visits made to coal and metalliferous mines was 945, and of this number 535 included underground inspections. At least one underground inspection was made at every coalmine, with the exception of five small pits giving employment to a total of 20 persons, and three of these mines were only worked occasionally during the year.

Persons Employed.—The following table gives the number of mines at work and the number of persons of various ages employed in and about mines under the Coal Mines Regulation Act:—

County.	Mines at work	Persons employed.			Below and above ground.
		Below ground. Males.	Above ground.		
			Males.	Females.	
Durham, South	217	83,652	21,862	22	105,536
Westmorland	1	7	2	—	9
Yorkshire, North Riding (coal)	7	20	3	—	23
Yorks, Cleveland (ironstone)	27	7,431	1,851	—	9,282
Total in 1911	252	91,110	23,718	22	114,850
Total in 1910	252	88,827	24,033	21	112 881

It will be seen that there is again an increase in the total number of persons employed—the increase, however, being almost confined to the coalmines in South Durham. In that part of the district there is an increase of 2,201 persons employed below ground, but a decrease of 326 in the number of persons employed above ground. There is hardly any change in the number of persons engaged in the coalmines of Westmorland and the North Riding of Yorkshire. There is again a reduction in the number of boys employed below ground between the ages of 13 and 14, and also a reduction of 75 in the number employed between 14 and 16 years. Twenty women were engaged in cleaning offices and other light domestic work in connection with the coalmines in South Durham. At the ironstone mines in Cleveland there is a total increase of 93 persons employed, 82 of these being below ground and 11 on the surface.

Output of Mineral.—Compared with last year there is an increase in the total output amounting to 1,670,747 tons. As compared with the record year of 1909 these figures show a decrease of 93,948 tons, which is principally due to the diminution in the output of Cleveland ironstone during 1911. The total output from coalmines was 28,148,847 tons, an increase of 85,113 above the highest record. In South Durham as compared with the previous year there is an increase of 1,813,415 tons in the quantity of coal produced, but a decrease of 4,769 tons in the amount of fireclay. Barytes, shale and whinstone each show an increase of 2,970, 6,172, and 70 tons respectively.

County.	Coal.	Fireclay.	Ironstone.	Other minerals.	Total.
	Tons.	Tons.	Tons.	Tons	Tons.
Durham, South	27,906,097	189,002	—	50,645	28,145,744
Westmorland	1,185	—	—	—	1,185
Yorkshire, North Riding	1,918	—	—	—	1,918
Yorkshire, Cleveland	—	—	6,003,957	—	6,003,957
Total in 1911	27,909,200	189,002	6,003,957	50,465	34,152,804
Total in 1910	26,094,897	193,771	6,152,823	40,560	32,482,057

The quantity of mineral raised per person employed below ground was at coalmines, 336 tons; at ironstone mines, 808 tons; at all mines under the Coal Mines Acts, 375 tons. In the case of coalmines there is an increase of 13 tons per person employed in the quantity of mineral raised as compared with the previous year. In the ironstone mines there is a reduction of 29 tons per person on the underground workers, and 23 tons per person on the number employed below and above ground.

There is a considerable increase in the number of coal-cutting machines at work and also in the output from them. Eighty-three machines were worked by compressed air as against 77 in 1910 and 55 by electricity as compared with 42. Electrically-driven machines were in use at 12 collieries, and machines worked by compressed air at 13 collieries. The total amount of machine-cut coal was 885,349 tons. There was also

669 tons of fireclay cut by a compressed air machine The number of coal conveyors in use at the face has more than doubled, 21 being electrically driven and 11 by compressed air.

The following table gives particulars:—

Description.	Number driven by Electricity.	Number driven by Compressed air.	Statute tons cut by Electricity.	Statute tons cut by Compressed air.
Disc	21	20	252,762	150 013
Bar	20	12	157,448	127,467
Chain	13	4	42,660	3,861
Percussive	1	47	201	*150,937
Rotary heading	—	—	—	—
Total in 1911	55	83	453,071	432 278
Total in 1910	42	77	353,861	337,358

* And 699 tons of fireclay.

Accidents.—During 1911 the district has been free from any large mining disaster causing heavy loss of life. Unfortunately there is an increase in the number of fatal accidents and deaths, and also in the number of non-fatal accidents and persons injured. There was only one fatal accident which was responsible for more than one death, two officials being killed by a fall of roof in a coalmine. The total number of fatal accidents reported was 120, causing 121 deaths as against 104 fatal accidents and 104 deaths in the preceding year. The increase may, to some extent, be due to the fact that practically all mines have worked regularly throughout the year, whereas at the beginning of 1910, many of the largest collieries were idle for several weeks and in some cases months, owing to disputes in connection with the Eight Hours Act. This increase is in a great measure also due to the larger number of persons killed in the ironstone mines of Cleveland, which are responsible for 18 deaths as compared with eight in the previous year.

There were no deaths caused by explosions of gas or coaldust. The percentage of deaths from falls is only about 1¼ per cent. less than in 1910, when it was exactly 50 per cent. There is a reduction of two in the number of shaft accidents—three deaths as compared with five. Miscellaneous accidents underground are again responsible for a large number of deaths—35 accidents causing 35 deaths, or an increase of four. There were 24 surface accidents, an increase of eight on last year's figures, the increase being principally due to accidents by machinery and from miscellaneous causes.

The following is a summary of fatal and non-fatal accidents, classified according to place and cause:—

Place and cause.	Fatal accidents.		Non-fatal accidents.*		Non-fatal accidents disabling for more than 7 days	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.†	Separate accidents.	Persons injured.
Explosions of firedamp or coaldust	—	—	4	6	2	4
Falls in mine	58	59	181	185	6,978	6,999
Shaft accidents	3	3	2	2	34	34
Miscellaneous underground	35	35	276	279	13,901	13,906
Total underground	96	97	463	472	20,915	20,943
On surface	24	24	76	79	1,474	1,476
Gross total in 1911	120	121	539	551	22,389	22,419
Total in 1910	104	104	458	466	19,611	19,664

* and † *See* footnotes on page iii.

The death rate from accidents per 1,000 persons employed below ground was, at coalmines, 0·956; at ironstone mines, 2·288; and at all mines under the Coal Mines Acts, 1·064. At all mines in 1910 it was 0·990. The corresponding death rates below and above ground were respectively 0·975, 1·939, 1·053, and 0·921.

For the second year in succession there have been no lives lost from explosions of gas or coaldust. There is, however, a slight increase in the number of non-fatal accidents and the number of persons injured by explosions of firedamp. There have been four separate explosions, causing injury to six persons as compared with two accidents and two persons injured in 1910. Three of these occurred in coalmines in South Durham and one at Lumpsey ironstone mine in Cleveland. The latter was not caused, as is usually the case in these mines, by drilling into a "back," or by the ignition of gas at a shot-hole, but was due rather to lack of precaution on the part of the two officials who were burnt, arising no doubt from a certain sense of security which is unfortunately often displayed when gas is seldom met with. In this instance a pillar of ironstone had been worked out next the barrier, the road next the barrier being the airway, and after the pillar had been extracted this airway closed. The under-manager and a deputy climbed up on to the fallen stones at the other end of the adjoining pillar with a view to making arrangements for working this pillar out. The boundary board was fallen a few feet above the height of the seam and as one of them raised his candle to examine the roof, some gas which had accumulated in a cavity was ignited and they were both burnt. No gas had previously been seen in that district and the workings and goaf edges were always examined with a safety lamp. The occurrence points to the importance of officials always using safety lamps when examining such places, even if gas has not been previously detected.

Judging by results the figures indicate a fairly good standard of ventilation for the district as a whole. This can only be done by impressing upon all overmen and deputies the necessity of noting even the slightest trace of gas in their written reports, and by insisting that workmen are withdrawn when gas is detected.

The number of fatal accidents and deaths caused by falls of roof and side show an increase on the previous year, the total number of lives lost being 59 from 58 separate accidents as compared with 52 deaths and accidents in 1910. Although there is an increase of seven deaths, the percentage of lives lost from this cause is less by 1¼ per cent. than it was in 1910, when exactly half the total deaths in mines under the Coal Mines Acts were due to falls of ground. The ironstone mines in Cleveland practically account for this increase in the number of lives lost, the number having risen from six in 1910 to 12 in 1911. The coalmines in South Durham are therefore responsible for 47 deaths as against 46 in the previous year. The increased number of fatal falls of ground in the ironstone mines is probably to some extent due to the fact that a larger proportion of pillars is now being removed and less whole or first working is in progress. Working the pillars out, especially in the thicker seams, is a much more dangerous operation than driving the first workings, and it is feared the death rate from this class of accident in Cleveland will increase instead of decrease as the area of broken workings is extended. There is a slightly larger proportion of fatal accidents at the face this year, the number being 44 (out of which nine were in Cleveland) as compared with 38 in 1910. This is the class of accident which the coal hewer has chiefly to guard against. However, in their anxiety to get coal, many hewers put off setting the necessary roof and coal supports until it is too late. Many hewers trust far too much to "jowling" or sounding the roof instead of complying with the timbering rule, and in many cases when inspecting and enquiring into accidents from falls, it is found that the deceased or injured person has been well in advance of the specified timbering distance. Frequently the maximum distance as fixed by the management is much too great, and in such cases the special timbering rules are to all intents and purposes useless, as the distance is fixed for the best roof in a particular seam, or even the whole mine, and is therefore much too great for an inferior roof in another portion of the mine. The power granted to an inspector in the Mines Act, 1911, to require the reduction of the timbering distance in cases where it is considered excessive, will, if used in a reasonable spirit, tend towards a reduction in the class of accident which is at present responsible for 45 to 50 per cent. of the loss of life in coalmines. All the fatal accidents caused the death of one person only except a fatal fall of roof on a roadway which had remained unaltered for many years. In this case a back overman and a deputy were killed by a long fall whilst examining and securing the roof. This fall was probably brought about by the near approach of a goaf in a seam a few fathoms below.

There were 181 non-fatal accidents causing injury to 185 persons, including one person who was injured by a fall of roof which proved fatal to his companion. These figures compared with last year show an increase of eight in the number of accidents and 10 in the number of persons injured, which is more than accounted for by the increased number of shifts worked.

Under the the heading of shaft accidents there were three fatal accidents causing three deaths, and two non-fatal accidents resulting in two persons being injured. This is a reduction of two in the number of deaths and 12 in the number of persons injured, and is the lowest number of deaths and injuries in shafts since the year 1904, in which year there were no fatal accidents. Two of the fatalities were due to persons falling part way down the shafts whilst engaged in repair work, and probably both would have been prevented by the use of the safety belts provided.

There is an increase of four in the number of fatal miscellaneous underground accidents and deaths compared with the figures for 1910. This increase is entirely due to accidents connected with haulage. There is also a large increase in the number of non-fatal accidents due to the increase in the number of accidents caused by explosives. There were no fatal accidents due to explosives, but, strange to say, the number of non-fatal accidents have increased from 23 to 52. The majority of these were due to carelessness or laziness, no less than 34 persons being injured, some very slightly, by being struck by stone or coal projected by shots, through neglecting to take sufficient shelter. Of the above 34 persons, 13 were injured in the ironstone mines, where a large amount of gunpowder is used, the shots being fired by the miners themselves. The Cleveland code of special rules is more stringent than similar rules in use in the coalmines in the district, except in the matter of the time in which a miner may be allowed to return after a shot has missed fire. In the ironstone mines the time is only five minutes, or half that allowed in coalmines. One accident, causing injuries to two coal hewers, was due to the illegal unramming of a gunpowder shot.

By underground haulage accidents 28 persons were killed. Three persons were killed and one injured while illegally riding, and one person was injured by going in front instead of behind a tub. There were 18 persons killed while engaged in haulage operations, or one more than last year, but there were six persons killed while walking in-bye or out-bye, to or from their work, as compared with one in 1910. The total number of non-fatal accidents and persons injured was 165, or an increase of 38 accidents and 36 persons injured as compared with last year. Out of 165 persons injured, 137 were engaged in haulage operations at the time of the accident. All the underground haulage fatal accidents were caused by the persons being run over or crushed by tubs—14, or exactly half, being in connection with mechanical haulage.

There were two fatal accidents underground caused by electric shock, resulting in the death of two persons and injury to another. The first occurred at Sherburn Hill Colliery belonging to the Lambton and Hetton Collieries Limited, in a longwall gateway a short distance from the face. Direct current at a voltage of 550 was used for working a coal-cutter, the current at the place of accident being conveyed in two ordinary insulated cables. These two cables were carried along the cross-gate, and then along No. 10 gateway to the switchbox, and then to the coal-cutter. Height had been made in the cross-gateway to within 2 yards of No. 9 gateway, and at this point, where the cables were carried past the gate-end, the height was only about 3 ft. As soon as height was made, the usual practice was to carry the cables across the gate-ends in boxes, so as to be well clear of the tubs. At the time of the accident this had not been done, although the wooden box was lying ready. It is probable that when a putter named Ashworth (the injured person) came out of No. 9 gateway with a full tub, a large coal on the tub caught one of the cables and dragged it slack, and that shortly afterwards, as Ashworth was pulling his empty tub by the in-bye end into the gateway, it came in contact with the slack cable and jammed it against a projecting portion of the gateway, resulting in an abrasion of the insulation, and the core of the cable came in contact with the iron tub he was engaged with. He was knocked down, and found with one foot lying across one of the rails. At the same moment another putter, named Laverick, who was sitting on one of the tram rails in the cross-gateway about 10 yards distant, also received a shock, and was severely burnt about the head and bare parts of his body, and in spite of continued efforts to restore him was found to be dead. Ashworth recovered after about 40 minutes' treatment. A pony was standing attached to the full tub which Ashworth had brought out, but it took no harm, as the tub was not in contact with the tram rails, all four wheels being off the way. The tubs were of iron, and evidently Laverick received a shock, the current passing through the tub Ashworth was pulling and then through the tram rails. The cables were suspended by leather secured to props, or by wooden supports. The obvious remedy to prevent such an occurrence is to provide more height at gate-ends where cables are carried across, and the latter should be laid in boxes where they cannot come in contact with tubs or ponies. Special Rule (of the code of rules recently superseded) 28 appeared only to apply to the protection of cables on main haulage roads, but the principle is the same, as an insulated cable in such a cramped position is more likely to suffer damage than on a roomy engine plane.

The second electrocution case occurred at Lumley Third Pit, belonging to the Lambton and Hetton Collieries Limited, the victim being a coal conveyor attendant. The conveyor in question was a Blackett conveyor, driven by a 6½-horse power motor of the squirrel cage type. The current supply was three-phase, the pressure at the terminals of the supply transformer being 400 volts. On the day of the accident a deputy received a slight shock about three-quarters of an hour after the motor had been started. It was accordingly stopped, and a message sent to the surface for an electrician, who found, on examination, that at the point where the trailing cable was connected to the motor a loose strand of wire from one of the leads at the terminal block had worked through the insulating tape, and was making contact with the frame of the motor. This was rectified, and the motor restarted. Four hours afterwards the deputy, as he was going along the mothergate, heard a humming noise on approaching the motor, and at once shut off the current at the gate-end box. He then found the conveyor attendant lying unconscious and face downwards between the tram rails at the delivery end of the conveyor. He at once gave an alarm, and artificial respiration was tried for one and a-half hours until a doctor arrived and pronounced life extinct. Provision was made to earth the conveyor to bank, and subsequent tests showed that the earth provided was fairly good. The earth wires also were found on inspection after the accident to be efficiently attached. The accident is thus most difficult to account for, and one possible explanation appears to be that the conditions when the accident occurred, and afterwards when the tests were made, were not the same. A loosely attached earth wire would explain the occurrence; or it might be that the earth connection, though good, was not good enough, and the motor frame was therefore enabled to assume a potential sufficiently high above the surrounding ground (which was wet) to cause the accident.

There were no fatal accidents caused by machinery underground. Eight non-fatal accidents occurred, causing injuries to eight persons.

The accidents under the heading of sundries show an increase of one in the number of deaths, and a decrease of three in the number of persons injured. None of them call for special mention.

There were 24 separate fatal accidents on the surface, causing 24 deaths, an increase of eight as compared with 1910. The increase was almost altogether confined to accidents caused by machinery and miscellaneous accidents. Of the six fatal accidents by machinery four were the direct result of oiling or replacing belts on machinery which was in motion. Fatal accidents on railways, tramways, &c., account for nine deaths, or an increase of one. There was only one surface accident in connection with the ironstone mines—a token lad having his head crushed between wagons whilst removing a token. There were 75 non-fatal accidents causing injuries to 78 persons—a slight increase on the previous year.

A fatal accident on the screens at Trimdon Grange Colliery, belonging to Messrs. Walter Scott Limited, the cause of which contained at first some element of doubt, was finally decided to have been the result of an electric shock, the unfortunate person being a screenman. The supply of current used for lighting the screens and other surface works was three-phase at a pressure of 220 volts. At the time of the accident the deceased was in the act of using his handkerchief to clean the thick protecting globe which surrounded an incandescent light bulb. The wires to the lamp were carried in an iron tube, at the end of which was an iron lamp shade. As the deceased was cleaning the globe he suddenly fell backwards, and on being asked what was the matter, he said he had "touched that globe," evidently associating in his own mind the action of touching the globe with the state of his sudden collapse. He immediately became unconscious, and efforts to restore him by artificial respiration were persevered with for one and a-half hours without success. A post-mortem examination showed that the cause of death was a diseased mitral valve, but there was no direct evidence to prove that the deceased had received an electric shock. An exhaustive investigation of the accident did not afford any satisfactory result, as no actual part of leakage could be afterwards discovered, though the insulation of the whole circuit was low. No mechanical damage of the wires could be found to account for the iron pipes which contained them becoming live. The pipes were supposed to be earthed by an earth wire connecting them to some cast iron piping of a coal washer, but it was evident the connection to earth was not a good one. The accident happened after some heavy rains, and the conditions existing at that time were more favourable to leakage than they were when the tests were made by Mr. Nelson, H.M. electrical inspector. It is probable that the cause of death was due partly to the fact that the deceased had a diseased heart, and was therefore unable to withstand a shock which might not have proved fatal to a person with a normal heart, and also to the fact that the damp conditions existing at the time were favourable to a breakdown of the insulation. The claim for compensation was resisted by the owners, but the county court judge held that the man's death was due to an electric shock.

There were eight fatalities due to miscellaneous causes resulting in eight deaths. All were of a very simple nature, and included falling from heapsteads, falling out of a cart, being kicked by a horse, etc. The only one which need be referred to is the death of a labourer at Waterhouses Colliery, who was suffocated in a heap of small coals. The heap was on the surface level and was not enclosed, but had a tramway underneath where tubs were filled with small coal through a sliding shutter in the floor of the heap, actuated by levers below. The unfortunate man stepped on to the coals in order to suspend his lamp on an upright just as one of the slides was opened beneath him and he was drawn into the coals and suffocated. A similar accident occurred at another colliery last year. Such accidents are easily preventable and should not occur with ordinary precautions.

There were 14 dangerous occurrences reported, five being slight underground fires and eight being due to breakages of winding ropes, chains or other gear. There was one case of overwinding at Kettleness Mine, where a person was being drawn to bank, and the brakesman, after almost stopping the cage at the usual point, took it up higher until Walker's detaching hook came into action. The operation was so gentle that the person being raised was not at first aware that the hook had acted. Work was resumed in about 20 minutes.

At East Hetton, on April 21, a cage load of 16 men were descending the upcast shaft when only one of the doors at the shaft top closed and immediately afterwards a tub ran back and fell down the shaft through the open door. The banksman signalled to the winding engineman to stop the engine, and the tub was subsequently found jammed between the cage chains and the shaft side. Fortunately no one was injured, and neither cage nor chains were damaged. A fitter was in the ascending cage, which was only 4 fathoms below the Low Main seam. He climbed up to that seam, and the 16 men in the other cage were got out by the jack engine in about half an hour. They all had a miraculous escape, as the falling tub might easily have struck the detaching hook, broken the rope, or drawn it from its socket. Possibly when the door at the heapstead level stuck, the rush of air into the shaft may have helped to move the tub towards the pit. A spring chock was provided, but it was not of good design, and it is not certain if the tub which had been pushed through the cage had passed beyond the chock. There was also a chain which the banksman neglected to fix across the entrance to the shaft. Proceedings were taken by the management against the two banksmen for this neglect, and they were both fined 10s. and costs.

Four surface fires occurred, the first one being at Barnhope Colliery on Sunday afternoon, March 5. On September 15 a serious fire occurred on the surface at South Pelaw Colliery, resulting in the rapid destruction of the heapstead, winding engine house and headgear. The cause of the fire remains a mystery. A surface fire occurred at Charley Pit, belonging to the South Moor Colliery Company Limited, on September 18. It originated in the winding engine house, which had been locked up from 6 p.m., and was probably caused by the fusing of the electric lighting wires. The fire would not have reached the proportion it did if there had been an adequate supply of water. On Saturday, November 5, a serious fire destroyed the heapstead and winding engine at Thrislington Colliery, but fortunately no one was injured and the ponies underground took no harm. There is little doubt the fire was caused by the bursting of one of the paraffin lamps in the engine house.

If proof were required, the occurrence of these four surface fires clearly show the necessity for having all buildings and erections near the shafts composed of fire-proof or non-inflammable material. Other points of interest show that the fires usually break out at the week-end, when hardly any workpeople are near; that wooden floors are distinctly unsuitable in winding engine houses; that paraffin lamps should not be used for illuminating engine houses, &c.; that where electricity is used for lighting, the wiring should be so arranged as to prevent the possibility of fusing; that it is desirable to have some means of operating the "buzzar" outside the winding or other engine house; that it frequently happens that the supply of water available in case of fire is quite inadequate. Finally, in view of the possibility of persons being underground when a surface fire occurs near the pit top, arrangements should be made for putting into immediate operation the reversal of the air current as soon as it can be decided that such a change would be to the benefit of those below ground.

An extremely interesting example of a coaldust explosion on the surface caused by excessive sparking from an electric motor occurred at New Brancepeth Colliery on July 6. The explosion took place in the coal-grinding house where a 25-horse power direct-current motor at 500 volts was in use for driving the machinery. The motor was enclosed but not gastight, and stood on a platform about 6 ft. above the ground floor. Owing to the short circuiting of one of the armature coils, considerable sparking ignited the coaldust inside the motor casing, causing an explosion which produced sufficient force to blow off the sheet iron covering over the commutator end of the motor. The flame thus produced was sufficient to explode the fine coaldust held in suspension within the building, and the flame extended 6 ft. outside the open door of the house, and for a height of 15 ft. inside. The report was heard some distance away. Some panes of glass were broken, but otherwise there was no further damage, as the roof, which was partly open, was composed of corrugated iron. The engineman was fortunately not inside the building at the time. The motor has since been erected outside the crusher house.

There were two separate cases of electrocution, by which three ponies were killed at Shildon Lodge Colliery. On the first occasion two ponies were electrocuted, the initial cause being the breakage of one of the armature end connections in the motor of a Morgan-Gardner coal-cutter, thus rendering the framework of the machine alive. The current was 500 volts continuous and the trailing cable contained the earth wire. Unfortunately the person in charge of the machine had neglected to tighten up the screw of the earth wire by which it was connected to the metal frame of the reel. The reel had been left standing across the tram rails, and a pony coupled to an iron tub received a shock and moved towards the reel, and is supposed to have got on to one of the cables and pulled the connection plug out of the reel. Another pony on reaching the gateway also received a shock through the rails, tub and gears and was also killed. An earth wire was afterwards continued from the earth wire of the out-bye armoured cable and taken in to the switchbox and joined on to the short earth wire from the reel to an iron rod. This additional earth wire afterwards was the means of conveying a fatal electric shock to another pony within a fortnight, owing to the parting of the out-bye armoured cable. The coal-cutter motors were subsequently altered and overhauled, and the installation, which was by no means of recent date, put into a more reliable condition.

Prosecutions.—There were no legal proceedings instituted against owners, agents or managers during the year. The total number of prosecutions of workmen by owners amounted to 161, an increase of 68 on the previous year. The total amount of the penalties inflicted was £74 18s., and the costs in connection with them amounted to £61 15s. 6d.

Eight Hours Act.—There has been less friction in the working of this Act, probably due in some measure to its provisions being better understood. The cessation of work late in the day on Saturdays still constitutes a grievance in some parts of the districts and especially in Cleveland.

Ambulance.—The total number of teams entered for the divisional competition was 42, and of this number 34 competed at different centres. This number was reduced to seven for the final competition for the Bain challenge shield, cups and medals, which was held in the Town Hall, Durham, on April 8, 1911. The South Skelton team was finally adjudged the winning team, thereby becoming the holders of the Bain challenge shield. They obtained 306 marks out of a possible 364, and as it was the sixth appearance of a South Skelton team, having already been second on three occasions and third twice, they gained a well merited and popular victory. Dawdon were second and obtained the committee's challenge cup and also the Dillon cup by virtue of winning the Sunderland divisional competition. Eppleton were third and were awarded the Heath cup for stretcher work. A gold medal presented by Dr. Oliver for the best individual work in the final competition was awarded to Mr. J. H. Duckering, a member of the South Skelton team.

Rescue Stations.—The splendidly-equipped station in Scotswood-road, Newcastle-on-Tyne, has fully justified its existence during the year, and the members of the brigade have been called out on several occasions. Some of the journeys to the scene of operations were exceptionally smart, notably in the case of the surface fire at South Pelaw Colliery. Capt. J. W. Simonds, the chief officer of the brigade, through whose zeal and untiring energy the staff have in a great measure attained such a high standard of efficiency, has severed his connection with the brigade on taking up an important position abroad. He has been succeeded by Mr. W. H. Ramsay. In connection with the new Order under the Mines Accidents (Rescue and Aid) Act, 1910, it is suggested that central rescue stations be formed in the vicinity of Willington and another near Seaham. These two stations, together with the existing one at

Elswick, will practically place all coalmines in the district to which the above order will apply within a radius of 10 miles of one or other of the above central stations. A large number of colliery officials have during the year put in a regular course of two or three weeks' instruction and training at the Elswick Central Station.

Board of Examination.—The annual examination for the South Durham district was held at Darlington on July 13 and 14. Fifteen candidates for first-class certificates were examined on both days, and four were successful. Seventy candidates presented themselves for second-class certificates, and were examined on the first day, and of this number 22 satisfied the examiners. As compared with the previous year there was a large increase in the number of candidates examined in both classes, but a considerable decrease in the number of those who were successful. A change in the constitution of the Board was occasioned by the retirement of Mr. A. L. Steavenson, due to continued and increasing ill-health. Mr. Austin Kirkup was appointed to be a member of the board in the place of Mr. Steavenson.

Explosives.—The following shows the quantities of the principal explosives used:—Ammonite, 57,569 lb.; bellite, 139,204 lb.; bobbinite, 27,070 lb.; Cornish powder, 10,099 lb.; monobel powder, 196,572 lb.; negro powder, 22,708 lb.; permonite, 44,650 lb.; rexite, 91,159 lb.; rippite, 20,553 lb.; roburite, No. 3, 148,949 lb.; sameonite, 27,035 lb.; stomonal, 68,071 lb.; etowite, 115,565 lb.; westphalite, 221,491 lb.; gelignite, 11,387 lb.; gunpowder (South Durham), 1,148,345 lb.; gunpowder (Cleveland), 2,075,001 lb. The total quantity of permitted explosives used was 1,253,696 lb.; whilst 4,489,345 lb. of non-permitted explosives were used; with the former 3,621,168 shots were fired (3,369,950 by electricity, 244,618 by fuse, and 6,600 by squibs), or including the latter 8,173,601 (3,377,299 being fired by electricity, 265,697 by fuse and 4,530,605 by squibs).

Safety Lamps.—The number of safety lamps in use was 64,146. The method of locking was by lead rivets, 23,964; magnetic, 29,542; screws, 10,204; other, 436. The kind of illuminant was—colza or colza and petroleum, 50,388; petroleum, 9,652; volatile spirit, 2,033; electricity, 2,073. The above figures show an increase of 2,340 in the number of lamps in use, with an increase of 1,194 in the number locked by lead rivets, and an increase of 1,969 in the number with magnetic locks. There is a corresponding decrease of 823 in the number locked by the old-fashioned screw and other locks. The total number of electrically-lighted lamps was 34,731, or an increase of 2,756 on last year.

IV.—Yorkshire and North land District.

The following is extracted from the late Mr. W. H. Pickering's report on the Yorkshire and North Midland District:—

The staff of inspectors now consists of one divisional, two senior, and four junior inspectors. Mr. James Mellors and Mr. G. Y. Tickle were on duty during the whole of the year, but Mr. G. Poole was transferred to London on July 8 to be private secretary to Mr. Redmayne.

The changes in the *personnel* of the staff and the interval which elapsed before the vacancy caused by the transfer of Mr. Poole was filled, made arrangements for the systematic inspection of the mines difficult, but all fatal accidents, and the most serious of the non-fatal accidents and dangerous occurrences, and the complaints from the miners and their representatives were investigated.

Persons Employed.—The total number of persons employed in and about the mines classed under the Coal Mines Regulation Acts was 241,282, being an increase of 3,418 as compared with the preceding year. In the counties the increases were:—Derby, 864; Lincoln, 2; Nottingham, 1,484; and Yorkshire, 1,068. The increase in underground workers was 2,005, and of surface workers 1,413. The increases in Yorkshire and Nottinghamshire were due for the most part to the development of the new collieries to the east, but the same explanation does not cover the increase in Derbyshire, for in that county no really new developments are in progress, and most of the collieries are old. In Nottingham and Yorkshire the increase in the output of mineral was in proportion to the increase in the number of persons employed, but in Derby, in spite of the increase of 864 persons, there was a small decrease in the output of mineral. The reason appears to be that under the conditions of work which now obtain, it is impossible for the older collieries to maintain their output unless additional labour is employed. They are thus most seriously handicapped in competition with the newer winnings.

The development of the coalfield to the east continues. During the year the sinking of two large collieries was commenced, one at Hatfield, 6 miles from Doncaster, and the other at Rufford, 6 miles east of Mansfield. The Barnsley seam was struck by two of the collieries in the Doncaster district, in the one case at a depth of 905 yards, and in the other 625 yards. A map showing the collieries in the Doncaster neighbourhood is given (fig. 2). It is in this area that eventually a very large population will be concentrated. In previous reports reference has been made to the social and other problems in connection with this immigration. The questions have been discussed almost *ad nauseam*, but so far no practical steps have been taken by the public authorities to provide on a generous scale for the health, social needs, and convenience of the rapidly-growing population. No doubt there are many difficulties in the way, but these difficulties increase daily and will in time become almost insuperable. The questions of housing and town planning have been touched upon in previous reports, and special mention is made to one of the problems which can only be solved by united action. Several of the collieries will work under land which is only just above the sea level. The strata are water-logged within a few feet of the surface, and drainage is difficult. When the coal is worked from under this land, and the surface has sunk over 3 ft. in consequence, all the drainage levels will be destroyed, and swamps will form unless preventive measures are taken. In such conditions the arrangement of the main sewers and main drains will be of vital importance to the health of the community.

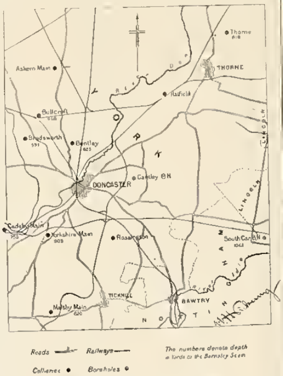

FIG. 2.—SKETCH MAP SHOWING POSITION OF COLLIERIES NEAR DONCASTER.

The number of mines at work was 678, being an increase of 12 as compared with the preceding year. The fluctuations of these figures have no significance, as more than 2,000 persons may be employed in some mines, and less than 10 in others. The following table shows the numbers employed:—

County.	Mines at work.	Persons employed. Below ground. Males.	Above ground. Males.	Above ground. Females.	Below and above ground.
Derby	158	43 515	10,341	—	53,856
Lincoln	1	63	13	—	76
Notts	59	31,586	7,761	—	39,347
Yorks	460	117,047	80,956	—	148,003
Total in 1911	678	192,211	49,071	—	241,282
Total in 1910	666	190,206	47,658	—	237,864

Output of Mineral.—The total output of minerals from mines classed under the Coal Mines Regulation Acts was 67,530,439 tons, or an increase of 1,227,670 tons as compared with the preceding year. The increases were:—coal, 1,195,746 tons; fireclay, 14,262 tons; ganister, 14,250 tons; and alum shale, 3,842 tons. There were insignificant decreases of 61 and 369 tons in the output of ironstone and iron pyrites respectively. The increase in the output of coal is due to the continued development of the district. The strike of the railway men in the autumn prevented the increase from being considerably greater. It was impossible to overtake the arrears when traffic was resumed, and there was a general complaint from the collieries of a shortage of wagons until the end of the year. This fact seems to point to the conclusion that the railways are working to their full capacity, and could not at present carry a much greater tonnage. From the large collieries which are sinking and developing in the coalfield an increase of 8,000,000 tons of coal to be carried may be expected within the next five or six years. To meet an anticipated increase in the traffic, the railway companies for the past few years have been widening the lines to admit of additional sets of rails, building new railways, some of which are designed so that the through mineral traffic will avoid congested centres such as Doncaster, and providing better facilities for handling the coal at the shipping ports. The large new docks at Immingham, in Lincolnshire, are nearly finished. The extensive arrangements at these docks for shipping coal are most admirable.

Practically all the new developments are in the seam variously known as the Warren House, the Barnsley, and the Top Hard. This seam persists over nearly the whole of the coalfield, and has been proved in many places to the east, where the coal measures are masked by newer strata. It has been almost exhausted in the northern section of the coalfield and in parts of Derbyshire, but there still remains an enormous area undeveloped. The output from this fine seam was probably greater than from any other single seam in the kingdom. The number of tons won from it in the coalfield during the year under review was 26,694,768, or 40 per cent. of the output. As regards counties, the figures for this seam were:—Derby, 6,121,667 tons; Nottingham, 7,007,830 tons; and Yorkshire, 13,565,271 tons; being 30, 60, and 35 per cent. of the county outputs respectively. Nearly all the new collieries are designed for outputs exceeding 1,000,000 tons a year. At present there are in the coalfield 11 separate colliery companies with outputs of 1,000,000 tons and over.

The following table shows the quantity of mineral raised:—

County.	Coal.	Fireclay.	Ironstone.	Ganister.	Iron pyrites.	Alum shale.	Total.
	Tons.	Tons	Tons.	Tons	Tons.	Tons.	Tons.
Derby	16,220,927	31,893	615	720	1,661	—	16,255,816
Lincoln	—	—	57,113	—	—	—	57,113
Notts	11,623,250	4,785	—	—	306	—	11,628,341
Yorks	39,132,700	303,864	36,099	105,990	—	10,516	39,589,169
Total in 1911	66,976,877	340,542	93 827	106,710	1,967	10,516	67,530 439
Total in 1910	65,781,131	326,280	93,888	92,460	2,336	6,674	66,302,769

The output per person employed was (*a*) below ground 351 tons, (*b*) above and below ground 280 tons. The figures for the preceding year were 348 and 279 tons respectively. The output of mineral per person employed above and below ground for the coal-producing counties was:—Derby 302 tons, Nottingham 295 tons, and Yorkshire 267 tons. The figures for the preceding year were 308, 295, and 263 tons respectively. Thus, the output per person employed in Derby is 6 tons less, in Nottingham the same, and in Yorkshire 4 tons more. In spite of improved appliances at collieries, and the introduction of coal-cutting machinery, the output per person is declining very seriously, the average for the preceding 10 years being 284 tons in the Yorkshire and North Midland coalfield, and 306 in the year 1907. The development of the Barnsley seam by the large new collieries in Yorkshire and Nottinghamshire should have the effect of increasing the output per person employed, as the figure for that seam in Yorkshire is 287 tons, or 20 tons more than the county average, and 29 tons more than the output of the rest of the seams.

Great progress was made in machine mining during the year. Table on next page shows that 5,648,582 tons of mineral were won by machinery, or an increase of 657,549 tons as compared with the preceding year. The number of electrically-driven machines increased from 235 to 268, but the machines driven by compressed air decreased from 246 to 243. Thus there was a total increase of 30 machines. The value of face conveyors in thin seams is being gradually recognised. They increased from 38 to 45.

Accidents.—During the year under review 230 fatal accidents happened in and about mines classed under the Coal Mines Regulation Acts, causing the loss of 240

TABLE SHOWING NUMBER OF TONS OF MINERAL WON BY MACHINERY.

Description.	Number driven by		Statute tons out by				Total tons of mineral cut.
			Electricity.	Compressed air.			
	Electricity.	Compressed air.	Coal.	Coal.	Fireclay.	Ganister.	
Bar	47	27	548,623	418,455	—	—	967,078
Chain	64	11	703,538	81,014	—	—	784,552
Disc	154	144	1,740,386	1,960,729	—	—	3,701,115
Percussive	2	59	26,584	113,010	3,720	21,608	164,922
Rotary heading	1	2	1,091	29,824	—	—	30,915
Total in 1911	268	243	3,020,222	2,603,032	3,720	21,608	5,648,582
Total in 1910	235	246	2,461,861	2,503,303	7,193	18,676	4,991,033

lives, giving a death-rate of 0·99 per 1,000 persons employed, and showing a decrease of 16 in the number of accidents and of 20 in the number of lives lost. The death-rates per 1,000 persons were (*a*) below ground 1·09, (*b*) above ground 0·61, (*c*) below and above ground 0·99. The figures for the preceding year were 1·18, 0·70 and 1·10 respectively. The death-rate per 1,000,000 tons raised was 3·55. The figure for the preceding year was 3·92. The main heads under which the accidents are tabulated show that the lives lost were—three from explosions of firedamp, or the same as for the preceding year; 121 from falls of roof and sides, or 12 less; 19 from shaft accidents, or eight more; 67 from miscellaneous causes underground, or 10 less; 30 on the surface, or six less. As regards the counties, the number of deaths was—Yorkshire 166, Derbyshire 51, Nottingham 23, the death-rates per 1,000 persons employed being 1·12, 0·94 and 0·58. The record for Nottingham is really remarkable, and is due to the good methods of mining as well as to the natural safe conditions.

For another year the coalfield has been spared a mining disaster resulting in a large number of deaths from one accident. The last disaster was in the year 1896—a remarkable record for a district where most of the persons employed work in very fiery mines. Credit is due to the officials and workmen alike for the very strong public opinion which has been formed regarding the proper use and care in handling safety lamps and explosives. In the reports for the years 1909 and 1910 are described providential escapes from serious colliery explosions, and another such case occurred during the year under review. A serious total is built up by accidents which for the most part have resulted in the loss of only one life. It is very encouraging to note a substantial reduction in the number of accidents, the number of deaths, and in the death rate per 1,000 persons employed. The number of deaths—other things being equal—might be expected to increase in proportion to the expansion of the coalfield. The death rate is the true test, and statistics show that it is the lowest recorded for the past 11 years.

The reduction in the number of deaths from falls of roof and side is particularly gratifying. The record is still far from satisfactory, for the accidents could be greatly reduced if the officials would exercise greater vigilance and the workmen more care. The education of public opinion is the only remedy. There were no fatal accidents due to electricity, but it is too early to decide whether this is a happy chance, or whether the potential dangers of electricity are better realised. Several underground fires originated by arcing of electric cables.

The following is a summary of fatal and non-fatal accidents, classified according to place and cause:—

Place and cause.	Fatal accidents.		Non-fatal accidents reported to inspector.*		All non-fatal accidents disabling for more than 7 days.	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.†	Separate accidents.	Persons injured.
Explosions of firedamp or coaldust	1	3	9	10	9	13
Falls in mine	118	121	612	618	13,485	13,522
Shaft accidents	16	19	17	31	96	113
Miscellaneous underground	67	67	689	694	21,964	21,974
Total underground	202	210	1,327	1,353	35,554	35,622
On surface	28	30	190	193	3,197	3,200
Gross total in 1911	230	240	1,517	1,546	38,751	38,822
Total in 1910	246	260	1,511	1,579	38,549	38,656

* and † *See* footnotes on page iii.

Only one fatal accident from an explosion of firedamp happened during the year. Three lives were lost thereby, but as the explosion occurred in a very fiery pit, it must be counted fortunate that a far more serious disaster did not result. The explosion occurred at the Maltby Main Colliery which is owned by the Maltby Main Colliery Company Limited, and which is situated about 7 miles to the south of Doncaster. The Barnsley seam had recently been struck at this colliery at a depth of 820 yards. The two shafts had been connected and headings driven to develop the seam, but at the time of the accident none were beyond the area of coal which will be left to support the shafts. Firedamp exudes very freely from the strata and is a very serious trouble and danger. The ventilation was produced by means of an exhausting Capell fan connected with the upcast shaft. The fan is designed to produce 300,000 cubic feet of air per minute with a 5 in. water-gauge. At the time of the accident the quantity of air circulating was 50,000 cubic feet per minute, that quantity being considered sufficient in the present circumstances. The ventilating current was conducted into the headings by means of iron air pipes. Some of these pipes were 20 in. and some 24 in. in diameter. No serious fault could be found with the general scheme of ventilation, but there is always a difficulty in passing sufficient air through pipes to produce a velocity in headings great enough to sweep out firedamp which may gather in cavities in the roof. This difficulty was recognised by the management, and flexible pipes were connected with the compressed air installation, and were used for air jets in the working places. The attached plan (fig. 3) shows the arrangement of the workings. At about 3 a.m. on Monday, August 21, 1911, the men and boys working in the dip main roads and at the pit bottom, heard a "sound," which was followed immediately by a slight gust of wind. No alarm was felt, and coal winding proceeded. In about five minutes, there was a much louder "sound," followed by a rush of air carrying dust. It was then realised that something serious had happened in the dip workings. George Best, the deputy in charge of the pit, was near the upcast pit bottom. He went down the main dip road, which was also the return, but was unable to get far owing to smoke and afterdamp. He, therefore, went round to the downcast, crossed the pit bottom, and proceeded down the intake. He found several props burning at the junction of this road with the level. He short-circuited the air, and organised a rescue party, who put out the fire by carrying water from the sump. The rescue party had to work in afterdamp, for the pipes were from the intake, and several of the rescue party were overcome by afterdamp and had to be carried out. Mr. Dyson, the manager, was unconscious for some time, but was restored by artificial respiration. The men equipped with the Draeger apparatus worked in front of the rest of the party, but one of these men fainted when handling the second body, and had to be carried out. Whether the fainting was due to the shock of handling a body so shockingly burned or to some defect in the apparatus itself, it is impossible to say. After the bodies had been recovered, an inspection was made of the accessible parts of the mine. It was clear that the explosion had originated in No. 4 heading. The flame of the explosion had extended a considerable distance, as shown by scorched timber, &c. No great force had been developed, though it was found that the top of a partly built brick stopping had been blown down, and doors underground and the doors of the air lock at the pit top had been blown open. As is usually the case in a newly opened seam, moisture exuded from the coal, and this had prevented fine coaldust from being deposited.

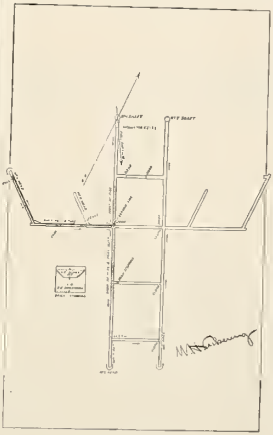

FIG. 3.—MALTBY MAIN COLLIERY. PLAN OF SOUTH SIDE WORKINGS.

There was a large accumulation of firedamp in No. 2 heading. The flame of the explosion passed close to this, but fortunately did not reach it. A further inspection of the pit was made the following morning, when the ventilation had been restored and it was possible to get to the face of No. 4 heading. One lamp was lying at the foot of a prop at the left-hand side of the place. The glass was smashed into hundreds of pieces, and there was an injury to the bottom rim of the brass oil vessel which could only have been caused by a severe blow from a miner's pick or a similar sharp-pointed implement. A pointed hook was attached to the top ring of the lamp. These hooks are provided for the convenience of the miners, who stick them into the props and thus suspend their lamps. At a height of 5 ft. from the foot of the prop there was a hole in which the point of the hook fitted, and Mr. Pickering was satisfied that the lamp had been hanging in that position. There was a quantity of soft shale and coal at the foot of the prop. The lamp was lying on the top of this. Deducting the length of the lamp, and the thickness of the coal and shale, the lamp would not have dropped more than 3 ft. Such a fall on to soft stuff would not seriously damage the lamp. The men had been ripping, and the lamp was on the prop which was supporting the last bar set at the out-bye end of the ripping. It was bad mining practice to hang a lamp so near the ripping. From the position in which the bodies were found, it was probable that one of the men was working at the ripping and the other two were pushing a tub into the place. A lamp with the glass missing and the standards bent was found by the rescue party when recovering the bodies, and unfortunately was brought out before its exact position was noticed. From information, it is concluded that either the lamp was dashed violently against the tub by the man who was using it at the time of the explosion, or it had been dropped and had been run over by the tub, which would run backwards when the men left it. The tub was stopped by one of the bodies. Circumstantial evidence points to the conclusion that this lamp was damaged after the explosion. Numerous instances can be given of the misuse of safety lamps. This year in this district there were 35 cases of prosecution of workmen for offences against rules about safety lamps. Of these, nine were for having the lamps near the swing of the pick. In all these nine cases the lamp had been pierced. Electric lamps are now being used in the mine. It will be noted that no explosion would have occurred, even when the lamp was broken, if the place had not contained inflammable gas. The extent of the flame and the evidence of heat show that there was a considerable accumulation of such gas inadequately diluted with air. George Best, the deputy, examined the place at 2 a.m. or about one hour before the explosion. His evidence is to the effect that the ventilation was satisfactory and that he found no gas. After the explosion, it was found that there had been a fall of roof in the level. This had crushed the air pipes and would have the effect of choking the ventilation. If this fall happened before the explosion, the accumulation of gas is accounted for. The fact that the explosion damaged the air pipes at the in-bye side of this fall, and only displaced those at the out-bye side, appears to point to the conclusion that the fall did happen before the explosion. It is strange, however, that the experienced miners who were in the place did not hear the fall, or did not notice the stoppage of the air current, and remained at work in such dangerous conditions. The stoppage of the air current might not be noticed if the men were working hard, for the current in the heading was sluggish and the mine hot. It is impossible to have a brisk current in a large heading ventilated by air pipes. In this case the area of the road was about 50 square feet, and of the pipes 3¼ square feet. Thus the velocity of 500 ft. per minute in the pipes would be reduced to only 30 in the heading. In a hot mine such a current is hardly perceptible. An air jet was working close to the men, and the noise from this, as well as its cooling effect, would tend to disguise the stoppage of the air. It seems clear that there were two explosions with an interval of five minutes between them. This interval was satisfactorily fixed by the onsetter, who estimated it by the work he did between the first sound and the second. Without direct evidence from men who were actually in the explosion, there must necessarily be some uncertainty, but the sequence of events was probably as follows:—(*a*) A fall of roof occurred in the level and broke the air-pipes; (*b*) firedamp accumulated in the heading in a few minutes; (*c*) J. C. Butler, the miner who was working at the ripping, accidently struck lamp No. 1414 with his pick and smashed it; (*d*) an explosive mixture of gas and air fired at the lamp; (*e*) Butler and his two mates (who were bringing a tub into the place) were enveloped in flame and fatally injured; (*f*) the explosion was not violent and did not spread very far; (*g*) in a few minutes firedamp again gathered and exploded either at some burning material, or at a gas jet from some point of issue; (*h*) the second explosion was far more violent, it gathered force by picking up a little coaldust and perhaps small pockets of gas. The men equipped with the Draeger rescue apparatus did good work in recovering the bodies and in restoring the ventilation. Without them these operations would have taken longer, and life might have been risked in the natural anxiety to get to the place of explosion to see whether any of the men were alive.

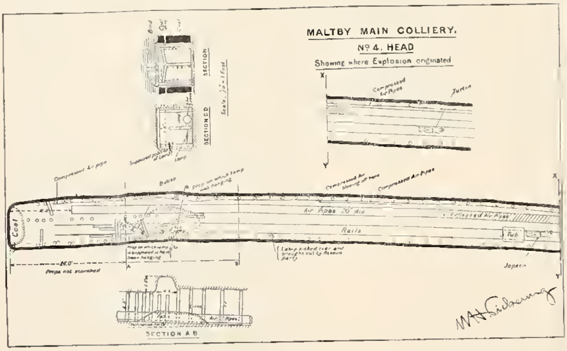

FIG. 4

The non-fatal accidents numbered nine, and caused injury to 10 persons. Seven of the explosions were in mines supposed to be non-fiery, and where naked lights were allowed and used. The other two were in mines worked by safety lamps.

During the year there were 118 fatal accidents from falls of roof and side, involving the loss of 121 lives, being a reduction of three in the number of accidents and of 12 in the number of lives lost. Although it is encouraging to be able to record a reduction in the accidents from this cause, the fact that there is still room for great improvement must again be emphasised. Seventy-five of the deaths occurred at the working face.

In connection with the working of shafts there were 16 accidents involving the loss of 19 lives, being an increase of five accidents and eight lives lost as compared with the preceding year. The most serious shaft accident happened at Southgate Colliery on November 22, three persons being killed and four others injured. At 1.15 p.m., 12 men were being lowered in the cage by F. T. Skelton, a relief winding-engineman, who had taken charge of the engines 15 minutes before so that the other engineman could have time for rest and food. The cage ran as usual until about 20 ft. from the bottom, when instead of the speed decreasing, it increased, and the cage dashed with some violence on to the sump boards. It was immediately raised for perhaps 20 ft. and again dashed on the bottom. It was again raised for a few feet and then lowered gently on to the bottom. The engineman's account is to the effect that he cut off the steam at about a third of the depth of the shaft from the top, and reversed the lever at half way. This was the usual procedure, and as a rule the cage would run quietly into the bottom, though at times an application of the brake was required to steady it. Soon after half way he found that the speed of the cage was not reducing. He therefore turned on steam and put it against the engine. This had no effect, so he applied the brake, but it failed to hold the engines, and the cage was then dashed into the bottom. He raised it to lower the ascending cage on to the props, but they were not in, and he had again to lower before he could bring the cages to rest. This account is improbable. Even if true it was a serious mistake on the part of the engineman not to keep the cage at rest after the first impact. The evidence that the keps at the pit top were in action is conclusive. The brake was effective immediately before and immediately after the accident, and subsequent trials showed that the engines could not move under full pressure of steam when the brake was applied. Mr. Pickering was satisfied that the engineman made a mistake, probably by putting steam in favour of the engines, when he intended to put it against them. When the overwind occurred he "lost his head" and instead of keeping the cages at rest, tried to bring them to their normal positions at the top and bottom of the shaft respectively. The inspector adds that it is probable that no one would have been killed if the cages had been fitted with properly-designed gates, and if the engines had been fitted with an automatic contrivance to prevent overwinding, it is probable that the accident would not have happened. The other shaft accidents require no description, but it may be noted that only three of them happened in sinking pits—a distinctly satisfactory record when it is remembered that much of this specially dangerous work is in progress in the division.

The fatal accidents classed under the heading of miscellaneous underground accidents numbered 67, involving the loss of the same number of lives, and being a reduction of 10 as compared with the preceding year. Three of the accidents were from explosives, 58 from haulage, one from machinery, and five from miscellaneous causes. No fatal accident from electric shock occurred during the year. Although the fatal accidents from explosives numbered only three, and the non-fatal 16, they must not be dismissed as being comparatively unimportant. When a miner is burnt by the flame of an explosive it is evident that gas would have been fired if it had been present, and a serious explosion might have been started. Unless the manager is very vigilant, the subordinate officials and miners are apt to become careless as regards the use of explosives. In one case, at Ryhill Main Colliery, a collier informed Mr. Wilson, who investigated the accident, that it had been his custom to cut out miss-shots. Other miners when questioned admitted that they had followed the same dangerous practice. On May 17, at Wharncliffe ganister mine, a deputy found a miner and his mate putting a shot-hole in the bottom of the ganister bed, and after examining the place he started preparing the primer charge, whilst the miner put some cartridges into the hole. The cartridges were 2 oz. each, ⅞ in. diameter, and the shot-hole was put in 1⅝ in. diameter, 3 ft. deep, by drill and hammer. It was not circular. The miner first pushed the separate cartridges to the back of the hole, using a wooden rammer for the purpose. He then put two, side by side, at the entrance, and pushed them in, but they jammed. He then rammed heavily, with the result that the charge exploded. He was killed. The manager's orders had been that the deputies should charge all holes. The deputy's excuse for failing to carry out these orders was to the effect that he understood that this only applied to putting in the primer and stemming.

Next to falls of roof and side, accidents in connection with the haulage of mineral account for most deaths in coalmines. During the year 58 persons were killed by these accidents, a decrease of two as compared with the preceding year; 45 of the accidents occurred to persons actually engaged in haulage work, eight to persons travelling to and from their working places, and eight were miscellaneous. One very sad feature of these accidents is the number of young boys killed. Many of them had hardly begun their working life. Twenty-four boys under 18 years of age were killed, and of these, three were only 13 years of age. Six persons were killed and 39 injured while illegally riding, and four persons were killed and 42 injured by going in front instead of behind tubs, while moving them by hand on inclined roads.

One person was killed and 11 injured by accidents from machinery underground. The fatal accident happened on July 4, B. Beckwith, a coal-cutting machine chargeman at Emley Moor Colliery, being fatally injured by having his legs cut off by the cutting wheel of a disc machine electrically driven. It is probable that he had turned the machine switch to the "on" position, and had forgotten the fact when he gave orders for the current to be switched on at the junction box. At the inquest the question of the competency of the men working at the electrical machines was raised, but as the deceased was a smart and competent machine man, and as the others were acting under his directions, there did not appear to be any breach of the rule. It is necessary for competent men to have assistants, otherwise no one would be trained. Manipulating an electric switch is as simple as turning a tap, and this simplicity is a distinct danger unless the effect of the manipulation is understood. It is of vital importance, therefore, that the men in charge of electrical machinery should thoroughly understand the work. It was a rule at this colliery for no man to have charge of a machine until he had worked at least six months at a machine under an experienced man.

The fatal accidents on the surface numbered 28, causing the death of 30 persons. Of these, six were killed by machinery, three by a boiler explosion, 10 on railways and sidings, and 11 by miscellaneous accidents. The boiler explosion happened at Grimethorpe Colliery, which is situated about seven miles from Barnsley, and is owned by the Carlton Main Colliery Company Limited. The accident happened on July 10 in the turbine engine house on the surface, the following persons being so severely scalded that they all died:—Frank Green, 42, chief mechanical engineer to the Carlton Main Colliery Company; John Allen, 45, enginewright, Grimethorpe Colliery; and Herbert Duckworth, foreman engineer of Vickers Limited. A new steam turbine designed to work either with exhaust or with live steam had recently been fixed, but was only under trial working. It was known that the vertical and horizontal steam pipe connections contained water due to condensation, and the danger of a "water hammer" was realised. A drain pipe had been fixed in front of the valve, but it had been used as a steam connection to a pump and no other drain provided. It was believed that if the valves were very slightly opened the water could be safely drained through a small 1 in. drain pipe in connection with the turbine. At the time of the accident Bacon was "easing" the valve for this purpose, and the other men were under the floor. Nearly all the water had been drained off when a very severe "water hammer" action burst an oblong piece of metal 11 in. by 6 in. out of the valve casting. After the original drain was used for a steam connection a new one should have been fixed in front of the valve. This work would not have taken the fitters more than two hours, and it is extraordinary that such skilful and experienced mechanical engineers should have neglected so rudimentary a precaution. Mr. Gill, the certificated manager of the colliery, was primarily responsible for the work, but it is usual for the manager, where a properly qualified mechanical engineer is appointed, to rely upon that engineer for the proper conduct of purely mechanical work. Mr. Green was the chief mechanical engineer for all the pits of the Carlton Main Colliery Company. He was a man of very superior qualifications, and, although Mr. Gill would be his superior officer when he was engaged at Grimethorpe Colliery, he would naturally rely upon Mr. Green's more exact knowledge in mechanical engineering. A modern colliery manager must have a working knowledge of mining, civil, electrical, and mechanical engineering, but it is impossible for him to be a specialist in them all.

In addition to the accidents tabulated, 74 notices of other deaths, which occurred in and about mines, were received. For the following reasons they are not included in the statistics:—50 were from natural causes; 7 were persons not employed; and 17 of the deaths occurred more than a year after the accident. Notices of 136 dangerous occurrences were received during the year. They were seven ignitions of gas; 41 underground fires; 46 breakages of winding appliances; 30 cases of overwinding; 2 inrushes of water, and 10 from miscellaneous causes. A fire occurred on April 19 at Pinxton Colliery. In the Brookhill shaft, about two years ago, an inset 24 ft. deep, 11 ft. wide and 5 ft. 6 in. high was made in the Waterloo seam. The roof of it was supported by props and bars. A three-throw pump was fixed in this inset to force the shaft water to the surface. The pump was driven by a 20-horse power motor. The current was three-phase, 400 volts. The cable was three-core, paper-covered, lead-coated, and armoured with steel tape. It was taken from the surface. The pump worked continuously. There was no attendant, the speed being automatically controlled by the rise and fall of the water in the tank fixed close to the pump. A copper wire fuse of No. 20 standard gauge calculated to blow at 47 ampères was fixed at the motor. It is probable that the cause of the fire was arcing at the point where the three core cable was separated for connection to the switch and fuses. Paper is a hygroscopic material, and the lead sheath of cables insulated by paper is designed to keep out moisture. When the cable is split a proper "dividing" box should be provided to effectively seal the ends. At Pinxton, a wrapping of tape was used instead of a box, and it is probable that this was not moisture-proof, and that, therefore, the paper became damp and lost its insulating properties. The members of the rescue brigade equipped with Meco apparatus proved to be efficient, and did some very useful work. After the accident, Mr. Nelson, H.M. electrical inspector of mines, inspected the electrical installation of the colliery. Reference to this and the subsequent action taken will be made in next year's report.

Serious outbursts of gas are not uncommon in the mines of the coalfield. At times they are from gas held in the strata under great pressure which issues in great "blowers" when the roof or floor breaks. At other times they are caused by a sudden settlement of the roof over a large area of goaf containing gas. Perhaps the most serious outburst during the year was one which occurred at Barrow Colliery. On a Sunday morning when no workmen were in the pit it was found by the officials on duty that one of the returns was so foul near the upcast pit bottom that gas would explode in a safety lamp. The quantity of air passing was 56,000 cubic feet per minute. After a short time the quantity of gas reduced, but for 10 hours the safety lamp showed a cap of ½ in. in the current. Two hours after the gas was found at the upcast pit bottom the gas would explode in a safety lamp held in the return ¾ mile in-bye. The quantity of air at that point was 31,000 cubic feet per minute. The workings were so fouled with gas that a full investigation was not possible until the evening. It was then found that the floor in the working face of a district in the Silkstone seam had lifted from 18 in. to 24 in., and that the gas had issued from a large break running parallel with the face.

Prosecutions.—In three instances legal proceedings were taken against owners, agents or managers. In all, seven charges were made, two resulted in convictions, three were withdrawn on payment of costs, and two were dismissed. The cases of prosecution of workmen by owners and managers for breaches of the regulations numbered 393. Convictions were obtained in 384 cases, and nine were dismissed. The fines amounted to £241 15s. 6d. and the costs to £202 7s 9d. making a total of £444 3s. 3d. As compared with the preceding year, there is an increase of 117 in the number of cases, and of £134 10s. 1d. in the amount of fines and costs. It must not be supposed from these large increases that miners became more indifferent to safety and discipline during the year. The following seem to be the root reasons for the increase:—(*a*) The tightening of discipline in the division; (*b*) the public attention drawn by recent mine disasters to the danger of matches in the mines; (*c*) the objections by the miners' representatives to the managers fining the workmen for alleged breaches of rule instead of taking them before the magistrates. These objections received wide publicity, for they were given in evidence before the Royal Commission on Mines; (*d*) the inclusion of cases of prosecution for cruelty to ponies, taken under the common law. Formerly many of these were not reported to the inspector of mines. From the mining point of view, it is singular that cruelty to animals and theft are regarded in the police courts as being more serious crimes than acts which endanger hundreds of human lives.

Safety Lamps.—The total number of safety lamps in use was 211,356, being an increase of 3,081 as compared with the preceding year. A striking feature of the table is the increase in the number of portable electric lamps from 69 to 922. The management of two mines introduced this type of lamp into the workings. They give an incomparably better light than the safety lamps, and their general use would have the effect of reducing accidents, especially from falls of roof and from haulage.

Before Mr. Pickering agreed to the introduction of these lamps he drew the attention of the management to the following points:—

(1.) An explosion might occur (*a*) if the connection between the battery and filament were broken in an explosive atmosphere; (*b*) if both glasses were broken in an explosive atmosphere.

(2.) If the lamps were used, arrangements would have to be made for periodical testing for firedamp by safety lamps or other means.

(3.) Objection 1 (*a*) can be overcome by a proper method of locking the lamp (*e.g.*, by a lead rivet), and a rule requiring that no lamp should be unlocked and opened except on the surface.

(4.) The danger of the glass being broken is far more remote than in the case of a safety lamp. It is probable that a shock which would break the outer glass would also break the thin glass of the bulb. The outer glass, however, is stronger than that of an ordinary safety lamp, and is better protected. The better light given by the electric lamp enables the miner to place the lamp in a place safe from falls or from blows from the tools.

(5.) The lamp gives such a splendid and clear light that accidents should be greatly reduced where they are used.

(6.) These lamps might be properly used under the following conditions:—

(*a*) The lamps to be locked with a lead rivet having a clear device on each end.

(*b*) No lamp to be opened except by an authorised person on the surface.

(*c*) Arrangements to be made for frequent testing for firedamp by safety lamps or other means.

(*d*) Any man ill-using a lamp, or damaging it, or having it within 2 ft. of the swing of the tools to be prosecuted.

Of the safety lamps used, 100,530 were equipped with one gauze and 109,904 with two gauzes; 206,740 of the total were shielded. The method of locking was, by lead rivet, 135,974; magnetic, 56,102; screw, 18,356; other, 2. The kind of illuminant was colza, or colza and petroleum, 143,661; petroleum, 31,777; volatile spirit, 27,617; electricity, 922; other, 7,379. The number of lamps lighted by the application of flame when open was 107,901; by electricity, 97,358; by internal igniters, 5,175.

Explosives.—No less than 43 different kinds of explosives are used in the coalmines of the coalfield. Of these, 37 are "permitted" explosives. The total quantity of explosives used was 1,537,187 lb., being an increase of 50,560 lb. as compared with the preceding year. The number of shots fired was 3,508,332, being an increase of 167,954 The number of missed shots was 5,807, showing that there was one missed fire in 604 shots.

The quantities of the principal explosives used was geliguite, 102,396 lb.; gunpowder, 160,672 lb.; abcite, 42,693 lb.; ammonite, 21,135 lb.; amvis, 11,959 lb.; arkite, 43,925 lb.; bellite, 81,087 lb.; bobbinite, 322,089 lb.; carbonite, 113.587 lb.; Cornish powder, 17,371 lb.; dominite, 27,369 lb.; excellite, 43,635 lb.; fracturite, 15,161 lb.; monobel powder, 44,303 lb.; rexite, 20,499 lb.; rippite, 99,061 lb.; roburite, 48,504 lb.; samsonite, 86,905 lb.; St. Helen's powder, 23,160 lb.; stowite, 75,134 lb.; swalite, 28,620 lb.; tutol, 17,940 lb.; westfalite, No. 1, 50,922 lb. Of the total quantity of explosives used, 1,264,840 lb. were permitted, and 272,347 lb. non-permitted explosives; 3,014,472 shots were fired by the former and 493,860 by the latter; 2,944,137 shots were fired by electricity and 564,195 by fuse.

Board for Examination.—The amalgamation of the Yorkshire and part of the Midland mines inspection districts, to form a division under the new scheme for mines inspection described in last year's report, brought two boards for examination within the boundaries of the division. The two old boards have been disbanded and a new one constituted. The examinations were held on August 1, 2 and 3 at Sheffield University, the examiners being C. E. Rhodes, Rotherham; W. B. M. Jackson, Chesterfield; and S. C. Wardell, Alfreton. The number of candidates was, first-class 67, of whom 17 were successful; second-class 114, of whom 29 were successful. As an additional duty, the board were directed to appoint a committee of three, consisting of a representative of the mineowners and of the workmen with the inspector of mines, to interview the candidates for the position of sub-inspectors of mines and to examine their credentials. The committee appointed was:—C. E. Rhodes, J. G. Hancock, M.P., and W. H. Pickering. The candidates numbered 144, and of these the committee recommended 46 as being eligible for the examination. They were all practical miners who had a long and varied experience of all branches of mining. They were a remarkably alert and intelligent body of men, 37 of them hold managers' first-class certificates of competency, and the rest second-class certificates of competency. The examinations were not held until after the close of the year.

Ambulance and Rescue and Aid.—These are interconnected, but proper organisation of ambulance work is of far more importance than the provision of rescue stations. No fresh rescue stations were established during the year, but the Mines Accidents (Rescue and Aid) Act, 1910, which has been re-enacted in the Coal Mines Act, 1911, makes it imperative that stations should be established for the large number of collieries not attached to the present centres. At some collieries ambulance work has languished a little during the past few years. It is not easy in any walk of life to keep up men's enthusiasm for gratuitous work for the public good. The burden usually falls on a few shoulders, and those who bear it are apt to become tired of working for others who show little appreciation. The organisation of ambulance work is easiest at those collieries where the higher colliery officials and the local miners' agents are keen on the work. There is room for much more co-operation in this direction. In spite of a want of interest in some quarters, much excellent ambulance work was done in the division during the year. The competition for the Wood shield by the Yorkshire Collieries Ambulance League again attracted a large number of teams, and after a keen fight the Grimethorpe team was declared to be the winner by the judging surgeons. A new departure was made in organising a competition limited to teams the members of which had gained first-year ambulance certificates within nine months of the date of the competition. This proved to be very popular. Twenty-one teams entered. At some colliery centres "ambulance corps" are formed. The particulars of the ambulance work done, and the organisation of the rescue brigade at Denaby and Cadeby Main Collieries, will be of interest, as an instance of what is done at some mines. Ambulance work was started in 1883. During the year 1911 the number of persons attending the classes was 336; of these, 215 passed the examination, 101 received "labels," and 38 medallions. To make provisions in case of a mining disaster, the following arrangements were made:—Forty ambulance pit-men were trained to wear the rescue apparatus in an irrespirable atmosphere; 100 ambulance pitmen were trained for restoration work, and to follow up the wearers of the artificial breathing apparatus; 24 ambulance men were organised to treat by first aid any injured men sent out of the mine, and to convey them to the hospital if necessary; 20 ambulance nurses, qualified in first aid to the injured, were appointed to assist the doctors in a temporary hospital near the pit mouth; and 30 nurses similarly qualified were appointed to attend to the injured in their own homes. Thus the number of persons organised for this emergency duty is 214. A list of the names and addresses of the men and of the officers in charge is posted near each pit. All the members of the organisation are regularly exercised in their respective duties. Whether the corps is called upon or not for a serious disaster, such training must be an important factor in the education of the officials and workmen of the colliery.

Hospitals.—As a rule, men who are injured in the mines receive effective first aid from those of their comrades who are qualified in ambulance work; but it is obvious that there will be needless suffering if the injured man has to be conveyed a long way to a hospital. No surgeon can do justice to a case if it has to be treated in a place where the modern hospital appliances and conveniences are not available. In most parts of the coalfield the provision of hospitals is more or less satisfactory, but it is necessary to give a word of warning as regards the Doncaster coalfield now being so rapidly developed. In the area covered by the map, given at the beginning of the report, there is only one hospital

—namely, the Doncaster Infirmary. When the pits are fully developed it will be quite impossible for the Doncaster Infirmary to cope with the extra work which will be thrown upon it. Already it is hard pressed to meet the needs of town and district. Doncaster is a small town and so many calls have recently been made on the purses of the generous that it is difficult to see where the money for the necessary extensions and for the increased annual expenditure can be found. The best solution of the difficulty seems to be the provision of cottage hospitals near the collieries. A modern coal-mine will alone find work for a small hospital, but in some cases the collieries could be grouped. For Denaby and Cadeby Main Collieries a cottage hospital, which has been most successful, was established some years ago. Generous contributions were made by a royalty owner and the colliery company and a considerable sum of money was collected by the workmen. The hospital is maintained by the miners themselves, who voluntarily decided to have 1d. a week deducted from their wages for this purpose. It is managed by a committee of working miners, who are justly proud of it. Another cottage hospital (named the Warde-Aldam Cottage Hospital, after the royalty owners, who gave the land and a very handsome donation) was built during the year. It is within a stone's throw of Frickley Colliery, owned by the Carlton Main Colliery Company. These two hospitals are just outside the area shown on the map. At least three similar ones should be built within the area.

V.—Manchester and Ireland District

The following is extracted from Mr. Gerrard's report on the inspection of mines in North and East Lancashire and Ireland:—Under the Coal Mines Act in North and East Lancashire there was a decrease in the number of persons employed underground of 960, but an increase in the number of persons employed above ground of seven. The production of coal increased by 21,001 tons. The value of the coal raised, at the pit's mouth, was 8s. 10·323d. per ton, being 0·188d. per ton more than in the previous year. There were 52 accidents causing 54 deaths; of these, 48 accidents causing 50 deaths occurred underground. The number of coal-cutting machines in use was 136, being 17 less than in 1910. In Ireland the quantity of coal raised was 84,564 tons, of which 71,535 tons were anthracite. Every mine had at least one underground inspection, some mines many.

Persons Employed.—The table below shows the number of persons employed:—

County.	No. of mines at work.	Persons employed: Below ground. Males.	Above ground. Males.	Above ground. Females.	Below and above ground.
N. & E. Lancashire	206	38,286	10,053	834	49,173
Ireland.					
Kilkenny	6	364	103	—	467
Leitrim	1	14	4	—	18
Queen's	1	43	55	—	98
Roscommon	3	85	8	—	93
Tipperary	6	68	26	—	94
Tyrone	1	15	5	—	20
Totals (Ireland)	18	589	201	—	790

Output of Mineral.—The following shows the output in North and East Lancashire:—

Mineral.	Quantity (statute tons).	Value at the mine per ton. s.	d.	Total value. £
Coal	11,020,695	8	10·323	4,882 306
Fireclay	110,029	3	4	18,338
Brick shale	38,111	1	6	2,859
Iron pyrites	259	7	9·78	101
Sandstone	100	1	0	5
Totals	11,169,194	—		4,903,609

The output per person employed below ground was 292 statute tons, above and below ground 227 statute tons. The quantity of coal raised was 21,001 tons more than in the previous year. The value is 0·188d. per ton more, taking cognisance of contracts, colliery consumption, &c.

Again the owners have courteously enabled Mr. Gerrard to give the value for almost the whole of the output, the value at the mine having been ascertained for 10,692,732 tons of coal. The values for several years past are:—1911, 8s. 10·323d.; 1910, 8s. 10·135d.; 1909, 8s. 10·308d.; 1908, 9s. 8·811d.; 1907, 9s. 0·415d.; 1906, 7s. 10·14d.; 1905, 7s. 8·84d.; 1904, 7s. 9·93d.; 1903, 8s. 3·725d.; 1902, 8s. 9·375d.; 1901, 10s. 2·67d.; 1900, 10s. 5·76d.; 1899, 7s. 6·7d.; 1898, 6s. 4·73d.; 1897, 6s. 3·43d.; 1896, 6s. 3·3d.; 1895, 6s. 7·3d.; 1894, 7s. 4·4d.; 1893, 7s. 9·8d.; 1892, 7s. 6·4d. The Act requires the owners to give the number of days on which coal was drawn. The total number of days worked in the year was 311 days more than last year at the same selected pits.

The following table shows the quantity of coal cut by machinery in 1911:—

Description.	Number driven by Electricity.	Number driven by Compressed air.	Statute tons cut by Electricity.	Statute tons cut by Compressed air.	No. of conveyors at coal face.
Lancashire.					
Disc—Diamond	—	17	—	—	—
Gillott and Copley	—	16	—	—	—
Bar—Pick-quick	3	5	—	—	—
Chain—Hopkinson	2	2	—	—	—
Percussive—Siskol	—	66	—	—	—
Hardy	—	25	—	—	—
Totals	5	131	43,684	424,833	79
Ireland.					
Bar—Pick-quick	1	—	1,700	—	—

Seventy-nine coal-face conveyors were in use.

The output of mineral in Ireland was as under:—

County.	Coal. Statute tons.	Fireclay. Statute tons.
Antrim (lignite)*	120	—
Kilkenny	56,981†	—
Leitrim	1,400	—
Queen's	6,221†	2
Roscommon	11,329	—
Tipperary	8,330†	—
Tyrone	300	1,000

* Lignite from a metalliferous mine † Anthracite, 71,535 tons, value £41,828.

The total quantity of coal and lignite was 84,684 tons, an increase compared with the previous year of 4,882 tons. The quantity of anthracite was 71,535 tons. The value of the coal at the mine throughout the year was 11s. 6·706d. per ton, the total value being £48,873. The value of the lignite was £60. The value of the fireclay was 3s. 6d. per ton. The total value of the minerals being £49,048. The output per person employed below ground was 143 5 tons, and per person employed above and below ground, 170 tons.

Accidents.—In North and East Lancashire there were 52 fatal accidents, causing the death of 54 persons. Of this number, 48 accidents occurred underground, causing 50 deaths; four fatal accidents occurred on the surface, causing four deaths. In the previous year there were 58 fatal accidents, causing the death of 403 persons; excluding the terrible Hulton disaster, 57 fatal accidents, causing 59 deaths.

The following is a summary of fatal and non-fatal accidents, classified according to place and cause:—

Place and cause.	Fatal accidents. Separate accidents.	Fatal accidents. Deaths.	Non-fatal accidents reported to inspector.* Separate accidents.	Non-fatal accidents reported to inspector.* Persons injured.†	All non-fatal accidents disabling for more than 7 days. Separate accidents.	All non-fatal accidents disabling for more than 7 days. Persons injured.
N. & E. Lancashire.						
Falls in mine	34	36	93	97	2,884	2,890
Shaft accidents	5	5	4	7	31	34
Miscellaneous underground	9	9	98	102	5,710	5,713
Total underground	48	50	195	206	8,625	8,637
On surface	4	4	19	20	526	526
Gross total in 1911	52	54	214	226	9,151	9,163
Total in 1910	58	403	228	252	8,634	8,674
Ireland.						
Falls in mine	1	1	2	4	7	8
Miscellaneous underground	—	—	1	1	20	20
Gross total in 1911	1	1	3	5	27	28
Total in 1910	—	—	6	7	33	34

* and † *See* footnotes on page iii.

The death-rate from accidents per 1,000 persons employed in Lancashire was: below ground, 1·306; above ground, 0·367; below and above ground, 1·098. The death-rate in Lancashire per million tons raised was for underground workers, 4·476; under and above ground, 4·834. The number of tons of mineral raised per death underground was 223,383; above and below ground, 206,836. The number of persons employed underground per life lost was 765; number employed above ground per life lost above ground was 2,721; number employed above and below ground per life lost above and below ground was 910. The death-rate from accidents per 1,000 persons employed in Ireland was: below ground, 1·697; above and below ground, 1 265.

The following shows the hours of the shift in which the accidents happened:—In the first hour, eight fatal, 31 non-fatal; in the second hour, seven fatal, 34 non-fatal; in the third hour, eight fatal, 30 non-fatal; in the fourth hour, one fatal, 30 non-fatal; in the fifth hour, eight fatal, 26 non-fatal; in the sixth hour, eight fatal, 30 non-fatal; in the seventh hour, six fatal, 19 non-fatal; in the eighth hour, five fatal, 13 non-fatal; in the ninth hour, three non-fatal; in the tenth hour, one fatal, one non-fatal; in the eleventh hour, one fatal; more than 12 hours, one non-fatal. The hour of shift in which the greatest number of accidents reported is seen from the above to be the second hour.

There were no explosions of firedamp or coaldust.

Eleven fatalities resulted from falls of side, one more than in the previous year; eight occurred in the working place, from the coal face; two occurred in roadways; one in a shaft. Three were from pronounced slips which ought to have been seen and guarded against. Two were from overhanging coal in steep seams where sprags gave way.

Twenty-three accidents arose from falls of roof, resulting in 25 deaths, three less than the previous year. Fifteen occurred in working places; eight on roads, five of these being whilst repairing. Ten accidents occurred from insufficient support, in several cases only ordinary timbering under conditions calling for extra support. In 11 cases there were pronounced slips, breaks, or faults; in one case a pot hole. In two cases props were being removed by using a short hammer. Under this head, falls of roof, there is a marked increase in the use of light bars along the working face. It is being more and more recognised that simple props are less secure than a bar with two props supporting.

From shaft accidents there were five fatal accidents causing five deaths, and four non-fatal accidents causing injury to seven persons. Two fatal accidents occurred whilst ascending or descending, two from falling from the cage at an intermediary mouthing, and one from being crushed by the cage at the shaft bottom where simultaneous loading of two decks is practised. There were nine miscellaneous accidents underground causing nine deaths, in the previous year there were 15 deaths. In connection with haulage, seven accidents occurred causing seven deaths. Three of these accidents arose in connection with mechanical haulage and four in connection with hand haulage. One death was caused by machinery; the deceased was struck on the head by the handle of a winch. One death was caused by a heavy coil of rope being conveyed on a bogie tilting over and crushing the deceased against the side of the road. There were no fatal accidents with explosives. On the surface four accidents occurred, causing four deaths. Three of these accidents were in connection with machinery.

The only accident connected with electricity in this district occurred on the surface at Hulton Colliery, to a turbine generator attendant. In attempting to replace blown-out fuses, not having switched off current, he was slightly burned on the face and eyes. He had passed the switch on his way to the fuses. The arrangement of the switch did not meet with the approval of Mr. Nelson; the fuses were on the "live" side of the switch—the position should be reversed.

Under the Notice of Accidents Act the following dangerous occurrences were reported:—Ignition of gas: May 4, Astley Green, ignition of gas in a sinking pit. In connection with winding in shafts, ropes, &c.: January 17, Rock Colliery, co. Kilkenny, winding rope broke at the lift of the cage from shaft bottom; September 14, Sovereign pit, Wigan Coal and Iron Company Limited, guide-rod broke in shaft. In connection with haulage: February 20, Ashton Moss Colliery, brake-block fired on an endless rope jig. Fires: May 11, Agecroft Colliery, spontaneous combustion.

Prosecutions.—There were no prosecutions by the inspector. The prosecutions of workmen by owners numbered 62, 18 owners taking proceedings for breach of rules.

Board of Examinations.—The examination was held on December 12, 13, 21, 22, at the Municipal Technical School, Manchester, by permission of the Committee of the City Council. Eighty-two candidates presented themselves for examination in the first class, of whom 12 qualified—14·6 per cent. One hundred and twenty-three candidates presented themselves for examination in the second class, of whom 39 qualified—31·7 per cent.

Explosives.—All the owners in the district filled in forms giving the quantity of explosives used during 1911, and the estimated number of shots. From these returns it appears that the principal explosives used were as under:—Abbcite, 14,461 lb.; ammonite, 81,924 lb.; arkite, 31,165 lb.; bellite, 16,417 lb.; bobbinite, 17,416 lb.; carbonite, 18,191 lb.; excellite, 18,457 lb.; Faversham, 30,423 lb.; monobel, 39,062 lb.; permonite, 14,678 lb.; rippite, 20,004 lb.; roburite, 71,417 lb.; samsonite, 38,660 lb.; stowite, 13,879 lb.

The following non-permitted explosives were also used:—Lancashire—gunpowder, 65,492 lb.; gelignite, 17,096 lb.—total, 82,588 lb. Ireland—gunpowder, 47,906 lb.; gelignite, 350 lb.—total, 48,256 lb. The total quantity of permitted explosives used during the year was 444,859 lb.—*i.e.*, 234 less than in the previous year. The estimated total number of shots, 1,024,222, is 63,964 more in number than in the previous year. Of the permitted explosive shots, 1,014,926 were electrically fired; this is 99 09 per cent. of the total number. The number of shots with permitted explosives is 85·92 per cent. of the total number. The total quantity of non-permitted explosives used during the year, 82,588 lb., is 7,074 lb. more than in the previous year. The number of shots, 167,726, is 5,428 more than in the previous year. The total number of shots, permitted and non-permitted, was 1,191,950, the percentage of non-permitted shots being 14·08 of the whole.

Referring to the number of missed shots, Mr. Gerrard finds that the average percentage was 0·1419. At two collieries where gunpowder is largely used there were 76,057 shots, of which 484 were missed fires = 0·636 per cent.

Safety Lamps.—The following summarises the safety lamp information—Number in use, 46,221. Method of locking—lead rivet, 40,562; magnetic, 5,167; screw, 250; other, 242. Kind of illuminant—colza or colza and petroleum, 29,038; petroleum, 3,157; volatile spirit, 10,955; electricity, 103; other illuminant (24 acetylene and 2,944 rape oil), 2,968. Lighted by electricity, 9,133; by tape igniters, 3,141 (Wolf lamps); by ordinary means, 33,947.

Coal Mines Regulation Act, 1908.—Nothing further has arisen in connection with this Act—the observations made in the previous report are still applicable.

Rescue Stations.—The Station at Howe Bridge, Atherton, built by the Lancashire and Cheshire coalowners for the training of men in the use of breathing apparatus, has now trained 602 men, approximately 120 teams. Of these there are 160 third-year men, having had three years' experience; 150 second-year men. Thus there are 310 with two years' experience. Serjeant-major Hill, the well qualified instructor, has now an assistant. The apparatus has been greatly improved by the addition of a condenser and a cooler, and by the self-regulation of the reducing valve the men can use the apparatus longer, with greater comfort and less liability to mishap. It is comforting to know that the bird, now required to accompany explorers, and upon which their safety so much depends, has not been overlooked; no longer now need the life of the bird be sacrificed, a light rectangular box, having mica sides to enable the bird to be seen and to permit of oxygen from a small cylinder to be administered to the bird for its revival, may prolong its life after warning has been given. A number of coalowners have provided at their mines sub-stations, where their men practise or have preliminary training. It is probable that suitable sub-stations will be established at Accrington, Ashton, Bolton and Coppull. It will be well if these are established under the direction of the central authority, and are furnished and supervised by the same authority. Of the larger collieries there are now only Pemberton House (107 persons underground), Oliviger (228), Hopwood Colliery (82) and Unsworth and Cowburn's (65), that have not teams trained or in training.

VI.—Liverpool and North Wales District.

Mr. Mottram, in his report on the Liverpool and North Wales district, states that the total value at the mines and quarries of the various minerals produced during the year 1911 would be approximately £8,243,682; coal representing £6,834,312, slate £916,219, limestone £102,118, lead £48,253, to which fall to be added the value of the various less important minerals. This total is £172,682 more than in the year 1910. Happily there has been no fatality through firedamp during the year, and under this head there was only one non-fatal accident.

Owing to the additional appointment to the junior staff, all the coalmines were visited, some several times, during the year.

Persons Employed.—The number of persons under different ages employed in and about the mines under the Coal Mines Regulation Act was 70,229, being an increase of 517 as compared with 1910. This increase was underground 494, surface 23, and was due to increased activity in the counties of Lancaster (West) and Denbigh. There was a slight decrease in Cheshire and Flint. Of the 70,229 persons employed, the following table shows that 53,748 were occupied in West Lancashire, 1,057 in Cheshire, 11,950 in Denbigh, and 3,474 in Flintshire. The females employed on the pit banks and surface numbered 1,788 as compared with 1,719 last year. There were 3,869 boys under the age of 16 employed, and of these 775 were under 14:—

County.	Mines at work.	Persons employed. Below ground. Males.	Persons employed. Above ground. Males.	Persons employed. Above ground. Females.	Below and above ground.
Cheshire	12	853	204	—	1,057
Denbighshire	34	9,875	2,073	2	11,950
Flintshire	17	2,813	661	—	3,474
Lancashire, West	156	42,836	9,126	1,786	53,748
Total in 1911	219	56,377	12,064	1,788	70,229
Total in 1910	216	55,882	12,110	1,719	69,712

Output of Mineral.—The next table shows quantity of mineral raised:—

County.	Coal. Tons	Fire-clay. Tons.	Iron-stone. Tons.	Other minerals. Tons	Total. Tons.
Cheshire	305,332	20,143	—	—	325,475
Denbighshire	2,679,686	36,008	341	1,782	2,717,817
Flintshire	763,392	7,842	—	90	771,324
Lancashire, W.	12,653,939	30,179	—	—	12,684,118
Total in 1911	16,402,349	94,172	341	1,872	16,498,734
Total in 1910	16,175,294	87,147	234	2,338	16,265,208

Taken alone West Lancashire gives an increase of 240,532 tons, and Denbigh 83,863. On the other hand Cheshire shows a decrease of 42,860 tons, and Flintshire 48,009 tons.

The average quantity of mineral raised during the year per person employed below ground was 292 tons (the same as last year), while the average quantity produced per person employed above and below ground was 235 tons as compared with 233 in 1910. The mineral raised per person employed in each county was as follows (below ground):—Cheshire, 381 tons; Denbighshire, 275 tons; Flintshire, 274 tons; and Lancashire (West), 296 tons.

The average selling price at the mines in West Lancashire, Cheshire, and North Wales is estimated to have been approximately 8s. 4d. per ton, or 2d. more than in 1910.

The next table gives the number of coal-cutting machines in use during the year:—

Description.	Number driven by Electricity.	Number driven by Compressed air.	Statute tons of coal cut by Electricity.	Statute tons of coal cut by Compressed air.
Disc	6	62	21,017	773,003
Bar	10	11	108,138	186,904
Chain	1	1	13,549	3 363
Percussive	—	47	—	76,854
Rotary heading	—	—	—	—
Totals	17	121	142,704	1,040,124

There were seven conveyors in use, two worked by compressed air and four by manual labour. Nine more coal-cutting machines were in use than in 1910. There has been a decrease of one in the number of electric driven machines and an increase of 10 in the number driven by compressed air. The output from all the machines was 1,182,828 tons as compared with 983,224 in 1910.

Accidents.—During the year notice was received of 462 accidents. Of these 75 were fatal accidents, involving a loss of 78 lives, as compared with 80 accidents and 82 deaths during the preceding year. Notice was received of 387 non-fatal accidents by which 428 persons were injured, as compared with 346 accidents and injury to 358 in 1910.

The following table gives a summary of the fatal and serious non-fatal accidents. In 1910 one in every 4·75 workmen employed underground was injured, and in 1911 the figures were one in 4·58

Place and cause.	Fatal accidents. Separate accidents.	Fatal accidents. Deaths.	Non-fatal accidents reported to inspector.* Separate accidents.	Non-fatal accidents reported to inspector.* Persons injured.†	All non-fatal accidents disabling for more than 7 days. Separate accidents.	All non-fatal accidents disabling for more than 7 days. Persons injured.
Explosions of firedamp or coaldust	—	—	1	1	—	—
Falls in mine	41	42	155	160	4,733	4,742
Shaft accidents	3	3	19	54	46	82
Miscellaneous underground	26	26	159	160	7,470	7,484
Total underground	70	71	334	375	12,249	12 308
On surface	5	7	53	53	955	957
Gross total in 1911	75	78	387	428	13,204	13,265
Total in 1910	80	82	340	358	12,704	12,727

* and † *See* footnotes on p. iii.

The death rates per 1,000 persons employed were—Below ground, 1·26 (in preceding year, 1·36); above ground, 0·64 (0·43); above and below ground, 1·11 (1·18). Illustrated in another way, one person out of 794 employed below ground, one out of every 1,979 employed on the surface, and one out of every 900 employed below ground and above ground lost his life by accident. It will be noticed from the above figures there is a slight improvement in the death-rate as compared with the preceding year. The county death-rates from all accidents per 1,000 persons employed above and below ground were—Cheshire, 1·89 (0·84); Denbighshire, 1·41 (1·45); Flintshire, 0·86 (1·71); West Lancashire, 1·04 (1·05). There has been no fatal accident due to the explosion of firedamp or coaldust and only one non-fatal accident due to this cause. This occurred in the Lower Florida Mine of No. I pit, Parr Colliery, belonging to Messrs. Richard Evans and Co. Limited, Haydock, near St. Helens. A fireman, named John Evans, was inspecting an upbrow, when the safety lamp he was using ignited firedamp and injured him. The lamp, of Mueseler type, was fitted with a chimney and a single copper gauze, and bonneted. After the explosion, the gauze was found loose inside the bonnet, and an examination showed that the flange of the gauze, made by simply turning outward the bottom of the gauze, had given way through being worn and frayed in places. It is evident that the lamp was faulty in construction, the diameter of the gauze was 1¼ in. and only 1⅝ in. across the flange. Since the accident the diameter of the flange has been increased and steel gauzes substituted for copper ones. The question of damaged lamps is, at some of the mines, engaging more attention than hitherto, in so far that a register is now being kept of all lamps returned to the lamp house in a damaged state. If the damage is found due to the neglect of the person to whom the lamp is issued, that person is sometimes prosecuted, but, considerably more often, is instead subjected to a fine.

In last year's report some condemnatory reference was made to large accumulations of dust in main haulage roads of some collieries. Since then, in some instances, large quantities of dust have been shovelled up and removed to the surface. There is, however, in other pits still much need of more vigorous and systematic treatment, particularly in view of the provisions for the prevention of coaldust which will shortly come into operation under the new Coal Mines Act. In some mines the fitful application of water applied by occasional tanks emptied in the middle of the haulage way, where the dust lies an inch or two deep, is next to useless, and no system of treatment such as that can be considered satisfactory unless followed by the removal of the dust itself. Steps are being taken at some mines to prevent, as far as practicable, coaldust from entering the downcast. In some cases the sides of the shaft are to be enclosed between the surface and the landing scaffold. In three instances at least the extraction and collection of dust made in the landing, tipping and screening of the coal at the surface is being done by the suction method. A series of tubes connected with the screens at one end collects the dust by means of an exhauster fitted with a water-spraying device. The dust-laden air is thus collected inside a specially designed chamber provided with an outlet for clean air, and another for the conduct of the water and dust to a settling tank. By this means a considerable quantity of the surface dust, which would otherwise descend the downcast, is secured and ultimately used as fuel. Mr. Mottram has noticed, however, where this system is in vogue, a considerable amount of dust still descends the downcast, blown from the tubs in their rapid ascent to the surface. This can be obviated to a considerable extent by spraying the tubs in transit or near the pit bottom; and where this is done the comparative freedom from dust at the bottom of the shaft is quite apparent. This method, as well as the spraying of the empty tubs at the screens or other convenient point on the surface, is worth the consideration of those now considering their plans for dealing with the dust question.

A portable spray tank for laying the dust in working places is in use at Pemberton Colliery, Wigan. The sketch (fig. 5), prepared by Mr. W. H. Murray, shows that the apparatus consists of a tank of 2 gallons capacity, fitted with a small rotary pump operated by a handle at the side, the discharge pipe being ¼ in. diameter with a spray nozzle at the end. The whole device is only 16½ in. by 8 in. by 5¼ in., and is carried by means of a canvas sling thrown over the shoulders of the operator. It is said to take three tankfuls to water each working-place—a length of 20 to 30 yards of floor, roof and sides. The pump empties the tank in 8 to 10 minutes, according to speed of rotation. The diameter of the nozzle is 1½ mm., the water is thrown out in a very fine spray, and it takes 30 minutes to water each working-place.

The deaths from falls show a decrease of four as compared with the previous year, and there was also a decrease of 3 in the number of persons injured and reported to the inspector. Of the 42 persons killed by falls during the year, 30 were working at the coal face, seven were employed repairing or enlarging roads, and five were otherwise working or passing on roads, the whole representing rather over 59 per cent. of the total fatalities underground. Taking into account all underground fatalities, the percentage of deaths due to falls was considerably higher in North Wales than in Cheshire and West Lancashire, and taking the workers' occupation as a whole last year it was less safe in North Wales than in other parts of the district; the death rate per 1,000 persons employed above ground and below ground being 1·29, as compared with 1·06 in Cheshire and West Lancashire.

During last year, in several of the fatal accidents by fall of roof at the working face, "slips" were a contributory cause, and in ten cases props supporting the roof were displaced. Comparatively speaking, it is not often that fatalities occur where the roof is secured by bars as well as props, and a good few accidents would be prevented by a more generous use of bars at the working face, and where the roof is known to contain slips, their use should be made compulsory. Four fatalities occurred during timber drawing operations.

In two instances workers were killed in working places not secured according to the propping rules of the pit.

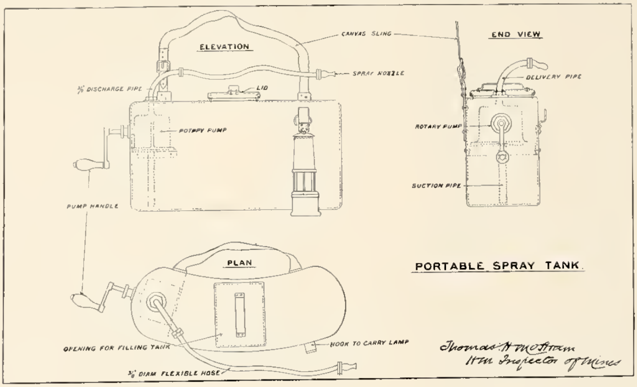

FIG. 5.

Three persons were killed by shaft accidents and 41 injured, as compared with eight deaths and injury to nine persons during the previous year. One death was due to an overwind at Golborne Colliery, West Lancashire, in a shaft 600 yards deep. On the morning of April 26, when 14 persons were being lowered, the ascending cage was overwound into and suspended by the detaching hook with which the headgears were provided. The winding engines of compound type with a steam pressure of about 135 lb. per square inch, were fitted with special brake and overwinder device actuated by governors. One part of this device, *i.e.*, the one set to prevent (1) an overwind in the event of the engineman starting the wrong way, or (2) in the case of the enginewinder giving an extra supply of steam at the very moment of landing, acted; but this did not prevent the descending cage being bumped at the bottom of the pit. The theory as to the cause of the overwind was, that the engineman retarded the governors just before the "cut off," with the result that they did not act, and at the critical moment, just as the top cage was reaching the surface landing, he momentarily lost control of the engines. There were six more accidents due to overwinding, three at Bold Colliery, by which 13 persons were injured, one at Bickershaw Colliery causing injury to six persons, another at King Pit, Lea Green Colliery, by which six persons were slightly injured, the sixth case being at a sinking pit at Pemberton Colliery, which resulted in injury to three persons. In one of the cases at Bold 10 persons were being lowered when the engineman overwound the ascending cage and bumped the descending one into the pit bottom. The violence of the detachment at the safety hook, with which the headgears were provided, broke a shackle and allowed the ascending cage to fall to the bottom of the shaft alongside the one occupied by the 10 persons referred to. Fortunately there was water in the sump or "dibhole," or the men by the bump they received would have been more seriously injured. The engines were fitted with a Vizor, but owing to the engineman giving the winding engine an extra puff of steam when nearing the surface landing, the ascending cage shot up into the headgear and struck the Vizor catch set to act in case of the cage being moved in the wrong direction; but this did not prevent the bumping of the descending cage at the pit bottom. In the two other cases at the same colliery the injury was also due to the bumping of the descending cage containing the men. At Bickershaw the cage was overwound when 18 men were being lowered. The ascending cage containing one man was caught and suspended by the safety hook. At King Pit, Lea Green, where there was a detaching hook in the headgear and a Vizor for controlling the speed of the engines, 24 persons were being wound when the cage containing them was drawn too far; but, fortunately, owing to the provision of the safety contrivances referred to, a very serious accident was averted.

Two winding ropes broke during the year, one at Low Hall No. 5 pit, the other at Newton pit. In the former case the rope was of best plough steel 4¼ in. circumference, and broke after being in use 13 months, while raising six full tubs of coal, the full weight of load, including rope, being 7 tons 15 cwt. The rope was found internally corroded. A steam jet had been used for injecting grease for lubrication, and as this device was thought to have injected steam as well as grease into the rope, and thus set up internal corrosion, this method of greasing has been discarded. At Newton Pit the rope was a lock-coil, 1 in. diameter, and also showed internal corrosion after being in use six and a-quarter years.

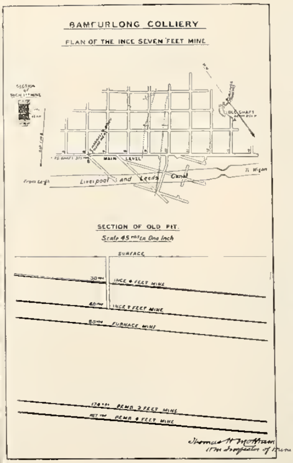

FIG. 6.

There were again no fatalities caused by explosives, though 10 persons were injured. In all these cases the injury was caused by pieces of coal or stone being projected by shots, and with a few exceptions the injuries were of a slight character. In one instance two persons got injured by a shot blowing through to another place without the men working there having been warned beforehand. This record may be considered as fairly good, seeing that nearly 3½ million shots were fired representing the use of no less than 28 different kinds of explosive. The miss-shots amount to 2,851, or 126 more than last year.

At 11.30 a.m. on December 23 an inrush of water occurred in the Ince Seven-feet seam of No. 1 pit, Bamfurlong Colliery Wigan. One man, David Magnall, a dataller, 64 years of age, lost his life, and others narrowly escaped. The seam in question is about 3 ft. 4 in. thick and has an inclination of 1 in 8. A miner, named Richard Birchall, working in a heading (No. 13 on plan, fig. 6), going to the rise, 600 yards from the winding shaft, holed through at A unexpectedly, on to a level of some workings belonging to an old pit 60 yards deep, worked prior to 1848 and filled up about 1892. The surface surrounding the top of the old shaft was covered with casual water, and shortly after the underground heading went through into the old workings, the *débris* in the old shaft and the water pent up in the old workings and shaft, along with a large volume of casual water on the surface forced its way down with terrible suddenness into the present workings of Bamfurlong Colliery. At the coroner's enquiry, Mr. Harold Stephenson, the certificated manager of the colliery, and Mr. George Horace Taylor, surveyor, stated that the Seven-feet mine has been leased to their firm and they believed the seam to be intact, as previous to the accident they had no information to the contrary. They knew of the existence of the old shaft but thought it had been sunk only only to the Ince Four-feet mine, 30 yards above the Ince Seven-feet, and produced an old Ordnance and geological map to support them in their belief. No plans of the workings existed, but the plan produced, however, described the old shaft as being 60 yards deep to the Ince Four-feet mine, and bore an inscription to the following effect:—Surveyed in 1845 by Captains Tucker, McKerlie and Hamley and Lieut. Burnaby, R.E., contoured in 1848-9 by Lieut. Barlow, R.E., and engraved in 1848. Published 1849. Geological Survey by Edward Hull, F,G.S., and A. C. Ramsey, F.R.S., local director, Geological Information Office. Published 1861. Sir R. J. Murchison, D.C.L., F.R.S., director-general. When working the Ince Four-feet mine, the management took precautions against old workings by endeavouring to procure plans, and failing in this they left a barrier of 145 yards against the old shaft. But as regards the Ince Seven-feet mine, they took no such precautions for the reason (1) that they expected to find virgin coal until the boundary was reached, and (2) they had previously worked deeper mines underneath the site of the old shaft without encountering old workings. It seems that the management was misled by the information given on the Ordnance map in respect that the name of the seam to which the shaft was sunk, was incorrectly stated inasmuch as the seam at 60 yards depth should have been described as the Ince Seven-feet instead of Ince Four-feet. The question arose, however, as to whether any surface or underground levels had been taken by the management to prove the accuracy or otherwise of the information given on the Ordnance map referred to, and it was frankly admitted that no such levels had been taken or thought of. The omission to take levels was no violation of the present Act, but by the new Mines Act underground levels will require to be taken and shown upon the plans at every colliery; and had such levels been taken at Bamfurlong, the inaccuracy of the Ordnance geological map with regard to the old shaft would have been discovered and the accident avoided.

The number of persons killed by haulage accidents was 20 as compared with 16, and the non-fatal accidents reported to the inspector number 105 as against 70 during 1910. Comparatively this is a bad record, and quite a number of such accidents as fall to be recorded this year, might have been avoided by stricter regulations with regard to persons travelling on steep haulage roads, and also by a more general use of appliances to prevent tubs running back when being hauled along inclined roadways. Two persons were injured while illegally riding, and three persons were injured by going in front instead of behind tubs while moving them by hand on inclined roads.

Another year has passed without any fatal accident due to electricity. There were, however, four non-fatal accidents, one to an electrician while trying to locate a fault in a fan motor with the pressure on, with the result that the armature shorted and his eyes were thereby slightly injured. In another case a shaft sinker, preparatory to testing, made contact with bare wires at the end of a shot-firing cable. The third accident was due to the bursting of a trailing cable connected to a coal-cutting machine. In the remaining case a motor attendant at St. Helens Colliery received a shock while lowering a set of tubs down an incline, at the time when the motor of the haulage engine was at rest. At the St. Helens Colliery current in the pit is got from a power house on the surface. The system of distribution is three-phase, 2,200 volts pressure, with insulated neutral. Current is taken down the shaft by a double-armoured three-core cable to a distributing station near the pit bottom. From that point it is taken by single-armoured cable along the main roads to substations, and after being transformed down to 440 is conducted by unarmoured cables to the various motors in the pit. Current at 440 volts was also taken through a small double-pole switch to eight lights arranged four in series. This lighting switch fused and caused a short between two phases, the overload coils in the power station tripped and so cut off the entire current; but, strangely, the overload cut-outs in the sub-station did not act. There must have been a heavy leak to earth through the cover when the lighting switch fused, and the shock accident to the attendant was apparently caused through the earth return to the surface being unable to take the discharge sufficiently rapidly. Mr. Nelson, H.M. electrical inspector of mines, subsequently inspected the plant, and his opinion was that one of the earth connections may have been disconnected at the time of the accident, but made good before the responsible electrician made his investigation.

The fatal accidents on the surface numbered five, involving seven deaths, or an increase of two as compared with the previous year.

Sixteen dangerous occurrences were reported under section 5 of the Notice of Accidents Act, 1906. None of these caused serious personal injury, and were as follow:—Underground fires, four; breakage of winding ropes, chains or other gear by which men are raised or lowered, eight; overwinding while men were being raised or lowered, two; inrush of water from old workings, two. Of the underground fires, two were due to spontaneous combustion; one was through the ignition of a wooden brake block by friction, and the remaining one by a haulage rope getting out of a pulley and, through cutting into a beam containing a concealed dog or spike, firing the beam. The failures of two winding ropes are included amongst the breakages. The remainder are breakages of engines, guides, &c. Neither case of inrush of water was of any magnitude, and in both instances the water broke through from old waste, from 8 to 10 yards above present workings.

Prosecutions.—The prosecutions during the year numbered 75 as compared with 19 the previous year, and seven of them were against under-officials and 68 against workmen. The fines imposed amounted to £39 14s. and the costs to £35 13s.

Board of Examinations.—The annual examination was held in June, when 23 candidates presented themselves for examination for first-class certificates and 96 for second-class certificates. Four of the former and 57 of the second class were successful.

Explosives.—The quantity of explosives used was 1,168,147 lb., including: — Ammonite, 335,432 lb.; roburite, 185,066 lb.; Faversham, 94,247 lb.; bellite, 84,018 lb.; westfalite, 78,271 lb.; excellite, 64,473 lb.; negro powder, 58,863 lb.; monobel, 33,819 lb.; carbonite, 32,653 lb.; bobbinite, 31,930 lb.; arkite, 22,265 lb.; gunpowder, 19,642 lb.; kolax, 17,198 lb.; gelignite, 16,741 lb.; rippite, 16,721 lb.; permonite, 15,204 lb.; samsonite, 14,343 lb.; rexite, 14,135 lb.; minite, 14,126 lb. Of the estimated number of shots fired, 3,405,589, 3,354,008 were fired by electricity and 51,581 by fuse. The number of miss-shots was 2,851—with electricity 2,738 and by fuse 113.

Safety Lamps.—The following are statistics relating to the number and description of safety lamps in use in the district:—Number in use, 65,472. Method of locking—lead rivet, 54,622; magnetic, 10,579; screw, 64; other, 207. Kind of illuminant—colza or colza and petroleum, 47,616; petroleum, 8,909; volatile spirit, 3,517; electricity, 188; other illuminant, 5,242. The method of lighting was—by electricity, 21,074; internal igniter, 542; otherwise, 43,856. The total number of safety lamps in use has increased since 1910 from 62,417 to 65,472, of which 21,074 are electrically ignited. The primitive screw method of lock is gradually disappearing, there being only 64 lamps so locked as compared with 81 last year. Electric lamps have increased in number from 160 to 188. Thirteen of this increase is due to the introduction of the Oldham lamp for use with rescue apparatus. The Sussman lamps are used by miners. There are also a considerable number of electric incandescent lamps in use for lighting pit bottoms and shaft sidings underground.

Eight Hours Act.—On the whole this Act continues to be loyally complied with both by the mineowners and workmen. There have been one or two complaints about (1) men descending an hour earlier on Saturday morning in order to finish work sooner in the afternoon, and (2) workers not returning to the surface within the specified time. These matters were, however, speedily rectified. It has also been found in certain instances when men, in cases of emergency, were below ground for more than the time fixed by the Act, the cause of the delay was omitted from the register kept at the colliery. The attention of the officials was in such cases directed to the requirements of the Act in this respect; and if the necessary explanation of the cause of delay in coming out of the mine were always promptly given in the register, there would be less cause for suspicion that men were violating the Act.

Rescue Stations.—The Howe Bridge station is still being maintained by the Lancashire and Cheshire coalowners, and is being maintained in a high state of efficiency. Mr. Charles Pilkington is still, as chairman, at the head of affairs, and it is satisfactory to know that considerably over 500 trained men were at the end of the year available for rescue work. During the year several calls for assistance at underground fires were attended to, and good work was done thereat by the use of rescue apparatus. The Garswood Hall Colliery station is still being maintained by the owners of the colliery, and teams of their own men continue their training not only in the gallery charged with noxious fumes, but underground as well. The North Wales coalowners, after visiting rescue stations in operation in Lancashire, South Wales and Nottingham, have definitely decided to build and manage a rescue station in or near Wrexham in the county of Denbigh. A committee has since viewed several sites, but has not decided which to select.

VII.—South Wales District.

Dr. W. N. Atkinson in his report on the South Wales division states that during the year 1,482 official visits to mines were made by the inspectors, of which 1,151 included underground inspections, and 284 quarries were inspected.

Persons Employed.—The first table shows the number of mines worked, and the number of persons employed

County.	Mines at work.	Persons employed. Below ground. Males.	Above ground. Males.	Above ground. Females.	Below and above ground.
Brecon	27	2 945	612	6	3,563
Carmarthen	73	8 088	2,18	—	10,269
Glamorgan	402	128,368	21,626	91	150,085
Monmouth	141	48,635	7,862	55	56,552
Pembroke	6	313	102	3	418
Total in 1911	649	188,349	32,383	155	220,887
Total in 1910	639	181 261	31,765	226	213,252

The figures show a total increase over the preceding year of 7,635 persons employed, which is equivalent to 3½ per cent. There is a continued decrease in the number of women and girls employed on the surface at mines.

Output of Mineral.—The next table shows the output of mineral from mines:—

County.	Coal.	Fireclay.	Ironstone.	Other minerals.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.
Brecon	776 486	810	—	—	777,296
Carmarthen	2,115 311	9,581	—	—	2 124,892
Glamorgan	33 463,974	21,517	6 522	6,500	33,498,513
Monmouth	13,798,747	99 836	10,983	300	13,909 866
Pembroke	46,209	—	—	—	46 209
Total in 1911	50,200,727	131 744	17,505	6,800	50,356,776
Total in 1910	48,699,982	185,442	18,390	4,066	48 907,880

The figures show a total increase of minerals raised, over the preceding year, of 1,448,896 tons, being an increase of 2·96 per cent. Of coal classed as anthracite the output was 3,992,763 tons, being a decrease of 39,549 tons from the preceding year. The output per person employed below ground was 267·3 tons, and above and below ground 227·9 tons.

COAL-CUTTING MACHINES.

Description.	Number driven by Electricity.	Number driven by Compressed air	Statute tons of coal cut by Electricity.	Statute tons of coal cut by Compressed air.
Disc	11	4	69,663*	49,210
Bar	28	41	250 099	313,642
Chain	4	2	2,913	8,558
Percussive	—	19	—	21,882†
Rotary heading	—	4	—	7,505
	43	70	322 675*	400 806†

* Includes 18 tons of fireclay.
† Includes 594 tons of fireclay.

The above machines were used in 46 mines. The figures show an increase over the preceding year of six machines and 164,200 tons of minerals. There were in use 43 conveyors at the coal face.

Accidents.—The total number of accidents reported was 1,390, of which 302 accidents caused the deaths of 313 persons; three of these fatal accidents (with three deaths) occurred in 1910, the deaths resulting after the statistics for that year were closed. The total number of persons injured by reported accidents was 1,170. There was no accident causing large loss of life. One fatal accident resulted in four deaths, one in three deaths, and six fatal accidents resulted each in two deaths, the remainder being all single fatalities.

The death rates were as follow:—Per 1,000 persons employed above ground, 0·861; per 1,000 persons employed below ground, 1·513; per 1,000 persons employed above and below ground, 1·417.

The following is a summary of fatal and non-fatal accidents, classified according to place and cause:—

Place and cause.	Fatal accidents. Separate accidents.	Fatal accidents. Deaths.	Non-fatal accidents reported to inspector.* Separate accidents.	Non-fatal accidents reported to inspector.* Persons injured.†	All non-fatal accidents disabling for more than 7 days. Separate accidents.	All non-fatal accidents disabling for more than 7 days. Persons injured.
Explosions of firedamp or coaldust	4	5	21	34	20	28
Falls in mine	160	161	474	486	13 331	13 391
Shaft accidents	20	24	19	48	142	163
Miscellaneous underground	91	95	449	477	15,357	15,397
Total undergr'nd	275	285	963	1,045	28,850	28,979
On surface	27	28	125	125	2 423	2,427
Gross total in 1911	302	313	1,088	1,170	31,273	31,406
Total in 1910	316	323	1,084	1,150	30,970	31,052

* and † *See* footnotes on page iii.

Twenty-five explosions or ignitions of firedamp, resulting in five deaths and injuries to 34 persons, were reported during the year.

At Ynyscedwyn Colliery, Brecon, on April 12, at 10.15 a.m., the motorman of an electric haulage engine was so injured by an explosion of firedamp that he died the following day. The firedamp appeared to have been ignited by sparking at the liquid starter of the motor, which was being used when the explosion occurred. The haulage engine and starter were fixed 25 yards from a main heading, in an old road, through which a current of about 1,500 cubic feet of intake air was deflected by a single door, through which rope haulage passed. After passing the haulage engine the air current had to find its way through old workings to the rise which could not be travelled. It was stated that no firedamp had previously been detected near the motor house, and it was suggested that the door above mentioned had been left open, and that the current passing the motor had reversed in consequence. This explanation appeared doubtful, however, as damage to the door by the explosion (which was the only indication of force) showed that it had been closed; and when the place was examined on the following day, with the door closed, a large firedamp cap appeared on the lamp flame 40 yards beyond the motor. It is not prudent to fix an electric motor under such conditions in a mine producing firedamp, and as the place was inside the lamp station a liquid starter should not have been used. The motor was removed immediately after the accident.

At the Seven Sisters Colliery, Glamorgan, on June 8, at 2 p.m., a collier was so injured by an explosion of firedamp caused by shotfiring that he died the following day. The explosion was caused by a blown-out shot of bobbinite fired by an electric fuse. It was the second of two shots fired in a skip, or slice of coal being taken off a pillar alongside a roadway, and it was fired about five minutes after the first shot. The blown-out shot was in a hole about 3 ft. long, and probably contained about 1 lb. of bobbinite. It was said to be stemmed with clay to the mouth. There was a hole in the roof of the road adjacent to the skip which might have contained gas, although none had been reported there; but there was known to be gas in another hole on the same road, about 24 yards away. The ventilation depended on doors on the haulage road, and the manager thought one of these must have been left open so as to divert the ventilation from the place of the explosion; but from whatever cause, it was evident that gas was present at or near the shot when it was fired. The shot-firer was dismissed. Explosives are too frequently used under risky conditions in the anthracite district, where Seven Sisters Colliery is situated. It is desirable also that the standard of safety of the permitted explosives should be raised.

The most serious explosion of the year occurred at Cwmaman Colliery, about 12·30 p.m. on September 16, 1911, causing the deaths of two men and slight injuries to one man and a boy. The serious aspect of this explosion was due more to the character of the mine in which it occurred than to the actual loss of life it caused. Cwmaman is a steam coal colliery, naturally dry and dusty, in which an explosion might have extremely disastrous results; but, fortunately, this explosion occurred in a part of the mine where the dust was chiefly composed of stone and was not sufficiently inflammable to be dangerous, and the explosion was practically entirely due to firedamp. The effects of the explosion, which had not been extremely violent, were manifested on three different levels or horizons, on roads extending from a staple pit connecting the different levels. As nearly as could be estimated from the indications observed, the flame of the explosion appeared to have traversed roads or passages of the aggregate length of about 676 yards.

The only probable means of ignition of the explosion was an open safety lamp at the relighting station, near the staple on the middle level. Bryant, the lamp inspector, was seen to take two extinguished and one lighted lamp to the station a few minutes before the explosion, and after the explosion two opened lamps were found there. There appears no doubt that one of these opened lamps caused the explosion. The only apparent or probable source to which such a large quantity of firedamp, as had evidently been present, could be attributed was a large fall of roof on the road near the bottom of the staple. The fall presented no features from which it could be determined whether it occurred before or was caused by the explosion; but if the latter, the source of the gas would be a complete mystery. Sudden issues of firedamp from falls on old roads such as this was are by no means unknown in the steam coal collieries of South Wales.

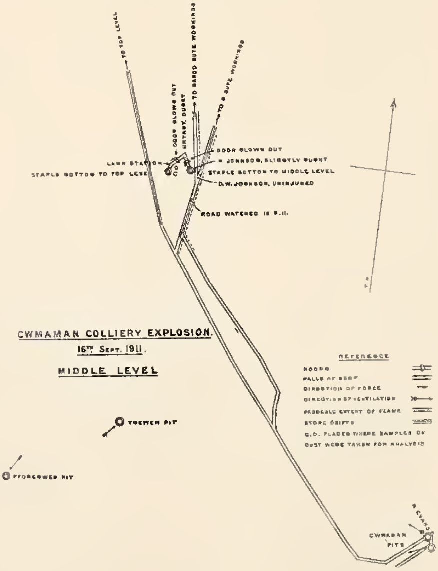

FIG. 7.

The extension of the explosion was no doubt prevented by the shaly and uninflammable nature of the dust on the roads it traversed, none of which were mechanical haulage roads. On the bottom and middle levels there had been no haulage for many years, and the shaly dust was from the rubbish due to repairs. On the top level there had been no haulage for 16 years except during the driving of a connection to the new Trewern shaft, and this was horse haulage. The nearest point to which the flame approached a main haulage road was on the middle level. The haulage road at this place was not very dusty, and had been watered the day before the explosion; but it seems clear the flame did not actually extend on this road. On the top level to the north-west of the staple there was a well-watered wet zone of 100 yards quite free from dust, but the flame of the explosion did not reach the wet zone.

The method of relighting safety lamps at lamp stations underground by exposed flame was until recent years almost universal; alternative and seldom adopted methods were to send the lamps to the surface to be relighted, or to take lighted spare lamps into the mine. Since the invention of electrical appliances for relighting lamps without opening them, that system has been largely adopted; and with the most improved forms of electric relighters, in which external sparking is prevented, the risk from an exposed flame or spark during relighting is removed. Risks in other directions have been experienced with electric relighters; but with proper care these may be so guarded against as to make the balance of safety in favour of electric relighting.

A number of samples of dust were analysed by Messrs. Treharne and Duncan, of Cardiff. Before being sent for analysis the samples were riddled through safety-lamp gauze in order to remove coarse particles and pieces of stone. The letters A, B, &c., refer to the places where the samples were taken, as shown by corresponding letters on the plans.

	A.	B	C.	D	E.
Fixed carbon	16·90	33 67	40 00	42·36	41 31
Volatile matter	8·95	8 53	10 93	12 76	15·30
Ash	72 20	56·00	47 17	43 24	41 26
Moisture	1·95	1 80	1 90	1·64	2·13
	100 00	100 00	100 00	100 00	100 00

	F.	G.	H	I.	J.
Fixed carbon	33 56	48·68	45 49	40·69	37 18
Volatile matter	11·51	15 00	11·13	14 24	11·83
Ash	52 78	34 78	41 18	42 25	48 82
Moisture	2 15	1·54	2 20	2·82	2 17
	100 00	100 00	100 00	100 00	100·00

Physical Examination of Samples.—1, not passing through 60 meshes to the inch; 2, passing through 60 mesh, but remaining on 80 mesh; 3, passing through 80 mesh, but remaining on 106 mesh; 4, passing through 106 meshes to the inch.

	A	B.	C.	D.	E.
1.	18 00	16·60	0 20	23 50	18 30
2.	16 50	12 80	1 60	13·40	15 20
3.	11 00	8 00	7·40	10·80	12 50
4.	54·50	62·60	90 80	52 30	54·00
	100 00	100 00	100 00	100 00	100·00

	F.	G.	H.	I.	J
1.	17 00	Insufficient	19 60	17 80	21·00
2	12 10	to make	15·80	16·20	17·00
3.	11 10	necessary	12 00	13 80	13 20
4	59 60	separation	52 60	52·20	48·80
	100 00		100 00	100 00	100 00

The amounts passing through the 106 meshes to the inch were found by difference. Determination of the ash contents of the material passing through the 106 mesh:—A, 71·80 per cent.; B, 53·47; C, 47·62; D, 42·90; E, 41·56; F, 53·47; G, 36·50; H, 42·48; I, 41·15; J, 49·15.

At Killan Colliery, Glamorgan, on October 23, at 2 p.m., a trammer was severely burnt by an explosion of firedamp, ignited by his naked light. He died four days after, from exhaustion following shock and septic pneumonia due to burns.

By falls of ground there were 160 fatal accidents and 161 deaths, and 474 reported non-fatal accidents, causing injuries to 486 persons. Thirteen of the persons killed and 40 of those injured were boys under 16 years of age. These accidents account for more than half of the loss of life by underground accidents, and notwithstanding the timbering rules, established about nine years ago, there is no diminution in their number.

Twenty fatal shaft accidents caused 24 deaths and 19 non-fatal accidents resulted in injuries to 48 persons. Two non-fatal accidents by overwinding caused injuries to 27 persons. They were both caused by descending cages containing men being lowered too rapidly to the bottom of the shafts, and both resulted from breakages of the winding engines. In one case one of the valves of the winding engine broke, and although a steam brake was applied it was not in time to stop the cage dashing on to the bottom with such force as to cause injuries to 17 of the 20 occupants of the cage. In the other case the accident was caused by the breakage of the ratchet rod on the reversing lever of the winding engine, causing the engineman to lose control of the engine, and although he applied the brakes, the cage was too near the bottom to be stopped in time. The ascending cage was arrested by the detaching hook. The most serious shaft accident of the year occurred in a sinking pit at Crown Colliery, near Llanelly, where four men were killed by the fall of a pump hung in the shaft. The pump was originally suspended by a wire rope for the purpose of being lowered and raised during sinking operations. One end of the rope was attached to the drum of a steam winch from whence the rope was led over a sheave fixed at the top of the shaft, and then down the shaft and round a sheave attached to the pump, and thence back to the top of the shaft where its capped end was secured to a beam of timber by means of a chain. The rope was clamped by means of two pairs of pitch pine clamps fixed on the rope close together and at right angles to each other. Each pair of clamps consisted of two blocks of pitch pine 12 in. long by 6 in. square in section, bolted together by two ⅝ in. bolts with nuts and washers, one on each side of the rope, the rope passing between the blocks in opposing semi-circular grooves of smaller diameter than itself. The two pairs of clamps thus formed a cube, as shown in sketch (fig. 8). The clamps rested against the walling of the shaft. The master sinker said he first wiped the rope where the clamps were to be fixed, and then wrapped sack cloth round it, after which the clamps were fixed by two sinkers, under his supervision. In addition to the clamps the rope was secured by means of a ⅝ in. chain passed round a balk of timber, each end of the chain being attached to the rope by two half hitches. After the clamps were fixed, the rope was taken off the winch and coiled up near the clamps, which took the weight of the pump without movement, and it remained thus suspended until the accident occurred. When the plant was examined after the accident it was found that the rope was broken close to the capping by which it was attached to the beam at the top of the shaft. It was also found that a considerable length of rope had slipped through the clamps and chain holding it at the other end, until arrested by a kink in the rope.

The true cause of the accident was, no doubt, that the rope slipped through the clamps with accelerating speed, almost attaining that of a falling body, until suddenly stopped by the kinking of the rope, which caused such a jerk as to break the rope at the cap on the other end. The rope was a flexible rope, three inches in circumference, of "best improved plough steel," with a calculated breaking strain of 37·63 tons, and had only been in use about three months, and appeared to have been in good condition before the accident. The weight of the pump and its attachments was about four tons, and as the rope was doubled, only half this weight was on each side. It appears to have been an error of judgment to rely on such clamps as were used in this case, especially considering that their failure endangered the lives of a number of men. The rope should not have been removed from the winch for any temporary purpose, and if clamps were used at all they should have been of metal. Pitch pine was not a suitable material on account of its softness and liability to be affected by atmospheric changes. The chain used in addition to the clamps was too large (⅝ in.) to effectively grip so small a rope.

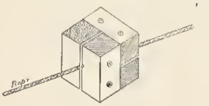

Fig. 8.

The makers of the rope, Messrs. William Cooke and Co., of Sheffield, made some tests of the holding power of similar clamps carefully adjusted on a similar rope with the following results:—

First Test. Rope wrapped with canvas. Rope began to draw out of clamps with 5·6 tons pressure.

Second Test. Rope bare. Rope began to draw out of clamps with 3·21 tons pressure.

Third Test. Rope bare. Rope began to draw out of clamps with 3·9 tons pressure.

Fourth Test. Rope wrapped with canvas. Rope began to draw out of clamps with 4·57 tons pressure.

By explosives there were five fatal accidents and five deaths, and 42 non-fatal accidents injuring 42 persons. Notwithstanding that attention was called in last year's report to the dangerous practice prevalent in some mines, of testing the insulation of the cable for electric shotfiring, by one man applying the ends of the cable to the shield of a lamp when near the shothole while another man at a considerable distance away applies the current from the battery, there were two fatal accidents from the same cause in 1911. A considerable number of the non-fatal accidents were due to the careless handling of explosives in the presence of naked lights.

At Bryncethin Colliery, on July 22, the manager, an overman, and a miner were killed by being suffocated by firedamp. Two other miners were rescued in an unconscious state, but they recovered. The accident occurred while an attempt was being made to remove a large accumulation of firedamp by boring into a part of the workings containing the gas. A holing was effected by means of a 2 in. borehole about 4½ ft. long, near the floor, by a miner named Daniel Evans, about 6.30 a.m., and gas came through so freely that he was obliged to run away, leaving the hole unplugged. By the manager's instructions, two other miners, named Ben Walker and David Lewis, returned first with an electric lamp in addition to their safety lamps. They left the safety lamps 30 or 40 yards back from the face on account of the gas, and then went to the face and plugged the borehole with one of their caps. They were joined shortly by David Evans and David Davies, overman, who left their safety lamps at the bottom of the top hole. They proceeded to enlarge the borehole by means of a pick, and before this was completed the manager arrived, and he ordered a second borehole to be put through nearer the roof. At the first blow struck with the jumper or drill, it went suddenly right through, making a hole so large that the gas came through in such quantity as to render unconscious the four men at the face. The colliery had been allowed to get into a bad state of repair, and had recently changed owners. There were several breaches of rules in connection with the accident on the part of the unfortunate manager who lost his life, and improper use was made of electric lamps in order to enable men to work in gas.

On March 24, at Dyllas Isha Colliery (Glam.), two lives were lost by an irruption of water from old workings. The colliery was a small one, working the No. 2 Rhondda seam by an adit drift, to the dip of old workings from another opening. The new workings had tapped the old workings by means of a borehole exactly at the spot where they expected to hole, according to the plan of the old workings, and it was expected that this connection entirely drained the old workings, with the exception of the bottom of one dip, which was below the line of free drainage. This expectation was verified to a great extent by a visit to the old workings, which were still accessible. The water was seen in the bottom of the old dip, and the lowest level off the dip was travelled for about 100 yards to where the road was blocked by a fall through which some water percolated, about 100 yards from the face of the level. The holing, through which the rush of water came which caused the accident, was into this old level at a point in-bye of the fall, which had evidently dammed back sufficient water to cause the accident. Although the plan of the old workings was not altogether accurate, this was not the cause of the accident, as it was clear that the working into which the water came would hole into the old level. The mistake was in taking it for granted that there could be no accumulation of water beyond the fall.

There were 73 fatal underground haulage accidents, with 74 deaths; 303 reported non-fatal accidents and 317 persons injured. The figures show a reduction from the preceding year of 16 deaths, but an increase of 30 persons injured. Of the persons killed, 16 were riders on mechanical haulage roads. Four persons were killed and two injured while illegally riding, and two persons were killed and 10 injured by going in front instead of behind tubs while moving them by hand on inclined roads.

By electricity there were two non-fatal accidents, injuring two persons by electricity underground. At Glengarw Colliery (Glam.) on March 15, a haulier whilst harnessing a horse on a double parting received an electric shock by his head coming in contact with an unarmoured cable, carrying 500 volts d.c., the insulation of which was defective. The place was wet, and the water had seriously deteriorated the insulation of the cable. On receiving the shock the haulier fell and his head struck a tram, causing concussion of the brain. He was unconscious for 45 minutes. At Pantyffynon Colliery on October 29, a motorman at a haulage engine received an electric shock causing burns to his hand and arm by treading on a wire, the insulation of which was abraded through having been trodden on, while his hand was on a resistance grid. The wire was one of a number between the controller and the resistance grid, which were not properly protected—current 500 volts three-phase.

There were by machinery underground 8 non-fatal accidents, and by sundries 11 fatal accidents, with 11 deaths, whilst there were 94 non-fatal accidents, with 94 persons injured.

On the surface at mines, including railways, tramways, and sidings, there were 27 fatal accidents and 28 deaths; 125 non-fatal accidents, and 125 persons injured.

A fatal accident, causing two deaths, occurred on the overhead transmission lines of the Powell-Duffryn Steam Coal Company, from the power station to Lower Duffryn Colliery, carrying three-phase current at 3,000 volts Additional poles were being erected between the original poles, in order to carry larger conductors, and the night before the accident an intermediate pole had been fixed adjacent to a pole where the line took a turn at right angles, and by this means an undue strain appeared to have been put on the conductors, with the result that the cross-arm carrying the conductors on the pole at the bend was slightly canted, and one of the insulators was drawn from its support, and the conductor it carried came in contact with a stay-wire supporting the pole, and from thence, by way of cradle-wires under the conductors, there was metallic connection to the next post, where the accident occurred. At this post the leakage caused charring and smoke, which was observed by men engaged in excavating lower down the mountain side. The foreman sent one of the men to see what caused the smoke, and this man apparently came in contact with a live guy-wire supporting the post, and was electrocuted. Shortly after, another of the workmen, going for tools, had to pass the place, and he, too, received a fatal shock —no doubt, while trying to rescue the first man; and, owing to trees, and the contour of the ground, these occurrences were not visible to the other men. The initial cause of the accident was undue strain or weakness of the fittings at the pole at the bend of the line; the pole was a single wooden pole, and it was stated at the inquest that double poles would be used at corners in future. Other overhead transmission lines of the company were already fitted with Merz-Price leakage cut-out gear which would prevent such an accident, and the same has since been applied to this line.

Notices were sent of 55 dangerous occurrences from which no personal injury resulted, as follows:—Ignition of gas or coaldust, 6; underground fires, 9; breakage of rope, chain, or other gear by which men are raised or lowered, 36; inrush of water from old workings, 2. Of the above ignitions of gas or coaldust, three were ignitions of firedamp by permitted explosives, two by samsonite and one by bobbinite. Two were ignitions of firedamp in the holing out of an electrical disc coal-cutting machine, probably by frictional sparks from the cutters. One was an ignition of firedamp by a naked light. Of the underground fires, six were gob fires, one was caused by a ventilating furnace, one by a naked light, and one by electricity. Six cases of overwinding were reported as dangerous occurrences, but not (in terms of the Order) "while men were being lowered or raised," but as these occurrences caused damage to the winding gear, &c., they are included with the breakages.

Prosecutions.—Proceedings were taken against the owners and officials of two collieries. Proceedings were taken by owners against workmen in 296 cases.

Board for Examinations.—In consequence of the recent re-arrangement of the inspection districts, by which Monmouthshire is included in the South Wales division, the board for examinations was reconstituted. Three members of the old Cardiff and Swansea Districts Board resigned, and were replaced by three members of the Southern District Board, representing Monmouthshire. Mr. A. P. Jones, the secretary, also resigned, and Mr. Martin Price was appointed secretary to the new board. The annual examination was held at Cardiff on May 23, 24, 25 and 26, 1911. There were 134 candidates for managers' certificates, of whom 72 were successful, and 297 candidates for under-managers' certificates, of whom 125 were successful.

Eight Hours Act.—Beyond a few complaints, which were duly attended to, little was heard of the working of this Act during the year. Two workmen were proceeded against by the owners of a colliery for remaining underground longer than allowed by the Act; a small fine was imposed on one of them and the other had to pay costs.

Rescue Stations and Ambulance Work.—There are now four rescue stations in working order in South Wales and Monmouthshire, and a fifth, in the Rhondda Valley, is in course of establishment.

They are as follows, in order of establishment:—(1) Aberaman; secretary, H. H. Evans. (2) Crumlin; secretary, W. H. Routledge. (3) Rhymney Valley (New Tredegar); secretary, N. Phillips. (4) Swansea; secretary, D. Ivor Evans. Ambulance classes and competitions were held as usual in various parts of the coalfield.

Explosives.—The total quantity of explosives used amounted to 1,912,129 lb., of which 1,370,749 lb. were permitted explosives. The quantities of the principal explosives used were as follows:—Abbcite 23,419 lb., bobbinite 310,889 lb., carbonite 97,539 lb., Cornish powder 13,621 lb., Faversham powder 39,497 lb., fracturite 40,668 lb., gelignite 159,162 lb., gunpowder 329,882 lb., monobel powder 72,691 lb., negro powder 15,419 lb., rexite 19,484 lb., rippite 120,062 lb., roburite No. 3 44,010 lb., St. Helens powder 22,030 lb., samsonite 413,878 lb., saxonite 42,124 lb., swalite 100,017 lb. Of the estimated number of shots fired—3,428,093—there were fired by electricity, 2,358,738; by fuse, 794,183; and by squibs, 275,172.

The number of miss-fire shots returned was 3,720—with electricity 2,494, and with time fuse 1,226.

Safety Lamps.—The number of safety lamps in use was 177,517. The method of locking was, lead rivets 83,514, magnetic 81,690, screws 951, pneumatic 11,362, colza or colza and petroleum 164,601, petroleum 258, volatile spirit 11,670, electricity 6, other illuminant 4. The lamps lighted and relighted by electricity numbered 103,336, by opening, 73,571, and by internal igniters 610.

VIII.—Midland and Southern District.

The following is abstracted from Mr. Hugh Johnstone's report on the above district:—During the year 1,768 mines were visited, 1,190 of the inspections being underground. With the exception of some of the smaller and less important mines, practically every mine in the district has been inspected at least once during the year and an underground inspection made of the whole or part of it.) Many of the larger and more important mines were visited repeatedly.

Fifty-one complaints were received from workmen and others; most of them were anonymous, but all were attended to and investigated. The majority were well founded, and served a useful purpose in calling attention to defects and irregularities which we were able to have remedied. As in the preceding year, many of them were in connection with the working of the Coal Mines Regulation Act, 1908 (Eight Hours Act), but in most cases a little explanation cleared up the misunderstanding and sufficed to remedy matters.

Persons Employed.—The following table shows the number of persons employed:—

County.	Mines at work	Persons employed. Below ground. Males.	Above ground. Males.	Above ground. Females.	Below and above ground.
Cheshire, part of	2	7	1	—	8
Derbyshire, South	11	3,094	835	—	3,929
Devon	1	1	—	—	1
Gloucester	50	7,026	1,508	—	8,534
Kent	6	282	425	—	707
Leicestershire	30	8,297	2,015	1	10,313
Northamptonshire	5	129	26	—	155
Salop	52	2,978	691	36	3,705
Somerset	22	5,704	1,034	2	6,740
Staffordshire, North	74	23,353	6,008	11	29,372
Do. South	218	20,166	6,937	85	27,188
Warwickshire	27	12,918	4,026	1	16,945
Worcester	43	1,670	537	39	2,246
Total in 1911	541	85,625	24,043	175	109,843
Total in 1910	553	84,041	23,514	187	107,742

In the number of mines at work during the year, there has been an increase of two in Gloucestershire, two in Kent, and one in Salop, and a decrease of one in Leicestershire, one in North Staffordshire, 10 in South Staffordshire, and five in Worcestershire. The number of persons employed shows an increase of 1,584 underground, and 517 above ground, making a total increase of 2,101, or nearly 2 per cent. The increases have been chiefly in Warwickshire and in North Staffordshire.

Output of Mineral.—The quantity of mineral raised is given in the appended table:—

County.	Coal.	Fireclay	Ironstone.	Other minerals.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.
Cheshire, part of	848	—	—	—	848
Derbyshire, Southern portion	943,563	22,406	—	18,727	984,696
Devon	—	—	—	—	—
Gloucester	1,436,200	2,457	—	—	1,438,657
Kent	150	—	—	—	150
Leicestershire	2,860,497	59,097	—	—	2,919,594
Northamptonshire	—	—	147,539*	—	147,539
Salop	815,194	23,000	11,414	31,232	880,840
Somerset	1,161,023	—	—	—	1,161,023
Staffordshire, North	6,617,172	17,967	897,090	6,500	7,538,729
" South	7,430,586	264,802	28,251	249	7,723,888
Warwickshire	4,893,483	26,894	—	5,650	4,926 027
Worcestershire	615,333	116,137	935	—	732,405
Total in 1911	26 774,049	532,760	1,085,229	62,358	28,454,396
Total in 1910	26,616,294	508,537	1,069,000	52,661	28,246,492

* Includes ironstone from both counties, Northamptonshire and Warwickshire.

The outputs for the year show increases of 157,755 tons of coal, 24,223 tons of fireclay, 16,229 tons of ironstone, and 9,697 tons of other minerals, chiefly marl and red clay. The total increase of output for the district was 207,904 tons or 0·74 per cent., as against an increase of 1·88 per cent. in the number of persons employed underground. In the output of coal alone, Warwickshire shows an increase of 239,147 tons, or 5·14 per cent.; Leicester of 67,371 tons or 2·41 per cent.; and North Staffordshire of 49,280 tons or 0·75 per cent. On the other hand, Somerset shows a decrease of 47,023 tons or 3·89 per cent.; Worcestershire of 43,064 tons or 6·54 per cent.; Gloucestershire of 40,950 tons or 2·77 per cent.; and South Derbyshire of 32,105 tons or 3·29 per cent. The output of coal for the whole division shows an increase of 157,755 tons or 0 59 per cent. The output of ironstone shows an increase of 16,229 tons or 1·52 per cent., the increase being chiefly in North and South Staffordshire.

The average quantity of mineral raised per person employed below ground was (exclusive of Cheshire, Devon, Kent, and Northampton) 332 tons. The average for 1910 was 336 tons. The quantity raised per person below ground shows an increase of 4·76 per cent. in Leicester, and 0·46 per cent. in Worcester; and a decrease of 0·625 per cent. in South Derbyshire, 5·09 per cent. in Gloucester, 3 27 per cent. in Salop, 8·11 per cent. in Somerset, 0·31 per cent. in North Staffordshire, 1·29 per cent. in South Staffordshire, and 2·56 per cent. in Warwickshire.

The next table gives the number of the various types of coal-cutting machines in use, their description, distribution throughout the district, motive power, and output of mineral produced:—

Description of machine and counties where used.	Number driven by Electricity.	Number driven by Compressed air.	Statute tons of coal out by Electricity.	Statute tons of coal out by Compressed air.
Disc:—				
Derbyshire S.	4	—	61,579	—
Leicestershire	5	1	57,005	9,000
Shropshire	1	—	14,387	—
Staffordshire, N.	13	3	157,641	39,196
Staffordshire, S.	6	3	31 633	20,350
Warwickshire	—	6	—	135,823
Bar:—				
Gloucestershire	2	—	808	—
Somersetshire	5	—	26,487	—
Staffordshire, N	3	—	35,215	—
Staffordshire, S.	7	—	13 718	—
Warwickshire	3	4	34 261	65,012
Chain:—				
Derbyshire, S.	2	—	51,428	—
Leicestershire	4	—	88 339	—
Somersetshire	1	—	5,297	—
Staffordshire, N.	3	2	25 418	38,401
Staffordshire, S.	4	—	36,290	—
Warwickshire	—	1	—	2,100
Percussive:—				
Gloucestershire		4	—	2,616
Leicestershire	—	1	—	3,226
Staffordshire, N.	—	28	—	87,607
Staffordshire, S.	—	1	—	969
Warwickshire	—	5	—	4,081
Rotary heading:—				
Staffordshire, N.	—	1	—	1,047
Warwickshire	—	1	—	712
Total	62	61	637,509	410,140

In addition, 83,526 tons of ironstone were cut by electricity and 6,236 tons by compressed air. Only one conveyor was at work at the coal face.

The above machines were used in one colliery in South Derbyshire, three collieries in Gloucestershire, four collieries in Leicestershire, one colliery in Salop, two collieries in Somersetshire, 12 collieries in North Staffordshire, six collieries in South Staffordshire, and three collieries in Warwickshire.

Accidents.—The total number of accidents reported during the year, including accidents on private branch railways, &c., was 752, a decrease of 50 as compared with the preceding year. There was a decrease of seven in the number of fatal accidents and of 10 in the number of persons killed. This decrease was chiefly in shaft and miscellaneous underground accidents. The non-fatal accidents also show a decrease of 43 in the number of accidents reported and of 37 in the number of persons injured. One hundred and thirty of the accidents proved fatal, resulting in 142 deaths; 622 were non-fatal, and caused injuries to 689 persons. The corresponding figures for 1910 were 137 fatal and 665 non-fatal accidents, causing 152 deaths and injuries to 726 persons. One accident, due to explosion of gas, caused two deaths; another, in which coaldust probably played a part, caused three deaths; one due to carbon-monoxide poisoning from an underground fire caused 5 deaths; and one due to an explosion of gas while a gob-fire was being built off caused six deaths.

The accidents, fatal and non-fatal, are summarised in the following table:—

Place and cause.	Fatal accidents. Separate accidents.	Fatal accidents. Deaths.	Non-fatal accidents reported to inspector.* Separate accidents.	Non-fatal accidents reported to inspector.* Persons injured.†	All non-fatal accidents disabling for more than 7 days. Separate accidents.	All non-fatal accidents disabling for more than 7 days. Persons injured.
Explosions of firedamp or coaldust	4	12	15	49	15	41
Falls in mine	62	62	249	264	4,944	4,958
Shaft accidents	12	12	14	23	59	65
Miscellaneous underground	34	38	268	276	8,535	8,546
Total underground	112	124	546	612	13,553	13,610
On surface	18	18	76	77	1,441	1,441
Gross total in 1911	130	142	622	689	14 994	15,051
Total in 1910	137	152	665	726	14,416	14,486

* and † *See* footnotes on page iii.

The death-rates from accidents per 1,000 persons employed were as follow:—Above ground, 0·743 (in preceding year, 0·675); below ground, 1·448 (1·618) above and below ground, 1·293 (1·411).

The county death-rates from all underground accidents per 1,000 persons employed underground were:—Derby, South, 0·646; Gloucester, 0·996; Leicester, 0·603; Salop, 2 015; Somerset, 1 578; Stafford, North, 1·370; Stafford, South, 1·984; Warwick, 0·852; Worcester, 4·790; the Black Country, 4·042. Of the total number of deaths below ground, 50 per cent. were caused by falls of roof and sides.

Four fatal and 15 non-fatal accidents from explosions of firedamp occurred during the year, resulting in 12 deaths and injuries to 49 persons. The corresponding figures for the preceding year were two fatal and 10 non-fatal accidents, causing two deaths and injuries to 20 persons. Only one of these accidents was probably aggravated by coaldust.

One accident injuring one person occurred in South Derbyshire; one causing two deaths and injuries to two persons in Gloucestershire; one injuring one person in Salop; six causing seven deaths and injuries to 22 persons in North Staffordshire; six causing injuries to 13 persons in South Staffordshire; two injuring two persons in Warwickshire; and two causing three deaths and injuries to eight persons in Worcestershire.

An explosion occurred at the Netherton Colliery, No. 7 Pit, Worcestershire, on Friday, September 15, by which three men were killed and seven injured. The workings had been standing for about 25 years, and had recently been opened for the purpose of working out some pillars which had been left. It is alleged that firedamp had never been seen in the mine, but that blackdamp was frequently found. All the miners used candles. An opening in the Thick coal had been made off the level at a point about 68 yards from the downcast shaft. The opening was about 6 ft. in width by 6 ft. in height for a distance of 6 yards from the level, beyond which the width gradually increased to 28 ft. at the working face, which was 62 ft. in from the level. Two shots, each charged with fully ½ lb. of compressed powder, were fired in the Brazils coal at the face. One hole had been drilled nearly at right-angles to the face, and the other, which was 8 ft. from it, inclined horizontally towards it to form a flanking hole. The two shots were lighted simultaneously, but the fuse of the first described was the shorter of the two, in order that it might explode first and relieve the other. On lighting them the two shot-firers retired to the mouth of the opening where eight other men had assembled in the level, as it was snap time. The first shot exploded in due course, and was followed after an interval of about 30 seconds by the explosion of the second shot, simultaneously with which a flame extended out to the level and for a distance of about 13 yards along it towards the downcast shaft. The deputy, who was on the surface at the time, immediately descended the downcast shaft and reached the opening about five minutes after the explosion had occurred. He found the place filled with gunpowder smoke, but on testing with a safety lamp failed to observe any indication of firedamp. An hour afterwards, when the smoke had cleared away, he revisited the place, examined it with a safety lamp, and subsequently with a naked light, and found no gas. A box containing two cartridges of compressed powder which lay on a ledge near the roof about 14 yards from the face had not been damaged, and a piece of taped fuse which lay beside it had not been burned. Mr. Saint and Mr. Felton, who visited the place on the following day, found no trace of coked dust, and evidence of flame was confined to four posts, one of which had been scorched, but there were only very faint signs of flame having touched the others. They formed the opinion that the first shot had blown out more coal than had been anticipated, leaving too little work for the second shot to do. The latter had, therefore, practically blown out, leaving a socket 6 in. in depth, and the flame, projected into an atmosphere charged with dust thrown into suspension by the first shot and possibly carrying a small percentage of firedamp, had travelled out from the opening until it was arrested by a damp portion of the level. Three days afterwards Mr. Saint found the place full of blackdamp. He collected some samples of dust. A sample collected from the top of the timbering in the opening was found to contain moisture 5·70 per cent., volatile matter 32·60 per cent., fixed carbon 48·85 per cent. and ash 12·85 per cent. A sample from the top of the timbering at the mouth of the opening yielded 23·45 per cent. volatile matter and 20·30 per cent. ash, and a sample collected on the level contained 19·57 per cent. volatile matter and 24·62 per cent. ash. A few days afterwards Mr. Johnstone took four samples of the air in the opening, which contained so much blackdamp that a safety lamp only burned with difficulty, but Dr. Cadman found, on analysis, that only one of them contained a very faint trace (0·04 per cent.) of CH_4. From the medical evidence given at the inquests, it appeared that the men had been scorched, not burned, and that their injuries had been due to intense heat rather than flame. Their hair had only slightly been singed. One of them had recently recovered from a long illness which it was considered had probably lowered his vitality, but surprise was expressed that the other two men had succumbed to their injuries, and it was suggested that they might have been adversely affected by something poisonous in the gases resulting from the explosion. When the third death took place, the coroner ordered a post-mortem examination, which was conducted by Dr. Messiter, who stated that there were surface burns on the face, arms and back. All the burns, however, were in process of healing. The burns on the back were the worst, but none of them in itself sufficiently severe to give rise to the expectation that death would follow. All the organs were very much congested, and the right lung was pneumonic. The condition of the organs was sufficient to account for death. Pneumonia was frequently produced by burns, but the unusual aspect of the present case was that this condition should develop eight or nine days after the burns, and that in twelve hours the patient should become delirious and collapse. The accident was the direct cause of the pneumonia. He was of opinion that the man was superficially burned by a flash of fire, that he would draw a deep breath as the result of the sudden shock, and that in doing so he inhaled noxious gases produced by the explosion. The inhalation of the deleterious gas from the time of the explosion until his removal from the place would in all probability lower his vital powers. He agreed that a post-mortem so long after the accident was quite useless for the detection of the products of combustion which might have been inhaled as the result of the explosion.

At the Jamage pit, North Staffordshire, on Saturday, November 25, at 9.50 a.m., an explosion occurred by which six men were killed and 14 injured. The accident occurred in the workings of the Bullhurst seam and formed the subject of a formal investigation which Mr. Redmayne, H.M. Chief Inspector of Mines, was appointed to hold under section 45 of the Coal Mines Regulation Act, 1887. His report [Cd. 6152] has already been published. Mr. Johnstone considers that the accident emphasises the very serious risks which attach to the working of a thick, dry, dusty and gassy seam, which is known to be liable to spontaneous combustion, and which is lying at a moderate inclination, and the necessity of laying out the workings and carrying on the whole operations in a carefully considered manner, so as to minimise these risks as far as this can be done.

The number of accidents from falls of ground reported during the year was 311, causing the deaths of 62 persons and injury to 264 others. The corresponding figures for the preceding year were 350 accidents, causing the deaths of 68 persons and injury to 297 others. Taking the district as a whole, the figures show a decrease of three accidents and six deaths from this cause, as compared with the preceding year. Warwickshire shows a decrease of two accidents and two deaths, Gloucestershire a decrease of three accidents and three deaths, North Staffordshire a decrease of four accidents and four deaths, and Worcestershire a decrease of five accidents and six deaths. On the other hand, South Staffordshire shows an increase of 10 accidents and eight deaths. In the Black Country, taken by itself, there were 17 fatal accidents, causing 17 deaths, as compared with 13 accidents, causing 15 deaths, in the preceding year. Of these 17 accidents, 14, causing 14 deaths, occurred in the Thick or Ten Yard coal.

Twenty-six shaft accidents were reported during the year; of these, 12 were fatal, causing the death of 12 persons, and 14 were non-fatal, causing injuries to 23 persons. The corresponding figures for the preceding year were 12 fatal and 15 non-fatal accidents, resulting in 20 deaths and injuries to 19 persons. An overwinding accident, which might have had very serious results, occurred at No. 5 pit, Cannock Chase Colliery, South Staffordshire, on September 12.

Thirty-four fatal and 268 non-fatal miscellaneous underground accidents were reported during the year, resulting in 38 deaths and injuries to 276 persons. The corresponding figures for the preceding year were 43 fatal and 262 non-fatal accidents, causing 46 deaths and injuries to 297 persons. There were no deaths by explosives. At the Eastern United Collieries, Gloucestershire, on January 10, a non-fatal accident occurred which resulted in very serious permanent injuries to a collier, and which appears to have been due to a direct and wilful contravention of No. 93 of the special rules established at the colliery. A rise place had been set away 6 yards from the face of a level, and had been driven up for a distance of 4 yards. A shot hole in each working face was charged with gelignite and the miners lighted the fuses and retired. The shot in the face of the level exploded, but the other one hung, and after waiting for five minutes, and notwithstanding the warning of his fellow workman, the collier who worked in the upset returned and was struck by coal projected by the shot in the upset, which exploded as he approached it. The special rule referred to prohibited him from returning to the shot within one hour. This is a very frequent cause of accident, and for this reason Mr. Johnstone is strongly of opinion that when opportunity offers, the rule referred to, and similar rules in other portions of the division, should be broadened to make the prohibition cover not only returning to shots which have been lighted, but also to shots which anyone has attempted to light. A rule amended in this manner was inserted in the code of special rules established at the Aberdeenshire and Kincardineshire Granite Quarries under the Quarries Act, 1894. At Thornleigh No. 2 Pit, Worcestershire, on January 27, two pit sinkers, sons of the contractor, were injured by the explosion of a charge of loose gunpowder while stemming a shot-hole in the bottom of a shaft which was being deepened. The loose gunpowder had been taken into the pit unknown to the manager. One of the men had placed some stemming over the charge and had lightly pressed it. He stated that he then gave it a harder blow, when the charge exploded, burning and pitting the two men more or less severely. The stemmer was made of iron tipped with about 6 in. of hard brass, and in the opinion of the man who was using it, it struck a nodule of pyrites when he struck the hard blow. Such stemmers are still occasionally used in the district and are invariably condemned by the inspectors when met with, on the ground that they do not comply with the requirements of General Rule 12 (*d*) of the Coal Mines Regulation Act, 1887. The fact of an iron stemmer being shod with a piece of copper or brass does not transform it into a copper or brass stemmer. At Parkhouse Colliery, North Staffordshire, on February 6, a collier was injured under circumstances which appeared to be very similar to those which accompanied the Eastern United Collieries accident above described. He had bored two vertical shot-holes which extended upwards into the ripping for a distance of about 15 in. They were placed in the centre of the gateroad and 3 ft. 3 in. apart. He charged both holes with compressed gunpowder with taped fuse attached. He stated that he lighted the out-bye one and, a few minutes after it exploded, he returned to light the in-bye one. As he approached it exploded, and a piece of bass projected by it struck him and inflicted a severe scalp wound. In view of the fact that the holes were vertical, Mr. Johnstone considered it exceedingly improbable that the sparks from the first fuse or a flash from the shot could light the second. It is much more likely that he had attempted to light both fuses, and believed that the inner one had failed to light. At Hanger Hill Pit, North Staffordshire, on February 22, a non-fatal accident occurred under practically similar circumstances. As a result the miners were prohibited fom firing their own shots, the overman now charging and firing all the shots, only one of them being charged and fired at a time. At Saltwells Clay Mine, Worcestershire, on March 6, another non-fatal accident of the same nature occurred. Electrical firing was subsequently substituted. At Brownlees, North Staffordshire, on March 17, there occurred a non-fatal accident which illustrates the danger of unramming shots, even when this is done with every possible care. A shot-hole 3 ft. 6 in. deep in stone in a cut had been charged with a 6 oz. cartridge and a 2 oz. primer of bellite. After about 5 in. of clay stemming had been put in, one of the detonator wires broke. A new hole was bored, charged and fired, but left a thin shell of stone along the side of the old hole. The shot-firer removed part of this, found the end of the broken wire connected it up to his cable and battery and attempted to explode the charge, but without success. He then proceeded to remove the stemming by means of a sharpened piece of wood, when the primer exploded, practically destroying one of his eyes and cutting his face. He was of the opinion that the explosion was caused by pulling at the detonator wires and not by picking out the stemming. At Broadfields, North Staffordshire, on September 25, a non-fatal accident occurred to a collier when attempting to light more than one shot at a time in a wet place. The manager subsequently issued instructions to the miners that only one shot was to be charged and fired in any place at one time. At Shelton Racecourse Pit, North Staffordshire, on October 4, a non-fatal accident of a somewhat unusual nature occurred in the Great Row seam. The seam in question is about 9 ft. in thickness, the lower 6 ft. of which is taken out in the first working. The accident occurred in a heading 7 ft. 6 in. in width. The coal was holed at the bottom and nicked vertically in the centre of the place by a Siskol heading machine, and subsequently brought down by a shot placed in each corner about 9 in. below the roof. During the previous night two shot-holes 4 ft. in depth had been charged with 8 oz. of ammonite; that on the right side was fired first, electrically, and did its work. The shot-firer then coupled his cable to the left-side shot and fired it. He alleged that he heard it explode, although the sound was somewhat muffled, and on returning to the place found that while the front portion of the dressing of coal had not been disturbed, it was broken at the back and slightly set away from the roof. He was satisfied that the charge had exploded, and had a new hole drilled, 3 in. or 4 in. from the old one and to a depth of about 2 ft. 3 in. The hole was charged with 6 oz. of ammonite and fired. It brought down the coal, and, the shot-firer alleges, left no trace of the old hole. On the following day two shots were fired advancing the face for a further distance of about 4 ft. or 5 ft. While the coal was being loaded the miner heard the side working slightly. It was near the point where the "bucked" shot had been. He proceeded to dress off some loose coal with his pick, when a violent explosion took place. If the shot-firer was correct in his statement that he heard the bucked shot go off, it follows that the detonator and at least part of the ammonite had exploded, and this appeared to be confirmed by the partial breakdown of the dressing of coal. In this case the accident could only have been caused by an unexploded portion of the ammonite being exploded by a blow from the pick, which the makers of this explosive maintain to be impossible. After carefully considering all the available evidence, Mr. Johnstone is of opinion that it is more probable that the so-called bucked shot had not exploded at all, that the fireman was deceived by a noise caused by the breaking down of the coal, which had possibly been partly shaken by the explosion of the right-hand shot, and that the accident was caused by the miner's pick striking the unexploded detonator. From the appearance of the place after the accident, the manager was of opinion that a full charge of ammonite had exploded, and that the miner only escaped fatal injury by not being in the direct path of the explosion.

Only one fatal accident, due to suffocation by natural gases, causing one death, was reported during the year.

One accident from underground fires was reported during the year, causing five deaths. In its general features, the accident closely resembled that which occurred at Hamstead on March 4, 1908, and further emphasises the extreme danger of storing or keeping inflammable materials near the bottom of a downcast shaft. The accident occurred at Cannock Chase Colliery, No. 9 pit, South Staffordshire, on December 14, at about 12.10 p.m. The two shafts, which are about 48 yards apart, are 258 yards in depth to the Bass seam in which the accident took place. The workings were ventilated by an exhausting Guibal fan, 24 ft. in diameter by 10 ft. in width, which at the time of the accident was running at about 55 revolutions per minute. The downcast shaft bottom was lighted by paraffin lamps, and a number of the boys employed in the vicinity of the shaft carried ordinary "shukey" lamps. A few gallons of oil for refilling these lamps were kept in sheet-iron bottles or cans in a small cabin situated in one of the main intake airways at a distance of 36 yards from the downcast shaft bottom, and the boys were permitted to refill their lamps from these cans as and when required. A spout can was kept for this purpose, but did not appear to have been regularly used. A pail was placed under the cans, ostensibly to catch any drops of oil, but it appeared from the evidence at the inquest that the practice of dipping their lamps into this pail was frequently followed by the boys. Fag ends of lamp wicks were occasionally thrown about, and the floor in the immediate vicinity of the cabin was more or less saturated with oil. A heave-up doggie, shortly after snapping time, on returning to the spot where he had been at work about 10 yards from the oil cabin, noticed a flame on the floor, which had spread to and ignited the woodwork of some empty tubs which stood in front of the cabin. He ran in and removed the oil bucket and attempted to stamp out the flame and also to overturn some of the tubs; but as they were closely buffered up, he was unable to do so. An alarm was raised and the overman and manager sent for; the former reached the shaft bottom at about 12.20, and immediately took steps to withdraw the men, of whom there were 161 in the pit at the time. He also had the separation doors between the two shafts opened in order to short-circuit the air, but unfortunately never thought of stopping the ventilating fan. By about 12.30 p.m. nearly all the men had been withdrawn from the pit, with the exception of four who were at work in Nos. 2 and 3 stalls (*see* fig. 9.) Henry Merritt, an examiner, who had been shot-firing in No. 1 stall when the alarm reached him, and who had made his escape by the return airway to the shaft bottom, was asked by the overman to go into Nos. 2 and 3 and fetch the men out, and immediately consented. Tom Stokes, a stallman, who had come out from No. 10 stall, volunteered to accompany him. They went in through the separation doors up an incline to A and thence *via* B and C to No. 2 stall, a distance of over 800 yards, and told the men to come out at once. Up to this time the atmosphere in the return airway carried some smoke and other products of combustion, but was quite breathable. Meantime a messenger had been despatched to fetch the manager and under-manager from an upper seam. On reaching them, he informed the latter that he was wanted at once in the Bass seam, but did not state for what purpose. The under-manager returned with him to the shaft, but the manager, not knowing that anything of a serious nature had occurred, continued on his course round the workings. When the under-manager reached the downcast shaft bottom, he found that the fire, fanned by the full current of air, had developed alarmingly, and was creeping outbye along the roof and against the air towards the shafts. Fearing that it would reach the upcast shaft and cut off all retreat, he ordered the separation doors to be closed, thus driving the whole of the smoke into and round the workings. When Merritt, Stokes and the four men whom they had gone to fetch from No. 2 reached the point C, they found that a large quantity of smoke was leaking through the double doors which separated the intake from the return at this point, and that the airway on the return side of this point had been very badly fouled. Some of the men shrank from entering it, but Merritt told them it was the only possible way out, and led the way, closely followed by a miner named Payne, who held on to Merritt's waistcoat. Bradbury followed, but the others appeared to have remained where they were and succumbed to the smoke and the poisonous gases from the fire. On reaching the point D, where the air was still comparatively free from smoke, Merritt sent Payne out-bye towards A, and returned through the double doors near B, and shouted to ascertain whether the others were following. Bradbury had reached the point shown on the plan, where he also succumbed to the smoke. Getting no reply to his shout, and finding it impossible to proceed in along the return, Merritt went along towards the upcast shaft and met some other men who had escaped from other portions of the workings which had been less affected. These men he sent to the surface, and then, retaining the cage at the upcast shaft bottom, he returned again to the doors at B accompanied by some other men. On opening these doors, however, he found that the smoke had become so dense that it was impossible to proceed, and therefore returned and ascended the upcast shaft, reaching the surface in a very exhausted condition. Meantime, a hose pipe connected to a donkey pump on surface had been led down the downcast shaft, and the fire was gradually driven back and mastered, but it was three days before the body of Bradbury could be brought to surface, and six days before the bodies of the other men who had been suffocated could be recovered. Very valuable work was done by the local fire brigade who had been summoned, and by a rescue brigade from North Staffordshire, led by Prof. Cadman and wearing breathing apparatus, but their efforts were only useful in combating and suppressing the fire, as from evidence subsequently obtained it appeared to be clear that the five men were all dead before either the fire brigade or the rescue brigade reached the mine. It was a very fortunate thing that the overman had the presence of mind to open the separation doors immediately after he reached the downcast shaft bottom, otherwise the loss of life would probably have been very much greater. The subsequent closing of these doors doubtless led to the sudden fouling of the return aircourse. It was, on the other hand, very unfortunate that no one thought of stopping the fan until Prof. Cadman and Mr. Johnstone reached the colliery at about 4.30 p.m., having been summoned by telephone from North Staffordshire, where they were at one time engaged with the reopening of Jamage Colliery. The actual cause of ignition was not discovered, but, from the position of the fire when first observed, it was probably due to the smouldering end of a lamp wick, or a snuffter from a lamp used by one of the lads employed about the pit bottom having fallen upon the oil-saturated floor. The cabin had been built with considerable care, in respect that its side walls were of brick and carried an iron plate on which the oil-cans rested, but, notwithstanding this, it was highly imprudent to place it where it was. Also, if the fan had been stopped and the separation doors opened immediately the alarm was raised, the fire would never have assumed the proportions it did; it could have been dealt with before it could have reached either of the shafts, and all the men in the pit might have been brought out without loss of life.

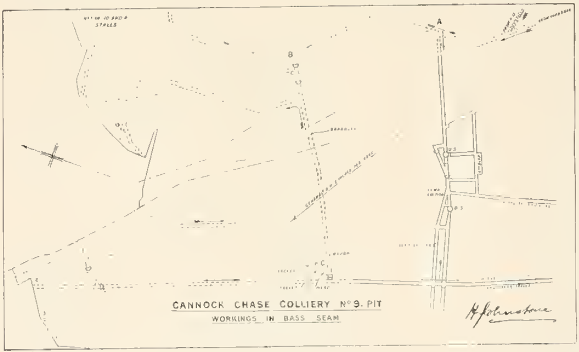

FIG. 9.

Two fatal accidents, caused by irruption of water, resulting in two deaths and injuries to four persons, were reported during the year. At the Minnie pit, Apedale Collieries, North Staffordshire, on April 24, an accident occurred by which one man lost his life. The outcrop of the seam, which at this point has an inclination of 78 degs., is covered by an alluvial deposit of clay, sand and gravel. In taking out the pillars a rib of coal, supposed to be 6 yards in thickness, was originally left under the alluvium, but, after the accident described in the report referred to, the thickness of the rib left in was increased to 22 yards. Notwithstanding this, the rib again gave way and a large quantity of mud, sand and water slipped into the gob, carried the *debris* of the gob with it along a level for a distance of about 20 yards, and flowed into a travelling road or ladderway in which deceased was at the time, knocking him down the ladderway and killing him instantly. Another man, who was at a lower point in the ladderway at the same time, had a very narrow escape. The fireman had been through the workings about half-an-hour previously, and had observed no indication of danger. The working of such a seam, where the outcrop of the coal is immediately overlaid by a stratum of clay covered by a deep deposit of sand and gravel more or less saturated with water, must always be accompanied with considerable danger. Owing to the level nature of the surface and the depth of the sand, it is impossible to drain away the water, and any breaking or subsidence of the barrier of coal left in must inevitably be followed by an influx of mud. The manager was of opinion that by increasing the thickness of the barrier left in, he had obviated all risk. After this accident a further precaution was taken by leaving in vertical ribs of coal at comparatively short intervals to support the barrier. At Leabrook Colliery, South Staffordshire, on November 30, at 10.30 a.m., an accident occurred by which one man was killed and four others injured. A strip of New Mine coal about 80 yards in width was being worked out by longwall, stripping an old gob on the left side and leaving a rib side on the boundary at the right side. The seam is 7 ft. 8 in. in thickness, of which 2 ft. is left in to support the roof. The coal was holed in the underclay, and when inspecting the colliery some six weeks before the accident, Mr. Felton observed that a small quantity of water, which had a strong odour of sulphuretted hydrogen, was trickling from the holing at various points along the face. He called the attention of the under-manager to it, as the odour might suggest that it came from old workings, but was assured by him that the coal in front of them was solid, that water had been bleeding from the face for a considerable distance as they advanced, and that it was not increasing. When the accident occurred, 19 men were employed at the coal face and 31 persons were underground, including

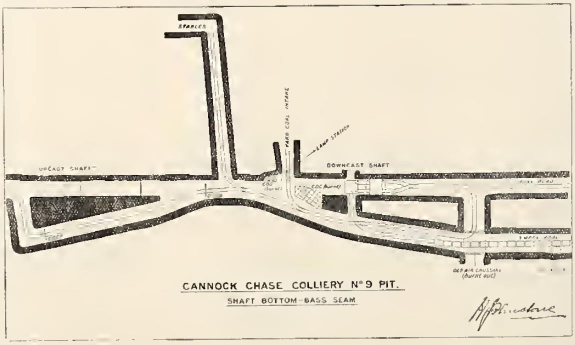

FIG. 10.

the under-manager. Nothing abnormal occurred until the time mentioned, when, without any warning, a crackling noise was heard, followed immediately by a great inrush of water and dirt, which swilled out the upper portion of a cog which stood 5 ft. from the longwall face. It was ascertained that at about half-past three o'clock two old pit shafts, situated under a railway embankment and apparently close to the point at which the water burst in, had suddenly plumped in within about 6 ft. of the rails along which passenger trains were frequently passing. The railway company had stopped the traffic, and turned out a large squad of men to fill up the shafts in order to prevent the rails slipping in. Mr. Johnstone had examined the shafts and found that the brick lining had slipped away, leaving them in a very precarious condition. On plumbing this shaft it was found to be about 60 yards in depth to the water. The vertical depth to the working face in Leabrook mine was estimated at about 90 yards, hence there appeared to be a head of something like 30 yards of water. The engine at the Leabrook pumping station of the Mines Drainage Commission, which drained the colliery, was only capable of raising about 350 gallons of water per minute, and the tanking operations at the colliery were dealing with about 250 gallons per minute, making a total of about 600 gallons. The water continued to rise rapidly and eventually flooded the whole mine and rose to a height of 11 ft. above the top of the inset. The railway which covered the shafts which caved in was constructed in or about 1861, and it is probable that the shafts were filled up at that time. It appears to be likely, however, that they were not filled up from the bottom, but only from scaffolds which had probably been placed at the level of the Thick coal. Water had accumulated underneath and supported these scaffolds until it was drawn away by the inrush into Leabrook, when apparently the scaffolds collapsed and allowed the filling to fall to the shaft bottom. The old shafts referred to are not shown on the colliery plan but are shown upon some old plans, copies of which were deposited at the Home Office in 1904, and also upon some old plans in the possession of the London and North-Western Railway Company. Neither of these old plans was consulted by the colliery owners, who appeared to have relied upon the plans furnished to them when they took over the colliery. The Thick coal and the Heathen coal appear to have been worked extensively from the old shafts referred to, but Mr. Johnstone has been unable to find any records of the New Mine coal having been worked from these shafts. This seam, however, was formerly worked from the Leabrook pits and probably from the Ten Score pits in the immediate neighbourhood, and on one of the old plans showing the workings from these pits, it was found that the strip of coal which was being worked out by the Leabrook Colliery Company is marked "Water Rib," indicating that the owners of the Ten Score pits had at that time knowledge or suspicion of the existence of a pound of water in the New Mine coal, from which they found it necessary to protect themselves. When the position of the old shafts referred to was plotted upon the working plan of the Leabrook Colliery, it was found that the working faces had advanced to within about 3ft. of them. The occurrence emphasises the necessity of having complete and accurate estate plans showing all underground workings in the various seams, with datum levels marked thereon, and of a close examination of such plans before workings are opened out in a water-logged district

Twenty-four fatal and 178 non-fatal underground haulage accidents were reported during the year, resulting in 24 deaths and injuries to 178 persons. The corresponding figures for the preceding year were 29 fatal and 170 non-fatal accidents, causing 31 deaths and injuries to 200 persons.

Of the above, two persons were killed and four injured while illegally riding and three persons were injured by going in front instead of behind tubs while moving them by hand on inclined roads.

One fatal and one non-fatal accident by electricity were reported during the year, resulting in one death and injury to one person. The fatal accident occurred at Halesfield Colliery, Shropshire, and was very clearly due to inefficient earthing of a cable in which the armouring had been cut in a number of places without being bridged over or otherwise rendered electrically continuous. The manager was of opinion that "it is not reasonably practicable to keep the armouring of cables earthed in a haulage road subject to heavy squeeze necessitating heavy repairs over a long period." The answer to this appears to be that if a road is of such a nature that electrical cables cannot be maintained in such a condition as to ensure as far as possible the safety of the workmen, the cables ought not to be there. Mr. Nelson, H.M. electrical inspector of mines, subsequently visited the colliery, and was of opinion that the supervision and maintenance of the plant had been very inefficient. In his report upon it he stated ". . . . I think it is impossible to come to any other conclusion than that the person in charge of the electrical plant at the mine has either been grossly ignorant of the risk he was allowing the workmen working on the cable level to run, or gravely negligent as regards his responsibility. If the risk in question was also unknown to the management, then it ought not to have been; but in any event, the conditions which admittedly existed before the accident constitute in my view a serious reflection upon those responsible." The non-fatal accident occurred to a pump motor attendant at Whitfield Colliery, North Staffordshire, on September 19. It appeared that the pump had lost its water, and the attendant had switched off the current and then switched it on again without placing the controller in the off position. The resistance being cut out, there was a flash from the contact, which slightly burned the back of his hand

Five fatal and 60 non-fatal "sundry" accidents were reported during the year, resulting in five deaths and injuries to 60 persons.

Eighteen fatal and 76 non-fatal accidents on the surface were reported during the year, causing 18 deaths and injuries to 77 persons. The corresponding figures for the preceding year were 15 fatal and 93 non fatal accidents, causing 16 deaths and injuries to 93 persons. The increase in the fatal accidents is due to accidents on railways, sidings or tramways, by which 10 persons were killed It appears to be clear that at least four of these accidents could have been prevented by the exercise of proper caution by the persons who were conducting shunting operations.

An accident occurred at Granville Colliery, South Derbyshire, on March 24, by an explosion in a powder magazine. The magazine or store, which was situated about ¾ mile from the colliery, was built in 1887, and had been in constant use since then. It measured 10 ft. by 7 ft., and was built of hard brick set in cement, the side walls being 2 ft. thick, the end walls 1 ft. 6 in. thick, and the roof consisting of a brick arch 14in. thick. The sides and top were lined with matchboarding and the floor was laid with 2 in. boards, all the woodwork being secured with copper nails. It was licensed under "D" division to contain 4,000 lb. of gunpowder, or 2,000 lb. of mixed explosives. When the accident occurred it contained 800 lb. of bobbinite, 200 lb. of compressed powder, and 50 lb. of rippite. The latter was enclosed in a wooden box, the lid of which was fastened with zinc nails. A groom was sent with a spring cart to fetch two boxes of bobbinite and one 5 lb. packet of rippite. To obtain the latter, it was necessary that he should open the box, and for this purpose a bronze chisel and wooden mallet were provided. It was conjectured that when opening the box he had driven the chisel into a chilled cartridge of rippite, or alternatively, had pressed or broken such a cartridge when levering off the lid, and that the rippite had exploded, and in turn exploded the whole contents of the store. His dismembered trunk was found at a distance of 95 yards from the magazine, and appeared to have fallen from a considerable height. The store was razed to the ground, and a peculiar feature of the explosion was that the materials which had formed the side walls were blown out for a distance of from 120 to 200 yards practically in straight lines at right-angles to the four walls. A brick had been blown through the back and front of the cart which stood opposite to and about 10 yards from one of the corners of the magazine in a diagonal direction, and had apparently struck the horse a glancing blow on the side of the head, fracturing his skull. The accident occurred at 2 p.m. The temperature as recorded at pit bank at 9 a.m. was 38 degs. Fahr., and it had probably been lower during the night.

During the year 89 dangerous occurrences were reported under the Notice of Accidents Act, 1906. Of these, two were above ground fires, 60 were underground fires, four were ignitions of firedamp by naked lights, two were breakages of winding machinery, four were breakages of winding ropes or their connections, two were cages falling in the shaft—in one case owing to an unbalanced cage running away while being lowered, and in the other case owing to a cage resting upon an obstruction and then falling away; one was the breaking of a cage slipper during winding operations; one was the arresting of an ascending cage by a dip rope which had cut through the troughs in which it was confined and had looped itself across the shaft; one was the fracturing of a steam pipe while a boiler was being raised by hydraulic jacks; seven were overwindings; four were inrushes of water; and one was the delayed explosion of a shot in a sinking pit. Of the underground fires, 52 were due to spontaneous combustion. One of these occurred in Leicestershire, one in Somerset, one in North Staffordshire, 44 in South Staffordshire, two in Warwickshire, and three in Worcestershire; 45 of them took place in the Thick coal Both of the above ground fires occurred at upcast shafts. One was probably caused by a spark from a passing locomotive and resulted in the destruction of the casing and headgear; the other was much less serious, and occurred while some men were riveting an iron casing which was being erected to replace a wooden one

Of the underground fires not due to spontaneous combustion, only one was at all serious. One was caused by a ventilating furnace; one was due to oil and dust on a clutch being fired by friction; one was due to the frayed edges of a canvas door having become ignited, presumably by sparks caused by iron tubs rubbing against the brickwork; one was due to the incandescence of a small accumulation of dust and fluff from the cotton driving ropes inside an armature; one was due to short-circuiting in the starting switchbox of an electrical coal-cutter; one was due to a small quantity of cotton waste drawn in by a haulage rope against the spindle of a guide pulley, having been set on fire presumably by the friction of the rope which had got out of the groove of the pulley and was rubbing over the spindle; one was due to the incandescence of some fine dust which had been deposited on the dished top of a jig wheel which had become heated by friction, and one occurred at a jig wheel presumably from the same cause or by gradual ignition of a piece of flat hemp rope with which the brake strap was lined. At Walsall Wood Colliery, South Staffordshire, on May 19, an electric coal-cutter had nearly completed a cut across the coal face, when the attendant noticed that one corner of the starting switch box was rapidly heating. He opened the switch, but finding that the heating continued to increase, he disconnected the cable at a junction box and sent for the electrician. Upon his arrival, he and the fireman proceeded to open the switchbox cover, both using naked lights. On raising the cover an ignition of gas took place. On opening the casing it was found that the corners of the contacts were slightly fused, that the bitumastic varnish with which the interior had been recently coated was burnt off at one corner of the casing, and the fibre backboard upon which the contacts were fixed was charred over a portion of its area to a depth of $\frac{3}{16}$ in. On testing them, both the bitumastic varnish and the fibre backboard were found to give off a highly inflammable gas upon the application of heat. No person was injured by the occurrence and little damage was done to the plant, but the case is interesting and indicates the grave risks incurred by using inflammable materials in electrical work underground, notwithstanding their insulating qualities.

At No. 18 Pit, Birchenwood Colliery, North Staffordshire, on October 18, when some colliers were proceeding up a dip in the Eight-feet Banbury seam, 130 yards in length and having an inclination of 15 degs., they observed a fire burning near the jig frame. They immediately informed the fireman for the district, who promptly withdrew all the men and sent for the manager and under-manager. On their reaching the spot it was found that the jig frame and the surrounding timber and coal were on fire. An attempt was made to extinguish it with water assisted by fire extinguishers, but owing to the high inclination of the dip and the distance from which water had to be carried, this was found to be impossible. The jig was very dusty, and as the roof was supported on props and bars, which were blazing, the manager feared that a heavy fall of roof on a jig having such a high inclination might result in raising a cloud of dust and causing a violent explosion. He therefore decided to withdraw and to seal off the whole district by the erection of stoppings in the main intake and return airways. This was successfully done, largely owing to the assistance of brigades of rescue men wearing breathing apparatus who were summoned from a number of the surrounding collieries. These men had all undergone training at the recently established North Staffordshire Rescue Station, but this was the first occasion on which they had been called upon to attempt actual rescue work underground, and unqualified praise was bestowed upon them by the manager and his officials for the method in which their work was done. The actual cause of the fire is largely matter of conjecture. The night fireman made his statutory inspection of the jig head in question about three hours before the fire was discovered, and although he was twice in the immediate neighbourhood of the jig wheel, and on its return side, he neither saw nor smelt any indication of heating or fire. He discovered a slight defect in the ventilation owing to a stopping having partially broken

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* A special report on this occurrence has been issued by the Home Office.

down, and repaired this with some canvas, which may have had the effect of driving some air over the jig frame and fanning any incipient fire which existed. The jig wheel was an ordinary cast iron one with a brake flange on its upper side, the brake strap being lined with hemp packing 3 in. broad by ⅜ in. thick. It is conjectured that the heat arising from the friction of the hemp on the cast iron wheel had set the frayed edges of the hemp smouldering, and that this had been fanned into flame when the increased air current was sent over it, thus setting fire to the framework and surrounding timber.

There is a very prevalent belief that when shots are fired by electricity, all danger from returning upon a missed or hanging shot is removed when the firing cable has been disconnected from the battery, and some support appears to be given to this view by the wording of the special rules in certain districts which provide that a certain period must elapse before anyone returns upon such a shot, except when fired by electricity. The fallacy of this has been proved on many occasions, and one of these occurred at Snowdown Colliery, Kent, on March 25. Thirteen shots charged with rippite with No. 7 electric low-tension detonators, specially insulated for submarine work, were being fired in the bottom of a shaft which was being sunk They were coupled together in series and coupled up to a dynamo which was generating a current of 220 volts. The shots failed to go off and the wires were uncoupled from the cable. Three minutes afterwards, one of the shots in the middle of the series exploded, leaving the other 12 shots intact. The makers of the explosive were communicated with, and, whilst admitting that such occurrences, although rare, were unfortunately not unknown, they were unable to offer any conclusive explanation. Mr. Johnstone says he has come across quite a number of such occurrences in which shots have exploded an appreciable time after the cable had been disconnected from the exploder, and in one case after it had also been disconnected from the fuse wires. The most feasible explanation appears to be that the priming charge in the detonator had become more or less damp, and had been ignited but not flashed by the passage of the current, in which case it had smouldered for a time until sufficient heat was developed to fire the fulminate of mercury. Some time ago, he experimented with a number of electric powder fuses in which the priming charge had been purposely damped, and in some cases actually moistened, by exposing them to a jet of soft steam. Although they all failed to fire on the first attempt, by repeatedly passing the current through them, he ultimately succeeded in firing even those which had been moistened. It appears that the only way to obviate risk of accident is to prohibit anyone from returning upon electrically fired hanging shots until at least 15 minutes have elapsed.

Prosecutions.—No prosecutions of owners took place during the year; 129 prosecutions by owners against employees for contravention of the general and special rules under the Coal Mines Regulation Acts, 1887-1908, and of the Cruelty to Animals Acts, were reported. Of the prosecutions in South Staffordshire, only one, took place in the Black Country. This may be taken as indicative of the inadequacy of the special rules established in that portion of the district, and of the reluctance of owners and managers to enforce the observance of these rules by prosecution, rather than of any excellence in the discipline maintained there.

Explosives.—The following shows the quantities of the principal explosives used:—

Permitted explosives: Ammonite 154,111 lb., amvis 17,029 lb., bellite 84,712 lb., bobbinite 305,260 lb., Cornish powder 23,127 lb., excellite 48,212 lb., Faversham powder 15,037 lb., monobel powder 171,581 lb., oaklite 15,975 lb., rippite 52,346 lb., St. Helen's powder 21,136 lb., Samsonite 38,588 lb., Westfalite 18,574 lb. Other than permitted explosives: Gelignite 41,565 lb., gunpowder 1,471,303 lb.

In all 1,012,636 lb. of permitted explosives were used, and 1,518,867 lb. of other explosives. With the former 2,056,408 shots, and with the latter 2,201,177 shots were fired. Of those fired with permitted explosives, 1,804,172 were fired by electricity, and 252,236 by fuse; with non-permitted explosives—by electricity 76,924, by fuse 1,809,605, and by squibs 314,648. The number of miss-fires recorded was 5,499, divided as follows—by electricity 2,491, by fuse 2,912, by squibs 96.

Safety Lamps.—The diminution in the proportion of lamps secured by the old screw lock continues very slowly. In South Derbyshire the proportion for 1911 was 24·2, as against 24·9 in 1910; in Leicestershire it was 7·7, as against 15·8; in Salop, 2·6, as against 3·8; in North Staffordshire, 0·4, as against 1·4; in Cannock Chase, 2·9, as against 3·1; in the Black Country, 46·1, as against 71; in Somerset, 0·9, as against 1·6. Warwickshire is the only county which shows an increase in the use of lamps locked in this antiquated method, the proportion being 16·8, as against 15. The following are further statistics:—Number in use, 64,250. Method of locking—lead rivets, 35,209; magnetic, 25,227; screws, 3,814. Kind of illuminant—colza or colza and petroleum, 32,865; petroleum, 12,487; volatile spirit, 18,708; other illuminant, 190.

The following shows the class of mines in which the lamps were used, and the method of lighting them:—In pits worked with safety lamps, 52,391; in pits worked with mixed lights, 10,681; in pits worked with naked lights for examination only, 1,178; lighted electrically, 43,184; internal ignition, 736; ordinary ignition, 20,330.

According to county, the statistics are as follows:—Derbyshire, South, 3,127; Gloucestershire, 249; Kent, 54; Leicestershire, 4,275; Shropshire, 2,377; N. Staffs., 25,628; Cannock Chase, 18,976; Black Country, 1,857; Somersetshire, 778; Warwickshire, 6,929.

Rescue Stations.—The temporary premises mentioned in the last report as having been secured by the North Staffordshire Coalowners' Association for a rescue station at Stoke-on-Trent, having proved to be inadequate for the purpose, the station was transferred to more commodious premises at Berry Hill Colliery. These premises consist of a smoke chamber 15 ft. by 11 ft. 6 in., with an extension gallery 37 ft. by 9 ft., and a store 30 ft. by 15 ft., in which the apparatus is kept. The extension gallery is fitted with an elevated platform with steeply inclined approaches, and in this the men undergoing training build brick stoppings, set timber and canvas, and go through stretcher drill. Both the smoke chamber and extension gallery can be filled with sulphur fumes during the practices. The equipment at present consists of 20 complete sets of the Fleuss-Davis apparatus, with the necessary spare parts and accessories. The station is in charge of an instructor and assistant, and two brigades of six men each undergo training per day. Each brigade attends nine practices, and they are then examined in actual work and knowledge of the apparatus by members of the committee, who, if satisfied, grant certificates of efficiency. The brigades are afterwards required to attend a practice at the station once in each quarter. Twenty brigades have been trained, and 19 of them have qualified as efficient. Twelve sets of apparatus with their accessories are kept in constant readiness, and arrangements are being made to instal a motor car fitted up to carry the apparatus to the collieries in the district as and when required. The brigades in connection with this station have already done some excellent work under very trying conditions at Birchenwood No. 18 Pit, at Jamage and at Cannock Chase No. 9 Pit. The sub-committee formed to carry on a series of exhaustive experiments at Birmingham University on behalf of the Coalowners' Association in the Staffordshire and Midland portion of the district issued their final report in March. It has been decided to adopt a general scheme applicable to the whole of the South Staffordshire and South Midlands area, with a chief instructor attached to Birmingham University, who will generally supervise and instruct the persons in charge of sub-stations which are to be established in various parts of the district. A uniform type of apparatus will be adopted as far as possible at these sub-stations, so as to facilitate the work of brigades called upon to render assistance in rescue operations in an emergency arising in any part of the district. Arrangements in connection with some of these sub-stations have already been almost completed.

Coal Mines Regulation Act, 1908.—So far as Mr. Johnstone is able to judge, this Act continues to work on the whole fairly satisfactorily, although coalowners complain that its effect has been to considerably reduce the output of mineral and to increase the cost of production. The average production per man in this district has been slightly reduced; but to what extent this is due to the operation of the Act there are no means of knowing.

Board for Examination for Certificates.—The secretary to the board was the late Mr. J. S. Martin, Bristol, until his death in December, when the board appointed Colonel R. S. Williamson, The Grange, Hednesford. The annual examination was held at Birmingham on April 25 and 26, 1911, when 16 candidates presented themselves for examination for first-class certificates, and 33 for second-class certificates. Two of the former and eight of the latter were recommended.

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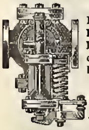

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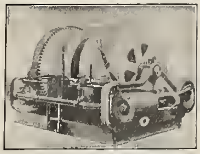

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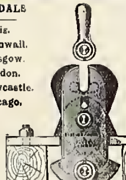

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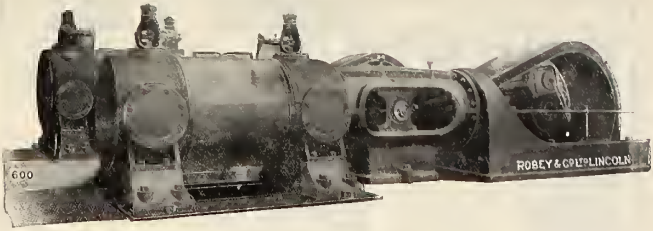

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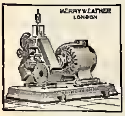

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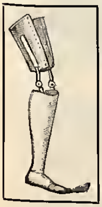

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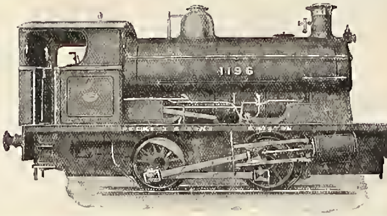

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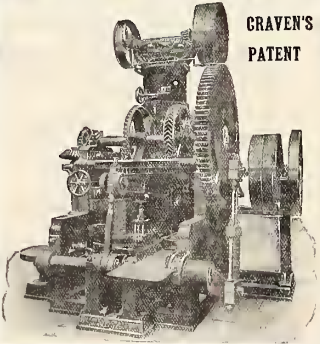

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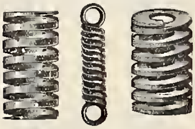

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   - (B) Swansea Valley.
   - (C) Brynamman District.
   - (D) Amman Valley.
   - (E) Ammanford.
   - (F) Loughor Valley.
   - (G) Gwendraeth District.
   - (H) Gwendraeth District.

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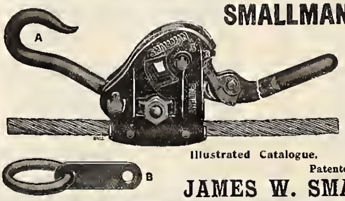
"The South Wales Coalfield," Part I., by Mr. H. K. Jordan, published in 1906, price £2 2s., dealt with the eastern half of the Coalfield, and may be obtained from the Secretary.



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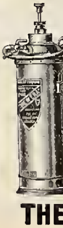

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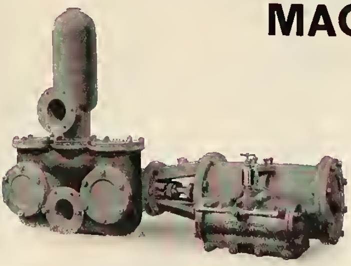

Fig. 600.—"CORNISH" STEAM PUMP for General Purposes.
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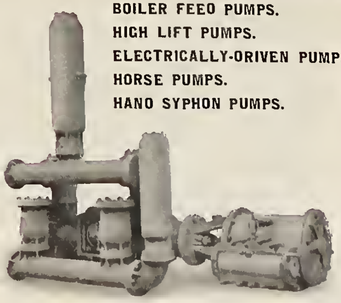

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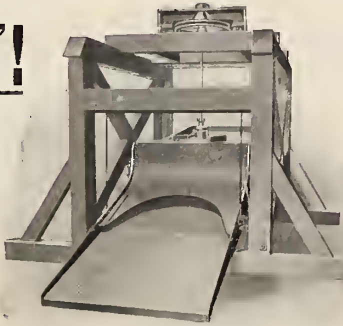

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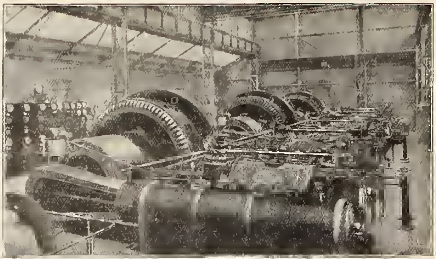

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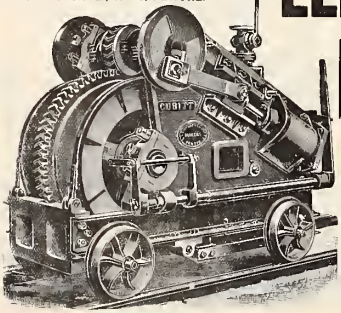

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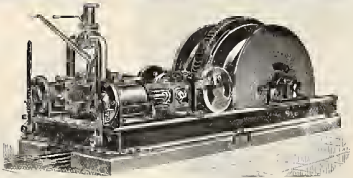

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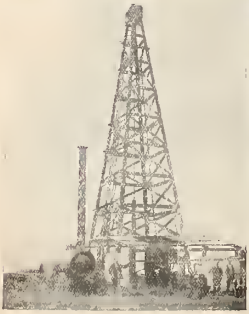

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Patent No. 29039—1910

THE PAPE MINERS' SAFETY LAMP.

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SPECIFICATION:

Dimensions—
Diameter 2¾ in.
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Weight, 5 lb.

Capacity, 2, 1½ c.p. bulbs from from 18 to 20 hours.

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For use in Gas Works, Oil Tanks, Mines, Garages, Submarines, Sewers, &c.

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10 in. by 3¾ in. diameter.
Weight, 3 lb.
Capacity, 1¼ c.p. for 12 hours.

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This lamp has been designed for use by the men in coal mines. The Accumulator is of a specially strong type, and has been manufactured to stand rough usage, to give long life and very low cost of maintenance. The actual capacity also is about 25 per cent. more than is claimed above, which will be found useful in emergencies.

This lamp can also be supplied in quantities on a maintenance contract at a fixed price per lamp per week.

Write for full particulars of our maintenance agreement.

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In stout Aluminium or Gunmetal Case, fitted with safety locking and sealing devices and Bull's-eye Lens.

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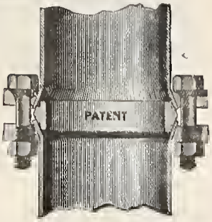

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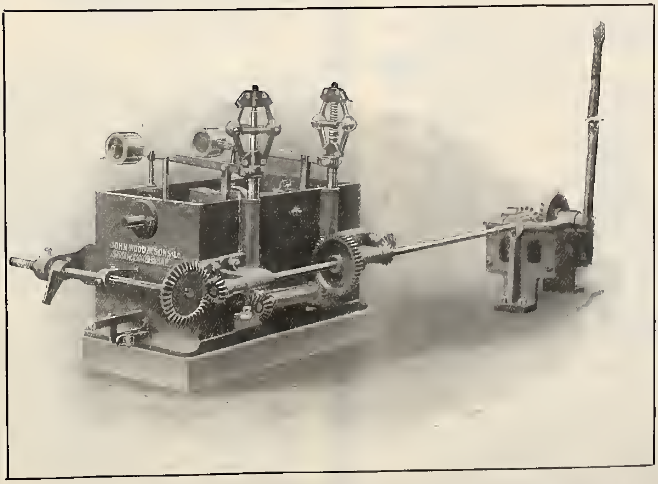

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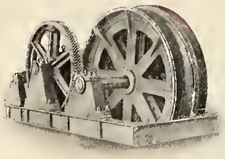

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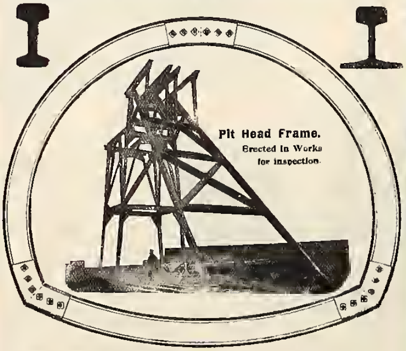

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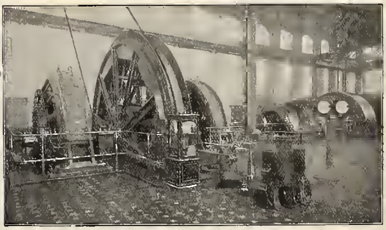

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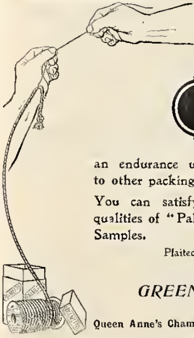

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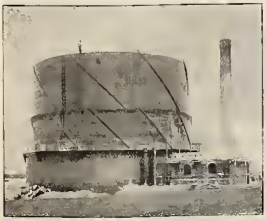

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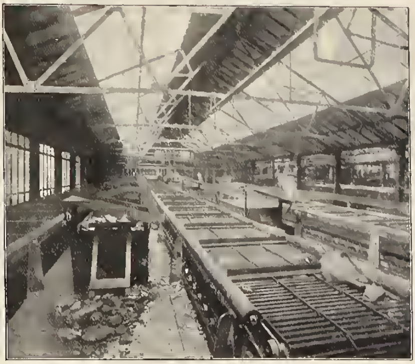

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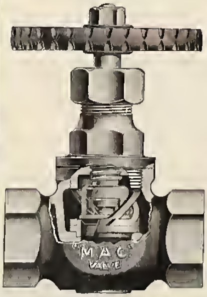

Figure 8200—Inside Screw
Figure 8205—Outside Screw

All parts interchangeable.
All joints made by metallic contact, thereby obviating the necessity of using jointing material.
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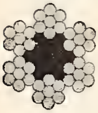
Fig. 2. HAULING.



Lang's Lay Ropes.

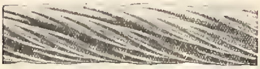


Fig. 26. WINDING.

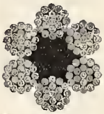
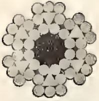


Fig. 1. HAULING.



Patent Flattened Strand Ropes.

Fig. 4. WINDING.

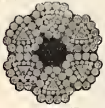
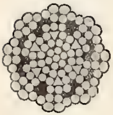


Fig. 13a. SINKING.



Advantages of Patent Flattened Strand Ropes

1. Greater wearing surface, therefore longer life of rope and less wear upon pulleys.
2. Greater strength, thereby admitting of smaller ropes being used for existing loads, or of increased loads without increase in size of rope.
3. Spliced easily and more effectively.
4. Less tendency to twist and stretch in working.

Fig. 13a for Sinking and Fig. 11b for Cranes, &c., are non-twisting.

Fig. 11b. CRANE, &c

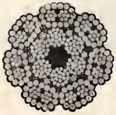


Fig. 15a.

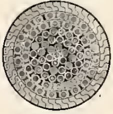


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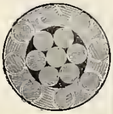
Fig. 20.



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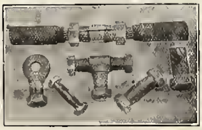
ALPHA Patent No. 3049/08. CABLE CONNECTOR



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THE COLLIERY GUARDIAN

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VOL. CIV. FRIDAY, AUGUST 30, 1912 No. 2696.

NORTH STAFFORDSHIRE INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

A general meeting of the members of this institute was held at the North Stafford Hotel, Stoke-on-Trent, on Friday, the 23rd inst., Mr. A. M. HENSHAW presiding.

The following gentleman, having been previously nominated, was elected as a member: Mr. Robert Smith, Biddulph Valley Ironworks, Stoke-on-Trent.

The CHAIRMAN announced that the council of the institute had nominated officers for the ensuing year as follow: — President, Mr. Hugh Johnstone, H.M. divisional inspector of mines for the Midland and Southern district. Vice-presidents, Messrs. John Gregory, J. T. Stobbs and F. H. Wynne. Vice-president of the Institution of Mining Engineers, Mr. Hugh Johnstone. Representatives on the council of the Institution of Mining Engineers, Messrs. Rugh Johnstone, John Gregory and A. Hassam.

Members of the council of this institute, Messrs. J. R. L. Allott, F. E. Buckley, John Cadman, D.Sc., John Reath, J. Maddock, W. G. Peasegood, W. Statham, W. Tellwright, J. Wain, P. Turner, Allen Heath, G. E. Lawton, W. Lockett, W. Barber and Norman McGowan. Secretary, Mr. F. R. Atkinson. Treasurer, Mr. G. E. Lawton.

The election will take place at the annual meeting in October.

New Rand Goldfield.

The CHAIRMAN gave a welcome to Mr. A. R. Sawyer, who was formerly one of H.M. inspectors of mines in North Staffordshire, and who was to read a paper on the subject of "The New Rand Goldfield." The chairman said it was a great pleasure to see Mr. Sawyer again in that room, where years ago they were accustomed to seeing him and hearing him read papers, which were landmarks in the history of mining in North Staffordshire, and which formed very largely the text-books of mining in the Midlands. He did not think anyone did more for the institute than did Mr. Sawyer during the 11 years he was associated with it, or that anyone did better work for it. Certainly no one did better work for the mining district of North Staffordshire than did Mr. Sawyer, and they always regarded him—and did still—as an excellent friend.

Mr. SAWYER acknowledged the welcome. Proceeding with his paper on "The New Rand Goldfield," he said he had alluded to this goldfield in papers read before the Institution of Mining Engineers in 1904 and 1907, and in his presidential address to the Geological Society of South Africa in 1905. All the information he had obtained since 1907 was contained in his various reports to the New Rand Limited.

The Rand from Randfontein to Modderfontein covers 45 miles from east to west. The outcrops having mostly been worked out, the workings are now within a vertical depth of about 1,000 ft. to 4,000 ft. The average yield is between 6 dwts. and 7 dwts., or between 25s. and 29s. per ton. It has produced to date over £300,000,000, and is now producing over £3,000,000 per month.

The geological systems as established in the Transvaal and Orange Free State are in chronological order, starting with the youngest :—

Karroo, with usually only one coalseam.
Pretoria.
Dolomite.
Black Reef.
Vaal River.
Witwatersrand.
Swaziland schists, resting on the old or basement granite.

The Witwatersrand system is about 20,000 ft. thick. Portions of this system outcrop in four large areas; the northern one contains the Rand.

The New Rand area, which lies 50 miles south of the Rand, contains only a very small outcrop of Witwatersrand rocks; the remainder is covered by younger Karroo beds.

The Witwatersrand rocks were laid down more or less flat, like other sedimentary rocks, over a large submarine plane, in which the general movement was one of subsidence, with a gradual encroachment on the land, which consisted of granite and Swaziland schists—possibly, as Dr. Mellor states, "under deltaic conditions on a very large scale, alternating with more or less deeper water conditions." Occasionally strong currents swept the shore, forming large, more or less continuous sheets of conglomerate. The occurrences of pebbles in the Hex River reef, 32 miles east of the site of the New Rand boring operations, as large as those in the Main Reef series on the Rand, show that these currents were sufficiently powerful to distribute such pebbles as far south as the New Rand area, in which similar-sized pebbles have already been discovered in some of the reefs. Earth movements subsequently occurred as elsewhere; the beds were tilted, curved and faulted. Denudation removed the tops of the anticlines, exposing the underlying granite, which, being plastic, had shared in the curving movement. Younger rock systems were then deposited unconformably on these older rocks in part, denudation and erosion being constantly at work. Therefore, this 20,000 ft. thick Witwatersrand system of rocks, although it only outcrops in certain areas, must underlie all these younger rocks, forming a vast and thick connected whole, whose limit no one can gauge and whose continuity is only interrupted by granite exposures. This Witewatersrand system of rocks is divided into an upper and lower system. The lower system, which rests on the "Old Granite," so called to distinguish it from a much younger Red Granite area—which occurs north of Pretoria, or on intervening Swaziland schists—consists, starting with the youngest, of :—

The Jeppestown series,
The Government Reef series,
The Hospital Hill series.

The rocks of which they are composed are quartzites, slates, grits and conglomerates. The conglomerates in the Witwatersrand system occur more or less in groups, which in mining phraseology are also called series. There are several of these groups or series. The one, from which the vast amount of gold referred to as being obtained on the Rand, is called the Main Reef series. It occurs near the bottom of the upper system, and is separated from the underlying Jeppestown series, on the Rand, by from 500 to 600 feet of quartzite and grits. The Main Reef series consists of one thick and "poor" conglomerate bed, of a so-called Main Reef "leader" above it, and of a South Reef above the "leader." The gold on the Rand is mostly obtained from the two thinner conglomerate beds, the "leader" and the South Reef.

Although these various conglomerates have frequently well-known characteristics, it is not always easy to determine their correlation from borehole cores with absolute certainty, owing to secondary silicification and consequent partial obliteration of the pebbles in depth. Conclusive proof as to the identity of any conglomerate beds so intersected can only be obtained by determining their stratigraphical position in the system. After the intersection of the thin reef in Nos. 15 and 16 boreholes on the New Rand area, these had to be deepened to establish the fact that instead of this reef being one of the non-payable reefs above the South Reef, it is a non-payable reef below the Main Reef.

The Witwatersrand rocks have been thrown into folds or anticlines and synclines, and have also been faulted and crumpled. These rocks on the Rand have a general dip to the south, and probably are the southern limb of a former anticline, the norther limb of which lies at the same depth from the surface beneath masses of black reef, dolomite and Pretoria rocks. The formation, which gradually dips at a lesser angle and is hidden by these younger formations to the south, reappears with a northern dip in the so-called Heidelberg district, and there forms the northern limb of an anticline, the top of which has been removed by denudation, and which has been called the Villiers anticline.

The southern limb of this anticline forms the New Rand goldfield. The Witwatersrand strata in the New Rand area has, therefore, a southern dip as on the Rand itself.

The Witwatersrand strata have been proved by boring over a distance across the formation of about three miles. The results are sufficient to identify the three sections of the lower Witwatersrand system—namely, the Jeppestown series, the Government Reef series and the Hospital Hill series. A thickness of about 600 ft. of more or less mineralised Main Reef quartzites and auriferous grits, containing a thin conglomerate reef just as on the Rand, has also been proved overlying the Jeppestown series. The persistency of this thin reef is proved by the fact of its intersection in Nos. 15 and 16 boreholes, which are 2,125 ft. apart.

The aggregate results obtained by the boring operations point pretty conclusively to the Main Reef series, whether thinner or thicker, poorer or richer than on the Rand, being ere long intersected in No. 17 borehole, unless the ground is faulted.

The principal reason why some of the conglomerates of the Main Reef series contain gold in payable quantities is because of their proximity to basic or ultrabasic igneous intrusive rocks, the mineralisation of the reef emanating mostly from them.

No. 17 borehole has been temporarily stopped at a depth of 1,164 ft. and will be restarted very shortly. Its progress will be followed with intense interest on scientific and commercial grounds alike.

If the operations are successful the importance of this goldfield to those interested, who control about 20 miles on the strike, is obvious. A new goldfield similar to the Rand would in many ways prove of great importance to South Africa. The work done by this company must incidentally be of considerable value in the solving of geological questions relating more especially to the Witwatersrand system.

If we were successful, this would be the first payable goldfield found not by chance, as has been invariably the case hitherto, but by geological reasoning or induction.

There are important features connected with this auriferous area which would be of great advantage if payable reefs are discovered in it :—

1. The Karroo beds, which are horizontal and which contain in part a workable coalseam, vary in thickness here from 666 ft. to about 800 ft. They lie immediately on the Witwatersrand strata. Neither the water-bearing dolomites, nor the hard Klipriversberg amygdaloids of the Vaal River system intervene, as they do in other localities where the Witwatersrand strata are equally hidden.

2. The advantage of leaving about 800 ft. of impervious cover instead of an outcrop will greatly simplify the water question, which is often a serious difficulty in almost all mining propositions where the outcrop touches the surface.

3. The Witwatersrand strata dip more or less to the south at an angle of 30 degs., an excellent angle for working. At whatever depth, therefore, the reefs may be intersected in No. 17 borehole, their sub-outcrops would occur at a depth of only about 800 ft. from the surface, to near which point a shaft could be sunk within eight months.

4. Whereas on the Rand the ore is now being worked at vertical depths of from about 1,000 ft. to 4,000 ft., we would be working at depths of from 800 ft. to not more than 2,000 ft.

5. The New Rand is bounded, and in part traversed by the Wilge River, so that a sufficient supply of water for all purposes may be depended upon all the year round.

6. The area is situated in one of the healthiest parts of South Africa, and the altitude is not too great.

7. We would have the benefit of the great progress in methods of ore reduction made on the Rand since its discovery.

The CHAIRMAN said it had been very interesting to hear Mr. Sawyer's explanation of what, after his description, appeared to be a more or less simple geological proposition. And if, instead of searching for gold, they were looking for a seam of coal, it seemed to him they would proceed in much the same way as Mr. Sawyer had proceeded, and bore, in a line towards the dip, a series of holes in the hope of finding the seam of coal. The sequence, therefore, to his mind appeared to be quite reasonably correct, and the deductions that had been drawn from the sections of the boreholes quite feasible. There was a difference between searching for gold and searching for coal. Coal could be readily identified, and if they as coalminers found coal in a borehole they would know what it was; but if they found reef, they would have great difficulty in saying whether it was reef at all, or whether it was payable reef.

Mr. Henshaw proceeded to put a number of questions, and, in reply, Mr. Sawyer amplified the statements in his paper.

One of the questions asked by the Chairman was in regard to the discovery of the reef. He said it was quite different to finding a seam of coal, and when they only had a borehole giving a core about an inch in diameter, it seemed to him quite an easy thing to pass through the reef, to bring it up and not know it. As so many quartzites contained gold, were there sufficient analyses made to avoid passing through the gold reef?

Mr. Sawyer said there was no chance of that happening. They were not working by contract; they had their own men, and they had got their own drill. Moreover, he thought they were recovering nearly 100 per cent. of the core. There was no chance of missing the reef.

In reply to a further question, he observed that the reef was unmistakable if they recovered the core.

Col. A. H. Heath proposed a vote of thanks to Mr. Sawyer, whom he heartily welcomed, recalling his work in North Staffordshire as a Government inspector of mines. Incidentally, Col. Heath expressed gratification that the work of erecting their mining school was now proceeding. Referring to the paper, he said at one time he thought Mr. Sawyer was rather bold in defining the district, on which he had been lecturing as a goldfield, because goldfield was a relative term. Many of the goldfields that had been recommended to the public as a profitable source of investment had no prospect of success, but in this case, whatever were the prospects of success in finding the reef Mr. Sawyer was looking for, of this they could be assured: that it was an honest venture, and one that was promoted and recommended by a man who was as good an authority on goldmining as anyone in South Africa. Something like £100,000 had already been provided for the operations that had taken place. The boring had stopped for the present, because the rod had broken, leaving 400 ft. of it and the cutting diamonds behind it, and also because the manager, for personal reasons, had had to return home, but the operations would be continued. He wished Mr. Sawyer success in his undertaking, and added that if he were successful in finding the reef, there would be such a humming on the Stock Exchange as had not been heard before.

Mr. R. H. Cole seconded the vote of thanks, which was heartily carried.

Last Friday, Saturday, and on Monday, numbers of the colliers had to be conveyed in wagonettes from the Bickershaw Collieries, near Wigan, owing to the flooded state of the roads.

Developments in Cumberland.—A correspondent writes: The Ellenborough Colliery, where a fine seam of coal was struck a week or two ago, is practically in the centre of the great Cumberland coalfield. Twenty-five years ago it was one of the most important collieries in West Cumberland, employing about 600 coal hewers, and the new discovery will go a long way to restore it to its former position. The colliery was sunk about 40 years ago by Messrs. Harris to a depth of about 130 fathoms. The seams worked at the time were the Cannel and Metal bands of the Ten-quarters, all of which yielded coal of fairly good quality. The Virgin seam was also found, but it was never worked to a very large extent owing to its deficient roof. The Ten-quarter seam was gradually worked to a fault, and it is interesting to note that the present company have struck the coal from the Rattler band on the other side of the trouble. The opinion of the most experienced coalminers who have been employed at "Guslot" is that there is an immense area that has never been touched, and sufficient coal to be won that will last for two or three generations. Under the present company, the Rattler band, the Virgin, and the Yard band have been worked, and both have yielded coal of good quality. In addition to the new seam, which will be set away in the course of a week or two, there is the Cannel band over the Ten-quarter, which is very far from being exhausted. About 16 fathoms below there is the Little Main, and beneath this there is the Three-quarter seam. The two last-named seams have never been touched by any of the companies who have previously worked the colliery, and should the Ten-quarter come up to expectations, it is safe to assume that still further important developments may be expected at this colliery in the near future.

THE "STACH" MINER'S ELECTRIC LAMP.

The "Stach" mining lamp, which has been awarded a prize by the Home Office, in connection with the competition that has just been decided, is of very strong construction and well adapted to withstand the rough usage necessarily obtaining in mining work.

As will be seen from the accompanying drawing, it consists externally of a wrought iron welded case, carried by an iron hoop, so arranged that the lamp is capable of being used in any position. To the top of this hoop is attached a spiked iron hook, for the purpose of suspending the lamp during work. On the top of the iron case there is fitted a brass ring rendered water-tight by means of a rubber seating. The ring and the case are arranged to fit together, and are locked by means of an iron pin worked by a spring. This spring can only be withdrawn by means of a powerful magnet. On the upper part of the lamp is a stout brass wire guard, protecting the glass globe and the glow lamp. The glass globe is of considerable thickness, and is set upon a rubber ring, which also renders this part of the lamp water-tight and gas-tight.

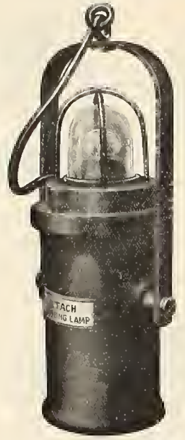


Fig. 1.—The "Stach" Miner's Electric Lamp.

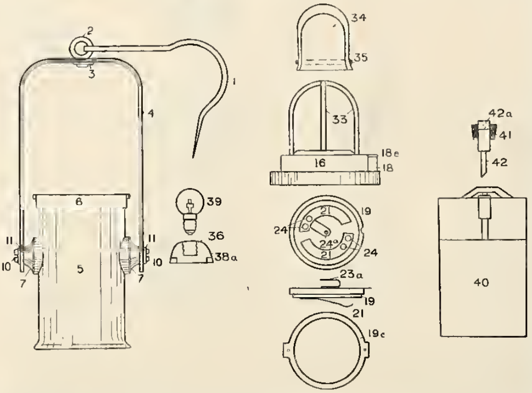


Fig. 2.—Details of Lamp.

Reference to Parts of "Stach" Lamps, Type "R":—1, carrying hook; 2, eye with rivet; 3, washer for same; 4, hoop; 5, pot; 6, fitting ring; 7, side springs; 10, side screws; 11, washers for same; 16, upper ring; 18, magnetic lock; 18e, covering plate for magnetic lock; 19, drilled ebonite disc; 19c, bayonet ring; 21, contact springs; 23a, contact springs for glowlamp; 24, screws for contact springs; 24a, lamp contact screw; 33, bent brass rods for guard; 34, patent bell glass; 35, round rubber fitting ring for same; 36, lampholder; 38a, nickel reflector; 39, patent glowlamp; 40, accumulator; 41, rubber plug; 42, gas outlet cartridge.

The metal filament lamp is of the Aegma type, 2 candle-power 2 volt, and is of the screw pattern. It has no tip, but is sealed off, so that the bulb is quite smooth. Between the leading-in wires there is placed a little wall of glass, so that even if the lamp is destroyed by breakage of the bulb and filament, the leading-in wires cannot be brought together so as to cause a short-circuit and a dangerous spark.

The method of lighting the lamp is to turn the upper part in a clockwise direction relatively to the lower part. This causes the contact springs to slide over the terminals of the accumulator, thus ensuring a good rubbing contact with a wiping action. Switching off is performed by reversing this operation. There is no perceptible spark at opening or closing the circuit, and lengthy experiments have been carried out which have proved that the ignition of inflammable gas, either inside or outside the lamp, is impossible.

The cell consists of a 2-volt, round, semi-dry, lead accumulator, in a celluloid case. It is so constructed that it not only always fits down into the proper position in the iron case, but it cannot be put on to the charging board in the reverse direction. This is very simply effected by means of a celluloid projection fixed eccentrically on the bottom of the cell, which also prevents any rotary motion in the battery case, as a corresponding recess is formed in the latter. The electrodes are wrapped in glass wool, which absorbs some two-thirds of the sulphuric acid used as electrolyte. The plates are so prepared that they are able to stand rapid discharge, and they can also be left for many months in a discharged condition without being damaged in the way in which most accumulators are damaged by such treatment. In consequence, they may be charged and discharged over 200 times before their useful life is exhausted, whereas 60 to 90 charges are the maximum limit for any ordinary accumulator. The special stopper is provided to prevent the escape of acid, and to render harmless any gas evolved during discharge. This stopper is so arranged that it is impossible to spill the acid, even if the cell is inverted, and should any very small drops of acid come through with the gas, they are taken up by a small and easily replaced piece of absorbent material. The terminals consist of substantial lead blocks properly marked "positive and negative," and the celluloid case is hermetically sealed, with the exception of the special stopper above described.

The lamp used gives 2-candle power, and one charge will last for 14 hours. A concave nickel or aluminium reflector can be provided if desired, so as to project the light in any direction, or to shield the eyes during use.

The lamp, which is made by the Electrical Company Limited, 122-124, Charing Cross-road, London, W.C., is already in use in considerable numbers. Its weight, when ready for use, is under 6 lb.

It was announced on Monday that a sub-rescue station for Lord Ellesmere's collieries is to be established at Tynesbank, Walkden. A great number of Lord Ellesmere's employees have been trained at Howe Bridge.

AN INTERESTING MEMORIAL.

Through the courtesy of Mr. Walter Bagshaw, F.R.M.S., hon. curator of the Wilton Park Museum, Batley, we are enabled to reproduce a photograph of a handsome statuette that has just been unveiled by the Mayor of Batley.

One of the most interesting developments of modern art, due in large measure to the work of such men as Rodin and Meunier, is its consecration of the rugged and virile episodes of everyday toil. The tense gnarled sinews of the labourer have their beauty as great as that of the graceful outlines of the Apollo Belvedere, and the association of industry has, apart from the figure, a peculiarly human interest.

"The mandate of God to his creature man is work. All true work is sacred. What man can do is his greatest ornament and he always consults his dignity by doing it."—(Carlyle). This is the inscription attached to the fine model of a miner (shown in the photograph) which has been presented to the Batley Park Museum by a gentleman who desires to remain anonymous. This gentleman expressed a wish to present to the museum a bronze figure representing the coal-getting industry, and in making the idea known to Mr. Bagshaw, said he would like it to be of such a character that it might impress the working man, enabling him to realise that the man who earned his living by "the sweat of his brow" might not only be a man, but a gentleman.

With these facts in mind, Mr. Bagshaw approached Messrs. Elkingtons, art metal workers, &c., of Birmingham, who undertook the work. The statue shows a miner in the ordinary working dress adopted locally, and he is carrying his pick over his left shoulder, and his safety lamp in his right hand. The figure is 2 ft. 6 in. in height, and stands on a block of coal 2 ft. 6 in. high and 15 in. square. The block of coal rests on a marble slab, 2 ft. 6 in. square and 6 in. thick. At the base of the model there is a laurel wreath. The model rests on a wood pedestal, 2 ft. 6 in. high, and stands altogether over 8 ft. high. Attached to the block of coal is a silver plate bearing the inscription quoted above.

It was announced on Monday that a number of urban mining districts in south-east Lancashire (including Farnworth, Worsley, Swinton and Tyldesley) are approaching the Home Office authorities with a view to securing immediate recognition as examination centres for firemen's certificates.

COALMINING IN NEW SOUTH WALES.

The report of the Under-Secretary of Mines for New South Wales, for the year 1911, has been issued. The total output of minerals last year was valued at £9,758,006, or an increase of £1,021,537. The output of coal was 8,691,604 tons, valued at £3,167,165, which represents an increase of 518,096 tons and £157,508 in value. With the exception of a few stoppages in individual mines, due to industrial troubles, the collieries in the Northern district were at work during the whole of the year. In the Southern district, also, the coal trade has been more regular. The total quantity of coal raised in the State to the end of 1911 is estimated at 171,710,165 tons, valued at £65,427,672.

A gratifying increase is shown in connection with the export trade, the shipments during 1911 amounting to 5,024,080 tons, valued at £2,664,191, as against 4,690,433 tons, valued at £2,459,156, in 1910. The coal shipped to oversea ports totalled 2,498,304 tons, valued at £1,355,501, being an increase of 286,368 tons and £153,830 in value. The exports to Australasian ports amounted to 2,525,776 tons, valued at £1,308,690, an increase of 47,279 tons and £51,205 in value.

The following table shows the output and average value per ton in each of the producing districts:—

District.	Output. 1910. Tons.	Output. 1911. Tons.	Average value per ton. 1910. s. d.	Average value per ton. 1911. s. d.
Northern......	5,366,975	5,793,646	8 1·44	8 0 13
Western	931,524	831,337	5 5 58	8 0 72
Southern......	1,875,009	2,066 621	6 1·76	6 1 88

The average value of the output during the past ten years has been as follows:—1902, 7s. 5·13d.; 1903, 7s. 3·61d.; 1904, 6s. 7·54d.; 1905, 6s. 0·5d.; 1906, 6s. 1·55d.; 1907, 6s. 9·01d.; 1908, 7s. 3·98d.; 1909, 7s. 5·53d.; 1910, 7s. 4·37d.; 1911, 7s. 3·45d.

The quantity of coke made in 1911 totalled 264,687 tons, valued at £184,337, which exhibits a decrease of 17,650 tons and £4,732 in value. Messrs. G. and C. Hoskins, at Lithgow, have built 80 ovens, but so far they have not been in operation. In the Southern district, the Corrimal-Balgownie Company is building 40 new ovens; in the Northern district a company was floated to erect by-product ovens at Hexham, but so far building operations have not commenced.

According to the report of Mr. A. A. Atkinson, chief inspector of coal and oil-shale mines, there were 135 mines at work in 1911, a decrease of 13. This was largely due to the temporary opening of several small mines during the general strike in 1909-10. Of the total 88 were in the Northern, 22 in the Southern and South-western, and 25 in the Western district. There were employed in the above mines a total of 17,657 persons—12,872 below and 4,875 above ground—as compared with 18,044 in 1910. In 1911 35·55 per cent. of the output in the Northern district was obtained from the Borehole seam in the upper coal measures and 50·67 per cent. from the Greta seams in the lower coal measures. This is the first time that the output from the Greta seams does not indicate a large percentage increase over that produced from the Borehole seam.

The quantity of coal and shale raised per person employed was 496 tons, or, taking only those engaged below ground, 681 tons. The corresponding figures for 1910 were 457 tons and 611 tons respectively.

The quantity of coal cut by machinery shows an increase of 387,402 tons as compared with 1910. The total quantity, viz., 2,637,672 tons, represents 33·4 per cent. of the total output. The greater part of the increased quantity cut was obtained by electrically-driven machines. In 1911, 202 machines were at work, compared with 181 in 1910; of these, 74 were of the percussive type, six of the revolving bar type and 122 of the chain-breast type; 128 were operated by electricity, with an output of 2,074,767 tons, and 74 by compressed air, with an output of 562,905 tons.

During the year 15 fatal and 125 non-fatal accidents were reported, each of the fatal accidents causing one death only, and there were six fewer deaths than in the preceding year. Of the deaths, none were due to falls, one to haulage, two to "sundries" below ground, two to accidents on surface tramways and one to a miscellaneous cause on the surface; 12 of the deaths occurred in the northern district, two in the Southern and South-western district and one in the Western district. The death-rate works out at 0·49 per 1,000 persons employed, or 584,447 tons of mineral raised per life lost.

No accident was caused by the ignition or explosion of firedamp or coaldust. It is noted that four of the fatal accidents from falls occurred during the first three months of the year in connection with the working of top coal at Pelaw Main Colliery. These occurrences caused a good deal of discussion amongst the mining community—particularly in the Maitland-Cessnock coalfield—and eventually a Royal Commission was appointed to enquire generally into the working of the thick seams of the coalfield.

The Killingworth Colliery was reopened on June 14, after having been sealed down since December 7, 1910, and commenced to get coal again about August 28. The report of the enquiry has not yet been printed.

During the year two Meco apparatus have been purchased by the Government, and several demonstrations have taken place at Newcastle, whilst meetings have been held with a view to the establishment of rescue stations, but Mr. Atkinson says the response of the mineowners has been somewhat lukewarm. In consequence of the seams of the Maitland coalfield being subject to spontaneous combustion, it seems desirable that the first rescue station should be erected in that district.

It is hoped that the geological work on the coastal portion of the southern coalfield will be completed during the present year, and every effort will be made to complete the memoir by the close of the year. In a progress report, Mr. L. F. Harper states that three isolated areas were dealt with during 1911—namely, Wollongong-Bulli, Termeil, and Robertson districts. In a report on the last named area, it is stated that the upper or Newcastle-Bulli coal measures underlie Robertson at a depth of about 1,400 ft., and are exposed in several natural sections. There is undoubted evidence that they are thinning rapidly as traced south and west from the Illawarra coastal range in the neighbourhood of Macquarie, and that, with two exceptions, the coal-seams found in the neighbourhood of Mount Kembla die out entirely in the south-west corner of the area under consideration, and the two remaining seams deteriorate in quality. The prospects of obtaining marketable coal in any quantity in the neighbourhood of Robertson are, therefore, practically *nil*.

Firemen's Certificates.—Mr. J. Duncan Millar, M.P., has received the following letter from the Home Secretary, in answer to the representation made by him on the subject of the present system of examinations for firemen's, &c., certificates under the Coal Mines Act:—"Dear Sir,—The Home Secretary desires me to say, in reply to your letter of the 29th ult., that he has made enquiries as to the arrangements for conducting the examinations for firemen's certificates under the Coal Mines Act 1911, and he finds that every care is taken to arrange for the examination of candidates for these certificates at convenient centres. In the Glasgow district, applicants receive a form in which they are requested to state at what centre it would be convenient for them to be examined, and out of 26 examinations already held since the recognition of the Royal Technical College as an examining authority, eight have been conducted at outside centres, viz., Bellshill, Kilmarnock, and Hamilton. No candidates have been asked to travel to Glasgow who have expressed a desire to be examined elsewhere, except in the case of those from Coatbridge, and it was at the request of the principal of the Technical School there, at which the candidates had been under instruction, that they were asked to go to the Glasgow College. As the return fare between Coatbridge and Glasgow is only one shilling, it does not appear that any serious hardship can have been inflicted upon them. In the Edinburgh district, Mr. McKenna finds that the only firemen who had been asked to attend these examinations at the Heriot-Watt College are those in the Loanhead district, for which Edinburgh is the nearest available centre, and those who attended the college itself for their class instruction, and for whom, therefore, the college was the obvious centre for examinations. Circulars have been sent out to the mine managers throughout the districts of Fife and the Lothians, asking them to send a list of the mine firemen who are ready for examination, and to say which centre would be the most convenient for their men. The college authorities have also been in communication with all the centres at which apparatus at present exists with a view to making arrangements to suit the convenience of each district. Examinations have already been held in several local centres. In these circumstances, it appears to Mr. McKenna that the system is working smoothly, and that every effort is being made to avoid inconvenience to the candidates. There is evidently a misunderstanding with regard to the school boards. In the course of the preliminary enquiries, certain school boards were asked whether they wished to apply for the Home Secretary's approval; but it is a mistake to say they were invited to make arrangements for the examination. The arrangements in connection with these examinations have received repeated and very careful consideration by the Home Secretary in consultation with the Secretary for Scotland and the Scottish Education Department; and Mr. McKenna is satisfied that the scheme adopted is that best suited for the circumstances of Scotland and the Scottish education system. He is advised that it would not be possible to conduct the full examination efficiently at a less fee than 7s. 6d., though, as you are no doubt aware, a smaller fee is fixed for firemen who require to take only part of the examination.—Yours faithfully, George Chrystal. Mr. Duncan Millar is still in further communication with the Home Secretary with a view to securing the recognition of other institutions beyond the Royal Technical College, Glasgow, and the Heriot-Watt College, Edinburgh, as examining authorities under the Act.

GEOLOGY OF THE WARWICKSHIRE COALFIELD.

At a recent meeting of the Geological Society the following communications were read :—

"On the Geology and Palæontology of the Warwickshire Coalfield," by Robert Douglass Vernon, B.A., B.Sc., F.G.S.

The main objects of this paper are to determine the true age of the so-called "permian" rocks of Warwickshire, and their stratigraphical relationship to the underlying carboniferous rocks and to the overlying deposits of triassic age. Further, the carboniferous rocks are subdivided into groups, and the age of the subdivisions is determined from a study of the fossil flora. The results may be summarised as follow :—

Table Illustrating the Carboniferous and Permian Succession in Warwickshire.

Name.	Characters.	Chief fossils	Thickness in feet.
Permian	Calcareous, false-bedded red sandstones, and lenticular red marls spotted with green; with two horizons of limestone conglomerates, the lowest of which forms the base.	*Walchia filiciformis* (Schlotheim). *Calamites* sp. *Dasyceps bucklandi* (Lloyd). *Oxyodon britannicus* von Huene.	? 1,000.
Keele beds ...	Red and purple sandstones and marls, with marly breccias, and, towards the base, beds of grey sandstone. Three thin beds of *Spirorbis* limestone, the lowest (and thickest) of which is taken as the base.	*Pecopteris polymorpha* Brongn. *P. arborescens* Schloth. *P. miltoni* (Artis). *Spirorbis*. Ostracoda.	1,000 to 1,500.
Haunchwood sandstones.	Grey sandstones and shales, with thin coals and some red mottled marls towards the top.	*Neuropteris ovata* Hoffmann. *N. scheuchzeri* Hoffmann. *N. rarinervis* Bunb. *Pecopteris miltoni* (Artis). *P. arborescens* Schloth. *Sphenophyllum emarginatum* Brongn.	300 to 450.
Nuneaton clays	Red and purple mottled marls and clays, with thin Espley rocks, a *Spirorbis* limestone, and local breccias.	*Cordaites borassifolius* Sternb. *Calamites* sp *Spirorbis*. Ostracoda. Fish-remains, undetermined.	80 to 150.
Middle coal measures.	Grey sandstones and shales, with thick coalseams and beds of ironstone, sandstones and breccias towards the top, which thicken to the north. An impersistent conglomerate forms the base.	*Zeilleria delicatula* (Sternb.). *Corynepteris coralloides* Gutbier. *Sigillaria boblayi* Brongn. *Lingula mytiloides* (Sow.). *Myalina compressa* Hind. *Pterinopecten papyraceus* (Sow.). *Carbonicola aquilina* Sow. *Anthracomya williamsoni* Brown. *Naiadites carinata* Sow. *Megalichthys hibberti* Agassiz. *Rhizodopsis sauroides* Willm. *Acanthodes wardi* Egert.	400 in the south to 700 in the north.

On stratigraphical and palæontological evidence it is shown that a large area of rocks previously mapped as permian is really carboniferous.

The carboniferous rocks are subdivided into groups which, on palæobotanical evidence, are proved to belong to the following three horizons of the Westphalian series: — The upper coal measures, the transition measures, and the middle coal measures; the lower coal measures are found to be absent.

The fossil flora is described in detail, and a brief account is given of the freshwater and marine faunas of the middle coal measures. The carboniferous rocks of Warwickshire are correlated with those of the other coalfields of the Midland province, and it can thus be demonstrated that there is a marked southerly attenuation and overlap of each of the subdivisions of the carboniferous system.

Some account of the permian and trias is given, in order to show the unconformable relationship of the permian to the carboniferous on the one hand, and that of the trias to the whole of the palæozoic rocks of the district on the other.

"On the Discovery of a Fossil-bearing Horizon in the Permian Rocks of Hamstead, near Birmingham," by Walter Henry Hardaker, M.Sc. (communicated by Prof. Charles Lapworth, LL.D., F.R.S., F.G.S.).

Some quarries in the permian rocks in the neighbourhood of Hamstead, near Birmingham, have afforded to the author an interesting series of fossils. These consist chiefly of the impressions of plants and of the footprints of amphibia assignable to several species.

The quarries from which the fossils have been obtained occur in that broad band of strata which is coloured upon the Geological Survey map as permian, and fringes the eastern side of the South Staffordshire coalfield.

The author describes and illustrates in detail the group (and sub-groups) in which the fossils occur, and shows that the group as a whole belongs in its lower parts to the Midland middle permian (or calcareous conglomerate and sandstone) division of Mr. Wickham King, and in its upper part to his upper permian (or breccia and sandstone) division.

Most of the plants and animal footprints discovered belong apparently to recognisable forms which have been long known to occur in the Rothliegende (or typical lower permian) of Germany, and they have little or no resemblance to those of the undisputed upper carboniferous of any known area; and the conclusion is drawn that these fossil-bearing Hamstead strata must in future be regarded as of Rothliegende or true lower permian age.

In discussion on the two foregoing papers, Prof. C. Lapworth said, in the course of a written communication, that both papers had a most important bearing upon the vexed and difficult question of the true limits of the so-called "permian" red rocks of the Midlands. Both in the South Staffordshire area dealt with in Mr. Hardaker's paper, and in the Warwickshire area covered more or less by Mr. Vernon in his paper, the so-called "permian" rocks apparently graduate upwards conformably from undoubted carboniferous deposits with highly profitable coalseams. The discoveries of Mr. Cantrill in the west, and Dr. Gibson in the north, prove that upper coal measure conditions continued at all events into the lower divisions of these red rocks, and even in composition and coloration the Midland permian has much in common lithologically with the true upper coal measures; while, as Mr. Kidston and Mr. Meachem had shown, the lowest members of the so-called "Midland permian" afforded fossils which were distinctly of the type of those of the upper coal measures. Now that Mr. Hardaker had so successfully worked out, almost bed by bed, a complete descending succession of strata from his highest permian zone down into the Thick coal seam of South Staffordshire; and that the various recent borings in search of coal through Warwickshire had made known the descending succession, almost bed by bed, from the higher zones of the so-called "permian" of Warwickshire down into the Hawkesbury Thick coal and its equivalent; it was plain that (if Mr. Hardaker's identification of the fossils discovered by him in the hitherto barren Midland permian were eventually confirmed by palæontologists) British geologists might now for the first time feel some assurance that the solution of the chief of the permian problems of the Midlands was almost within sight, and might anticipate that such a solution would have the usual effect of justifying and at the same time harmonising the differing views of previous observers.

Dr. Walcot Gibson remarked that, as several borings and sinkings for coal through the red rocks of Warwickshire were in progress, the very interesting results obtained by the authors of these two papers should stimulate local geologists to obtain further evidence on an important and hitherto unsolved problem. The "lower permian" of Prof. Hull and Mr. Wickham King was everywhere in the Midlands conformable to the coal measures, and contained carboniferous plants. In the Claverley boring, situated near Enville, which is the typical area of the Salopian permian, all the plants, of which some specimens were exhibited by the director of the Geological Survey, are carboniferous forms, and one of them (*Neuropteris heterophylla*) is a characteristic middle coal measure species. He would ask Mr. Vernon to state on what evidence he based the unconformity between the limestone conglomerate series with permian fossils and the underlying Keele beds with carboniferous plants.

Dr. C. A. Matley mentioned that his investigations of the keuper rocks of Warwickshire had brought him to the western edge of the ground shown on Mr. Vernon's map, and enquired whether that author had been able to confirm the position of the lines shown on the Geological Survey map as separating the permian from the trias. The speaker had not found the western boundary always well defined, while the boundary fault seemed, at Maxstoke Priory, to be farther west than the Geological Survey map indicated.

The President (Dr. Strahan), from his own recollection of the ground, believed that there was a continuous and conformable sequence from the lowest coal measures of Warwickshire up into the Keele beds. He therefore asked for some further details respecting the section in which the Haunchwood sandstone was said to rest unconformably upon upturned middle coal measures.

Mr. Vernon, in reply, pointed out that the unconformity at the base of the permian was inferred from the fact that 75 per cent. of the pebbles in the Corley conglomerates consist of carboniferous limestone. Further, the lowest beds of the Corley conglomerates can be shown to rest upon different horizons of the Keele beds; thus, near Exhall, the Keele beds are only about 650 ft. thick, but near Coventry, in the borehole at Whitmore Park, they reach 977 ft., while in the Kenersley borehole they attained a thickness of 1,413 ft. In answer to Dr. Matley, he said he thought that the importance of the western boundary fault near Nuneaton had been much exaggerated. In reply to the point raised by the president, Mr. Vernon said that, although the subdivisions of the upper coal measures are conformable, near Polesworth, the Nuneaton clays are locally absent, and so the nearly horizontal Haunchwood sandstones come to rest upon middle coal measures which have a westerly dip.

Mr. Hardaker stated nothing was known as to the line of separation between the upper carboniferous and the permian rocks in the Hamstead area. An unconformity accompanied by a bed of conglomerate occurs in the shaft at Hamstead Colliery at a depth of 802 ft.; but this cannot be taken as the boundary between carboniferous and permian, for the carboniferous plant, *Odontopteris lindleyana*, occurs at a depth of 729 ft., or 73 ft. above the conglomerate. Above this there is strict conformity, and yet at the surface true lower permian rocks are found. Perhaps, under the circumstances, the best line of separation would be at the base of the calcareous conglomerate of Mr. Wickham King.

THE OLDHAM MINER'S ELECTRIC LAMP.

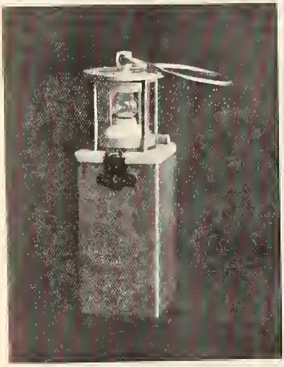
The lamp for which Messrs. Oldham and Son, of Denton, Manchester, were awarded a prize in the recent Home Office competition, is totally enclosed, rendering it safe in gaseous atmospheres. The accumulator, which is of the Chloride type, and non-spillable, is enclosed in a rectangular cast aluminium case. It is equipped with a magnetic lock and the light is switched on or off by a slight rotary motion of the base. The frame or cage, which consists of four upright brass pillars, surrounding a strong glass cylinder, can be readily unscrewed from the case. The bulb, which is of the metal filament type, gives nearly two-candle power for 12 hours. An outside protector is supplied which gives light three-fourths round and eight candle-power in a forward direction. The lamp weighs about 4 lb.

In addition to the "lighthouse" pattern, described above, the makers supply a "searchlight" type adapted for use by rescue teams, which was actually employed during the recovery operations following the Hulton disaster. This type, which is equipped with gastight switch and lead plug lock, throws the light forward in the fashion of a "bull's eye" lantern. It has a capacity of from 9 to 10 candle power, and will burn continuously for from 15 to 18 hours. The lamp, which weighs rather less than 4½ lb., will burn under water.

In connection with the mining classes which have been held at Rhostyllen, under the Denbighshire Education Authority, a meeting was held last week, when certificates were presented to the members who had successfully passed the examination. There were 36 candidates in all, out of which 30 had earned certificates, which were presented to the students by Mr. F. Blew in suitable terms. On behalf of the class, Mr. Daniel Morris presented their teacher, Mr. Edward Williams, with an umbrella, suitably inscribed, in recognition of his efforts since he took over the class, and several other students bore testimony to the efficient manner in which Mr. Williams had discharged his duties as teacher of the class.

THE GRAY-SUSSMANN MINER'S ELECTRIC LAMP.

As already announced, one of the prizes awarded in the recent competition organised by the Home Office has gone to Mr. William E. Grey, of 19, Archer-street, Camden Town, London, N.W., for his Gray-Sussmann lamp. Mr. Gray was the original inventor of the Sussmann lamp, one of the earliest types of portable lamps introduced into collieries. For this lamp the inventor was awarded a gold medal at the Paris Exhibition in 1900, and a large number have been in constant use for many years at Murton Colliery, in County Durham. The improved lamp shown at Rotherham is made in three sizes, giving 1 to 1½ and 2 candle power, and weighing 3 to 3¾ lb. and 4¼ lb. respectively; each size has a burning capacity of from 11 to 12 hours. The bulb, which is a 2-volt metal filament, is mounted on a base plate, between two conical reflector domes, the lower dome containing a switch which, when fixed, is quite gastight. The domes are surrounded by a strong glass cylinder, having a thickness of about ¼ in., the whole being secured to the base plate by means of an aluminium top plate and four standards. The switch is operated from the outside by means of a milled-headed screw on the right-hand side of the lamp. The base plate is hinged to the battery case by a strong brass butt, and is sealed by a hasp and staple with the usual lead rivet. The battery case is made of either strong tinned steel or cast aluminium.



On the under side of the lid two spring contacts are fitted, which engage with two corresponding lugs or battery terminals when the lid is closed. The battery (which is of the semi-dry type) is square, the case being made of stout celluloid. The acid is absorbed by a special composition, so that there is no free liquid to spill.

These lamps are an approved success, upwards of 7,000 having been supplied to various collieries in England during the past twelve months, including the following, in numbers varying from 400 to 1,800:—Whitehaven Colliery, Whitehaven; Easington Coal Company, Durham; Houghton Main Coal Company; Messrs. Pope and Pearson Limited; Maltby Main Colliery; Langwith Colliery.

We may mention that Messrs. John Davis and Sons (Derby) Limited, of the All Saints Works, Derby, act as agents for the sale of the lamps.

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, August 20, 1912, is as follows:—Antwerp, 103 tons; Amsterdam, 2,352; Alexandria, 8,561; Alderney, 291; Bandholm, 976; Bremen, 2,569; Buenos Ayres, 4,409; Cronstadt, 19,728; Constantinople, 2,048; Copenhagen, 601; Christiania, 502; Drontheim, 52; Danzig, 802; Elsinore, 1,257; Gothenburg, 3,761; Ghent, 570; Hamburg, 5,235; Harlingen, 1,429; Halmstadt, 1,083; Harburg, 4,063; Hargshamn, 1,448; Konigsberg, 1,337; Libau, 412; Leghorn, 331; Lisbon, 3,002; Malmo, 1,358; Munkmarsch, 162; Marseilles, 3,629; Naples, 447; Nakskov, 1,350; Norrsundet, 1,048; Odense, 1,662; Oscarshamn, 2,129; Pernau, 1,640; Rotterdam, 14,931; Riga, 2,538; Revel, 3,165; Raa, 276; Rouen, 6,041; St. Petersburg, 9,329; Stettin, 7,259; Trelleborg, 1,734; Trieste, 200; Tromso, 1,436; Wasa, 1,476; Werkebach, 1,087; Windau, 1,098; total, 130,963 tons; corresponding period last year, 89,779 tons.

UNEMPLOYMENT INSURANCE.

Some further decisions have been given by the Umpire appointed under the Unemployment Insurance (Umpire) Regulations, as to the necessity or otherwise of paying contributions in pursuance of Part II. (unemployment) of the National Insurance Act, 1911. From these we select the following:—

Contributions Payable.

Workmen employed by an iron and steel company, and described as joiners, fitters and labourers, who are engaged in turning rolls for mills, turning hammers and anvils, turning and fitting material for the machinery in the forge.

Workmen engaged in making and fixing deep well machinery, engines, windmills, machine pumps and other mechanical appliances for raising water from the ground.

Workmen engaged in the construction, reconstruction or alteration of steelworks plant.

Boilermakers and labourers engaged wholly or mainly in repair of boilers in connection with steelworks or other businesses, whether such businesses are among those specified in Schedule VI. of the National Insurance Act, 1911, or not.

Bricklayers and labourers engaged wholly or mainly in repair of boiler settings in connection with steelworks or other businesses, whether such businesses are among those specified in Schedule VI. of the National Insurance Act, 1911, or not.

Workmen employed at steelworks, and engaged in the millwrights' department.

Workmen engaged in the construction, reconstruction or alteration of coke ovens or by-product plant. "Alteration," in the opinion of the Umpire, relates to work which involves a substantial change or variation in the original design.

Workmen described as boiler and steam pipe coverers, and engaged in the work of applying non-conducting material to steam boilers and steam pipes for preventing loss of heat by radiation.

Workmen employed at forge, rolling mill and steel works, and described as follows:—(1) Workmen employed in the motor frame department, shearers, pressmen, chippers, smiths, riveters, planers, dressers; (2) workmen employed in flanging shops, flangers, welders, labourers, if engaged in a process of mechanical engineering (including boilermaking).

Workmen employed by ironfounders (common and malleable) producing castings not for use as parts of the products of a mechanical engineering establishment, and engaged wholly or mainly in fettling castings.

Workmen employed by a firm of manufacturers of colliery trams, and engaged in the manufacture of iron, steel or wooden coal trams or tubs for use underground in coalmines.

Contributions not Payable.

Workmen engaged in the work of well sinking and artesian well boring, and in the equipment by such well borers of temporary test pumping plant.

Rail bank workmen employed in connection with rolling mills, and engaged in straightening, drilling, planing and dressing, cutting, loading and discharging rolled rails.

Switchboard attendants or other workmen engaged wholly or mainly in minding, tenting or driving electrical machinery in connection with businesses other than those included under the trades specified in Schedule VI. of the National Insurance Act, 1911, and not engaged wholly or mainly in the upkeep and repair of electrical machinery and conductors.

Workshop instructors in technical institutes in connection with any insured trades who engage in manual labour incidentally to the giving of instruction.

Workmen engaged in the manufacture of gas testing apparatus, or in testing and fitting incandescent gas burners, except in so far as same is covered by decisions relating to ironfounding.

Workmen engaged in boring holes to prove the existence or non-existence of coal or other minerals.

Workmen employed at a slate quarry, and engaged in making slates and removing rock or rubbish.

Workmen employed at an ironworks wholly or mainly in driving, tenting or minding the machinery, and not wholly or mainly employed in upkeep and repair of machinery, and described as follows:—Blast engine driver; lift or hoist engine drivers; boiler minders and cleaners; engine driver of slag-breaking plant; machinery tenter of slag-breaking plant; locomotive drivers, cleaners and shunters.

Workmen engaged in making wrought iron tubes and tube fittings.

Workmen employed at chemical works, and described as: Tar stillmen; oil stillmen; benzol man; boiler firemen and their assistants; ammonia stillmen and their assistants; coopers; process man; labourers.

Workmen employed at steelworks, and described as follows:—(1) Men working boiler feed pumps; (2) boiler-firers; (3) coal-elevator men; (4) hydraulic enginemen; (5) men in charge of engines producing power; (6) switchboard attendants. *Steel disc wheel plant*: (7) men producing gas for heating blankets and blooms for forging and rolling mills; (8) men at hydraulic presses; (9) men at rolling mill; (10) crane men; (11) men at furnaces.

Workmen employed in the repair of ovens for the manufacture of coke and of by-product plant (other than buildings or machinery).

Workpeople described as general labourers in a clay-field, who are engaged at times in sharpening spades, picks and other simple tools, not being machine tools, used in the clay pits.

Workmen employed by ironfounders (common and malleable) producing castings not for use as parts of the products of a mechanical engineering establishment, and described as follows:—(1) Workmen employed in warehouse; (2) workmen employed wholly or mainly in drilling small castings; (3) workmen employed wholly or mainly in varnishing castings. *Note.*—"Workmen" includes both males and females.

Workmen employed by an iron and steel company, and described as follows:—(1) Overhead steam, electric, hydraulic and bogie cranemen employed at crane work in connection with the conversion of iron into steel, rolling of steel bars, rails, &c., and loading same into railway wagons; (2) lamp trimmers trimming electric lamps; (3) blowing, hydraulic and mill enginemen producing blast for steel converters and pressure hydraulic plant for rolling steel bars.

Workmen engaged in melting steel by the crucible steel process.

Workmen employed by a mining company, and described as: Underground miners, underground labourers, underground timbermen, underground pitmen, underground hauliers, trammers and fillers.

Persons engaged in smelting refractory ores by electricity.

Workmen employed in an iron and steel works, and wholly or mainly engaged in making tools for puddlers and millmen.

Persons engaged in making bricks by hand or machinery, and burning same in chamber kilns.

Workmen employed by a firm of china clay merchants, and engaged in the work of:—(1) Unloading from railway trucks stoneware, iron pipes, &c.; (2) engine drivers, shunters, cleaners and checkers; (3) packers on railway; (4) raising stone in granite quarry; (5) removing overburden of clay; (6) cutting small leats on moors for conveyance of water, not being works of construction; (7) shaft sinking for china clay production; (8) hedging and general carting; (9) sharpening picks for quarry and clay work men; (10) making pick shafts and sawing wood for micas for refining the clay.

A well attended meeting of the subscribers to the Cadeby disaster relief fund, was held in the offices of Messrs. J. W. and A. E. Hattersley, Mexbrough, on Saturday, the vicar of Mexbrough, the Rev. Canon W. H. F. Bateman, R.D., presiding. The chairman detailed the history of the establishment of the fund and the issue of appeals, and went on to say that arrangements had been made by the committee with the Denaby and Cadeby Colliery Company to provide for present necessities, an account of all disbursements under that head being kept, and that amount would constitute the first claim on the fund. It was considered essential that a body of gentlemen should be asked to act as trustees to the fund which was being raised. A scheme of administration was already under consideration, and this would be submitted to actuarial examination to see that what they purposed to give in the way of maintenance was within the possibilities of the fund. A general vote of sympathy with the families of the victims of the disaster was passed, and an expression of thanks was accorded to Mr. N. B. Laidlaw (who had acted as secretary) and Mr. J. W. Hattersley for his services as legal advisor. The following gentlemen were formally elected trustees: Earl Yarborough, Viscount Halifax, Sir Charles N. Nicholson, Bart., M.P., General Sir Joseph Bewicke-Copley, Mr. F. J. O. Montagu, Mr. Charles Thellusson (High Sheriff of the West Riding), and Mr. W. W. Warde-Aldam, and a vote of thanks was accorded them for their willingness to act. The following executive committee was appointed: The Rev. Canon W. H. F. Bateman, R.D. (vicar of Mexbrough), the Rev. S. F. Hawkes (vicar of Denaby), the Rev. W. A. Strawbridge (vicar of Conisbrough), Mr. John Wood (chairman of the Mexbrough Urban District Council), Mr. W. H. Chambers (chairman of the Denaby Parish Council), Mr. H. L. Smethurst (chairman of the Conisbrough Parish Council), Mr. N. B. Laidlaw, Mr. J. W. Hattersley, Mr. William Gladwin, and Mr. Arthur Sykes, Mr. Thomas Hill (president of the Cadeby branch of the Yorkshire Miners' Association), and Mr. George White (Multon-on-the-Hill). The draft of the trust deed was approved.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Minimum Wage Act Difficulties—Special Joint Conferences upon Interpretation of Rules—Rising Feeling of Antagonism by Workmen—The "Locking up" of Mineral Areas—Raising Railway Rates for Coal—Reorganisation of Miners' Federation—Mischievous Proposals and Conflict of Opinion—Doubling the Dock and Railway Charges for Mixing Coal.

The Minimum Wage Act award has opened out some difficult questions of interpretation, and the rules are occasioning strong protest. On Friday a special meeting of the Statutory Board took place in order to decide what interpretation should be placed upon disputed points; and also to deal with allegations from the men that some employers sought to evade the operation of the Act, having reclassified the workmen, or sought to substitute the standard of 1879 for that of 1877. There was, too, the question of framing a panel of independent umpires for settling points of disagreement at the various collieries.

It was found impracticable to reach conclusion on Friday, and an adjournment till Tuesday was made. Chief among the questions raised by the men were—

(1) Whether verbal notice from a workman is sufficient when he is unable to earn his wage on tonnage because of circumstances not under his control?

(2) The workman's right to be notified of any alleged offence which deprives him of his title to the minimum wage.

(3) That in cases of abstention through illness or accident, the workman's own medical man should be present during medical examination.

(4) The right to payment at minimum rates pending any investigation arising from dispute between the workman and management.

As previously reported, some men who were regarded as colliers are now classified "fillers"; riders are in certain places classed as "shacklers"; and similar alterations involving loss in wages are complained of. One colliery, through substitution of the 1879 standard for 1877, changes the rate from 4s. 9d. to 4s. 3½d.; and there are other changes in different parts of the coalfield which have had to be dealt with. One stoppage has already taken place because of new practices adopted since the Minimum Act has come into force; and the feeling against the new rules is widespread and keen.

Mr. Vernon Hartshorn, who this week has summarised the opinion at the Blackpool Conference of the Miners' Federation of Great Britain, sets out one chief grievance to be the character of the independent chairmen. He describes them as men drawn from the employing, the capitalistic, or professional classes, not possessed of any practical knowledge of mining, but looking at the questions from a commercial and not a humanitarian point of view. Some of the rules, he says, "run counter to the Act itself." Day-wage men were led to believe that there would be an absolute minimum, wiping out all rates below that figure. But in South Wales these low rates still apply, unless the men comply with rules as to putting in a certain proportion of their time—five-sixths of the working week. "This is heaping injustice upon injustice, and will not be tolerated by the Miners' Federation for long."

Other alleged shortcomings are set forth, such as the taking of the average of the price list rates instead of the average earnings as the basis of the new minimum. But the more important is that as to the fortnight's average in an abnormal place, which Mr. Hartshorn puts thus:—

> Suppose a collier is working in a good place during the first week of the fortnight. He earns more than the minimum. Then, the second week he gets into a bad place and earns less than the minimum. According to the fortnightly average rule, the balance which he earned above the minimum in the first week (money actually earned) is, in effect, taken by the coalowners to pay the man for his work in an abnormal place. Can anything more ridiculous be imagined?

Further discussion took place during two sittings on Tuesday, but the work was not completed, and an adjournment till September 12 was agreed upon.

Mr. W. Brace, M.P., president of the South Wales Miners' Federation, criticised the action of employers in substituting day-to-day contracts for the monthly engagements that formerly prevailed, and regarded the new practice as contrary to the Conciliation Board agreement, pointing out that it could be used effectively by the men in guerilla conflict. A reply has been published showing how the men have departed from the Conciliation Board agreement, in sympathetic strikes and in repudiation of arrangements made; and it is stated that the new practice is intended to prevent abuse of the Minimum Wage Act.

A question of considerable importance has been raised, namely, the locking-up of coal areas in certain parts of South Wales. One object of withholding these areas from development is not concealed; they are "held for the rise"; and the total thus reserved is estimated to amount to thousands of acres, some of it the finest mineral territory in the district. Whilst in some cases the landowners, following long practice, fear to have the surroundings of their other properties disfigured by collieries and miners' towns, in other instances a demand for excessive terms is the barrier to development, and there is evidently, in certain cases, a determination to keep possession, notwithstanding approach from would-be lessees, with the obvious expectation of securing still higher prices in the future. The only practicable proposal mooted in relation to these properties is that the local authorities should be empowered to rate them; that, upon proof of their being lettable on reasonable terms, their exemption should cease and the owner become contributory to local rates to the extent of the ascertained letting value. It would, of course, be difficult to ascertain what would be a fair estimate of probable output upon which to base the local levy; but more difficult problems than this have been solved before now.

Further controversy has taken place upon the subject of increasing the rates for carrying coal on the local railways. The argument has broadened out into what is practically a threat that unless the rate for carrying coal be increased, the dock and railway companies cannot provide those facilities—sidings, tips, etc.—which are required to give despatch. "Stop" wagons is, of course, a very costly experience for colliery proprietors, in addition to the annoyance of knowing that there is a ready sale at a high price for all the coal that can be put out, whilst the wagons needed to transfer it to the dock are lying somewhere in sidings filled with coal which cannot be shipped. It is contended on the one hand that the railway companies find difficulty in raising capital, because of the unsatisfactory returns; and instances are quoted where, in respect of one local railway and dock security, a 4½ per cent. preference issue at 85 was so little appreciated by the public, that underwriters, at a lower figure, had to take up 75 per cent. of the whole. Then again, the issue of new stock by another local company at a premium, has resulted in a very large proportion remaining in the hands of the underwriters. It is a fact that many of the railway companies in the country have their capital account overdrawn, and are operating upon bank accommodation because the times are so unfavourable for the issue of new stock. This fact is also being pressed into service as a reason for raising the coal rate.

An interesting point brought out during the controversy is the difference in working expenses. Whereas 20 years ago or thereabouts the Taff Vale Company worked their line at little more than 52 per cent. of the gross receipts, their latest account shows that this has risen to 57·6. The Barry Company, comparing 1892 with the first half of 1912, has risen in its working costs from 44·24 to 61·6, an increase of 17·36 per cent., and the Rhymney Railway, for the same period shows an increase of nearly 10 per cent. The comparison, however, is not quite fair in the case of Barry Company, because Barry was in 1892 almost a new undertaking, and therefore its working expenses were low.

It is argued that the price of coal has increased very little. Whereas during 1910-1911 it ranged from 16s. 3d. to 18s. 6d., the years from 1892 to 1897 shows a range from 9s. 1d. to 10s. 4d., and it is upon this increase of price that the railway shareholders' case for increased charges has been based. The increase desired is a small fraction per ton per mile, which would total upon the whole journey to one halfpenny only; but even this would mean a very heavy burden upon the larger undertakings, which count their outputs by hundreds of thousands, and even millions of tons. For ½d. per ton per mile upon the whole journey would mean £2,000 per million tons, no inconsiderable figure, especially when it is borne in mind that the collieries at the present time have the very heavy additional costs entailed by the new Mines Act, the Minimum Wage Act, and the Insurance Act, with a perpetual growth in pressure of local rates.

The question of facilities has already brought out a proposal that additional docks should be provided, although, it is only four or five years since the great new dock at Cardiff was brought into operation. One of the suggestions is that the Barry Company should take prompt steps for utilising their great timber pond as an additional dock; and this matter will certainly receive early attention, because the company have purchased about 200 acres of land immediately adjacent to their No. 2 dock and the timber pond; and it is obvious that extensions are under contemplation. All the more so, because the percentage of local coal exports which Barry is receiving, is lower than the percentage which they were dealing with a few years ago; and this is a fact upon which shareholders are making comment.

The reorganisation scheme of the South Wales Federation is being very severely criticised, chiefly because it is recognised, even among the men themselves, as an attempt to oust the present leaders and to introduce changes which would give place and power to a new, very extreme section. As an example of the views held, quotation may be made of remarks at a meeting in Ebbw Vale, where the chairman said he did not give the originators of the scheme credit for any sincerity. To him it was a wild composition, drawn up by, and the outcome of, wild minds. A more ridiculous scheme he could not conceive. He advised the men to vote *en bloc* against it.—Another speaker said the scheme was unworkable and financially unsound; that its clauses would not benefit the coalfield, while Ebbw Vale would be hard hit. Llanerch men have passed a resolution against the scheme.

As discussion proceeds in the different parts of the coalfield, it develops itself as a contest between the extremists of the Syndicalist type, even against those who hitherto have been regarded as Socialists. It is questionable whether the Syndicalists have the advantage of the workmen so much at heart, as they have the advancement of their own peculiar ideas, chief of which is the making of the industry unprofitable, so as to bring about State (or class) ownership. The way in which they are working is to centralise operations of the Federation, destroy the policy of home rule in the districts, and, as previously described, make the agents be the servants, rather than the leaders, of the men. Leadership, it is designed, shall rest only in an executive elected by a delegates' conference, this executive to determine the policy, and the agents in each district to carry it out. They will not have the Parliamentary representatives charged with the industrial work at all. The whole idea is that the central executive, on which shall be no M.P.'s and no miners' leaders, shall decide on the policy and force it into direct effect in every part of the coalfield.

This opens out a situation which leads observers to conclude that the aim is not to settle grievances—certainly not to facilitate settlement of grievances—at the individual collieries affected, but rather to extend the area of discontent and dissatisfaction. How can it be possible for a central executive to decide and deal in detail with the scores of questions which must crop up locally? Under the present system of home rule in the districts, where the agents and the managers by frequent intercourse have personal knowledge of each other, it is obvious that a settlement can more readily be arrived at than when the agent should, as in future, act only as the servant of some central body. Not only does this apply to ordinary grievances in working places, but also to compensation cases and similar matters. The whole proposal is an introduction to perpetual disturbance, with ultimate chaos.

Cardiff Chamber of Commerce discussed, on Wednesday, the increase in dock charges for mixing coal, Mr. W. North Lewis (president) stating that the companies proposed to increase the charge by 100 per cent. It was a great pity, he said, that the companies should have formulated the increased scale before consulting the traders; for whilst there should, perhaps, be increases in certain directions, they had adopted the crude expedient of simply doubling the charges all round. A committee was appointed to fully consider the question, and also to go into the matter of dock accommodation.

The Great Western Railway Company are about to construct a new branch line—from Pyle to the Port Talbot docks, and large siding accommodation will be provided. It is desired to facilitate the shipment of coal from the Ogmore and Garw valleys, where material developments are in progress.

More steelworks extensions are in progress at Port Talbot—part of the great development which South Wales is experiencing in this trade all over the district. Three new smelting furnaces are being constructed.

Monmouthshire will have to meet a bill for no less than £12,500 as the cost to the county of the riots at Tredegar during the strike.

A serious gob fire broke out a few days ago in the Terrace Pit of the Rhymney Iron Company, Pontlottyn, and although the pit is not now being worked, there was a risk of it spreading and affecting adjoining workings. The New Tredegar Rescue Brigade has undertaken its first work, this outbreak giving opportunity for the result of their training to be made apparent. They have found the task to be most difficult and dangerous, owing to the timbers being burnt through, and the constant droppings from the roof thus occasioned. The apparatus was a complete success so far as regards the smoke and fumes encountered. It has been found necessary to wall in the burning section.

A one-day strike of 4,000 men took place at the Glamorgan Colliery, Rhondda, on Monday. It arose out of a dispute as to stoppage. About a week ago, a boy was killed; and, in accordance with custom, a section of the men stopped for the day. They allege that the deduction made from their wages was too heavy, and, failing agreement, the whole of the men struck Upon a deputation meeting the general manager, it was agreed that the question of custom should be referred to the Concilation Board, and work was therefore resumed during Tuesday.

Mr. W. Bailey Hawkins, chairman of the Brecon and Merthyr Railway (which has an important section running across the coalfield to Newport), showed at the shareholders' meeting on Tuesday that the outlook in respect of coal traffic was very good. The Bedwas Navigation Company, which now has an output of 200 tons per day, gave indication of early increase to 800 tons. Work was going on satisfactorily at the New Britannia Pits, Pengam, and at Pentwyn, where a new shaft was being sunk, a similar increase of output was expected.

MEMBERSHIP OF TRADE UNIONS IN 1911.

According to an article in the Board of Trade *Labour Gazette*, at the end of 1911 the total membership of the 1,168 registered and unregistered trade unions known to the Department was 3,010,346, an increase of no less than 23·3 per cent. as compared with a year ago. This is the greatest annual rate of increase recorded during the period for which comparative figures are available (1892-1911), the highest previously attained being 13·9 per cent. in 1907. The past year was characterised by important disputes in the transport trades, and it was in this group that the rate of increase was most marked. In unions of seamen and canal, dock, and wharf labourers the membership in 1911 was treble that in 1910; the combined membership of unions of transport workers and general and builders' labourers showed an increase of 102·9 per cent., as compared with 8·9 per cent. for all the remaining unions. In this connection it will be remembered that the upheaval in the transport trades in 1889-90 was also accompanied by a very large increase in the membership of the trade unions affected.

The following shows the membership in some of the more important coalmining unions:—

	No. of unions at end of 1911.	Membership at end of 1911.	Percentage increase (+) or decrease (−) in membership compared with 1910.
Northumberland, Durham and Cumberland	11	196,803	+ 7·6
Yorkshire	4	94,991	+ 4·5
Lancashire and Cheshire	17	72,021	+ 21·7
Midlands	23	127,610	− 0·1
Wales and Monmouth	9	140,846	− 12·4
Scotland	11	92,040	+ 6·3
Other mining and quarrying	10	23,508	+ 7·9

The total membership of unions in the coalmining industry increased by 2·2 per cent.

The total membership in 1911 showed an increase of 53·2 per cent. on that of 1902, and of 57·6 per cent. on that of 1904, when the lowest membership of the ten-year period was reached.

The total membership was inclusive of females, who numbered 272,858 in 1911, as compared with 221,283 in 1910 (an increase of 23·3 per cent.), and with 125,423 in 1902 (an increase of 117·6 per cent.).

The number of federations of trade unions in existence at the end of 1911 was 110, with a membership of 3,812,599, an increase of 13·2 per cent. compared with 1910, and of 107·2 per cent. compared with 1902. This is the gross membership, in which many trade union members are counted more than once, owing to some unions being affiliated to more than one federation. The largest federations were the General Federation of Trade Unions, with a membership of 861,482 (an increase of 21·4 per cent. compared with 1910), the Miners' Federation of Great Britain, with a membership of 588,000 (a decrease of 1·5 per cent.), the Federation of Engineering and Shipbuilding Trades of the United Kingdom, with a membership of 401,472 (an increase of 7·9 per cent.), and the National Transport Workers' Federation, which was established in 1911, and had a membership of 200,185 at the end of the year.

CONTINENTAL MINING NOTES.

Belgium.

The production of pig iron from Belgian blastfurnaces during the seven months ending with July last comprised 55,160 tons of foundry pig, 19,130 tons of forge pig, 1,258,750 tons of steel pig—a total of 1,333,040 tons, as contrasted with only 1,202,030 tons in the corresponding period of 1911.

France.

It is the intention of the Government of Madagascar to shortly invite tenders for the lease of a coal-bearing area which has been discovered in the southern province of Betroka (latitude 26 degs. 25 min. south, longitude 47 degs. 45 min. east), in the valley of the River Onilahy, 80 miles distant from the port of Tuléar, and at 702 ft. above sea-level.

Miners' Wages.—A conference took place on August 26 at Arras to consider the application of the workmen in the Nord and Pas-de-Calais for an advance in wages and the unification of the wage basis. M. Basly, on behalf of the workmen, laid stress upon the increased price of coal and the advance in the cost of living. The companies, on the other hand, stated that the cost of working had sensibly increased, and that impending legislation would impose still further burdens. Nevertheless, as an act of benevolence, they were willing to concede some advance in wages—namely, by 5 per cent. for underground workmen, 3 per cent. to date from October 1 next and 2 per cent. from April 1, 1913. This raises wages ultimately to the following percentages above the standard.—Nord collieries, except Douchy and Anzin, 25 per cent.; Pas-de-Calais collieries, including Douchy, 22 per cent. No further modification is to take place in wages until July 1, 1915. With regard to the unification of the basis, the companies stated that local natural and economic differences rendered it impossible for them to adopt such a policy.

Germany.

A new company has recently been formed in Brussels, with a capital £40,000 and the title La Société de la Charbonnage Thomaszeche, to acquire and carry on a colliery at Buhl, in the Grand Duchy of Baden.

Coal Syndicate Report for July.—The total coal raised during the month amounted to 8,424,608 tons (7,381,514 tons in July 1911), or 312,023 tons (283,904 tons) per working day. The calculated distribution was 6,814,808 tons (5,919,836 tons), being 252,400 tons (227,686 tons) per working day, or 96·09 per cent. (86·82 per cent.) of the participation. Total distribution of coal by the syndicated pits, 8,372,794 tons (7,338,945 tons), or 310,103 tons (282,267 tons) per working day. Deliveries, including local sales, miners' house coal, and supplies to pits' own ironworks: Coal, 5,561,861 tons (4,922,277 tons), or 205 995 tons (189,318 tons per working day. Coke, 1,621,170 tons (1,364,158 tons), or 52,296 tons (44,005 tons) per working day; briquettes, 391,509 tons (348,922 tons), or 14,500 tons (13,420 tons) per working day.

Fuel Traffic in Ruhr Harbours, July.—The total deliveries of coal, coke and briquettes by rail amounted to: Ruhrort 1,196,398 tons, Duisburg 388,213 tons, Hochfeld 39,232 tons, or 1,623,843 tons in all. Outward shipments: To Coblenz and places higher up river, 912,282 tons, to places below Coblenz 14,313 tons, to Holland 528,983 tons, to Belgium 324,084 tons, to France 34,360 tons, and to other destinations 34,760 tons. Total shipments from: Ruhrort 1,169,268 tons, Duisburg 359,082 tons, Hochfeld 40,797 tons, Rheinpreussen 96,014 tons, Schwelgern 102,943 tons, Walsum 80,679 tons, aggregate 1,848,784 tons.

Ruhr Coal Market.—The traffic in coal still maintains its activity, buyers being anxious to secure supplies as early as possible in order to avoid risk of delay from a shortage of railway wagons later on. In the home market, the iron industry is still the largest buyer, and its requirements are growing as the result of the favourable situation it enjoys. Exports are also increasing, Holland and Belgium taking large consignments, though the prices are not particularly good. Supplies to South Germany are going forward in larger amount, though the local trade in that district is quiet. In industrial coals, small nuts are the only kind selling more freely, and the demand for house coal has not yet become very brisk, though improving. With northern Germany a good, regular business is being done, the increasing competition of English coals not having had much effect so far. Industrial coals find the readiest sale there, and enquiries for gas coal have been on the increase, and house coal is in fair request, though not as active as could be desired. Business in coking coal is not altogether satisfactory, for reasons connected with the situation in the coke market and the peculiar conditions existing in the Syndicate. The coke market remains in the same position, the distribution being insufficient to absorb the quantities at the disposal of the Syndicate, so that stocks have attained considerable dimensions.

Coal Market in Upper Silesia.—The activity which has prevailed in this market for some time past is, if anything, more pronounced, and the pits have very little coal in stock. This is regarded in some quarters as a drawback, in view of the probability of increased demands for the autumn trade; but, as a matter of fact, buyers are taking in their supplies earlier than usual. Nevertheless, some difficulty may be expected when the supply of railway wagons becomes short, and the pits are now full up with orders for some time ahead. A scarcity of labour is also being experienced. The export trade is making great demands on the pits, Austria-Hungary being a large buyer at good prices, and therefore worth cultivating; whilst the requirements of Russian-Poland are so extensive that it becomes difficult to satisfy them to the full. Industrial and coking coals sell freely, and both house and gas coal are in improved request; whilst the coke market is particularly active, the small grades being in growing demand, apart from the fact that the whole output of blastfurnace and foundry coke is taken up immediately.

Russia.

La Société des Usines de Briansk are in negotiation for the purchase of the collieries of the Société Minière de Routchenko (Russia).

The Prodougol Syndicate have recently concluded the following contracts in the Levantine markets:—Two contracts (620,000 and 720,000 poods respectively) unscreened locomotive coal, for the Bulgarian Railways, at 18·7 copecks delivered at Varna or Bourgas; 620,000 poods of washed coal, for the Turkish Railways, at 17·5 copecks delivered at Constantinople; 400,000 poods of unscreened locomotive coal, for the Turkish Anatolian Railways, at 17·9 copecks delivered at Xaidar; 750,000 poods of unscreened gas coal, for the Bucharest Gasworks, at 17.8 copecks delivered at the Soulina and Constantza Works; 60,000 poods of unscreened gas coal, for the Constantinople Gasworks, at 16·7 copecks delivered at the works; also two important contracts in Greece, and others maturing in Bulgaria and Turkey.

COKE OUTPUT OF UNITED STATES.

The production of coke in the United States in 1911 was less than that of 1910, and below the average for the last six or seven years, according to a statement by Edward W. Parker just issued by the United States Geological Survey, but a striking and encouraging feature of the condition of the industry was an increase in the amount of coke made in by-product ovens and the incidental conservation of the gas and coal-tar products otherwise wasted. In sympathy with the depression in the iron trade, the total production of coke decreased 15 per cent. in 1911, compared with 1910, but the output from the by-product ovens increased 10 per cent., and the increase to the number of ovens of this type in operation was larger than in any other year, with one exception, since they were introduced into the United States.

The total production of coke in 1911 was 35,555,362 short tons, valued at 84,103,571 dols., compared with 41,708,810 tons, valued at 99,742,701 dols., in 1910. The 1911 output consisted of 27,705,517 tons of beehive coke, with an average value of 2·05 dols. a ton, and 7,847,845 tons of by-product coke, with an average value of 3·48 dols. a ton. The difference in price was due largely to the fact that most of the by-product plants are situated nearer to the markets for coke, as well as for gas and other by-products, so that the transportation charges are added to the cost of the coal instead of to that of the manufactured coke.

The beehive ovens produced an average of 466 tons each; the by-product ovens an average of 1,817 tons each. At the close of 1911 there were 2,354 ovens in the course of construction, of which 698 were of the by-product type.

The following table shows the total production of coke in the United States during the last five years; it also shows the increase in the production of by-product coke in those years:—

Year.	By-product.	Total.
1907	5,607,899	40,779,564
1908	4,201,226	26,033,518
1909	6,254,644	39,315,065
1910	7,138,734	41,708,810
1911	7,847,845	35,555,362

EXAMINATION QUESTIONS.

The following is a copy of the printed questions set to candidates for managers' and under-managers' certificates at the examination held in the York and North Midland District in 1911.

YORK AND NORTH MIDLAND DISTRICT.

For First-class Certificates

No. 1 Paper.

The Coal Mines Regulation Acts; Orders issued by the Home Office in connection therewith; the Special Rules of the District, and the Winning and Working of Mines.

1. What are the provisions of the Coal Mines Regulation Acts as to alternative means of exit from mines, and the connection between the same?

2. What are the provisions as to withdrawal of workmen?

3. What are the precautions prescribed by the Acts when approaching an accumulation of water?

4. What percentage of gas would you expect to detect with an ordinary safety lamp, and what percentage would you consider dangerous for men to be allowed to work in?

5. Explain briefly the provisions of the Home Office Order as to explosives.

6. What are the regulations as to the provision of overwinding gear?

7. What are the regulations as to the use of ropes and chains for raising and lowering persons?

8. What are the provisions as to supply of timber?

9. What is meant by (*a*) low, (*b*) medium, (*c*) high, (*d*) extra high pressure electric supply?

10. State generally what your opinion is with regard to the use of electricity underground in a dry and dusty mine?

11. Explain, with sketches, how you would arrange to deal with 500 gallons of water per minute in sinking a 14 ft. shaft to a depth of 170 yards. No tubbing is required. Give also sketches showing position of winding and crab ropes, headgear, &c.

12. What do you consider the best method of firing shots in a wet sinking pit, and what explosive would you use?

13. How would you work a seam of coal, 5 ft. thick, lying at a depth of 700 yards? The roof consists of 10 ft. of poor bind, with coal streaks. This is slightly damp and is overlaid by a strong rock of considerable thickness. Give sketches showing method of timbering and packing, position of buttocks, &c., with dimensions.

14. Under what conditions would you apply coal-cutting machines? Give, if possible, a typical example of the use of either rotary or percussive machines.

15. Under what conditions would you apply steel girders in your main roads? Give the size and weight per foot of what you would consider a suitable girder for a road 10 ft. wide between timbers.

No. 2 Paper.

Machinery.

1. State the number and size of Lancashire boilers required for a winding engine raising 3,000 tons of coal in 16 hours from a depth of 900 yards, the steam pressure to be 120 lb. to the square inch. Give the thickness of the shell plates, and also state what should be the tensile strength of the Siemens-Martin acid-steel plates. Also give the dimensions of the chimney required and the weight of good clean slack which you would expect the boilers to consume in 24 hours, the temperature of the feed-water entering the boilers being 190 degs Fahr. Show all your calculations.

2. Give the circumference, weight and type of winding rope required for the above colliery, six tubs each time being drawn, the weight of each tub, including the coal, being 17 cwt. What rope capels would you use? Give a sketch of the same, and state any special advantage possessed by the cappel you would select. How often would you re-cap the winding rope?

3. Describe the type and give dimensions of a pump for dealing with 600 gallons of water per minute from a shaft 500 yards deep. Give the diameter of the rising main and the thickness of metal in the bottom pipe. Should the bottom pipe in the rising main break, how would you replace it with a new one?

4. Describe any type of steam-engine indicator you have used. State its use, and show a good diagram of a high-pressure engine cutting off at quarter stroke; also a diagram from the same engine with a late admission and a late exhaust.

5. If a safety valve is 4½ in. diameter, and the lever 42 in. in length to the centre of the weight, and 4¼ in. from the fulcrum to the centre of the valve, and the weight 74 lb., at what pressure per square inch will the boiler blow off?

6. What weight would an oak beam, 12 in. wide, 18 in. deep, and 20 ft. long, carry, the weight being applied at the centre?

Electricity.

1. Give a description of the following motors:—(*a*) Shunt wound, (*b*) compound wound, (*c*) slip ring, (*d*) squirrel cage, and state their suitability for different classes of mining work.

2. Define the words "ampère," "volt," "megohm," "periodicity," and "torque."

3. Write out a specification for a cable to carry a three-phase alternating current of 350 ampères at 600 volts along a road 1 mile in length, showing all the calculations. How would you put the cable in if the road had a very hard, dry floor?

4. An alternating current three-phase motor takes 120 ampères at 440 volts. What is the horse-power developed, the power factor being 0·87 and the efficiency 87 per cent.?

5. Describe and sketch a switchboard with its fittings for a colliery power station, having two three-phase alternating current generators (one generator only being used at one time) and there being three feeder circuits from the switchboard.

6. If there was a leakage in a circuit, how would you determine the amount of the leakage, and what steps would you take to locate and remedy it?

No. 3 Paper.

Ventilation, Surveying and Plans.

1. The accompanying sketch shows an estate of 3,000 acres. It is required to produce 2,000 tons of coal per day. The depth of the drawing shaft is, say, 800 yards, and the thickness of the seam is 6 ft. Fill in the position of the shafts, and sketch the faces and all necessary roadways. Show the course of the ventilation, indicating the position of doors, &c. Give a full description of the workings, method of ventilation, and system of haulage you would adopt. Show the size and shape of the shaft pillar.

2. Name the gases common in coalmines, and give a description of each. State what precautions you would take with regard to dust. Name and describe the different ventilating fans and state which you would prefer. Give the formulæ you would use in calculating the size of fan for a given quantity of air per minute.

3. Describe the methods of surveying with fast and with loose needle, and show your method of booking the surveys.

4. A field was surveyed by running a line from end to end and offsetting to the boundary. Give the area of the field in acres, roods and perches from the notes below, and afterwards plot the survey to a scale of 2 chains to an inch.

Links.	Chains.	Links.
	11·5	182
108	10·68	
	10·2	247
	7·95	273
172	5·6	220
	4·87	213
222	4·0	
213	3·7	
244	2·6	
	2·0	227
	1·25	141
185	0·95	
	0·4	84
20	0	

5. The level course of a seam is due east and west, and the full dip 1 in 5. A road is driven in the seam at 45 degs N.E. What is its gradient?

6. Describe the method of levelling with the usual instruments, and also with the spirit level and straight edge.

No. 4 Paper.

Management of Collieries; Safety of Mines and Miners; the Treatment of Injured Persons as recommended by the St. John Ambulance Association and Rescue Stations.

1. Give a short account of the principal duties a manager should discharge to provide for the safe and economical working of a mine.

2. Describe the arrangements you would make at a new colliery so that the ventilating current could be quickly reversed.

3. Give a sketch and description of a bricking scaffold in a sinking pit, 20 ft. in diameter. State how you would support it whilst bricking was in progress, and how you would raise and lower it.

4. Describe how you would seal a serious fire in a district having two intakes and one return. What special precautions to prevent accident would you take during the operation of sealing, and also when it became desirable to reopen the district?

5. Give your views upon the comparative safety of armoured and unarmoured cables.

Describe an oil switch for a three-phase current of 500 volts, and state whether such a switch would be safe in a part of a mine where firedamp might be present.

6. Give your views on rescue stations and describe the training of rescue brigades.

For Second-class Certificates.

No. 1 Paper.

The Coal Mines Regulation Acts; Orders issued by the Home Office in connection therewith, and the Special Rules of the District.

1. What examinations of working places and roadways are prescribed by the Coal Mines Regulation Acts?

2. What are the provisions as to the withdrawal of workmen?

3. What are the precautions prescribed by the Acts when approaching an accumulation of water?

4. Give the General Rules as to the provision of refuge or manholes on underground roads.

5. Explain briefly the provisions of the Home Office Order as to explosives.

6. What are the provisions as to supply of timber?

7 What are the provisions in the special rules as to lamp-keepers' duties?

8. Give the special rules as to the duties of the horse-keepers and drivers.

9 What are the provisions as to firing shots from power cables?

10. What are the provisions as to the use of electric re-lighting apparatus for safety lamps?

No. 2 Paper.

Ventilation; the Use of Safety Lamps, Anemometer, Barometer, and Water Gauge.

1. Describe the different methods of ventilation, stating which you prefer. Give the number of splits and the quantity of air required for a fiery mine in which 800 men and 50 horses are employed.

2. Name the different gases usually found in coalmines, and state under what circumstances you would expect to find them.

3. Describe the method of measuring the air current and calculating the amount passing per minute.

4. Give a description of the safety lamp you prefer. How would you detect a small percentage of gas?

5. Describe the use of the barometer and water-gauge, and say what you might expect on a sudden rise of the water-gauge or a fall of the barometer

6. Where must the splitting of air currents begin and end to have the greatest effect?

No. 3 Paper.

The Practical Working of Mines, including Machinery and the use of Electricity, with special reference to Safety.

1. Explain the action of the siphon. How is the height of the suction pipe of a pump governed? Explain the meaning of the term "slip" in a pump

2 A single-acting pump is 5 in. in diameter, 10 in. stroke, and makes 80 revolutions per minute. What quantity of water will it deliver in eight hours, and what power is required to lift the water up an incline 1,000 yards long, rising 1 in 15? How would you proceed if, when starting to pump, it failed to deliver the water?

3. How does the strength of a beam vary?

4. Give the principal dimensions of a steam engine for hauling, required to work an endless rope on an engine plane 1 mile in length, having a gradient against the load of 1 in 8, the speed of the rope being 2½ miles per hour and the quantity of coal 80 tons per hour.

5. What is the horse-power of an engine 30 in. diameter, 5 ft stroke, making 55 revolutions per minute, the pressure of the steam in the engine-house being 70 lb. to the square inch?

6. What would you do if you found the level of the water in a boiler dangerously low?

Electricity.

1. The ventilating apparatus at a colliery has been standing for 12 hours. Coal-cutting machines are in use. What precautions would you take before starting the coal-cutting machines?

2. What horse-power is developed by a continuous-current motor, taking 85 ampères at 440 volts, the efficiency being 87 per cent?

3. When working a coal-cutting machine you find—(*a*) arcing at the trailing cables, (*b*) your safety lamp shows that gas is present in the gate end. What steps would you take in each of the above cases? Also, what would you do when leaving the machine at the end of the shift? and how often would you examine the trailing cables? and what would you do if you found them defective?

4. Explain what is meant by (*a*) Board of Trade unit, (*b*) ampère, (*c*) kilowatt, (*d*) volt.

5. State what is required to be kept in every underground electrical engine-house.

6. What is the difference between materials known as "insulators" and those known as "conductors"? Mention two of the best known insulating materials.

7. Give your views on the comparative advantages of electricity and compressed air for underground power with regard to safety and economy.

No. 4 Paper.

Management of Collieries; Safety of Mines and Miners; the Treatment of Injured Persons as recommended by the St John Ambulance Association and Rescue Stations.

1. Give a short account of the principal duties an under-manager should discharge to provide for the safe and economical working of a mine.

2. Give a sketch showing the system of timbering you would adopt in a seam 6 ft. thick, worked longwall, the roof being a weak shale and the floor a strong fireclay. Give the sizes of the packs and the distances between the roof supports.

3. What precautions would you take to prevent explosion of coaldust in a hot dry mine.

4. What means do you consider could be taken to reduce the present heavy death-rate from falls of roof and sides?

5. How would you estimate the percentage of firedamp in a working place by means of a safety lamp? and in what circumstances, owing to the presence of firedamp, would you withdraw the men?

6. If a miner's foot were cut off by a fall of roof, how would you stop the bleeding if no specially-provided ambulance appliances were immediately available?

WORKMEN'S COMPENSATION.

(Specially Contributed.)

Light Work

Earl of Ellesmere v. *Hamer*.—In this case (Salford, June 27) it was made plain that the fact that a man cannot get work in the open market is no excuse for his not doing such work as is offered to him. An application was made to reduce the compensation payable to a man who had suffered from lead poisoning.

The judge held that under a decision by the Master of the Rolls and Lord Justice Fletcher Moulton, county court judges had a discretion to diminish compensation without hearing evidence as to the worth of the workman in the open labour market. Generally he rather dreaded what came from the Court of Appeal but this was one of the decisions he could appreciate. This was not the case of a workman who had been injured, and then found a difficulty in finding work again. On the contrary, the Earl's agent had gone out of his way to try and get the applicant back to work, yet he rejected every offer. He was not there to help those who would not even try to help themselves. The compensation would be reduced to 10s. a week.

Agreements for Compensation.

Freeland v. *Summerlee Iron Company*.—This case (July 5) shows that an agreement to compensate must be definite and distinct before the courts will enforce it. The respondents admitted liability on December 29, 1911, and tendered payment of the compensation then due. They requested the applicant to sign a receipt therefor, but the appellant objected to the form of receipt, and refused to sign it. The part objected to was the following:—"At the first or any subsequent payment liability was admitted only for the compensation to date of payment. Further liability, if any, will be determined week by week when application for payment is made." The appellant maintained that he was entitled to have from the respondents a simple and unqualified admission of liability, such as he could embody in a memorandum of agreement for the purpose of recording. He therefore invoked arbitration on the ground that a question had arisen as to the duration of the compensation.

The Court of Session held that the facts disclosed a question between the parties on which arbitration could competently be invoked.

Epilepsy Caused by Accident.

Jenkins v. *Pease and Partners*.—In this case (Bishop Auckland, July 9) it appeared that on July 11, 1911, the husband of the applicant was drawing timber by the aid of a machine when he was caught on the head by a prop. He continued to work regularly for three days, and then commenced to take epileptic fits. Deceased died in February 1912.

The claim was not made until six or seven weeks after the death of the deceased. The widow did not put the claim in sooner for fear of exciting her husband.

Dr. Alex. Mackay, of Crook, said the deceased gave him the history of the accident, and the witness came to the conclusion that he was suffering from some affection of the brain, which was in all probability caused by the accident. A *post mortem* examination was held on the body, and it was found that epilepsy was the cause of the man's death. In his opinion, the death by epilepsy was brought on by the accident.

The judge awarded the applicant the sum of £300—£200 for the widow and £100 for the dependant daughter.

Settlement by Agreement.

It is important for employers to know that in a recent case the Court of Appeal have held that where an accident happens which entitles a worker to the payment of weekly compensation, if a settlement is arrived at before any weekly payments have been made, the agreement to settle need not be registered in the county court. This decision has given rise to a question in the House of Commons addressed to the Home Secretary, who said that if the decision is affirmed by the House of Lords an amending Act will have to be considered.

The Minimum Wage.

Kelly v. *the Owners of the Big pit, Blaenavon*.—In this case (Abergavenny, June 15) Mrs. Mary Ann Kelly, of Blaenavon, claimed compensation for the death of her husband, Joseph Kelly, a hitcher, who was fatally crushed by a descending cage at the Big pit, Blaenavon, on May 6 last.

The dependants were the widow and five children. The respondents had paid £284 1s. into court with an admission of liability.

Mr. Priestley, for the applicant, in asking his Honour for an adjournment pending the fixing of the minimum rates of wages by the District Board, explained that the claim had been calculated on weekly earnings of £1 16s. 5d. per week, and that the rates which would be fixed by the District Board being retrospective might mean an increase in the wages of the deceased.

His Honour granted an adjournment to the Blaenavon County Court, or to such time as the minimum rates of wages are fixed by the District Board.

New Rules.

New rules have been issued, under date July 26, 1912, to come into operation on September 30. An explanatory memorandum that accompanies them is as follows:—

Rule 1.—Difficulties have been experienced as to the appointment of next friends to infants, especially in regard to applications for the review of weekly payments. Rule 1 provides that in such cases the judge may order an infant to appear as if he were of full age, on the analogy of section 96 of the County Courts Act, which enables infants to sue for wages, &c., as if they were of full age.

Rule 2.—Some registrars have taken the view that dependants in Scotland or Ireland applying for compensation must give security for costs in accordance with the county court rules.

One of the judges recently gave a considered judgment that security could not be required, and Rule 2 has been framed in accordance with that decision.

Rule 3.—This rule applies Rule 49, as to the recording of memoranda of agreements, to the cases to which proviso (*d*) to paragraph 9 of the Second Schedule to the Act is applied by section 11 (1) (*c*) of the National Insurance Act, 1911 (1 and 2 Geo. 5, c. 55).

Rule 4.—Difficulties have been experienced on the taxation of costs as to the allowances for work done for which no provision is made by the scales of costs applicable to actions. Rule 4 has been framed to meet such cases. It is founded on the county court rule, Order XXII.A, Rule 27, paragraph (4).

Rupture of the Aorta.

Hopkinson v. *Bolsover Colliery Company*.—In this case (Mansfield, June 10) it was made plain that the dependants of a man who has died through the rupture of the aorta must do more than prove that he was doing something just before death which might have caused the rupture.

The deceased was employed at the colliery, and on January 18 he went down the mine to his stall. During the day he had occasion to remove some props. This he proceeded to do in the authorised way—by ringer and chain. About one o'clock he fixed his ringer and chain to a prop, and had apparently pulled to some extent, but was not able to pull it out. Whilst he was there, three workmen came along with a loaded tub of dirt, and when they got to where the deceased was, they saw him with the ringer and chain in his hand. They called to him to get out of the way to allow them to pass, and he did so. They then proceeded some little distance beyond with the tub, which they emptied. They returned with the empty tub, but when they reached the particular place where Hopkinson was working, they found him lying on the road and discovered that he was dead. The question for his Honour to decide was whether death arose in the course of his employment. Evidence was given by witnesses that on their return with the empty tub they noticed that the prop on which the deceased had been working was pulled further away than when they first saw it.

At a post-mortem the doctor found that the wall of the aorta was much weakened and diseased, and in two places there was a sacculated aneurism. One of these burst, letting blood into the pericardium, thus causing death. The point was whether this could be an accident within the meaning of the Act.

Dr. Gray said that, if shortly before the man's death he was doing something which required muscular effort or strain, then he would say that that particular effort would probably be the determining cause of the rupture.

His Honour held that there was no evidence of any accident having happened to the deceased, and it was necessary that this should be established if the action was to succeed. He therefore entered judgment in favour of the respondents. The latter did not ask for costs.

⁂ *We shall be pleased to answer in this column questions relating to Workmen's Compensation and Employers' Liability. All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.*

New Junior Mines Inspector.—The Home Secretary has appointed Mr. Arthur Leonard Flint to be a Junior Inspector of Mines under the Coal Mines Regulation Acts, 1887 to 1911, and has directed him to act also as an inspector for the purposes of the Metalliferous Mines Regulation Acts, 1872 and 1875, and of the Quarries Act, 1894, and has further appointed him to be an Inspector of Factories and Workshops for the purposes of the Factory and Workshops Act, 1901.

BOOK NOTICES.

The Use of Oxygen Breathing or Rescue Apparatus for Work in Noxious Atmospheres, the Organisation of Colliery Rescue Brigades, &c. By A. T. Winborn. Newport: Committee of the Monmouthshire Colliery Owners' Rescue Association.

This little text book by a practical man should prove extremely useful to those who now under the Mines Act, have to provide equipment for rescue and recovery work. The opening chapter deals with the physiology of respiration and the requirements of a rescue apparatus. The opinion of the author is that, except for use in quelling fires, the mouth-breathing type is safer than the helmet type, owing to the comparatively smaller area over which an airtight joint has to be made. Sergeant Winborn strongly deprecates the practice of using one cylinder for the inward journey and reserving another for the outward journey, owing to the danger of unsuspected loss of oxygen, and he advocates the adoption of one main valve preferably, or the simultaneous use of both valves, where two are employed. He is also adverse to the carrying of gauges in front, and thinks that the importance of auxiliary or by-pass valves has been exaggerated, mainly because it is apt to be used for other than emergency purposes.

Chapter II. is a short history of designs, whilst Chapter III. deals with the Draeger apparatus. The following chapter treats of other apparatus, of which it is evident the author has not had so familiar an acquaintance; we note in passing that the names of the makers of the Aerolith apparatus are incorrectly spelt, and the improved liquid air apparatus used at Seutswood receives somewhat inadequate treatment.

The fifth chapter, which deals with the "necessity of training men and the effective condition of apparatus" is the most important section of the book, and is rendered especially valuable by the experience of the author. Following it is a short chapter on mine gases, &c.; whilst Chapter VII. is a catechism on the subject of rescue apparatus. There are appendices showing the latest types of Draeger and pneumatogen apparatus, and giving the rules in force at the Crumlin station, and the text of the Home Office Order.

The book is well illustrated and should well fulfil its object as a handy text-book for those engaged in the practical side of rescue work.

The North Country Coal and Shipping Annual, 1912. Edited by Joseph Davies and Graham Wallis. London, Newcastle and Cardiff: The Business Statistics Company Limited. Price 7s. 6d. net.

An annual on the same lines as the *South Wales Coal Annual*, and from the same house, will meet with a ready welcome in the coal trade. Of somewhat similar scope, it gives an amount of carefully-compiled information of special interest to the foreign buyer. Amongst the features that may be mentioned are sections on wages, production, shipment and exports. There is a useful list of all collieries in Northumberland and Durham employing over ten men, giving detailed information in respect of each colliery, its position, railway station, names of colliery and commercial managers, and address of shipping office, and the number of men employed. Tables of shipping, bunker and trimming charges are added for the benefit of shipowners and others frequenting the Tyne and Wear, whilst the texts of the various charters are included. The whole is prefaced by an account of the enterprises associated with the important firm of Lambert Brothers Limited. The annual is well printed, and should have a successful future.

Daily Wages Calculator. London: McCorquodale and Co. Price 3s. net.

This calculator gives reckonings from one-eighth of a day to 10 days, advancing by one-eighths of a day, and after that by days, at rates from 1s. 0½d. to 12s. per day, advancing by ½d. gradations. It is so arranged that over 400 results are shown on a page, and should prove most useful to collieries having to work out minimum and other datal rates.

Coal Trade of Alexandria.—Mr. Vice-Consul Mulock supplies the following table, showing imports of coal at Alexandria during 1911:—

Country.	1909.	1910.	1911.	Yearly average during the period 1906-10.
	Tons.	Tons.	Tons.	Tons.
United Kingdom	1,155,539	1,097,384	1,171,461	1,212,055
Belgium	991	2,767	1,089	1,808
France and Algeria	10	880	30	518*
Germany	12,921	40,451	67,086	12,905
Turkey	—	3,763	—	2,326
Total, including others	1,169,082	1,145,593	1,325,916	1,230,168

* France supplied none in 1907.

Of the British coal imported during 1911, 637,080 tons were Welsh, 210,588 tons Newcastle, 200,242 tons Yorkshire and Lancashire, and 123,551 tons Scotch, making a total of 1,171,461 tons.

INDIAN AND COLONIAL NOTES.

India.

The Late Mr. W. H. Pickering: Tribute from the Mining and Geological Institute of India.—A meeting of the Mining and Geological Institute of India was held on Monday, August 5, 1912, and at its close the President (Mr. G. F. Adams) rose and said: "Gentlemen,—Before we part we have a duty to perform. Well I know how much every man in this room wishes it were unnecessary to perform that duty. But as Providence has so ordained it, I am quite sure that every man in this room must think it fitting that we should pass a resolution touching the death of Mr. Pickering. The circumstances of that death must be now known to each one of you. Tragic though those circumstances were, I cannot but think that he died the death which, of all others, he would have preferred to die, when his appointed time came—that is, a death met with in endeavouring to rescue his fellow-men. For he died as he lived. His life was great-hearted and noble, his death was great-hearted and brave. We feel for all those who perished; but they are not connected with this Institute in the way in which Mr. Pickering was, and therefore I suggest that at any rate our first resolution should refer to him alone. I beg therefore to call upon Mr. C. Nairne, his friend, to propose the resolution; and I beg to call on Mr. R. R. Simpson, his friend and one-time colleague, to second it."

Mr. C. Nairne said: "Mr. President and gentlemen,—I beg to move the following resolution: 'The members of the Mining and Geological Institute of India assembled here at Asansol on the 5th day of August, 1912, desire to place on record their sorrow and grief for the death of William Henry Pickering, the founder of our Institute; secondly, their sense of the loss that that death will entail to the whole mining world; and thirdly, their admiration of the gallantry and heroism which culminated in that death. They desire also to record a very sincere vote of condolence with Mrs. Pickering and with Mr. Basil Pickering, to each of whom they wish a copy of this resolution to be sent.' In proposing this resolution I do it not only from knowledge of the great work performed by our late friend, but from my knowledge of Mr. Pickering as a personal friend. The death of Mr. Pickering marks the close of a career of one of the most brilliant in the annals of the mining world of Great Britain and India. The energy with which he made for the welfare of those connected with mining in all its branches has become history that will go down to posterity in the records of those many institutions of which he was a prominent member, and in the ever-green memory of all those who were associated with him. What he did for the industry here in India is well known, and his connection with India always kept warm his heart toward us, for he had in his big heart the best interests of all connected with Indian mining. I am sure that all of us gathered here are in accord, and extend to Mrs. Pickering and her gallant son the assurance of our very profound sympathy with them in their sad loss and bereavement."

Mr. R. R. Simpson said: "Mr. President and gentlemen,—It was my privilege to be more closely associated than most of you with the late Mr. Pickering. It was on his invitation that I accepted an appointment in the Department of Mines, and under his wise and sympathetic control that I spent two of the happiest years of my official life in India. He was an ideal chief, and thoroughly understood the secret of getting the best work out of the members of his staff with the minimum of interference. By one and all of them he was regarded with the liveliest feelings of respect and affection. He it was who moulded the form of the Department, and founded its traditions on lines which I trust it will ever strive to follow and develop worthily. To me personally his untimely death is a grievous loss, for I loved and admired him even more than I had suspected. It has been suggested that this Institute should adopt some tangible form of perpetuating his memory, and I earnestly hope that steps will be taken to that end. I beg to second the resolution."

Mr. F. Owen said: "Mr. President and gentlemen,—In view of the sympathetic remarks that have just been so ably made by my colleagues, I will only occupy your attention for a few moments. The tragedy of this recent catastrophe is still fresh within our minds; and while we all feel keenly for those who have perished—either while at work in the depths of the earth, unconscious of their approaching fate, or those noble rescuers who heroically volunteered, knowing well the perils that lay before them—let us turn our thoughts to those mourners that are left behind, whether in lowly cottage or mansion. Gentlemen, I allude to the relatives of all those who have sacrificed their lives for their duty's sake—from Mrs. Pickering, with whom Mr. Nairne has so deeply sympathised in her great loss, to the humblest miner's wife or daughter in her equally great or greater sorrow. Gentlemen, I beg to move a very sincere vote of condolence with the relatives of all the deceased." Mr. J. A. Oliver said: "I beg to second the resolution proposed by Mr. Owen." The foregoing resolutions were passed in silence, the members standing.

Africa.

Mr. U. P. Swinburne, A.R.S.M., M.I.M.M., has been appointed Chief Inspector of Mines for the Union of South Africa, the appointment dating from July 1 last.

Just before the close of the Parliamentary session Sir Thomas Watt, who represents the northern portion of Natal in the House of Assembly, brought forward a motion requesting the Government to take into consideration, during the recess, the question of building an alternative and shorter line from Durban to the Natal coalfields. The motion was debated at some length, and on the whole was favourably received, the Minister of Railways undertaking to make full enquiries into the whole question and to report during next session.

South African Mineral Output.—During the month of May, says our correspondent, the mineral production for the Union of South Africa was probably a record, for without including diamonds it reached the enormous total of £3,565,524. Gold, of course, accounted for by far the largest bulk of this total, reaching as it did £3,311,158, but even coal constituted a record, the total sales reaching 728,664 tons, and the value £182,247, averaging 5s. per ton at the pits. The following figures will show the position of the coal trade in the different provinces of the Union, for all have been more or less endowed by Nature with extensive coalfields, those of the Cape Province being of the least value and importance:—

	No. of Collieries.	Tons Sold.	Pit ton.	
			Value. £	Per ton. s. d.
Transvaal	33	422,844	92,941	4 4·75
Natal	19	251,293	72,316	5 9·07
Orange Free State	5	47,812	13,070	5 5·61
Cape	8	6,715	3,920	11 8·10
	65	728,664	182,247	5 0·2

As compared with the previous month these figures show that the coal sales increased by over 50,000 tons, whilst a slight improvement also took place in the average selling price. This improvement in the tonnage sold was noticeable in all the provinces, but more particularly in Natal and the Transvaal, and probably represents the effects of the late miners' strike in England and Wales. The benefits of the recent strike seem to have been as much felt by the Transvaal as the Natal coal trade, and during the short time it lasted the Middelburg collieries of the Transvaal were well employed, but without at all sharing any improvement in the matter of selling prices. This is due to the fact that the bulk of the output of the collieries in the Transvaal is disposed of by the Coalowners' Association by contract, a custom which has been always observed by the collieries in the Transvaal even before the association was formed. As the collieries naturally regulate their output to their contract requirements, and not the contracts to the output as in Europe, they have but little surplus for disposal during short period strikes, and cannot therefore take full advantage of sudden and temporary changes in the market. Moreover, both in the Transvaal and Natal the shipping companies arrange their contracts in such a manner as to give them an option to take local coal in such quantities as they may require, and as best suits their convenience, such contracts only becoming operative when other supplies appear to fail, or prices soar beyond what the shipping owners care to pay. The position therefore is that it is only during an Australian or Welsh strike that local collieries are affected, and it is then only as regards the demand, and plays no part, or very little, in securing better prices. Strikes are practically unknown in South African collieries, the unskilled native mine labourer being either too intelligent or too uncivilised to support a Union, although they reap the full advantages of a rise in wages when labour is scarce. Engaging themselves for periods extending from six to twelve months, they impart a uniformity to coal trade conditions and selling prices alike beneficial to all concerned, and at the same time enable long-timed contracts to be entered into with confidence. These conditions, of course, prevent the coalowners taking full advantage of any disturbance in the Welsh and Australian coal trade, especially as regards selling prices, but they tend to steady local coal trade affairs, and to promote the uniformity so characteristic of the South African coal trade.

Australia.

Mr. Hyman Herman, B.C.E., F.G.S., has been appointed Director of the Geological Survey in Victoria, in succession to Mr. E. J. Dunn, who has retired.

The Victoria State Coalmine.—At a recent meeting of the council of the Chamber of Mines of Victoria, attention was called to the articles and correspondence in the Press on the State coalmine. It was pointed out that the costs of the mine when completed would be about £200,000, being nearly three times as much as the estimate of the Minister of Mines (£77,000) when he introduced the Bill. Further, that the total costs of the mine, with its adjuncts, the Wonthaggi Railway, the waterworks, State brickworks, and miners' cottages, would before completion amount to about £100,000, against which large amount some of the assets held by the State were of very doubtful value; also that the cost of the coal at the pit's mouth and the proportion of slack were both very much in excess of the Minister's estimates; and that notwithstanding the high earnings of the workers, there had been constant turmoil and strife, which appeared likely now to terminate in a big strike. After full discussion, the following resolution was carried:—"That in the opinion of the council of the Chamber of Mines of Victoria, in view of the highly unsatisfactory state of affairs at the Sate coalmine, and of the very heavy capital expenditure in excess of the original estimates, it is necessary, in the interest of the public, that a Royal Commission be appointed to investigate and report upon the working and accounts of the mine from its inception until now, such commission to have power to examine witnesses on oath, and to employ high-class accountants, possessed of mining experience, to examine the books and accounts."

Increased Price of Coal.—Complaints respecting the increasing price of coal are being heard in Sydney and other parts of the State. So far as our Sydney correspondent can ascertain, it amounts to about 7½ per cent. in the retail trade. "This is not much," he says, "but it is felt in many ways, by reason of the general increase in the cost of living." According to a Sydney tradesman, while the cost of mining coal has increased, much more money has to be paid as the result of wages boards awards, to everybody who has anything to do with delivering the coal to consumers; for instance, the wages of masters, officers, firemen, sailors, and donkeymen on coal boats have gone up considerably. Then there are higher rates for coal lumpers, who have to be paid 2s. 3d. per hour for night work, instead of 1s. 9d. as hitherto; while the wages of truck and trolleymen have been increased. Yardsmen, for instance, have jumped up from 42s. to 44s. per week. Overtime rates also are higher, and where a carter has to carry coal over 35 yds. from his cart, he has to be paid 1s. per hour extra. Such is the position of the coal trade in Sydney at the present time, and it is difficult to perceive in what manner the suggested establishment of State coal depots, as in New Zealand, would provide a remedy.

The Coal Vend Case.—The fines and Crown costs, aggregating £17,000, claimed from the colliery defendants in the Coal Vend case, have been unconditionally paid, but the shipowning defendants intend proceeding with their appeal. Our Sydney correspondent, writing under date of July 16, states that an application was about to be made in Melbourne, by counsel on behalf of the Commonwealth Government, for an order in connection with the minutes of the judicial judgment. The shipping companies' appeal will be heard at the beginning of August, when the Bench will probably consist of Sir Samuel Griffith, Chief Justice, Sir Edmond Barton, Mr. Justice O'Connor, and Mr. Justice Higgins, President of the Federal Arbitration Court. The withdrawal of the colliery proprietors from the appeal will not materially limit the points to be raised in the issue. The question of the constitutionality of the statute will be effectively discussed on the grounds set down for argument. The Federal Attorney-General has announced that the payment of fines and costs by the colliery proprietors will not preclude his taking further proceedings, should such be deemed necessary. It is doubtful whether Mr. Justice Isaacs will take part in the proceedings, although he is not precluded by custom or otherwise from so doing.

Proposed New South Wales Coalmining Legislation.—The State Minister for Mines, who has been a practical coalminer, proposes, writes our Sydney correspondent, to introduce several amendments in the State Acts, affecting the working of coalmines in the State. He states that in future "Permissive" explosives are to be defined, and the law is to be so altered that certificates of competency may be given to any fireman or shot firer, by the colliery deputy, upon the workman showing that he has satisfactory knowledge of the work that he is engaged in. Plans of mines are to be open for inspection, and representatives of miners are to be given a statutory power to make an immediate examination of any place where an accident has occurred; at the same time all accidents, whether serious or not, must be reported to the Government inspector. It is also proposed that where payment is made according to the weight of coal got, the coal must be weighed before it is put on the screens, thus removing a frequent cause of dispute. For a similar reason the existing method of appointing checkweighmen is to be defined, and at the same time it is intended to compel mineowners, who supply explosives to their men, instead of permitting the men to purchase their own, to do this themselves at absolutely net cost. In addition, better provision is to be made for better sanitation below ground, and separate travelling roads are to be provided; whilst under a Mines Inspection Amending Bill, quarries, smelting works and dredges, will be brought under the operation of the existing regulations. It is very unlikely that there will be any serious opposition to any of the proposed amendments, none involving any violation of principle.

The erection of the extensive new works for the Partington Steel and Iron Company is effecting a big change at Irlam, on the banks of the Ship Canal—some 9 miles from Manchester. The greater portion of the 90 acres of land is intersected with railway lines. About a dozen steel tubular-shaped shafts, over 100 ft. in height, and several large workshops are now in building, between 50 and 60 bricklayers being engaged on the work. A number of cottages for the workmen, of whom there will be 1,200 or 1,400, have just been completed and others are being erected.

THE COAL AND IRON TRADES.

Thursday, August 29

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 139,181 tons of coal were despatched from Tyne Dock, an increase of 63,678 tons when compared with the shipments for the corresponding week of last year. No coke was shipped. The Dunston clearances amounted to 53,632 tons of coal and 4,419 tons of coke, an increase of 20,093 tons of coal and 4,336 tons of coke. The Blyth shipments totalled 104,061 tons of coal and coke, an increase of 52,753 tons. The comparatively small shipments a year ago were due to the fact that the railway strike was in progress. The following important sales have been recorded during the week :—30,000 tons of good unscreened Durham bunkers, for delivery over next year, at 12s. 9d. per ton f.o.b.; and 25,000 tons of good Durham blastfurnace coke, for delivery to Workington over the ensuing six months, at 27s. per ton delivered. The Berlin Gasworks—which consume a very considerable quantity of coal, including much Silesian fuel, annually—are enquiring for about 250,000 tons of Durham gas coal for delivery over 12 months. The Danish State Railways want 90,000 tons of locomotive coal for the mechanical department and 30,000 tons of best Newcastle steams for the marine department, shipment over the winter months. A representative of a Russian coal contracting firm has been visiting Newcastle Exchange during the week end; it is hoped that there will be a considerable purchase of coal for late autumn delivery as a consequence. The prompt coal market is very dull, and concessions as to the prices of nearly every description of fuel have had to be made. Coal tonnage is abnormally scarce, not only on the north-east coast, but apparently all over the country. Rates of freight have materially advanced, and business is being seriously checked. Gas coal is suffering comparatively slightly, but this is because the metropolitan gas companies are taking out their full contract requirements and are utilising their contract tonnage very skilfully and very quickly—it being no uncommon thing for a 1,400-ton vessel to make eight round voyages to London from the Tyne in a month as compared with the usual four or five such trips. For forward shipment there is a good undercurrent of enquiry, but the prospective lack of tonnage is telling against actual transactions. Wherever possible, merchants are holding off in view of the high freights. Quotations for prompt shipment are as follow :—Best steams, Blyths (D.C.B.), 13s. 7½d. to 13s. 9d. per ton f.o.b., a decrease of 1½d. on the week; Tynes (Bowers, &c.), 13s. 9d., 3d. cheaper; seconds, Blyths, 12s., from 3d. to 6d. lower; Tynes (Bastings or West Hartleys), 12s. 3d., from 3d to 9d. reduced; unscreened, 11s. to 11s. 6d., from 3d. to 6d. fallen; smalls, Blyths, 9s. to 9s. 3d., 3d. down; Tynes, 8s. 6d., similarly reduced; specials, 9s. 6d., 6d. cheaper; smithies, 12s., 6d. lower; gas bests (New Pelton or Holmside), 12s. 6d. to 12s. 9d., 3d. down; seconds (Pelaw Main or similar), 12s. to 12s. 6d., 3d. decreased; specials, 13s, 6d. lower; unscreened bunkers, Durhams, 11s. 9d. to 12s. 6d., an advance of from 3d. to 6d.; Northumbrians, 11s. to 11s. 6d., 6d. lower; coking coal, 11s. 6d. to 11s. 9d., from 6d. to 9d. fallen; smalls, 11s. 6d., 6d. lower; households, 14s. 6d., unaltered; coke, foundry, 23s., a decline of 6d.; blastfurnace, 20s., 1s. reduced; and gas coke, 20s., unaltered.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 110,745 tons of coal and 1,305 tons of coke, as compared with 84,920 tons of coal and 215 tons of coke for the corresponding period of 1911, being an increase of 25,825 tons of coal, and 1,090 tons of coke. Owing to the lack of prompt tonnage business is difficult to effect, and consequently coal prices are easier. Gas coals are moderately steady, this no doubt being chiefly due to the heavy requirements of the London gas companies to replace depleted stocks which took place during the recent dock strike. There is a growing demand for best coking unscreened coals, also coking smalls are in request. There is also an increasing demand for furnace coke, and gas coke is firm for export. If the difficulty of securing steamers was overcome there would be more business passing, but as it is at present, collieries have had to restrict their output in order not to cause wagon congestion at the shipping ports. This will no doubt be got over as the Baltic is relieved of tonnage. The average market quotations are as follow :—Special wear gas, 13s. to 14s.; seconds, 12s. to 12s. 6d.; household, ordinaries, 14s.; bests, 15s.; coking unscreened, 12s. to 12s. 9d.; smalls, 11s. 6d. to 12s.; smithies, 12s. 6d. to 13s.; peas and nuts, 13s. to 14s.; foundry coke, 23s. to 24s.; gas house coke, 20s.; blastfurnace coke, 21s. to 22s. at the Teesside furnaces. Current bunker quotations are: Pease's, South Derwent, Framwellgate, 12s.; Priestman's, Consett, Burnhope, 12s. 9d.; Morrison's Murley Hill, 13s.; South Hetton, Washington, 12s. 6d.; Ryhope, 13s.; North Hetton, 11s.—all free on board South Dock. The firmness in outward coal freights is even more pronounced than last week, owners increasing their ideas of value for prompt tonnage. London is worth anything from 4s. 3d. to 4s. 6d., and Havre 6s. Baltic is also stiffer, Cronstadt at 6s. 6d. to 6s. 9d., and Pillau 6s. 6d. fairly represents the market. Bay is also advancing Bordeaux to 7s. 6d., Bilbao 8s. There is also keen pressure for the Mediterranean, and with the possibility of a strike at Genoa, owners are asking 12s. 6d., other fixtures are Port Said 11s., Alexandria 12s. 6d.

Middlesbrough-on-Tees.

COAL.

The fuel trade is steady. There is the natural enlarged demand for gas coal at this season of the year. Best Durham gas ranges from 12s. 9d. to 13s. 3d. f.o.b., and for second quality 12s. to 12s. 6d. is the current quotation. A full supply of bunker coal meets the heavy requirements. For the usual classes of unscreened Durhams the price is 11s. 9d. to 12s. 6d. f.o.b., with special kinds up to 14s. Household coal continues quiet. There is a good demand for coking coal, and unscreened kinds are 12s. 6d. to 13s., whilst smalls stand at 12s. 3d. Coke is well taken up both for home consumption and for export. Foundry kinds are 23s. to 23s. 6d. f.o.b. Gas coke is firm with a fair demand for export. Local consumption of coke is heavy and is increasing. For average blast-furnace quality 22s. and upward is now quoted delivered at Teesside works.

IRON.

Improved and improving genuine demand for Cleveland pig iron is causing prices to advance steadily, and this week higher prices have been realised than since the early part of December 1906. Buyers are very anxious to place orders, and they do not hesitate to follow the upward movement. American advices are strong, and Continental reports most satisfactory. Considerable sales of pig have been made to Continental customers. The opinion prevails that there will be some difficulty in meeting the autumn demand for pig iron, and substantial withdrawals from the public warrant stores in the near future are confidently anticipated. Customers now complain that deliveries of pig are below what could be desired. No. 3 g.m.b. Cleveland pig is very firm at 63s. 7½d. f.o.b.; No. 1 has risen to 68s. 7½d.; No. 4 foundry and No. 4 forge are each fully 63s. 4½d.; and mottled and white irons are quite 62s. 10½d.—all for early delivery, higher rates being asked on forward account. There is more enquiry for east coast hæmatite pig, but actual business is still on only a limited scale. Prospects, however, are bright, for all the consuming industries are full of work. Mixed numbers of hæmatite are 75s. for delivery to the end of next month. Prices of foreign ore are not easily fixed, as ideas of buyers and sellers as to values differ considerably. Up to 23s. ex-ship Tees is asked for best rubio, but most consumers consider that the price should not be any more than 22s. Freights Bilbao-Middlesbrough are firm at 7s. 3d. Excellent accounts are given of the manufactured iron and steel industries. Work has been resumed at the large Teesside establishments after last week's annual race holidays, and most firms are going at full pressure. Some producers are so busy that they cannot undertake further contracts for delivery before 1914. Principal market quotations stand: Common iron bars, £8 5s.; iron ship plates £7 15s. to £8; iron ship angles £8 5s., iron ship rivets £9 10s., steel ship plates £8, steel ship angles £7 7s. 6d., steel joists £7 2s. 6d. to £7 5s., cast iron railway chairs £3 17s. 6d., light iron rails £6 15s., heavy steel rails £6 7s. 6d. to £6 10s., and steel railway sleepers £7—railway material net, and all other descriptions less 2½ cent.

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South-West Lancashire.

COAL.

In the household trade a good deal of activity prevails, partly due to the inclement weather for the time of the year, but principally to the intention of the consumer to lay in stocks for fear of any withdrawal of the summer prices. Forges and other users of screened coal for manufacturing purposes continue to take full supplies. Bunker fuel requirements, mainly on contract account, are steady and quite equal to what collieries seem able to supply. There are a few outside orders; and where these can be supplied slightly better prices are being asked, as the quantity to be obtained outside contracts is only limited, consequently there is a decided tendency upwards, prices of screened Lancashire steam coals ranging from 11s. 6d. f.o.b. for the better grades. The Irish and coastwise trade generally for household fuel continues extremely brisk, merchants apparently being anxious to get early supplies to increase their stocks. Best coal rules at about 15s. 6d. per ton net f.o.b., with good seconds at 14s. to 14s. 3d. Slack, as named last week, is at the moment rather on the easier side in consequence of first one town and then another not requiring supplies during its annual holidays; but this is not of any moment, and generally the position is a very firm one. List prices remain at from 9s. 9d. to 10s. for best rough slacks, with 9s. to 9s. 3d. for good medium qualities, and 8s. 6d. or thereabouts with the commoner and finer grades—all into wagons at the pit. Enquiries are still in the market for locomotive coal, but it is not probable that the same price will be accepted now as was agreed upon a month or two ago.

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South Lancashire and Cheshire.

COAL.

The attendance on the Manchester Coal Exchange on Tuesday was a good one. The demand for house coal is better, and orders are coming in freely, doubtless in anticipation of a possible early advance in prices. It is not likely, however, that any advance will take place at the beginning of September. List prices remain as last reported—16s. to 16s. 9d. for best house coal, with good medium qualities 14s. 6d. to 15s. 6d., and kitchen qualities 11s. 9d. to 12s. 9d., all at the pit. Furnace coal continues to be enquired for, and the price is firm at about 12s. 6d. per ton at the pit. There is a little further improvement in shipping coal, the price being about 12s. to 14s. f.o.b. Partington. Owing to wakes stoppages, slack is perhaps a little more freely offered, but prices are firm at late rates, 9s. to 9s. 9d. for best, with seconds at 8s. to 8s. 6d.—into wagons at the pit.

IRON.

There was a good attendance on 'Change in Manchester on Tuesday last, and pig iron continues very firm. Forges are busily engaged on crown iron bars at £8 5s., second quality £7 15s., hoops £8 7s. 6d., sheets £9 5s., and are very much behind with deliveries. Steelworks are fully occupied, with bars at £8 to £8 5s., less 2½ per cent., and billets at £6 net. Ironfounders and heavy engineers are not too well-off for orders. Wagon works are extremely busy.

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Yorkshire and Derbyshire.

Leeds.

COAL.

There was a very good attendance at the market on Tuesday. In addition to a large number of colliery representatives, many local merchants and Hull exporters were present. No official change in prices was announced, but quotations were firm all round, especially in steam coal and nuts. The West Yorkshire pits have worked practically full time this week and the demand has been sufficient to absorb the whole output. Business in house coal has maintained the improvement noted last week, and stocks in colliery sidings are very much less since our last report. The demand from London and the eastern and southern counties has been relatively a full one, the standard qualities of best coal receiving considerable attention. The advances in the public prices of the lower grades of house coal which took place last week have strengthened quotations, and it is confidently expected locally that best coal will be advanced within the next few days and lowest summer prices withdrawn. Further house coal contracts have been booked at 2s. per ton advance on the old prices, and values generally are firmly held. Current pit prices for London and district average as follow :—Haigh Moor selected, 14s.; Wallsend and London best, 13s.; Silkstone best, 13s. (special qualities, 13s. 6d. to 14s.); Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. to 11s. 6d. Coastwise trade is fairly brisk, and f.o.b. Hull quotations are stronger on the week. For early September shipment the following figures are quoted :—Haigh Moor best, 16s. to 16s. 9d.; Silkstone best, 15s. to 15s. 9d.; Silkstone house, 14s. 3d. to 14s. 9d.; large house nuts, 12s. 9d. to 13s. 6d. Business at the West Riding depots is more plentiful, best qualities selling readily. Current quotations :—Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. 6d. to 16s.; Silkstone house, 14s. 6d. to 15s. 6d.; ordinary house coal, 14s. to 15s.; secondary qualities, 12s. to 13s. 6d. Works fuel is in strong request, and although the supply is more plentiful, stocks at the pits are very light. The following pit prices are steady :—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slacks, 8s. to 9s.; small slacks, 7s. to 7s. 6d.; coking smalls, 6s. 6d. to 7s. Increased firmness characterises the market for washed furnace coke, average samples realising 16s. per ton at the ovens, with special qualities at about 16s. 6d. In the gas coal trade probably more contracts have been fixed up this week than in any similar period since the strike. Buyers have at last realised the strength of the market, and are accepting offers which a month ago they would not look at. Although 2s. advance is being generally accepted, late comers are likely to have to pay 2s. 6d. or even more. A good deal of interest is being taken in the tenders to be submitted this week to the Bradford Corporation, and it is understood that in all cases the full official advance will be quoted. Current pit prices:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal 9s. to 10s. There is a full demand for gas coal on export account at about the following f.o.b. Hull figures :—Screened gas coal, 12s. 6d. to 13s. 6d.; gas nuts, 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d. to 12s. 6d.

Barnsley.

COAL.

Despite the fact that considerable delay is arising in the loading of vessels at Hull, the export trade continues to be of a particularly active description, and there is every promise that an unusually busy September will be experienced. The interruption referred to at the port, however, has had little effect on the collieries, who are able to dispose of their full output in a very ready manner. The approaching Doncaster race week, commencing on the 9th prox., will, as usual, in some districts bring the coal traffic to a standstill, and no doubt this fact is entering into the consideration of exporters, who are now exceptionally active in obtaining supplies of both steam and gas coal. The railway companies and other large home consumers are also equally pressing to obtain their contract supplies, and all these factors enable sellers to maintain values in a very firm manner. Forward business is practically *nil*, buyers preferring to take their chance whilst the market is continuing in such a strong position, though there is a possibility of higher figures being obtained. The best quality hards are again quoted this week at from 12s. 6d. to 12s. 9d. per ton, and the latter figure is readily paid for quick delivery. Secondary qualities also show a similar degree of greater strength, and quotations are about from 11s. 3d. to 11s. 6d. per ton, and a greater tonnage of this class of coal is being taken on shipment account The best washed nuts are from 10s. to 10s. 6d. per ton, and secondary qualities from 9s. 3d. to 9s. 9d. per ton. The somewhat irregular demand for slacks which was felt during the last few weeks, owing to holidays in the textile districts, has not led to the accumulation of any considerable amount of stock at the collieries, and prices are again very firmly held at from 7s. 9d. to 8s. per ton for the best qualities, and from 6s. 6d. to 7s. per ton for rougher sorts. Now that a larger number of contracts are being completed the gas coal collieries are showing more activity, and the output is being well cleared, though some collieries where larger stocks generally appear at this period of the year have not the usual quantity on the ground. In regard to the house-coal trade, as hinted last week, several collieries find the demand so well sustained that they contemplate an advance on present quotations of 1s. per ton next week, though up to the present little is heard of a general move in this direction. No doubt the more active enquiry which is being experienced was not only due to the colder weather but also to the tendency for prices to advance, and this has no doubt proved a good policy on the part of buyers, who continue to renew contracts at 2s. per ton advance on last year. The present prices are—best Silkstone 13s. 6d. per ton, best Barnsley softs 12s. 6d. per ton, seconds 11s. to 11s. 6d. per ton, and best house nuts about 10s. 6d. to 11s. per ton. The position in regard to coke has undergone no change on the week, and, despite the fact that the output has been considerably augmented, there are no stocks on hand, and prices are again at about 16s. per ton for the ordinary brands.

Hull.

COAL.

The market has remained very firm all the week, and last week's quotations are fully maintained. The demand for steam hards continues particularly strong, and small prompt lots required for completing have been sold at 15s. 6d., while for larger lots required for immediate shipment 15s. 9d. and as high as 16s. has been asked for the best South Yorkshire. The collieries are apparently very busy fulfilling their contracts that little free coal is for disposal, and, in fact, are reported to have refused absolutely to contract for September delivery, anticipating, doubtless, a heavier demand as the Baltic season advances to its close. Under the circumstances, forward business is somewhat difficult, and it is considered quite possible that the coalowners will be able to command the full advance asked over last year's contract prices. It is reported that one large contract for the delivery of 30,000 tons of best Yorkshire steam hards over the twelve months at 14s. 3d. has been entered into, and that a similar offer covering the supply of large quantities had subsequently been refused. Other quantities have been sold forward at a higher figure, 14s. 9d. being mentioned in one case—or 2s. 6d. in advance of the price this time last year. There is also a good demand for bunkers, which are said to have been sold for a twelvemonth's supply—half Yorkshires, half Parkgates—at 12s. 6d. All classes of coal maintain late rates, the demand for rough slacks and gas coals being particularly strong. House coals are in better request. The export at all the Humber ports continues on a large scale. Last week at Hull a record quantity was shipped, and the total from all the Humber ports was, roughly, 200,000 tons, exclusive of bunkers. This week, if not quite so active, has been very busy, and loading turns have been somewhat better. There is, however, a shortage of available tonnage, and freight rates have in consequence been kept high. Hull to Cronstadt has been done several times for large steamers at 6s. 6d., a similar rate having been paid from Grimsby for a large steamer with 6s. 4½d. for a small one. Swedish Sound ports have been done at 7s. 6d. and 7s. 9d., and the near Continental ports at 4s. Hamburg. There has been practically nothing doing in the Mediterranean direction, Hull to Genoa being quoted at 11s. 6d. Coastwise fixtures are on the basis of Hull to London 4s. for large steamers, 3s. 6d. to 3s. 9d. for smaller, Goole to London 4s. 6d. The following are the approximate prices for prompt shipment f.o.b. at Hull ruling on the Humber Coal Exchange to-day:—South Yorkshire: Best steam hards, 15s. 3d. to 15s. 9d.; washed double screened nuts, 13s. to 13s. 6d.; unwashed double screened nuts, 12s. 9d. to 13s.; unwashed single-screened nuts, 11s. 9d. to 12s.; washed smalls, 11s. 6d. to 11s. 9d.; unwashed smalls, 10s. 6d. to 10s. 9d.; West Yorkshire: Hartleys, 12s. 6d. to 12s. 9d.; rough slack, 10s. 6d.; pea slack, 8s. 3d.; best Silkstone screened gas coal, 12s. 9d. to 13s.; best Silkstone unscreened gas coal, 12s. to 12s. 3d.; Parkgates, 14s. Derbyshire and Notts: Best steam hards at Hull, 14s. 6d. to 14s. 9d.; best steam hards at Grimsby 14s. 3d. to 14s. 6d.; Derbyshire nuts (doubles) at Hull, 12s. 9d. to 13s.; Derbyshire nuts (doubles) at Grimsby, 12s. 6d. to 12s. 9d.; Derbyshire large nuts at Hull, 13s.; Derbyshire large nuts at Grimsby, 12s. 6d.; Nottinghamshire hards at Hull, 14s. 6d.; Nottinghamshire hards at Grimsby, 14s. 3d.

Chesterfield.

COAL.

The unseasonable weather has caused a brisker demand for house coal, and orders are coming to hand pretty freely. Prices maintain their firmness, and it is probable that these will be advanced in the course of a week or two. The pits producing this class of coal are now working practically full time, with every likelihood of their continuing to do so for some time to come. There are no stocks of any size at any of the collieries. The position with regard to fuel for manufacturing purposes continues the same. The demand is strong for the various classes required at the large iron and steel works of Sheffield and district. It is difficult to satisfy the needs of the market, more particularly in respect of cobbles and nuts for gas-producers. Prices are very firm, For slack for steam-raising purposes there is a great demand, and prices are likely to advance still further. The Lancashire cotton mills continue to draw heavy supplies from this district. Stocks are completely exhausted. Steam coal for locomotive purposes continues to move freely. It is many years since the demand was so pressing as it is at present. Railway companies are still ordering in excess of their contract quantity. Several contracts for best Derbyshire Top Hards, made a year ago, will expire at the end of September. For a renewal of these, colliery owners will require an advance of at least 2s. 6d. per ton. There is considerable activity in the export trade, where the demand for steam coal is exceptionally strong. Shipments of Derbyshire Top Hards are heavy, and prices continue to harden. To-day's price for the best brands is 11s. 3d. per ton at the pit. There is a brisk demand for the smaller classes of fuel, and orders are coming to hand freely for cobbles and nuts for near Continental ports. There is also a large enquiry for washed nuts and washed slack, prices of which are still advancing. The supply of this class of fuel appears to be much below the requirements of the market. The active condition of the coke trade is now such as to call for an unusually heavy tonnage of coking fuel, and, to meet this demand by the collieries themselves, a considerable quantity is taken off the market. It has been foreseen for some time that the increasing requirements of slack for the various by-product plants recently erected at collieries in almost every district would ultimately cause a rise in the value of small coal independently of a natural appreciation due to improved trade. The coke market is in a strong position. The demand for all qualities of coke is brisk, and prices still show a hardening tendency. Blast-furnace coke is in specially active request, and some difficulty is experienced in securing full supplies. Prices are as follow:—Best 13s. 6d., seconds 12s., cobbles 11s., nuts 10s., slack 8s.

IRON.

The market is cheerful in tone, and the demand for pig iron and for manufactured iron continues active. Work is abundant all round, and prices are advancing.

Nottingham.

COAL.

The general tone of the coal trade in Nottinghamshire has displayed an improvement during the last few days, and the outlook is more satisfactory. The cool weather has stimulated the demand in the domestic fuel section, and increased business is being done by local merchants and at landsale depots. The stocks at collieries are beginning to decline, but the improvement has not been sufficient to keep the pits fully employed. Values are hardening, and in most cases late rates are being obtained, hand-picked brights making from 12s. 6d. to 13s. per ton, good households from 10s. 6d. to 11s. 6d., seconds 10s. to 10s. 6d., nuts 9s. to 10s., cheap kitchens 8s. to 9s. Business continues brisk in the steam coal branch. There is a good tonnage being sent away for shipment, and orders are coming to hand freely in regard to industrials in the home market. Throughout this section prices are firm, best steams being quoted at 11s. and 11s. 6d. per ton, good seconds 9s. 6d. to 10s. 6d. Slacks are in better demand, there being little difficulty in disposing of nearly every kind. The position in regard to gas coal is improving, while coke is going out of hand satisfactorily.

Leicestershire.

COAL.

There is happily a continuance of the good business which was noted in last report. There is a very good enquiry for household coals of all qualities. The better kinds are much more in request, and the middle sorts used for the retail trade are more wanted. Also there is a more pressing demand for small household coal. Steam coals are improving on their late good position, there being a better demand for them in all sorts both, cobbles and slacks, special slacks being markedly in request. Local merchants continue to do better business, and the cold weather materially helps them. The collieries generally are making a very good output, and stocks generally are very light. Deliveries are on a very full scale, so that the prospects are quite of an encouraging nature. The present activity is felt in the market rates. Prices are very firm, and there is not any prospect of change except upward. It is likely that some increase in price will occur early next month.

South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL.

The general condition of the coal trade throughout the Cannock Chase district is very satisfactory for the time of the year, and an early advance in prices may be expected. Most of the collieries are busy, but the heavy rains this week have caused some inconvenience and prevented some of the collieries from working full time. Business in the household department is steadily improving, and there is a brisk demand for coal for manufacturing purposes. Railway and canal sales are, on the whole, satisfactory, and there is an improved demand at the landsale depots.

Birmingham.

COAL.

The coal trade is wonderfully brisk for the time of year. The announcement of a prospective increase in price has stimulated the demand for household fuel. The revised lists issued during the week state that from 1s. to 1s. 6d. will be added to the cost from the beginning of September, on works fuel about 1s. per ton, and on slacks 1s., applying, of course, only to lots outside contracts, so that the effect on iron and steel works, for which, of course, there is a very steady consumption, will not be very great. Steam fuel for export is in enquiry. Cokes are dearer, and a satisfactory demand is experienced for sales at remunerative rates.

IRON.

There is little change to record since last week in the condition of the South Staffordshire iron and steel trades. The tone of the market, however, was quite buoyant, reflecting the trade prosperity of the district. Order books are full of work for the next two or three months, and although the pressure for delivery is somewhat less severe, producers are still unequal to meet customers' demands. Pig iron prices remain firm at the recent high level, nor is there likely to be any giving way. The Middlesbrough market maintains a decided strength, coke during the week has been quoted as high as 22s. 6d. and 23s., and behind these factors there is a constant demand swallowing up practically the output of the district. Sales are of fair bulk for early delivery, but contracting for forward use has not developed sufficiently to test future prices. In the meantime Northamptonshire forge commands 62s. and 63s., Derbyshire 63s. 6d. to 64s. 6d. (advance of 1s. in each case), Staffordshire common 59s., and part-mine 62s. 6d. to 63s. 6d. It is a long time since barmakers experienced so large a volume of business, and, if they are inclined, they have no difficulty in enlarging their order books. Prices have undergone no change on the week, marked qualities being on the £9 10s. basis, and merchant bars averaging about £8 5s. Some nut and bolt iron is reaching Wednesbury and Darlaston districts from the Continent against contracts, but delivery is not promised under eight to twelve weeks. Consumers, therefore, are compelled to have large supplies of local makes for which they ask £7 15s. to £8 a ton, and the mills are kept going steadily. Black sheets are in good demand at £8 2s. 6d. to £8 5s. for doubles, a figure which is considered high compared with prices obtained for galvanised corrugated sheets. Quotations for these remain at £12 to £12 2s. 6d. a ton, but in some cases for large orders these are cut to the extent of possibly 1s. 3d. Spelter is delivered in the district at £26 to £27; and with wages up 2½ per cent. and dearer coal, the galvanised sheet trade is certainly not on a very remunerative basis at the moment, although there is a good deal of work going. Within the last four or five years the productive capacity of the district has been very largely increased, and there is a good deal of competition for all the orders going. Gas and steel strips are in active demand, attesting the activity of the industries for which they minister. For small rounds, flats and squares prices range from £8 5s. for common qualities to £8 10s. for merchant qualities, three-eighths basis with the usual extra. Steelmakers stand in an exceptional position with six months' work on hand. English billets are still quoted at £6 to £6 2s. 6d, and a small amount of Continental material is coming in at about £5 15s. Manufacturers could do with a lot more in order to ease English prices.

Forest of Dean.

Lydney.

COAL.

Merchants are evidently anxious to get in a bit of stock before the end of this month in anticipation of an advance in prices on the 1st prox., as the house coal trade of this neighbourhood is flourishing just now. A good number of vessels are getting up for loading, stocks at the docks are therefore very small, The railborne trade is also active, and a steady flow of orders are coming in regularly from the inland districts. For the present there is no alteration in values, and prices continue as last quoted, block being 15s. 6d. per ton net at pit, other sorts in proportion. In consequence of weak enquiry for slack coal, it has been thought advisable to reduce 1s. per ton, rough slack is therefore 6s. 6d. per ton from the 26th inst. The steam coal trade keeps very busy; large shipments are being made; one or two of the pits are launching out into Continental business, and there is no doubt that new markets will have to be found, as outputs are on the increase. Prices remain about the same.

THE SCOTCH COAL AND IRON TRADES.

Thursday, August 29.

Glasgow and Lanarkshire.

COAL.

There is continued activity in the various departments of the Scotch coal trade, although the shipments fall considerably short of the high total of the preceding week. The aggregate clearances at the Scotch ports amounted to 360,907 tons, being 19,981 tons less than in the preceding week, but still 22,882 tons in excess of the quantity despatched in the corresponding week of 1911. At Glasgow 54,158 tons were despatched abroad and 42,679 tons coastwise, the total of 96,837 tons comparing with 98,390 tons in the preceding week and 105,348 tons in the corresponding week of last year. The demand for the different classes of coal has been well maintained. A fair business has been done in steam coal at about former rates. The better sorts of house coal have sold very freely, both for home use and shipment. Splint coal meets with an active and increasing demand, and is accordingly comparatively firm in price. The market for nuts, which has been an active one during a succession of weeks, continues to show a gratifying amount of activity, and it is not unlikely that measures may be adopted to increase the supplies. The quotations f.o.b. at Glasgow are for steam coal 11s. 6d. to 12s. 6d., ell coal 12s. to 12s. 6d., splint 12s. 6d. to 13s., washed treble nuts 13s. to 13s. 6d., doubles 12s. 6d. to 13s., and singles 11s. 6d. to 12s. per ton. Supplies of coal are abundant, and as a rule railway and shipping facilities are satisfactory. Coal for manufacturing purposes is in strong demand, and good prices are paid for all sorts of small hard coal and dross for furnace use. Colder weather has quickened the demand for house coal for home use, and prices are firm.

IRON.

There has been a further upward movement in the prices of Cleveland warrants since last report. Demand has been good on the part of shippers and home consumers, and a considerable business is being done for future delivery. Cleveland warrants have sold from 62s. 1½d. to 63s. 3½d. cash, 62s. 3d. and 63s. 8d. one month, and 62s. 9d. to 63s. 9d. three months. Transactions have also been noted at 62s. 9d. 14 and 21 days, 62s. 6d. October 18, and 63s. 6d. and 63s. 7½d. for November 1, and 63s. 3d. for November 11. Business has been done in Cumberland hæmatite warrants at 77s. 9d. cash, which shows an advance of 9d. on previous transactions. A large amount of hæmatite pig iron is going into consumption in Scotland, and the quotation is now from 81s. to 81s. 6d. for delivery at west of Scotland steelworks. There are 88 furnaces in blast, compared with 82 at this time last year, and of the total 47 are making hæmatite, 37 ordinary, and four basic iron. Some of the special brands of Scotch pig iron are very scarce, and there has been a further general advance in prices. Govan and Monkland are quoted f.o.b. at Glasgow, Nos. 1 70s., Nos. 3, 68s. 6d.; Carnbroe, No. 1, 73s. 6d., No. 3, 69s. 6d.; Clyde and Langloan, Nos. 1, 77s., Nos. 3, 72s.; Calder No. 1 not quoted, No. 3 72s.; Summerlee, No. 1, 77s. 6d., No. 3, 72s. 6d.; Gartsherrie, No. 1, 78s., No. 3, 73s.; Coltness, No. 1, 94s., No. 3, 74s.; Eglinton at Ardrossan or Troon, No. 1, 70s., No. 3, 69s.; Glengarnock at Ardrossan, No. 1, 78s., No. 3, 73s.; Dalmellington at Ayr, No. 1, 71s., No. 3, 69s.; Shotts at Leith, No. 1, 77s. 6d.; No. 3, 72s. 6d; Carron at Grangemouth, No. 1, 77s. 6d., No. 3, 72s. 6d. per ton. The shipments of pig iron at Scottish ports in the past week were 2,365 tons foreign and 2,717 coastwise, the total of 5,082 tons showing an increase of 1,551 compared with the corresponding week of last year. The arrivals at Grangemouth of pig iron from Middlesbrough and district amounted to 11,352 tons, a large increase on the corresponding week. The finished iron and steel trades of the west of Scotland have very full employment. There is much pressure for delivery of steel for shipbuilding and other purposes. The fresh business coming forward, however, appears to be only moderate in quantity. Malleable iron is quoted on the basis of £8 2s. 6d. for Crown bars, and Siemens steel at the same rate for ship plates, subject to the usual 5 per cent. discount for Clyde delivery.

◆

Renfrew, Ayr and Dumbarton.

COAL.

There has been an active business in the coal trade of this district, and shipments are rather better than they were in the preceding week. The clearances have been at Bowling 305 tons, Greenock 447, Irvine 1,071, Ardrossan 5,832, Troon 6,919, and Ayr 20,089—total 34,633 tons, compared with 32,328 in the preceding week and 36,071 in the corresponding week of last year. Of the total of 34,633 tons despatched in the past week, 3,850 tons were sent abroad and 30,813 coastwise. A very considerable proportion of the latter figure represents the trade with Irish ports. A large business is being done in coal for manufacturing purposes, at firm rates. Household coal for home use is selling more freely owing to colder weather and the advance of the season, and prices of all sorts of coal are firm.

◆

Stirling, the Lothians and Fife.

COAL.

There has been a quieter business in the export branch of the coal trade in the Firth of Forth district. The foreign shipments amounted to 31,847 tons, and 24,727 tons were despatched coastwise. The clearances were at Granton 7,666 tons, Bo'ness 19,487, Grangemouth 38,800, Leith 40,621—total 106,574 tons, compared with 116,723 in the preceding week and 62,405 in the corresponding week of last year. Best screened steam coal is quoted at Leith 12s. 6d. to 13s., secondary qualities 11s. 9d. to 12s. 3d., treble nuts 13s. 6d. to 14s., doubles 12s. 9d. to 13s., and singles 12s. 3d. to 12s. 9d. per ton. The shipping trade at some of the Fife ports has suffered owing to the prevalence of low tides, and the total clearances are about 10,000 tons less than in the previous week. At Methil 60,799 tons were cleared, Burntisland 57,050, Dysart 1,410, Wemyss 1,241, Alloa 1,155, Tayport 604, and Charleston 574—total 122,833 tons, against 133,447 in the preceding week, and 134,201 in the corresponding week of last year. There has been a very good demand for shipment to Mediterranean and Baltic ports, and a good coastwise trade has also been done. First-class screened navigation coal is quoted at Methil and Burntisland 15s. 6d. to 16s. 6d., unscreened 13s. to 13s. 6d., steam coal 11s. 6d. to 13s., treble nuts 13s. 6d. to 14s. 6d., doubles 13s. to 14s., and singles 12s. 6d. to 13s. per ton. There is increasing activity in the inland branches of the trade, and prices of house coal are well maintained.

THE LONDON COAL TRADE.

Thursday, August 29.

The London coal trade has maintained the increased demand noted last week, and both collieries and merchants have had a steady flow of orders. Colliery prices have stiffened considerably, and for orders of any magnitude it is difficult to get a quotation at all. The majority of sellers are evidently contemplating issuing an advanced price list early next week, and a general advance in retail prices is fully anticipated very shortly. On Friday last it was decided to advance all qualities from kitchen coal downwards 1s. per ton, but Derby brights, Silkstone, &c., to remain at the previous low prices. Buyers who have not yet covered for their requirements over the contract period have shown a decided eagerness lately to do so, and in cases where stocks at the depots have been diminished a keen anxiety to replenish them has been in evidence. In consequence, collieries are now in a satisfactory position both for current and forward tonnage, and in many cases instructions have been given for the withdrawal of all outstanding offers. House coals of all descriptions have a steady demand at constantly stiffening prices. Hard cobbles are only in moderate request, although no change in prices can be obtained by prospective buyers. Bakers' nuts have an improved demand, and quotations are firmer. Best hards and steam coal are quiet but steady. Good quality nutty slacks are in request, and prices are steady. Double-screened nuts are not in such good demand, and prices are somewhat easier, but for forward business no change is noticeable. Coke is in moderate request, but the small quantity available is easily taken up, and prices are inclined to stiffen for future tonnage. In some quarters the view is held that the present rush of orders is purely for stocking purposes, and therefore, when the cellars are full, a period of very quiet trade must intervene before the real winter demand sets in. This, however, is to a certain extent discounted by the fact that the recent cold wet weather has caused a large number of householders to start fires, and a good quantity of coal has thereby been consumed very much earlier than usual. The seaborne market is steady and in fair demand, but the heavy business in the north does not allow very much to come to the Thames, and in consequence no real test can be brought to bear. Prices are nominally 21s. for best, and 20s. for seconds, but as nothing is actually on offer it is out of the question to take them as a fair guide of their actual value; probably 6d. to 1s. per ton more would be a safer basis. Wagons appear to be in great demand everywhere, and there are several complaints of undue delay in the running of both loaded and empty wagons. The miners also are reported in many districts to be very restless owing to the effect the Mines Act is having, but it is hoped that no serious dislocation will occur, especially now that a good season of steady business, good for both masters and men, appears to have set in.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, August 23.—There were no cargoes of Durham or Yorkshire seaborne house coal on offer to-day, and the demand remained steady. No quotations. Cargoes 19.

Monday, August 26.—There was a good enquiry for seaborne house coal, but no Durham on offer. Small quantities of Yorkshire seconds selling readily. No quotations. Cargoes 39.

Wednesday, August 28.—There was a good demand for seaborne house coal cargoes at to-day's market, but in the absence of supplies no sales to report. No quotations. Cargoes 8.

THE IRISH COAL TRADE.

Thursday, August 29.

Dublin.

In the coal trade generally business has been active during the past week, and there has been more enquiry for household qualities in preparation for horse show week than is usually the case, owing to very unseasonable weather. There is no change in prices either of household or steam coals, and no advance has been made here in Scotch coals, although they are dearer in districts further north. City prices stand as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; best coke, 23s. per ton; "bell" coal, 1s. 5d. per sack; steam coals, from 20s. per ton upwards. The coaling vessels arriving totalled 49, as compared with 46 the week previously, chiefly from Garston, Irvine, Ayr, Glasgow, Port Talbot, Newport, Manchester, Girvan, Workington, Preston, Point of Aire, and Swansea. On Thursday last Earl Fitzwilliam, one of the largest mine owners in the United Kingdom, visited the Gracefield Collieries in the Queen's County, and after having inspected the mines, congratulated all who were connected with them on the manner in which they had been equipped, at the same time expressing his intention of testing the coal to see whether he could have it used.

Belfast.

The coal trade continues to improve in all branches, and prices of household sorts are expected to be increased at an early date next month. Present quotations in the city are:—Best Arley coal, 25s. per ton; Hartley, 24s.; Orrell nuts, 24s.; Wigan, 23s.; Scotch, 21s.; best Orrell slack, 21s. Steam coals are keeping firm, and tending upwards. Scotch qualities now being advanced 6d. per ton. Quay prices are as follow:—Arley house coal, 21s. 4d. per ton; Scotch household, 18s.; Scotch steam coal, 16s. to 17s. per ton; navigation steam, 16s. to 17s.; Welsh steam coal, 16s. 6d. to 17s. 6d. per ton. There is a good supply in the port, cargoes arriving during the week being chiefly from Garston, Girvan, Ayr, Preston, Glasgow, Ardrossan, Ellesmere Port, Maryport, Troon, Whitehaven, Swansea, Irvine, Newport, Manchester and Sharpness. The freight market is steady and unchanged.

THE BY-PRODUCTS TRADE.

Tar products:—The market is steady as a whole. Prices are for the most part well maintained. Pitch steady. Benzols dear. Naphthas firm, especially crude. Creosote and carbolics are much about the same. Nearest quotations are:—

Benzols, 90's, 1s. 1d.; ditto 50's, 11½d.; toluol, 10½d.; carbolic acid, crude (60 per cent.), 2s. 7d. to 2s. 8d.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 1s. 1d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 3d. for ordinary qualities; pitch, 51s. to 52s. f.o.b. east coast; ditto, 50s. 6d. to 51s. 6d. f.a.s. west coast; ditto, 55s. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—The market continues very firm. There is not a large amount of business passing, but enough to show the tendency of prices. For forward the enquiry is good, and as high as £14 13s. 9d. is required for October-March in some localities. Prompt prices are very firm as follows:—

London (ordinary makes), £13 12s. 6d.; Beckton, £14 2s. 6d.; Liverpool, £14 10s.; Hull, £14 7s. 6d.; Scotch ports, £14 12s. 6d. to £14 15s.; nitrate of soda (ordinary), 11s. 4½d. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

THE TIN-PLATE TRADE.

Liverpool.

There has been a considerable enquiry the last few days, a very fair amount of business resulting. The tone of the market is firm with an upward tendency. Makers all seem to be comfortably booked over the next two or three months, and they are not disposed to sell ahead, unless at an advance on current rates, which run:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 14s. 9d. to 14s. 10½d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 3d. to 15s. 4½d. per box; I C 28 × 20 (112 sh. 216 lb.), 29s. 6d. to 29s. 9d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. to 15s. 3d. per box; I C 14 × 19¼ (120 sh. 110 lb.), 15s. to 15s. 3d. per box; I C 20 × 10 (225 sh. 156 lb.), 21s. 6d. to 22s. per box; I C squares and odd sizes, 15s. to 15s. 3d. basis. Ternes rule firm at 26s. 3d. to 26s. 6d. for I C 28 × 20, for delivery this year end. For shipment over first quarter of 1913, works are asking 6d. to 1s. advance. Charcoal tins are steady at 17s. basis and upwards. Coke wasters meet with a fair demand. Quotations:—C W 14 × 20, 13s. 9d. to 13s. 10½d. per box; C W 28 × 20, 28s. 3d. to 28s. 6d. per box; C W 14 × 18¾, 13s. 9d. per box; C W 20 × 10, 19s. 6d. per box—all f.o.b. Wales, less 4 per cent.

After a test of several weeks, both practically and analytically, the Rhondda Rescue Station Committee have placed their order with the Mining Engineering Company Limited for the complete equipment of their station, which is the largest in the United Kingdom. This is the first competitive test they have had with their 1912 apparatus under working conditions, and we understand that in every instance it has come out on top as regards efficiency, amount of work done per man, and comfort. The company are shortly removing to more convenient premises, where they are installing up-to-date machinery to meet the increased demand for their specialities.

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See Illustrated Page Advertisement in August 9 issue.

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The Edmonton Urban District Council invite **TENDERS** for the supply and delivery at the Angel-road or Edmonton Low Level Station of the Great Eastern Railway (at the option of the Council) of **STEAM COAL** and **SLACK** and **BROKEN** and **UNBROKEN COKE** for the period between the 29th September, 1912, and the 30th September, 1913.

It will be a condition of contract that the firm whose tender is accepted shall pay to all workmen in their employ rates of wages not less and observe hours of labour not greater than the rates of wages and hours of labour in force within the district.

Persons tendering are requested to quote nett prices without trade discounts.

Forms of tender and full particulars may be obtained at the Council's Offices, Town Hall, Edmonton.

Sealed tenders (which must be upon the forms supplied by the Council) endorsed "Tender for Coal, Slack and Coke," to be delivered at my office not later than 12 o'clock (noon) on Tuesday, the 10th September next.

The Council do not bind themselves to accept the lowest or any tender, and the person whose tender may be accepted will be required to enter into a proper contract and provide such sureties as the Council shall direct.

Town Hall,
Edmonton,
30th August, 1912.
By order,
WM. FRANCIS PAYNE,
Clerk of the Council.

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For Sale, 4 sets Three-throw Ram PUMPS, by Pearn's; *not been put to work*; duty 10,200 galls. hour each against heads of 440 and 200 yards (2 to each); all complete with Suction and Delivery Valves, and with Gearing and Rope Pulleys, arranged for motor drive in each case.—For particulars and inspection apply to **Box 4910,** *Colliery Guardian* Office, 30 & 31, Furnival st., Holborn, London, E.C.

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⁂ *For other Miscellaneous Advertisements see Last White Page.*

Forthcoming Annual Meetings.

Institution of Mining Engineers—
Provincial Meeting (Birmingham) September 11, 12 & 13, 1912
Midland Counties Institution of Engineers Sept. 1912
Manchester Geological and Mining Society, Oct. 8, 1912
North Staffordshire Institute of Mining and Mechanical Engineers .. ... October 14, 1912
South Staffordshire and Warwickshire Institute of Mining Engineers ... October 1912 (2nd week)
Iron and Steel Institute—
Autumn Meeting ... ... September 1912
Association of Mining Electrical Engineers—
October 4 & 5, 1912 (Provis.)

The Colliery Guardian.

LONDON, FRIDAY, AUGUST 30, 1912.

Four thousand men struck work on the 27th inst. at the Glamorgan Collieries over the fatal accident custom. The matter was considered by a special joint sub-committee of masters' and workmen's representatives at Cardiff on the same day. The sub-committee also considered the rights of the miners under Lord St. Aldwyn's award and the rules and regulations governing the minimum wage. The discussion was eventually adjourned without any definite decisions being arrived at.

A joint meeting of coalowners' and miners' delegates was held at Cardiff on the 23rd inst. to discuss the statements made by the South Wales Miners' Federation that at some of the collieries sections of the workmen had been reclassified since the passing of the Minimum Wage Act, to the disadvantage of the employees. Discussion of the points was deferred.

The members of the Wages Board of the Northumberland Miners' Association met the coalowners of the county at the Coal Trade Office, Newcastle, on Saturday afternoon, and made an application for an advance of wages. At the close it was officially stated that an advance of 2½ per cent. had been agreed to. The advance takes effect upon the pays commencing on August 26 and September 2, and brings the wages of underground workmen and "banksmen" to 35 per cent. above the 1879 standard. Wages of surface labourers other than "banksmen" are advanced to 28 per cent. above the same standard.

The annual Trade Union Congress opens next Monday at Newport (Mon.).

Sir George Askwith, Chief Industrial Commissioner, left London last week on a visit to Canada.

where he will enquire into labour conditions in the Dominion, and particularly into the working of the Canadian Industrial Disputes Investigation Act of 1907. Sir George was accompanied by Mr. Isaac Mitchell, of the Labour Department of the Board of Trade. Sir George Askwith and Mr. Mitchell are expected back in England in time for the resumed meeting of the Industrial Council on October 15.

Indian Railways and the Coal Trade.

The *wagen-mangel*, or truck famine, is an affliction to traders the world over, and lies at the bottom of most of the quarrels that occasionally spring up between railways and their clients. At the present time in India it has assumed almost the proportions of a plague, and the incapacity of the Indian Railways Administration to rise to the occasion has rendered incalculable harm to Indian commerce and called forth the most bitter criticism. On March 9, as reported in our issue of April 12, a meeting of the Committee of the Bengal Chamber of Commerce was held to confer with the Hon. W. H. Clark, the member for Commerce and Industry, with regard to the shortage of coal at Calcutta, and urging the appointment of a traffic expert. Mr. Clark stated that Sir Trevredyn Wynne was about to make a tour of the railways, and that he intended to telegraph for 2,500 wagons in addition to the 6,000 provided for in the railway programme.

These measures appear to have given no satisfaction, and the agitation has spread to this country. Replying to Sir J. D. Rees in the House of Commons on July 11, the Under-Secretary for India threw some further light on the subject. Mr. Montagu expressed the opinion that the difficulty of dealing with the coal traffic at Calcutta was largely due to congestion at the Calcutta docks in consequence of lack of shipping and inadequate facilities for the export trade. There had also recently been an exceptional demand for coal wagons in India, because coal required for the railways in the west of India that would ordinarily have been carried by steamer had been carried by rail owing to high steamer freights consequent on the English coal strike. Provision had been made in the Budget for spending £3,100,000 on additional rolling stock in 1912-13, and it was the present policy of the Government of India to spend the capital grants for railways mainly on improving open lines and on rolling stock.

On the previous day, the Secretary of State for India received a deputation from the East Indian section of the London Chamber of Commerce on the subject of the provision of rolling stock. At that meeting Mr. C. Campbell McLeod referred to telegrams received from the Chambers of Commerce of Bengal, Bombay, and Karachi, and suggested the appointment of traffic experts to settle whether the congestion all over India was due to a shortage of wagons or to inefficient management; the provision of an "urgent" supply of wagons; the institution of a wagon reserve; the concentration of expenditure on open lines; and the quadrupling of the lines between Asansol and Bundel, and from Ghats to Bombay. The Marquis of Crewe's reply, which was on the lines of the statement made by the Under-Secretary, however, cannot be regarded as inspiring, the chief difficulty evidently being the prosaic one of borrowing money for the contemplated expenditure.

Some light upon this side of the matter is thrown by an excellent paper by Mr. Neville Priestley, managing director of the South Indian Railway, in a paper contributed to the Royal Society of Arts some little time ago. He recalled the report of the Committee appointed in 1908, who found "that the equipment of Indian railways had been unequal to the requirements of the trade" and recommended increased allotments for railway construction, amounting to £100,000,000 in the eight years following. Nevertheless the annual moiety has not been expended in any single year since the report was issued, notwithstanding that the demands of Indian trade have grown even more rapidly than was contemplated—the reason, of course, being the indifferent reception that has awaited the issue of fresh loans. Mr. Priestley points out that the present high standards of construction are incompatible with the profitable building of branch and feeder lines in many places where they are badly needed. This view may seem at first sight irreconcilable with the appeal for limitation of expenditure to main lines, but an inveterate disregard of it in the past may nevertheless have been the chief agent in producing a situation that calls for other more urgent measures.

The trouble undoubtedly originates from the old mistake of endeavouring to graft Western ideas upon an Eastern stock; the policy of the Indian Railway Board has been largely swayed by officials, ignorant of the needs of the country, whose counsels of perfection have had the great defect of being financially unsound. We can quite appreciate the difficulties of a stay-at-home administration that now has to reap so unsatisfactory a harvest, to repair the errors of its predecessors, and at the same time to appease the clamant demands of the Indian trading community.

One thing, however, is certain—namely, that expenditure now deferred will only serve to increase the cost when payment of the bill can no longer be postponed. Cheap coal has come as a godsend to Indian commerce; but, owing to the long distances that have to be traversed, the traffic problem is an essential factor. Already some of the railways in the west of the Empire are diverting their attention to Natal coal, and in a report recently prepared for the Transvaal Railway Board by Mr. Gordon Sandilands, their special commissioner in the East, the prospects of capturing a portion at least of the seaborne trade to Karachi and Bombay are regarded as being very promising. These ports between them take about two million tons annually, and sample cargoes of Transvaal coal have already been shipped to three of the Indian railways. Natal and New South Wales have also nibbled at these markets, but there is no reason whatever why the Bengal coalfield should not be placed in a position to satisfy practically the whole of the demands of the Empire. The advantage is so great that money should be found by hook or by crook.

Coalmining in 1911.

During the prolonged discussion on the probable effects of the Miners' Eight Hours Act two results were widely anticipated, viz., a diminution in the output of coal, and an increase in the number of accidents, owing to the greater pressure at which mining operations would have to be conducted. Some sensation, therefore—and no little elation in a section of the political Press—has followed from the official announcement that the output of coal for 1911 was the greatest hitherto produced, and the accident death-rate was the lowest on record. Thus baldly stated, it would appear that the predicted effects of recent legislation are not destined to be realised, but it would be well not to be over hasty in drawing conclusions from the figures.

In examining more closely the significance of the output figures for 1911, which reached the unprecedented total of 285 942,232 tons for all mines under the Coal Mines Act, the increase of 7 458,871 tons in the output of coal is to be explained to a large extent by exceptional circumstances. There had been a marked decline in output in the years following the abnormal production of 1907, which amounted to 282,104,141 tons. The comparatively low figures for 1910 were partly due to the disordered state of the labour element in the Durham and Northumberland coalfields. The latter half of last year, on the other hand, was altogether exceptional, for the shadow of the national strike was already looming, and coal consumers were accumulating those vast stores of fuel which enabled the country to face the general stoppage last spring with comparative unconcern.

It would be wrong, therefore, to conclude from the output returns for 1911 that the Eight Hours Act has not been prejudicial to the output of coal. As a matter of fact, it would appear that the output of coal per man has declined. In the year 1907, the output per man reached 299·9 tons. This fell progressively in the following years to 278·8 tons in 1908, 274·0 tons in 1909 and 265·6 tons in 1910, when the influence of the strikes in the northern coalfield is visible. Last year the output per man was 267·9 tons, or just 32 tons less than in 1907. When it is remembered that the coalminers now number roughly a million, even a small reduction of output per man assumes a serious aspect.

Turning next to the death-rate figures, it is certainly a matter for congratulation that the death-rate per 1,000 persons employed last year should have fallen to the record figure of 1·19, but here again do not let us be over sanguine in drawing conclusions from these figures. We agree with Mr. Redmayne that for comparative purposes the rate per 1,000 persons employed is a safer criterion than the actual number of persons killed. Yet there is something still wanting before a theory can be based upon such results. An accident may be fatal or otherwise according to most fortuitous circumstances. One person or many may be killed as a result of a single accident. Every accident, therefore, is a potential danger to life, and if we measure the safety of coalmining in 1911 by the total number both of fatal and non-fatal accidents, we find that 6,722 separate accidents were reported to the inspectors in 1911, as compared with 6,674 in 1910, showing an increase of 48. If, again, we consider the total non-fatal accidents which disabled men for more than seven days, it is found that there were 7,588 more of such accidents last year than in the preceding year.

It is clear, therefore, that the low accident death-rate in 1911 cannot be safely regarded as a measure of the normal condition to which coalmining has been brought, and it would neither be surprising nor a cause for undue alarm if this rate should fail to be maintained.

The fallacy which may be involved in basing conclusions as to the safety of coalmining from death-rate statistics may be illustrated by a comparison of the figures in this country and in India. Although in the latter country the output per man employed is only about 108 tons per year, the tonnage incidence of fatal accidents appears to be steadily rising, and in 1910 reached the high level of 14·05 per million tons of coal raised. In the United Kingdom for the same year the tonnage death-rate was only 6·37. In the same year the death-rate per 1,000 men employed in India was only 1·52, as compared with 1·69 in this country. Based solely upon these results, it would be difficult to decide whether coalmining is safer in India than in the United Kingdom. Nor is it easy to devise a fair standard of comparison between two countries where the conditions are so totally different.

Another point, which is far from satisfactory, is the small headway that is being made against accidents from falls of ground, which accounted for more than half of the deaths in British coalmines last year, and gave the second highest figure on record. There has been practically no improvement in this respect for the past 20 years, notwithstanding the greater stringency of Government supervision. While, therefore, there is convincing proof that on the whole the Coal Mines Regulation Acts have made for greater safety in working, there is need for serious reflection as to the most effective way to secure further progress in this direction. It would be a pity to carry too far the present tendency to reduce colliery management to the mere perfunctory signing of official forms. It would be equally misleading to imagine that State control alone can accomplish much more than has been already done; and it is pure folly to suggest that the coincidence last year of a double record, both in output and in immunity from fatal accidents is any warrant for political gratification.

Trade Summary.

The London coal trade has maintained the improvement noted last week, and sellers have found a ready market at better prices. Only small parcels are on offer, however, as, in view of the prospective advance and the heavy bookings both current and forward, the majority of collieries are holding their hands for a bit. The cheaper qualities were advanced 1s. per ton on the merchants' lists on Friday last. The seaborne market is quiet, owing to the absence of cargoes, and prices are purely nominal.

The market at Newcastle is dull, so far as immediate business is concerned, and prices have weakened in all directions. For forward shipment there is a good enquiry, but here also tonnage difficulties are having their effect.

The Durham coal trade is easier, owing to the lack of tonnage. Gas coals, however, are moderately steady, owing to the large London consignments. Coking coals are in good request. Coke is firm.

The Lancashire house coal trade is fairly active, many customers having started to lay in stocks. The demand for manufacturing fuels and bunker sorts continues steady.

The West Yorkshire trade is active in nearly all departments, the virility of the house coal market having been well sustained, whilst steam and manufacturing coals are in excellent request.

The export trade of the South Yorkshire coalfield is exceptionally strong, in view of the approaching race week at Doncaster. Forward business, however, is not much in evidence. The house coal trade is busy. Coke is steady and the output is large.

Derbyshire house coal finds a ready market and prices are firm. The position as regards manufacturing fuel remains satisfactory and steam coal continues to move freely.

The lack of tipping facilities continues to excite attention at Cardiff, and it is feared that the trouble will become intensified when the anticipated rush for supplies occurs. This is added to a scarcity of tonnage and a high range of freights. These are all factors that affect prices, which for the time being are unstable. The small coal market is easier. Monmouthshire coals are steady. Bituminous sorts are slow of sale. Patent fuel is active. Coke is scarce.

The Scottish coal trade continues active in all branches.

THE WELSH COAL AND IRON TRADES.

Thursday, August 29.

North Wales.

Ruabon.

COAL.

A goodly number of vessels of varying kinds have coaled at the Merseyside ports during the past week, and the North Wales collieries have had a fair proportion of this trade, though owing to the slight boom in other departments, the collieries raising the better class of fuel have been able to obtain better than bunker prices in the open market, and therefore have not so eagerly sought the shipping trade. The household coal trade is certainly improving, this doubtless being due to the fact that the continued wet and cold weather has caused householders to lay in their stock, added to the fact of the approach of autumn, when it is confidently asserted there will be a general increase all round in prices for all classes of fuel. A nice little business is being done at Ellesmere Port in loading small vessels with fuel for merchants who live at little seaside spots on the North Wales coast. These small craft take about 150 to 200 tons of fuel, and the owners are able to buy this quantity for quick loading at a favourable spot lot price. The railway companies are taking large quantities of steam coal against their locomotive contracts, and other manufacturing firms are also taking fair quantities. Gas contracts are now practically completed so far as this district is concerned, and most of the fuel now being supplied to these works is under the new contracts and at the advanced prices. Now is the time for making the contracts for the supply of coal and slack for the schools for the education authorities, and a number of the contracts are now open. It is anticipated that this winter's school contracts will be at least 2s. per ton advance on the prices last paid, and no doubt an effort will be made to obtain the 2s. 6d. per ton advance where there is any reasonable prospect of getting it. This week's ruling prices are as follow:—Best large household coal, 15s. to 16s. per ton f.o.r., and landsales prices average about 18s. 4d. at the wharf. Steam coal for manufacturing purposes 12s. to 13s. per ton f.o.r., and for shipment at Birkenhead 11s. and upwards according to quality. Nuts are in great demand at the steady figure of 11s. per ton, and at this figure there is but a small quantity obtainable, as most of the collieries have contracted for nearly the whole of their output under gas contracts. Slacks at varying figures, according to quality, up to 7s. 6d. per ton f.o.r. There is a good demand for gas coke at the same price as quoted last week—15s. per ton at the works.

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Monmouthshire, South Wales, &c.

Newport.

COAL

The steam coal market in all departments maintains the firm and even tone of the past few weeks, albeit there is a relaxation of the pressure of business which was perceptible over last week-end. A scarcity of prompt tonnage hampers some sellers, who, although fully stemmed, are in urgent need of wagons to keep pits going. Regarding forward business, buyers now seem inclined to hold their hands for awhile, while sellers continue almost enthusiastic as to the course of the market, and decline to consider making any concessions. Small coals are hardly so firm as of late, but no perceptible change can be recorded. Patent fuel rules firm. Negotiations between the Arrow Fuel Company and the Newport Docks Company have now reached the concluding stages, by which means the Docks Company will afford facilities for storing fuel ready for export up to 50,000 tons. Up to the present time the capacity of the works has not been utilised nearly to its fullest extent for lack of storage, but now it is expected that the output will be doubled. The house coal trade increases slowly, owners now foreshadowing a rise by next week. Coke continues very scarce and very dear. Pitwood supplies are about equal to the demand, values remaining based upon 24s. for best French fir ex-ship. In the freight market a fair amount of outward chartering has been done, rates for the Mediterranean ruling firmer—otherwise no change. Latest approximate quotations are as follow, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 9d. to 16s.; western-valleys, ordinaries, 14s. 9d. to 15s. 3d.; eastern-valleys, best, 14s. 3d. to 14s. 9d.; other sorts, 13s. 9d. to 14s.; colliery smalls, best, 9s. to 9s. 3d.; seconds, 8s. 9d. to 9s.; inferiors, 8s. 3d. to 8s. 6d.; screenings, 9s. 3d.; through coals, 10s. 9d. to 11s.; nuts, best washed, 11s. 3d. to 11s. 6d.; house coals, best, 18s. to 18s. 6d.; seconds, 16s. 6d. to 17s. 6d.; patent fuel, 17s. 9d. to 18s. 3d. Coke: Furnace, 22s. to 25s.; foundry, 26s. to 30s.

IRON.

Throughout this district, the tone of the iron and steel trades continues strong. In no department is there any weakening of prices, whilst on the other hand manufacturers in many cases have been able to obtain considerable advances. Enquiry is again better, but many works are holding off the market in anticipation of further improvement in the immediate future. Rail mills, also tin-plate bar and sheet bar mills, are still considerably in arrears with deliveries of specifications in hand, and are exceedingly well placed with orders for some time ahead. There is little alteration in values of rails, which are again quoted upon a basis of £6 7s. 6d., to £6 10s. for heavy sections. It is difficult to determine properly values of tin-plate and sheet bars, for while official quotations now rule upon £5 12s. 6d. to £5 15s. Bessemer, works that can give reasonably prompt deliveries can easily obtain a few shillings more. In the pig iron market business continues in every way satisfactory, with values maintained at 81s. to 82s. for Welsh hæmatite delivered in the district. Iron ore has not advanced. The condition of the tin-plate market is unaltered. Works are all practically fully committed for their production over the next few months, and quotations generally are nominal. On the advances in raw material there is a slight increase on the week, latest official figures showing values based upon 14s. 9d. to 14s. 10½d. Bessemer, and 14s. 10½d. to 15s. Siemens for 20 × 14 × 112.

Cardiff.

COAL.

The observations made last week as to the want of better facilities for the tipping of coal have attracted considerable attention. On 'Change almost every day the chief topic of conversation has been the shortage of tips, instances being recorded both at Cardiff and Barry of vessels having actually come under demurrage before a tip was available. The result is that notwithstanding that the best collieries have been very well stemmed, they have experienced great difficulty in providing full work for their employees unless a large number of foreign wagons were temporarily engaged. In fact, whenever there is anything like a pressure of tonnage there is invariably a lack of the requisite dock accommodation, and, of course, this state of things is likely to become intensified when a greater demand for coal sets in, of which there is every prospect in the not distant future. Happily the directors of the Barry Dock and Railway Company seem to have recognised the urgency of the situation, and at the last half-yearly meeting the announcement was made that they had acquired at an outlay of about £60,000, considerably more than 200 acres of land at the western end of the No. 2 dock between Cadoxton and Sully for the purposes of a new dock and railway and manufactory extensions. It is well known that some such scheme has been under consideration for several years, and a good deal of excavating work has already been done. The new dock will, it is said, absorb the existing timber float of upwards of 40 acres. To that will be added a further 40 or 50 acres, with the necessary quayage and entrances to the No. 1 dock; and should it be deemed necessary a new timber float will be constructed at the extreme end of the new dock. Whether this movement on the part of the Barry Company will stimulate the Cardiff Railway Company to make further extensions remains to be seen. Apparently they prefer first to see what influence the extra charges which the South Wales railway companies propose to make from October 1 next for mixing coal will have on the trade of the ports affected. The new charges will be much in excess of those previously in vogue, being in nearly all cases almost twice as much as the old tariff. Naturally they are much resented by firms who have been in the habit of mixing coals, but there is no question that a large number of colliery owners and shippers sympathise with the action of the dock and railway companies, as they believe that if it minimises to any appreciable extent the practice of mixing coals, tipping will be proceeded with more expeditiously than has hitherto been the case, and that is a desideratum devoutly to be desired. It is somewhat noteworthy that whilst Newport and Swansea have been enlarging their dock accommodation there has been no movement in that direction in the port of Cardiff for the last fifteen years with the exception of the provision of the Queen Alexandra Dock. Though this dock was authorised in 1894, it was not opened till 1907—a period of 13 years from the authorisation to the opening for traffic. In the opinion of colliery salesmen, the want of proper tipping accommodation has had a very detrimental effect on the price of coal, because, as they point out, if a buyer is fortunate enough to be in possession of a tip, he is able to purchase on the market at a considerable reduction below quoted prices. Judging from the extensive developments which are at present taking place in the colliery districts, it is feared that by the time the Queen Alexandra Dock is working at its full capacity, the requirements of the coal trade will be far in excess of the facilities at present provided. Therefore, should there be no further dock accommodation provided, it will probably mean a transfer to Newport and Port Talbot of traffic which in the ordinary course would come to the port of Cardiff. Another factor which tends to keep down the price of coal is, no doubt, the difficulty of obtaining tonnage, and the high rates that have to be paid for it. It is undisputed that had tonnage been plentiful, and rates at about the normal, the price of coal would have been very greatly increased. At present, for current business, best steam coals are quoted at round about 17s. 6d., though, where the question of providing empties arises, there is no doubt that buyers could get on at a shade less. Superior Admiralty seconds are 16s. 9d. and ordinary seconds 16s. 3d. per ton. With regard to the future, sellers are as optimistic as ever, or even more so. Aforetime, whenever there has been a lull in prices, the view held by those best able to judge was that the depression was temporary and would, in the course of a few weeks, right itself. That view has been confirmed by subsequent events and the recovery predicted has taken place. Although there are still four months to run before the year terminates, and it is by no means unusual for contracts to be entered into for next year as late as November, and even December, buyers are showing great anxiety to enter into forward engagements, and in several instances business has been concluded for next year at quite 1s. per ton advance on last year's prices. It is stated on good authority that one of the best collieries has contracted to supply coals over next year at 18s. per ton, less 2½ per cent. Even at that figure, which represents an advance of 1s. per ton on the 1912 prices, it is very questionable whether sellers will be in a better position than they were. The new Coal Mines Act will, it is feared, add more money to the cost of production. The roadways in many of the pits have to be widened, so as to allow of greater space between the tram lines and sides of the passages; and the cost of complying with this legislative enactment can at present scarcely be estimated. One thing is certain, it is absolutely essential that better prices should be paid for coal than were obtainable a year ago. It is not surprising, therefore, to hear that offers of 17s. for dry coals have been refused by some collieries as being altogether inadequate to meet the extra costs which are likely to be incurred. Ordinary second-class steam coals have been sold over the year at 16s. 3d., but it is doubtful whether this figure will be repeated. The small coal market is a little easier. This invariably happens at this period of the year, for owing to the fruit harvest in Italy and Spain there is a great scarcity of wagons, and consequently less demand for coal. Best bunkerings are selling at 11s. 3d., next best 10s. 9d. to 11s., and cargo qualities 9s. 9d. to 10s. 3d. per ton. There is but little indication at present that there will be any serious decline from these prices. Contractors are evincing much eagerness to cover their requirements for next year, and one large consumer has bought from 20,000 to 30,000 tons at 10s., or an advance of at least 1s. per ton on the price previously paid. Washed nuts are 14s. 6d. to 15s. 6d., and washed peas 13s. to 13s. 6d. per ton. After a temporary lull, freights have again hardened, and there is considerable difficulty in obtaining sufficient tonnage to meet requirements even at the high rates at present prevailing. As much as 12s. 9d. has been paid to Venice, 11s. 9d. to Genoa, 13s. 9d. to Bari, 12s. 6d. to Torre Annunziata, 12s. to Teneriffe, and 23s. to the River Plate. In the French coasting freights there has been an advance of 6d. to 9d. per ton. There is a fairly good enquiry for Monmouthshire coals, and the market keeps steady. Black Veins are 16s. to 16s. 3d., western-valleys 15s. to 15s. 6d., and eastern-valleys (best) 14s. 6d. to 15s., in each case f.o.b. Cardiff. The quantity of coal shipped coastwise from the Bristol Channel ports in the month of July was 414,743 tons, as against 369,202 tons in the corresponding month of last year, being an increase of 45,541 tons. From Cardiff there were exported 243,710 tons, of which Southampton took 49,730 tons, Liverpool 32,000, Bristol 22,185, Yarmouth 19,050, London 17,500, Sheerness 12,400, Harwich 11,100, and Newcastle 12,300 tons. From Newport the shipments were 65,839 tons, Port Talbot 16,585 tons, Briton Ferry 13,832 tons, and Swansea 31,336 tons. Included in the Bristol Channel returns for July were 33,367 tons from Gloucester, a record shipment. Very little enquiry exists for bituminous coals. No. 3 Rhondda large is still quoted at 17s. 6d., through-and-through 15s., and small 12s. per ton. No. 2 large is 13s. to 13s. 3d., through-and-through 11s. 6d., and small 9s. 6d. to 9s. 9d. per ton. Shipments of patent fuel for the week exceeded 30,000 tons, the Crown Company exporting 11,672 tons, other Cardiff makers 7,100 tons and Swansea 12,420 tons. Best brands for prompt shipment are still quoted at 19s., but 18s. 6d. is being accepted for October. Coke continues scarce with a strong enquiry. Ordinary foundry qualities are 25s., with the usual extra for special. Furnace coke is about 20s. per ton. Pitwood is 24s.

IRON.

Shipments of tinplates last week were 95,000 boxes below the receipts from works, and stocks have been increased to 220,000 boxes. Owing to the continued rise in the price of raw materials—block tin having gone up £3 5s. per ton, the market is being firm, and makers anticipate an early increase in prices. I C 28 × 20 plates are eagerly sought after at 29s. 3d. per box, but makers will not sell under 29s. 6d., whilst for forward delivery they are asking 30s. There is but little enquiry for oil sizes, but a satisfactory business is doing with the Eastern markets, especially in wasters. Oil sizes are 14s. 9d. to 15s., and ordinary Bessemer cokes 14s. 7½d. to 14s. 9d. Notwithstanding the large import of foreign bars, the whole of the Welsh steel smelting plants and bar rolling mills are exceptionally busy. In addition to the new steelworks in course of erection at Loughor, it is reported that Messrs. Richard Thomas and Co. are about to extend their steel works at Llanelly by the erection of several additional furnaces, and that the Cwmfelin steel and tinplate works at Swansea are again to be enlarged at an outlay of about £100,000. There is no change in the prices of bars, which remain at from £5 12s. 6d. to £5 15s. for Bessemer, and £5 15s. to £5 17s. 6d for Siemens qualities. There is a pretty good demand for galvanised sheets, especially from the Far East, but prices are without any improvement. 24-gauge corrugateds are still selling at £12. Rails are somewhat firmer, and no difficulty is experienced in securing £6 7s. 6d to £6 10s. for heavy sections, and 7s. 6d. more for the smaller sizes. A strike of moulders has taken place at Carmarthen, where the wages are only 23s. to 24s. per week. At Llanelly, which is only about 20 miles away, the moulders are in receipt of 38s. per week. Welsh hematite pig iron is 79s. to 79s. 6d. f.o.b. New steel crop ends are quoted up to 62s. 6d.

Swansea.

COAL.

The returns of the trade of the port last week were again of a highly satisfactory nature. The coal and patent fuel trades were both active, the shipments totalling 103,862 tons. There was a good attendance on 'Change this morning, and there was no material alteration in the general conditions prevailing on the anthracite coal market, the undertone remaining steady. There was an excellent demand for Swansea Valley large, and last week's prices were fully maintained. Red vein large was also steady. Machine-made nuts and cobbles were firm, especially French and German sizes. Beans and peas were slightly weaker, but not sufficiently to affect prices. Rubbly culm was in good request, and values moved in an upward direction; duff, however, was weaker. The conditions in the steam coal market were without alteration, large was not in very good demand, but smalls and bunker throughs were firm. The following were approximately the closing quotations:—Anthracite: Best large for malting (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 17s. to 19s., less 2½ per cent.; Red Vein large, 13s. 6d. to 14s. 6d., less 2½ per cent.; machine-made cobbles, 22s. to 24s. net; Paris, French, and German nuts, 23s. 6d. to 26s. 6d.; beans, 21s. to 23s. 6d.; machine-made large peas, 13s. to 14s. 6d.; ditto fine peas, 11s. 6d. to 13s., all net; rubbly culm, 7s. 6d. to 8s., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 18s. 9d. to 19s.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 18s. 6d.; through-and-through, 15s. to 16s. 6d.; small, 12s. 6d. to 13s. 3d.; No. 2 Rhondda large, 14s. to 15s. 6d.; through-and-through, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 6d., all less 2½ per cent. Patent fuel, 17s. to 18s., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

Trade in this district was again satisfactory during the past week. There was a splendid yield of pig iron at Messrs. Baldwin's blast furnace, and, notwithstanding some large imports of foreign bars for tin-plate manufacture, the whole of the steel-smelting plants and bar-rolling mills were kept exceptionally busy for the full time. The tin-plate industry was brisk, and two more mills were operating than in the preceding week. Engineering firms were experiencing busy times, and foundries were well supplied with orders. The shipments of tin-plates last week were 95,548 boxes, receipts from works 123,360 boxes, and stocks in the dock warehouses and vans 220,644 boxes.

Llanelly.

COAL.

There is no sign of the coal trade in this district weakening. Collieries are very well placed for all kinds, with prices fully maintained. For several sorts there is quite a scarcity and the continuation of the heavy rains does not help matters as, owing to the number of men absenting themselves from work, outputs are not near what they should be. There is still considerable trouble being experienced in getting sufficient tonnage along, and large quantities of coal are lying around the various docks waiting shipment. Anthracite of all kinds is in good demand at satisfactory prices. Best malting and horticultural coals have a very strong enquiry and prices are getting firmer. Some collieries are unable to quote for further new business. The machine-made kinds are going well, and culm and duff are scarce. Steam and bituminous coals are in good demand and all coal is being quickly bought up. Prices this week are:—Best malting large, 22s. to 24s.; second malting large, 20s. to 22s.; Big Vein large, 16s. 6d. to 18s. 6d.; Red Vein large, 13s. 6d. to 14s. 6d.; machine-made cobbles, 21s. to 23s.; German, French, and Paris nuts, 22s. to 24s.; machine-made large beans, 22s. to 24s.; ditto peas, 14s. to 15s.; rubbly culm, 8s. to 8s. 6d.; duff, 5s. to 5s. 6d.; large steam, 13s. to 14s.; through-and-through, 10s. 9d. to 11s. 3d.; bituminous small, 10s. 6d. to 11s.; small steam, 6s. 6d. to 9s. 6d.—all f.o.b.

LABOUR AND WAGES.

North of England.

A strike of putter lads has taken place at Newbiggin Colliery, near Amble, which laid the pit idle on Monday.

After a strike lasting a week, the Heworth miners resumed work on Monday. A desire having been expressed that the minimum wage claims should be enquired into on the ordinary reckoning day, so that the men may draw their money on the usual pay day, an effort is to be made to induce the management to adopt the suggestion.

The Northumberland Miners' council held a special meeting on Monday at the Burt Hall, Newcastle, at which consideration was given to the grievances of stonemen and shifters. Mr. Joseph English (president) was in the chair. A number of resolutions were passed, including the following:—

"That we institute legal action against any colliery owner guilty of violating the Mines (Eight Hours) Act, and that our branches be requested to send to our central office particulars of cases where they believe this Act has been violated."

On the question of free houses, rent, and fire coal, the following resolution was agreed to:—

"That the time has come when stonemen, shifters, and ridders should be entitled to free houses and fire coal, or rent and fire coal on the same conditions as hewers are entitled to this allowance, and in case of owners of any colliery refusing to agree to this, and the workmen of such colliery deciding by vote according to rule to strike for the same, all of our branches are requested to support them by special levy for that purpose."

The council agreed that the following work be regarded as the work of stonemen, and that in cases of workmen belonging to a lower grade being sent to such work, they should be paid stonemen's wages:—" (*a*) Driving drifts, open or closed; (*b*) driving 'caunches,' top or bottom, and taking side stone; (*c*) timbering with baulks and girders; (*d*) putting roads through old bords or other 'troubles,' other than when done by hewers; (*e*) making sumps or any work recognised at any colliery as stone work." It is not intended that workmen other than stonemen, and engaged in merely removing loose stone or other material from places where any of the above work is being done, shall be entitled to stonemen's wages. With regard to first and second-class stonemen, the following definition was agreed to:—(*a*) First-class stoneman—a man working at and in charge of above-named work as stoneman; (*b*) second-class stoneman—a man doing the above-named work of stoneman, but under the supervision of the man in charge.

The following resolutions were also passed:—

"Boring.—That in the case of a shifter or other low-paid workman being sent to do boring, they be paid at stoneman's wages.

"Wages of stoneman sent from bargain to datal work.—In case of a workman, who has been recognised as a stoneman, having to leave 'bargain' to go to datal work, he be paid not less than stoneman's wages.

"Compulsory bargain work.—That no man shall be compelled to work in any 'bargain' in the taking of which he had no part.

"Except in special and unforeseen circumstances, 'bargains' be let at the commencement of each quarter, and no reduction of prices be made during the quarter.

"Condemnation of 'butty' system.—(*a*) That we condemn the system, prevailing at some collieries, of workmen engaging others to work for them in any bargains; (*b*) that we insist on all workmen being employed and paid directly by the colliery owners; (*c*) also that the men whose wages depend on the aggregate earnings in any bargain shall share alike in proportion to the number of shifts worked at each.

"Penalty for work in 'butty' system.—That we empower the workmen at any colliery to come out on strike in order to destroy the 'butty' system, should the colliery management insist upon its continuance."

It was further agreed that the request be made to all hewers not to take stone bargains.

The council concluded the business of their special meeting on Wednesday, when another series of resolutions dealing with Labour representation in Parliament and the finances of the association was passed. In the afternoon the council were engaged in the consideration of the financial position of the association, as placed before them in a circular issued by the finance committee. This circular stated that the property of the association was very heavily mortgaged at the present time, and that they were in the unenviable position of being unable to call a strike at any colliery, if necessity demanded such, owing to lack of funds. The recent strike and the strike of 1910 were severe blows to the union; and in addition to the cost of these strikes, the benefits of the association have been gradually and continually increasing, as is manifested by the following particulars:—The death legacies have been increased 50 per cent. since 1905; half the salaries of local secretaries and treasurers are now paid from the general fund, and amount to £750 per year since 1905; the expenses of all county ballot votes are now defrayed by the general fund (each ballot vote costs the association £110); the rent paid during strikes has been increased 50 per cent.; the amount paid to solicitors and doctors for the purpose of ensuring to members the fullest advantages of the Compensation Acts was no less than £290 during 1911. The general fund has to bear additional expense for the payment of members' travelling expenses, and doctors' certificates for members suffering from industrial diseases. The amount paid for printing, stationery, and postage, has considerably increased during the last few years. Two members are now sent annually to Ruskin College at a cost of £104. Members' contributions to the Miners' Federation is a large and additional cost to the general fund during the last few years. The latest addition to expenditure is Minimum Wage Umpires' fees, and in view of the increasing activity and interestedness of members in their own welfare everything indicates that these additions will be further added to. With a view to sustaining the financial efficiency and prestige of the association, the committee asked the association to agree to the following proposals:—

"That all adult pieceworkers and members who are entitled to wages not less than the datallers' minimum wage of 4s. 9d. shall pay not less than 9d. per fortnight to the general fund.

"Other members not less than 6d. per fortnight, and half-members not less than 3d. per fortnight to the general fund.

"That the medical charity levies be abolished, and that a sum of money, not to exceed 1s. per member nor 6d. per half-member per year, be taken from the general fund for charitable purposes."

The council approved of the proposals, and they will be subjected now to approval by a vote of the colliery lodges. Recently, it will be remembered, the miners voted against increasing the subscription of full members from 6d. to 1s. per fortnight, and it remains to be seen whether they will agree to the advance now proposed, which would have the effect of increasing the annual income by £8,000. With this additional amount it is estimated that the association will be able to pay working expenses, and, at the same time, do something to liquidate the mortgage on their property. At the beginning of 1910, the association had assets valued at about £150,000. The eight hours' strike and the strike of this year, however, meant an expenditure of £156,000, and, in addition, £5,000 was sent to the Cambrian miners to support them in their dispute with the coalowners. Thus, the union has spent £11,000 more than their funds were worth, and, in addition, has destroyed a large source of income, for they had investments which were bringing in about £4,000 a year.

The council meeting was resumed on Tuesday. On the question of the restoration of short shifts, the following resolution was passed:—"That we as an association again press the owners' association to agree to restore all the short shifts existing previous to the Eight Hours Act." Discussion on a proposed meeting with the owners led to the adoption of the following resolution:—

"That as soon as the proxy vote of the branches has been completed on the resolutions to be sent out from this council meeting, the Colliery Owners' Association be requested to grant our representatives an interview for the purpose of laying before them the resolution carried by the proxy vote, and that in the meantime active propaganda work throughout our branches be instituted so as to secure the better organisation of night workers."

The report of Mr. J. E. S. Lee, of North Ashfield, Hexham, umpire to act between the Bedlington Coal Company and the workmen at West Sleekburn Colliery in various disputed points under the Minimum Wage Act, has been made and handed to the parties concerned. The umpire rules that all the hewers are entitled to claim wages from the first day they worked after the national stoppage. Regarding the horsekeepers, the umpire decides that they shall work 12½ shifts per fortnight.

A singular dispute occurred last week at the Houghton-le-Spring pit of the Lambton Collieries Company. On the night of Tuesday, August 13, a filler, employed at the colliery, died while down the mine, and the dispute turned on the question of whether this man died from natural causes or from the effect of some accident. No inquest has been held. The body of the man was taken out of the pit about 9 o'clock and the colliery was laid idle on the following day. In accordance with the county agreement, this would be perfectly right in case death was due to accident, and had occurred two hours before coal-drawing had ceased. The contention of the management, however, is that death was not due to any accident, that the pit had no right to be idle on the day following the death, and that the fact that it was idle prevented every man and boy in the pit from earning the minimum wage for the current pay. On Wednesday of this week, when the paynotes were issued to the men, it was found that the minimum wage had not been allowed, and the men in consequence laid the pit idle. On Thursday of last week an agreement was arrived at.

Representatives of the Northumberland Coalowners' Association and of the Miners' Association met in Newcastle-on-Tyne on Saturday to discuss the men's application for an advance in wages. After a long discussion it was resolved that the men's wages should be advanced by 2½ per cent., making them 35 per cent. above the 1879 basis. The miners received last May an advance of 3¾ per cent. and in January last an increase of 1¼ per cent.

A dispute under the Act has been settled at Hazelrigg Colliery, in Northumberland. The management had, at the first pay after the strike, refused the minimum pay to 127 hewers, 14 shifters, and 17 boys, on account of the inefficiency of the piece worker. Dr. Hay, of Jesmond, was appointed umpire, and his award is that 12 of the hewers' claims be disallowed and three of the shifters'. He states that the diminished output is due chiefly to new cavils, to strange work, and to the pit not being in the condition it would have been had work not been suspended.

Considerable dissatisfaction exists in Cleveland regarding the adverse effects of the new Explosive Order of the Home Office upon the ironstone industry. Six weeks ago both the Mineowners' and the Miners' associations appealed to the Home Office to hold an enquiry with a view to the exemption of Cleveland from the operations of the Order. Beyond an acknowledgment of the letter, no reply has been received, and neither side can understand the delay. Particular objection is taken to the clause which insists, in cases where the shots miss fire, upon the worker keeping away from the place for a period of an hour, which is exactly 12 times the length of time recognised in the Cleveland mining industry up to the time of the Order being issued. In some cases men whose shots have missed fire have been sent home by the overmen, rather then being kept idle in the mine for the period of an hour.

The calls upon the ordinary fund of the Cleveland Miners' Association have increased so much in recent years that it has now been felt necessary in the best interests of the association to ask the members to make a further sacrifice each week by the addition of 1d. to the contribution of 3d. now paid, the extra sum to be devoted to a new fund to be used to defray the expenses of sending members and their wives and children to hospitals and infirmaries for special medical and surgical treatment. For some years past huge sums have been taken from the ordinary fund for hospital purposes, but, owing to the finances of the association being swallowed up by the miners' strike, such payments cannot continue, and the officials of the association have issued a circular to the members strongly appealing to them to vote for the increase of the contribution and the establishing of a special hospital fund. A ballot will shortly be taken. The present membership is about 10,000.

At a recent meeting of the executive committee of the Northumberland Miners' Association matters in dispute at Netherton Colliery were discussed at length. The principal question raised was with regard to the dispute with the putters, who had been refused the minimum wage because they had left work before "loose" or shifting gear day. The pit had been laid idle two days, and 4s. per day damage had been claimed from each man and boy, but that had been refused. Mr. J. Johnson, the workmen's representative, pointed out to the meeting the conditions of Rule 41 of the association, which reads:—"When a pit is stopped by the workmen, or by any of them without notice on the ground that the management are not carrying out the conditions of the Mines Regulation Act, by introducing changes or setting aside existing arrangements without due notice being given to the workmen, the case shall at once be submitted to the executive, who, after hearing all the evidence relating to the case and are satisfied the workmen are in the right, shall have power to grant them support under Rule 35." A question of custom was involved, and also whether new mining regulations abrogate such custom.

The miners' members of the Joint Committee report that they met the executive in order to get their co-operation in deciding what old cases, if any, should be withdrawn before the Joint Committee resumes the strike, owing to the coalowners refusing to continue the Joint Committee unless all the old cases are withdrawn, so that the committee might re-commence with a clean sheet.

It was decided:—

"(*a*) That we agree to withdraw the particular cases suggested by our members of the Joint Committee, the members of the Joint Committee to again request the coalowners to agree on this condition to resume the sittings of the committee.

"(*b*) That where, in our opinion, the cases withdrawn should be proceeded with locally, a deputation consisting of one member of the Joint Committee and one member of this committee, along with a local deputation, meet the management at each colliery and try to settle the case or cases."

Federated Area

The question of bankmen's wages in the Erewash Valley district came under consideration at the monthly meeting of the Notts Miners' Association, held on Saturday afternoon. It was reported that the efforts made at individual collieries to settle the matter had proved unsuccessful, and consequently the council instructed Mr. C. Bunfield, the secretary, to write the Owners' Association asking for another conference to discuss the position. Mr. W. Carter, assistant secretary, submitted a report concerning the bankmen's wages at the Mansfield Colliery, and the matter was left in his hands. Mr. J. G. Hancock, M.P., the agent, having reported on the hours and wages of the enginemen and firemen, he was requested to secure a meeting with the owners to consider the same. Voting on the nominees of the branches to constitute the men's side of the local tribunal under the Minimum Wage Act resulted in the following being appointed:—Messrs. J. Cohley, W. Broughton, J. E. Whyatt, I. Taylor, J. Lack, A. Beswick, D. Davis, F. Carter, T. Perks, G. W. Hancock, G. Moore, W. Steven, J. H. Hunt, J. J. Jones, F. E. Varley, J. H. Hankin, A. Allton, G. A. Spencer, A. Elliott, and G. Peach. It was decided that meetings should be held in the county to discuss the question of the nationalisation of mines and minerals. The question of the Langton (Pinxton) men having power to hand in notices with a view to remedying a grievance being reised, the council unanimously agreed that the matter should be left in the hands of local lodges and secretaries with full power to act. Three officials and a representative each from Linby, Hucknall No. 2, Mansfield, and Sherwood lodges were appointed to represent the association at the annual conference to be held at Swansea.

With regard to the case recently heard in the Wrexham County Court, before Judge Moss, wherein two fillers employed at Wrexham and Acton Colliery sued the Wrexham and Acton Colliery Company for the difference between the minimum wage for fillers under the Act, and the wages previously earned by them, this difference being 1s. 1d. per day, it has been decided by the men's Federation to appeal against the decision of the county court judge that there was no privity of contract between the fillers and the colliery company. The appeal will be heard in October.

Among the miners in this district, since the hearing of the above case, much dissatisfaction is alleged to exist, especially among the fillers, notably at the colliery in question, where the Minimum Wage Act has caused their earnings to be reduced in a number of cases by 1s. 1d. per day, and this also applies to several of the other local collieries near to Wrexham. The fillers state that the contracting colliers earn well above their minimum wage, but, taking advantage of the award, they are reducing their fillers' wages, from the old daily figure of 5s. 11d. to the schedule rate under the award of 4s. 10d.

In giving his decision on hearing the case above referred to, Judge Moss stated that the fillers had no claim for wages against the colliery company, though he would not say they had no remedy, but they must look for payment from the contractors. Having regard to the fact that the custom had been to pay higher wages than the minimum under the award, it would not be surprising if the fillers made an attempt to recover the difference in the county court.

It was announced last week-end that Messrs. A. Knowles and Sons Limited, colliery proprietors, Pendleton and Pendlebury, have, in response to representations from the men, decided to increase the wages of their surface workers 5d. per day. A considerable number of employees will participate in the advance.

The council of the Yorkshire Miners' Association met at Barnsley on the 26th inst. The men of the Bowling branch asked permission to take a ballot on the question of giving notice, the allegation being that a man had received notice to leave because he refused to contract out of the Minimum Wage Act. The district are to vote on the application. In regard to the new branch at the Maltby Colliery, Mr. J. Wadsworth, M.P., general secretary, said they had received a rather bad report, alleging that the men working on the butty system were not being properly treated.

The Cannock Chase miners are not satisfied with the working of the Minimum Wage Act. The local committees have been called together to consider the points in dispute, but they have not been able to settle them, and the Joint District Board, of which Sir Clarendon Hyde is chairman, will be convened early next month. The chief question concerns outstanding accounts of a considerable sum, which the employers refuse to pay on the ground that the men are inefficient. Another point is as to the construction of certain of the rules.

The dispute at Bentinck Colliery, Notts, with regard to the granting of facilities for taring trams has been amicably settled

An executive meeting of the Derbyshire and Notts branch of the Enginemen and Firemen's Union was held at Mansfield on Monday. Reports to hand were dealt with, and it was stated that some of the owners and managers had not yet conformed to the agreement made. The general secretary (Mr. S. W. Rowarth) said there were only a few who had not done so, the exceptions being some of the colliery owners who were not members of the Midland Colliery Owners' Association. Other matters considered related to wages and the bringing of outsiders to be placed before men who were entitled to promotion—both by seniority and merit—and the undue pressure of work on some of the winding enginemen. These subjects were referred to the general secretary, and in some cases permission was given to the men to tender their notices failing a satisfactory settlement.

A meeting of surfacemen, mainly from Orgreave Colliery, Sheffield, was addressed on Saturday by Mr. A. J. Bailey, organising secretary, who said he hoped in a few days to be able to announce that a settlement had been arrived at in connection with the application made last September, and fully discussed during the miners' strike. As the result of four months' negotiations, in which several meetings had been held with the coalowners, they had abolished once for all the system of working 84 hours per week. They had introduced for some of the men a working day of eight hours, while others would get relief at week-ends. They had not secured minimum wages for all classes of labour, but had secured it for the lower paid.

Scotland.

Mr. William Adamson, M.P., visited East Wemyss on Saturday, and conferred with representatives of the Fife and Clackmannan Coalowners' Association with reference to the threatened strike by the 800 men employed at the Michael Pit, belonging to the Wemyss Coal Company, as the result of their dissatisfaction with the method of weighing by "Billy Fairplay." After discussion, it was intimated that the Wemyss Coal Company would abolish the "Billy Fairplay," provided the men accepted new tonnage rates. The men had tonnage rates based on the new system prepared, and on comparing them said they found there was a difference of 7d. per ton in favour of the coal company. The price per ton is to be the subject of further negotiations.

At a meeting of Michael Colliery employees, on Tuesday, they decided to reject the offer by the Wemyss Coal Company to introduce the triping system in place of "Billy Fairplay" at the colliery. The Wemyss Company are understood to have the Coalmasters' Association's support. Eight hundred men are affected. It is regarded by Fife miners as a test fight for the existence of "Billy Fairplay."

Bridgeness and Grange miners resumed work on the 23rd inst., pending the adjustment by Mr. Doonan, the miners' agent, with the management of certain questions affecting the wages, chiefly of oncost men, in the collieries. The existing discontent in the district about wages has spread to Kinneil, where the miners are aggrieved about alleged excessive deductions for dirt. The men affirm that these deductions are at times as high as 15s. per week, bringing their wages below the minimum standard. On the other hand, the colliery manager states that an average of the wages earned is struck every fortnight at the pay office, and that the average pay is 7s. and a fraction per man per shift.

On Monday, a demonstration of the miners on strike at Dreghorn took place, addresses being delivered by Mr. Robert Smillie, president of the Scottish Miners' Federation, and others. Prior to the meeting being held, an attempt was made by means of a conference to arrive at a settlement of the miners' dispute, but without success.

Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

TO CORRESPONDENTS.

Responsibility of Firemen.

Student.—The same answer will cover both your questions. A certificated fireman is responsible for carrying out the duties allotted to him under the Act, and may be prosecuted by the owner, agent or manager for any infraction of the regulations. On the other hand, clause 14 (1) of the Coal Mines Act requires that the manager shall appoint competent persons to act as firemen, and can undoubtedly be held responsible for the incompetence of officials appointed by him; in other words, a manager does not absolve his liability by the mere fact of ascertaining that such officials possess the necessary qualifications constituted by a certificate. The decision of the Court in such a case would largely depend upon the evidence, and it would have to be clearly proved that the manager had been guilty of carelessness in the selection of his officials. In the first case you mention, it would be entirely a question of fact as to whether the manager, the fireman or the stallman was liable. The whole question is covered by clause 75, in very definite language. As regards civil responsibility, the owner, agent or manager is liable for damages caused by the misdemeanours of his servants; if, for example, it could be proved that a workman had lost his life through the incompetence of an official appointed by the manager, his dependants would be entitled to recover at common law.—[Ed. *C.G.*]

INTERNATIONAL GEOLOGICAL CONGRESS.

The International Geological Congress, on the joint invitation of the Government of Canada, the Provincial Governments, the Department of Mines, and the Canadian Mining Institute, will hold its twelfth meeting in Canada during the summer of 1913.

For purposes of organisation, a meeting of representatives from various scientific bodies of Canada was held in Toronto, Ontario, on December 2, 1910. Field-Marshal H.R.H. the Duke of Connaught, Governor-General of the Dominion of Canada, has graciously consented to become honorary president. An executive committee has been appointed, with Dr. Frank D. Adams, D.Sc., F.R.S., Dean of the Faculty of Applied Science and Logan Professor of Geology, McGill University, Montreal, as president; Mr. R. W. Brock, M.A., F.R.S.C., Director of the Geological Survey of Canada, Ottawa, as general secretary; and Mr. W. Stanley Lecky, A.R.S.M., Victoria Memorial Museum, Ottawa, as secretary.

It is proposed to hold the meeting of the Congress in Toronto, beginning on or about August 21. The Congress will continue in session for eight days. The following topics have been selected by the executive committee as the principal subjects for discussion:—

1. The coal resources of the world.
2. Differentiation in igneous magmas.
3. The influence of depth on the character of metalliferous deposits.
4. The origin and extent of the pre-Cambrian sedimentaries.
5. The subdivisions, correlation and terminology of the pre-Cambrian.
6. To what extent was the Ice Age broken by interglacial periods?
7. The physical and faunal characteristics of the palæozoic seas with reference to the value of the recurrence of seas in establishing geologic systems.

The executive committee of the Eleventh Congress, held in Sweden, compiled and published a comprehensive report on the "Iron Ore Resources of the World." The present executive has undertaken the preparation of a similar monograph on the coal resources of the world. In order to make the work as complete as possible, the co-operation of all the principal countries of the world has been invited. This invitation has met with a cordial response, and it is hoped the volumes will be ready for distribution before the meeting, so that they may constitute a basis for discussion at the Congress.

Arrangements have been made for a series of excursions which will enable the members of the Congress to gain a knowledge of the geology and physiography, as well as the mineral and other natural resources of all the more accessible portions of the Dominion of Canada. These excursions will take place before, during and after the meeting of the Congress. Members will be given the opportunity of participating in one or more of the longer in addition to several of the shorter excursions.

Of the excursions before the meeting, one, lasting 10 days, provides for a visit to the maritime provinces of the Atlantic coast The coalmines and steelworks at Sydney and North Sydney will be seen. Another, extending over nine days, will be to the Haliburton-Bancroft area, Ontario; another, lasting 12 days, to the Sudbury, Cobalt and Porcupine mining areas situated in the Laurentian protaxis, north-east of Lake Huron; three days visits will be paid to the Niagara-Iroquois Beach, Ontario, and the asbestos deposits of the Province of Quebec; whilst a short excursion will be made to examine one of the typical anorthosite intrusions of the Laurentian protaxis, near St. Jerome. Other places to be visited before the meeting are the Monteregian Hills, Quebec; the district to the north of the River Ottawa, between the cities of Montreal and Ottawa; the region in the vicinity of Kingston, Ontario; the terraces on Mount Royal and the drift deposits at Mile End and elsewhere in the vicinity of Montreal; Ordovician formations exposed at various points between the cities of Montreal and Ottawa. An excursion, which is of especial interest of palæontologists, provides for the study and collection of silurian and devonian fossils in the region lying to the west of Toronto between Lakes Huron and Ontario.

The arrangements provide for short excursions to various localities in the immediate neighbourhood of Toronto during the meeting. Among others the following places and objects of interest will be visited:—Niagara Falls, glacial and interglacial deposits in the neighbourhood of the Don Valley and at Scarboro Heights, the palæozoic formations at Hamilton, the sandstone quarries of the Credit River, the morainic deposits north of Toronto, the Laurentian of the Muskoka region, the natural gas and oil fields of Ontario, the highly fossiliferous palæozoic strata at Streeteville, and the clay deposits and works near Toronto. Starting from Toronto there will be four transcontinental excursions after the meeting as follow:—

Canadian Pacific Railway (Main Line).—Time 15 days, Toronto to Vancouver; and five days returning Vancouver to Toronto or Montreal.

Canadian Pacific Railway (Crow's Nest Branch).—Time 15 days, Toronto to Vancouver; and five days returning Vancouver to Toronto or Montreal. Those participating in this excursion will travel over the main line of the Canadian Pacific Railway directly to Medicine Hat in the Province of Alberta. From this point the journey is by way of the Crow's Nest branch line passing through the mining centres of Lethbridge, Fernie, Nelson, Rossland and Greenwood to Midway. At Midway the party will be divided, some returning to Nelson and Revelstoke on the main line by way of the Arrow Lakes. The remainder of the party will proceed to Vancouver, passing through a mining region of which the principal places are Hedley, Princeton, Tulameen and Nicola. Between Lethbridge and Fernie sections of the cretaceous coal measures will be examined. The Oligocene coal basins at Princeton and Nicola will also be visited.

Canadian Northern Railway.—Time 16 days, Toronto to Vancouver; and five days returning Vancouver to Toronto or Montreal. It is arranged that this excursion will cross Lakes Huron and Superior to Port Arthur.

Grand Trunk Pacific Railway—Time 15 days, Toronto to Vancouver; five days returning Vancouver to Toronto or Montreal. Proceeding by way of the Grand Trunk and the Temiskaming and Northern Ontario railways, through the mining camps of Cobalt and Porcupine, the party will arrive at Cochrane and will thence travel over the new transcontinental line of the Grand Trunk Pacific Railway. The coal measures at Entwhistle on the Pembina River, west of Edmonton, the coal beds at Carlsbad, and fossil-bearing devono-carboniferous limestones in the same locality will be among the interesting features of this excursion.

Lakes Erie and Huron (14 Days).—The excursion through Lakes Ontario, Erie and Huron will include a visit to Niagara Falls There will also be a second excursion to Sudbury-Cobalt-Porcupine, Ontario (12 days). Another excursion, lasting four days, will be made to Vancouver Island, and one extending over 23 days to Yukon and Northern British Columbia Starting from Vancouver, an eight days excursion permits of a sea voyage of 500 miles along the west coast of British Columbia. From Prince Rupert, the terminus of the Grand Trunk Pacific Railway, the journey will be made by rail up the Skeena River Valley to Hazelton. An excursion is arranged to Athabasca and Peace River, Alberta, extending over 13 days, coinciding with the arrival of those participating in some of the above excursions.

The secretary will be pleased to answer all enquiries regarding the arrangements for the Congress. Correspondence should be addressed as follows:—

The Secretary, International Geological Congress,
Victoria Memorial Museum, Ottawa, Canada.

Cable address:—Geocong, Ottawa. Messages may be sent in any of these codes:—

A B C 5th. Lieber. Bedford McNeill, 1908.

COASTWISE SHIPMENTS IN JULY.

According to the monthly coal tables the following were the coastwise shipments during July:—

From	Total cargo.		Total bunker.	
	1911.	1912.	1911.	1912.
	Tons	Tons.	Tons.	Tons
Bristol Channel ports	369,202	414,743	20,155	23,205
North-western ports	234,318	301,589	64,921	68,103
North-eastern ports	680,660	534,702	28,315	28,830
Humber ports	191,249	201,436	12,304	10,360
Other ports on east coast	20,673	19,944	8,257	6,762
Other English ports	2,725	1,789	7,891	8,715
Total from England and Wales	1,498,827	1,474,262	141,903	146,084
Ports on east coast of Scotland	128,931	121,056	28,982	18,993
Ports on west coast of Scotland	134,872	155,193	29,677	40,537
Total from Scotland	263,803	276,249	58,659	59,530
Irish ports	—	—	10,386	3,130
Total from United Kingdom	1,762,630	1,750,511	205,948	208,750

The destination of cargo shipments was as follows:—

To ports in	July 1911. Tons.	July 1912. Tons.
England and Wales	1,146,113	1,039,430
Scotland	104,015	114,078
Ireland	248,069	310,848

Shipments to London amounted to 528,963 tons.

COLLIERY ACCIDENTS.

Cadeby Main.

Another victim is added to the Cadeby Main death roll as a result of an alarming occurrence in the mine on the evening of Sunday, August 18. For a week ten rescue teams, supplied by the Wath Rescue Station, had been working incessantly in the south district restoring the ventilation and locating the bodies still below ground. The first body of the 15 men who were entombed in the July explosion was found on the morning of the day in question, the Mitchell Main team being on duty at the time, and altogether about 12 bodies were discovered during the day. The Manvers Main team was engaged in taking a body up to the stopping when the accident occurred. They had reached one of the steel doors and were setting down the stretcher to rest, when a man at the back end of the stretcher, named James Burns, of West Melton, dropped the mouthpiece of his breathing mask out of his mouth. The result was that he got a mouthful of the inert gas which had been pumped into the mine for the last fortnight, and was knocked over. His mate dropped the stretcher at once and went to his assistance. He tried to put the mouthpiece back again, but the man's teeth were tightly clenched. The men then brought the oxygen from his apparatus as close to his face as possible, and in this way they tried to bring him back to his senses. Soon, however, they found that they were themselves in extreme peril. Their supply of oxygen was running short, and their strength was rapidly waning. It was at this point that one of their number, a man named Bernard Hill, of 55, Beech-road, Wath-on-Dearne, saved four of the party, including himself, by his coolness and presence of mind. He left the search party, groped along the road, and managed to find one of the signal wires which connected the place with the stoppings just as the reserve rescue team, the Hickleton

Main, was waiting to go down. He tapped the wire, and the Hickleton Main men at once rushed in and were just in time to recover four of the Manvers men, who were in a bad state of exhaustion. Burns was in a bad way, and had to be left. They rushed these men out of the workings into the fresh air, returning quickly for Burns, whom they also recovered. Although three pulmotors were employed, the doctor, on arrival, could only pronounce life to be extinct.

The first of the 15 bodies entombed by the second explosion on July 9 was delivered to the surface early on the following morning. Later in the day the body was identified as that of Arthur Edward Rowell, aged 29, dataller, of 5, Wadworth-street, Denaby Main.

Mr. Allen opened the inquest on James Burns on the same day, but has decided to adjourn the investigation until Tuesday, September 10, by which time it is probable the remaining 13 bodies still entombed in the mine will be recovered.

Crook.

At Bishop Auckland, on the 17th inst., Mr. J. T. Proud held the inquest on the bodies of two of the victims of the Crook gas-poisoning accident, Edward Reed of Crook, and George Foster of Cockfield.

Matthew Morris stated that he was chargeman at Messrs. Pease and Partners' tar distillery. On Wednesday, August 14, he found the plates on the front part of the still, next to the fire, were bulged in, and required repairing. The still had been cleaned out on Monday. Messrs. R. Wilson and Sons sent three or four men on Wednesday afternoon to do the repairs. On the following day, when the accident occurred, he was called out, and on going to the still he found his son, Robert Morris (one of the deceased), Benjamin Race, Edward Reed, and George Foster were all in the still.

Cornelius Hagan, boilersmith for Messrs. R. Wilson and Son, said that after dinner, on August 15, Foster went into the still with witness, and the latter noticed Foster to be breathing heavily. He asked him what was the matter, but got no reply. He saw Foster climb to the ladder, get on the first step, and then reel over. He and Race, who had come to his assistance, lifted Foster up and got him to the top of the dome. At that moment he noticed that Race was also breathing heavily, and Race fell to the ground. Witness then felt his own legs giving way, and was assisted out by one of his own workmen; and he then called for further assistance, a number of men coming forward. Morris and Reed went in to try and rescue Foster and Race.

Stephen Sparke Wraith, chief electrician for Messrs. Pease's West Collieries, stated that on the rescue apparatus being obtained he went into the still, but could not smell any gas. The apparatus, however, did not work. He could not see, and made his way out again. On the apparatus being fixed properly, a man named Roger Robertson went into the still and fixed the ropes on Morris, who was pulled out. Witness then went in again, and Reed was got out. Robertson got Race out. After that witness got the last man, Foster, out. Not more than an hour would elapse between going for the rescue apparatus and the last man being brought out.

Dr. Cecil McCullagh said he attended the men from the time of their admittance to the hospital. Neither of them recovered consciousness, and the symptoms were consistent with gas-poisoning, probably by carbon monoxide. Death in both cases resulted from gas-poisoning.

The jury returned a verdict that deceased had been killed, whilst following their employment, by gas-poisoning.

MINING AND OTHER NOTES.

The King has approved the appointment of the Right Hon. Arnold Morley to be chairman of the Dominions Royal Commission, appointed in pursuance of the 20th resolution of the Imperial Conference, 1911, in succession to the Right Hon. Lord Inchcape, who has been compelled to resign his appointment, owing to urgent business affairs. The Commission has now completed the preliminary arrangements for the performance of its work, and proposes to reassemble in the United Kingdom in October to hear evidence. The Commission is prepared, subject to its terms of reference, to receive suggestions from associations or private persons in this country, as to the possible development of the natural resources of the self-governing Dominions, and the extension and improvement of their trade with the United Kingdom. Communications should be addressed to the Secretary, Dominions Royal Commission, Scotland House, Embankment, London, S.W.

The foundry and engineering shop, some time belonging to Messrs. John Dick and Co. Limited, known as Clifton Foundry, Coatbridge, has been sold at the upset price of £11,000.

At the invitation of Mr. Austin Kirkup and the owners of the Lambton and Hetton Collieries, a party, representing the Newcastle-upon-Tyne Association of Students of the Institution of Civil Engineers, recently visited the Lumley New Winning Colliery. The colliery is of interest as being "smokeless," every operation—winding, hauling, screening, and coal-cutting, etc.—being carried on by electrical power, obtained from either Carrville or Philadelphia power stations.

The Hartlepools Chamber of Commerce on the 23rd inst., discussed at a private meeting, the question of the existing congestion of traffic at the docks. As a result, a committee was appointed to investigate the grievances complained of, and, if considered necessary, to confer with a committee of the West Hartlepool Town Council, which was appointed some time ago to consider the subject.

At the St Helens Police Court on Friday, a collier named Michael Thomas, was summoned for travelling on a tramcar with an explosive, "ammonite," in his possession. The storekeeper at the Sutton Heath Colliery, said colliers had been in the habit of carrying the stuff with them on trains, trams and bicycles. It would not explode if hit with a hammer. Witness added that he had some ammonite with him, and asked if the Bench would like a demonstration to be given, but the invitation was declined. The Bench decided to impose the full penalty of £2, and allow the analytical chemist's and advocate's fees.

At the invitation of Mr. William Maurice, president of the Association of Mining Electrical Engineers, the Notts and Derbyshire branch held an excursion meeting at Hucknall, on Saturday. The members met at No. 2 pit, and made an inspection of the exhaust generating plant, afterwards visiting the No. 1 colliery, where they were shown the storage battery subsection. The following officers of the branch were elected:—President, Mr. W. Maurice, Hucknall; vice-presidents, Professor Robinson, Nottingham, Mr. E. E. Beadsmoore, Tibshelf; secretary, Mr. F. Cusworth, East Kirkby; auditors, Mr. E. L. Ahrons, Nottingham, and Mr. E. Beadsmoore; committee, Messrs. F. Smith (Pinxton), J. T. Taylor (Swanwick), C. Newton (Derby), J. Watson (Loscoe), E. R. Hudson (Ilkeston), F. Church (Tibshelf), F. W. Rowley (Eastwood), A. Lee (Retford), F. W. Pyatt (Mansfield), E. E. Beadsmoore, and E. L. Ahrons. The president handed over certificates which had been obtained in the recent examination by Messrs. E. R. Hudson (Ilkeston), A. E. Lole (Jacksdale), and C. J. McKenna, Manton Colliery; also service certificates to Messrs. C. Bakewell (Creswell), W. T. Garner (Eastwood), and J. T. Taylor (Swanwick).

At Halifax, on Saturday, Arthur Wilkinson, a mineowner, of Elland, was fined £4 and costs for four offences (£1 in each case), under the Coal Mines Regulation Act, 1887. Two informations were laid for having gelignite cartridges in the Longman and Blackley mines, packed in a manner which constituted a breach of the Act. They were in cardboard boxes, it was stated, some of the cartridges protruding, and being without cover. For the defence, it was pointed out that the pit was a clay pit, and the only cage was a hand-worked one, which went down about 30 yards. There were in the two mines six clay getters, all men of experience, and there were not such dangers in those mines as there were in coalmines. The defendant suggested that the charges were vindictive. Two further charges against the defendant were that the detonators had not been handed out and taken down the mines according to the Act. Three other informations were withdrawn on payment of costs.

Last week a gob fire occurred in a disused pit, known as the Old Terrace Colliery, Rhymney. The old pit is used as the upcast for the Duffryn Colliery, belonging to the Rhymney Iron and Coal Company. Mr. W. Moss, the manager, and a gang of men descended the Mardy Colliery, about 200 yards distant, which is on the Monmouthshire side of the valley, and adjacent to the Old Terrace Colliery, but were driven back by the smoke. Later a contingent of the New Tredegar Rescue Brigade, together with their up-to-date appliances, descended the Old Terrace shaft, and eventually succeeded in reaching the scene of the fire, which they found in a "gob" about 9 ft. high. Only one man and a horse are kept in this old working, and it is stated that they were not in the pit at the time the outbreak was discovered. Shortly after 11 o'clock the rescue brigade returned to the surface, and reported that the fire, which was 250 yards distant in the working, had been considerably damped down. A second contingent of rescue workers went down, and it is believed were successful in extinguishing the fire.

Mr. Joseph McKendrick, Gilbertfield Colliery, Cambuslang (Messrs. John Watson Limited), has been appointed manager at Bothwell Park Colliery, Holytown. Mr. McKendrick has had a long experience of the Lanarkshire coalfield, and his new employers, Messrs. Wm. Baird and Co., should find him a valuable servant.

Mr. James Kirkpatrick, who was recently appointed manager to the Banknock Coal Company, at their collieries in the Dennyloanhead district, has received the appointment of manager at Viewpark Collieries, in the Uddingston district of Lanarkshire.

Under the joint auspices of the Scottish branches of the National Association of Colliery Managers and the Association of Mining Electrical Engineers, a most successful excursion was held on Saturday last to Loch Lomond.

Work had to be suspended at Oughterside Colliery, near Maryport, on Wednesday morning of last week, owing to the engineman making a mistake which caused an overwind. This happened at 7.30 and the workman had to be drawn to the surface. Repairs had not been effected in time to allow the afternoon shift to start, but work was resumed as usual the following morning.

Another development in regard to railway accommodation in South Yorkshire is about to take place. The construction of the railway line from Hatfield Main Colliery, at Stainforth, to Black Carr Junction, near Doncaster, is, it is understood, to be begun at once. The making of this line has been under consideration for a long time, the object being to link up the Axholme joint railway with the Dearne Valley Railway. The estimated cost is £64,320. The railway, when completed, will aid in the development of the coalfields, as it will provide a means of conveyance to the four principal points of the compass.

Colliery developments have caused a great demand for housing in the Doncaster district, and the Corporation is trying to meet the pressure. Last week it accepted a contract for £25,997 on a rehousing scheme, which means that the original estimate has been exceeded by £4,000. Sixteen tenders were received, and that of Mr. A. Thompson, of Town Moor-avenue, Doncaster, was accepted. The contract is for 60 houses on the Balby site for £12,530, and 64 on the Carr House site for £13,467. The contractor recently completed 140 houses at the new colliery village of Edlington. The contract is expected to be completed in from 9 to 12 months. Having exceeded by £4,000 the sum sanctioned by the Local Government Board at their enquiry, the Corporation will now have to make a further application for this amount to be loaned.

Messrs. Geo. Robson and Co., Eclipse Engineering Works, Napier-street, Sheffield, inform us that they have recently obtained a contract for a complete coal-handling plant for the Bristol Corporation.

The Castleford Technical Committee have given courses of instruction to the deputies at Glasshoughton, Wheldale and Bowers Allerton Collieries in gas testing and air measurement. The classes are held at the Mining School, Castleford, under the direction of Mr. W. A Machin, who has obtained highly successful results with his pupils. No less than 118 sat for examination in gas testing at the Wakefield Technical Schools, and 115 obtained certificates; 14 sat for air measurement, and 11 obtained certificates. The facilities at Castleford are excellent; day and evening courses are arranged and have been well attended, students being prepared for all the Home Office examinations in mining and surveying. The surveying course is under the charge of Mr. F. W. Milsom. This session, a special course in electricity is being held, commencing on September 9. Particulars of the classes may be obtained from Mr J. A. Stokes, A.R.S.S., Technical Schools, Castleford.

The new resident manager at Dennyloanhead, on behalf of the Banknock Coal Company is Mr. David Todd, formerly of Polmaise, Stirlingshire. Mr. Todd, who comes from a well-known mining family in the Kilsyth district, has had a very successful career in different parts of Stirlingshire and Lanarkshire.

Mr. David Livingstone, under-manager at Tannochside Colliery, Uddingston, has been successful in securing a more lucrative appointment at Morningside, near Wishaw. Prior to his departure the workmen at Tannochside presented him with a purse of sovereigns, together with a handsome gold brooch for Mrs. Livingstone.

Stephen Gibbons, junr., a winding engineman, has retired from the service of the Ellenbrough Colliery under peculiar circumstances, and as the result of a strong and decided action by the Enginemen's Union. It appeared that this engineman, who is 24 years of age, was appointed to run a winding engine. The Enginemen's Union took the matter up and tendered their notices. They would not work if he continued to work, and refused to have him a member of the union. It seems that the latter body have a rule which forbids learners starting at the work after 22. But, as such, he contends that he is not a learner, but a fully-qualified engineman, having served an apprenticeship in a prior appointment. He also tendered the £10 which, under certain conditions, is required from men joining the union, but this was refused. As the enginemen have power by striking to stop the pit, and as the company could not, naturally, see its way to incur the loss for one man, they had to dispense with his services.

Rapid preparations are now being made for starting the Pilkington Colliery Company's new pits at Astley Green, in South Lancashire, which have been in sinking for about four years, an increased number of men having been started in certain of the shallower mines. Last week-end fields in the immediate vicinity of these pits were converted into miniature lakes through the heavy rainfall.

The Earl of Fitzwilliam, accompanied by Sir Anthony Weldon, Bart., and Mr. Percy La Touche, visited the Queen's County Colliery last week, says the *Irish Independent*. The Earl of Fitzwilliam descended the Gracefield shaft along with Mr. Parkinson, the owner, and Mr. Elder, mining engineer, and subsequently his lordship congratulated all who are connected with the mine on the splendid manner in which the works have been equipped. The coal raised, he was told, was specially suitable for steam raising. Mr. Parkinson's pluck and patriotic enterprise deserved success. The coming of a light railway to Athy would be a great boon to the country generally, and when the Irish people were placed in immediate communication with that great source of wealth, the results would be generally beneficial. There was no doubt there was an enormous

BLAST FURNACES OF THE UNITEO KINCOOM BUILT AND IN BLAST.

	Furnaces built, June 30, 1912	Furnaces in blast, June 30, 1912.	Average number of furnaces in blast.		Furnaces re-lining or re-building. June 30, 1912.	New furnaces building.
			June quarter, 1912	March quarter, 1912.		
ENGLAND.						
Durham and Northumberland	40	26	22¾	22¼	6	—
Lincolnshire	16	15	9	10¾	—	1
Notts and Leicestershire	8	6	5	1¼	2	—
Cleveland	75	55	49	49¾	12	1
W. Cumberland	34	14	12	7	4	1
N. Staffordshire	30	13	13	13¼	4	—
S. and W. Yorkshire	23	11	9	11¼	2	1
Lancashire	29	12	10	10¼	5	5
Shropshire	6	1	1	3	1	—
Northamptonshire	20	14	13¼	13¼	3	—
Derbyshire	44	37	27¼	26¼	3	1
S. Staffordshire and Worcester	31	20	17½	16¼	3	
Gloucester, Somerset and Wilts.	2		—	—		—
WALES, North	4	3	2	2¾	1	
,, South	34	13	9¼	11	4	
SCOTLAND	102	85	71½	53¾	11	1
Total	498	325*	275¼	243¾	59	11

* Comprised as follows:—Making hæmatite, 103; forge and foundry, 163; basic, 47; ferro-manganese, spiegel, ferro-silicon, &c., 12.

quantity of coal in the basin, and the supply, in the near future, with modern transit facilities, should average hundreds of thousands of tons annually. Further recent boring operations in the Gracefield district have revealed the presence of coal in places hitherto untapped, and it is believed that the fuel will be found in very large quantities. The negotiations for the starting of the light railway in the district are progressing satisfactorily, so that it is hoped the present costly transit facilities will soon be superseded.

We understand that Messrs. Marple and Gillott Limited have secured the services of Mr. G. Llewellyn Davies, well known in the coal and iron trade, who will now take over the control of their mineral department generally, at King's-chambers, Angel-street, Sheffield, and elsewhere. Mr. Davies' long experience of this class of business as secretary, commercial manager and partner, etc., has, in the past, spoken for itself.

Mr. Paul S. Lea, assistant manager at the White Moss Collieries, Skelmersdale, has been appointed one of H.M. junior inspectors of mines in the Midland and Southern district. Mr. Lea, who is a grandson of Mr. Paul Lea, manager of the White Moss Colliery, served his articles at that colliery and gained many distinctions at the Wigan Mining School.

Messrs. Yeadon, Son and Co. have recently forwarded two of their latest improved complete briquette plants to customers in Nova Scotia and Vancouver. Both these plants are for producing ovoid briquettes, suitable for locomotive and domestic consumption.

At Hartford Colliery, Northumberland, there was an alarming inrush of water on Tuesday. It occurred in what is known as the Old Plessey district, and the water flowed with great force and in considerable volume. Some of the miners had difficulty in reaching the shaft in safety. It was expected that the pit would be at work again in a few days, although the precaution was taken to bring the ponies to bank.

The report of the Statistical Department of the Norddeutscher Lloyd, Bremen, on the consumption of coal and provisions on board the steamers of the company shows that the consumption of coal amounted to just under 1¾ million tons, costing nearly 1½ millions sterling, and that provisions represented a cost of just under one million sterling. The actual expenditure under the two heads works out at 1s. 6d. per second.

A return prepared by Mr. T. Gilbert Evans, assistant overseer, shows that during the year ended June 30 last there were 1,484,037 tons of large coal worked and raised in the parish of Merthyr, the ratable value of which was £16,751. There was a decreased output of 211,844 tons as compared with the year ended December 31, 1911, and of 287,109 tons as compared with the year ended June 30, 1911. During the same period the quantity of small coal worked and raised in the parish amounted to 432,128 tons, having a ratable value of £4,671 8s. 3d., a decrease as compared with the year ended December 31, 1911, of 77,770 tons, and the year ended June 30, 1911, of 99,438 tons. There were 104,160 tons of large coal with a ratable value of £867 18s., and 24,342 tons of small coal with a ratable value of £51 2s. 4d., worked in other parishes and brought to bank in the parish of Merthyr in the year covered by the return, these figures showing a diminished output of large coal of 17,155 tons as compared with the year ended December 31, 1911, and of 18,910 tons as compared with the year ended June 30, 1911, the decreased output of small coal as against the two years brought into comparison being 3,886 tons and 3,301 tons respectively.

The British Consul at Nagasaki states that the export of coal from the principal ports of that consular district during the last three years was as follows:—

Year.	Nagasaki. Tons.	Kuchinotsu. Tons.	Karatsu. Tons.	Total. Tons.
1909	87,429	267,977	270,743	626,149
1910	108,294	2,000	242,326	352,620
1911	146,424	7,000	379,044	532,468

The average value per ton during 1911 was, at Nagasaki, 12s. 10d.; at Kuchinotsu, 16s. 4d.; and at Karatsu, 11s. 8d. The large export trade formerly done at Kuchinotsu is now carried on at the port of Miike in the Shimonoseki consular district, the coal coming from the same mines as that formerly exported from Kuchinotsu. In 1911, Miike had an export of 890,304 tons of coal, with an average value of 11s. 7d. per ton. The above figures do not include bunker coals. Of these, 433,608 tons were taken at Nagasaki, 100,880 tons at Karatsu, and 170,225 tons at Kuchinotsu. At Miike 148,499 tons were taken.

Dalmellington Iron Company Limited.—The report of the directors for the year ended June 30, 1912, states that a feature of the past year has been the widespread unrest among workmen, culminating in a national strike of colliers. The Minimum Wage Act, the new Coal Mines Regulation Act, with the Rescue and Aid Order, the Explosives Order, the Electricity Special Rules, and the National Insurance Act, will add very seriously to the cost of coal and iron during the current year. The gross profit earned amounts to £41,479 3s. 1d., and the balance from last year was £4,535 12s. 4d., making £46,014 15s. 5d. It is proposed to pay a dividend on the ordinary shares of 7s. 6d. per share, being 7½ per cent. per annum, free of income tax, and carry forward to next year £5,761 7s. 10d.

BLAST FURNACE STATISTICS.

The annexed statistics are compiled from returns received direct from the furnaces and published at the office of the *Iron Trades Circular* (Ryland's).

Total number of furnaces built on June 30, 1912	498
Total number of furnaces in blast on June 30, 1912	325
Increase or decrease in the number of furnaces built since March 31, 1912	—
Increase in the number of furnaces in blast since March 31, 1912	270
Furnaces blown-in since March 31, 1912	274

All furnaces shown above, with the exception of 55 in blast at March quarter, and 4 furnaces blown out.

Furnaces blown-out since March 31, 1912 4

Durham and Northumberland (1): Consett Iron Company Limited, 1. *Shropshire* (1): Lilleshall Company Limited, 1. *South and West Yorkshire* (1): Wm. Woodhead and Son Limited, 1. *North Staffordshire* (1): Midland Coal, Coke and Iron Company Limited, 1.

Furnaces being built at present time 11

Lincolnshire (1): North Lincolnshire Iron Company Limited, 1. *West Cumberland* (1): Whitehaven Hæmatite Iron and Steel Company Limited, 1. *Cleveland* (1): Bolckow, Vaughan and Co. Limited, 1. *Lancashire* (5): Wigan Coal and Iron Company Limited, 2; Partington Steel and Iron Company Limited, 3. *Derbyshire* (1): Clay Cross Company, 1. *Yorkshire* (1): Newton, Chambers and Co. Limited, 1. *Scotland* (1): Dalmellington Iron Company Limited, 1.

Furnaces being re-built or re-lined at present time 59

Scotland (11): William Dixon Limited, 2; James Dunlop and Co. Limited, 1; Langloan Iron and Chemical Company, 1; Glasgow Iron and Steel Company, 1; Glengarnock Iron and Steel Company Limited, 2; Carron Company Limited, 1; Coltness Iron Company, 2; Summerlee Iron Company, 1. *South Wales* (4): Guest, Keen and Nettlefolds Limited (Cardiff), 1; Ebbw Vale Steel, Iron and Coal Company Limited, 1; Briton Ferry Works Limited, 1; Blaenavon Company, 1. *Durham* (6): Linthorpe-Dinsdale Smelting Company Limited, 1; Consett Iron Company Limited, 3; Carlton Iron Company, 1; Seaton Carew Iron Company, 1. *Nottinghamshire and Leicestershire* (2): Bestwood Coal and Iron Company Limited, 1; Holwell Iron Company, 1. *Cleveland* (12): North-Eastern Steel Company Limited, 1; Bolckow, Vaughan and Co. Limited, 4; Walker, Maynard and Co. Limited, 1; Gjers, Mills and Co. Limited, 2; Sir B. Samuelson and Co. Limited, 2; Pease and Partners, 2. *North Wales* (1): Brymbo Steel Company, 1. *South Staffordshire* (3): N. Hingley and Sons, 1; G. and R. Thomas, 1; Cochrane and Co., 1. *Cumberland* (4): Distington Hæmatite Iron Company Limited, 1; Workington Iron and Steel Company Limited, 2; Millom and Askam Hæmatite Iron Company, 1. *Staffordshire (North)* (4): Shelton Company, 1; R. Heath and Sons, 2; Stafford Coal and Iron Company, 1. *Yorkshire (West Riding)* (2): Yorkshire Iron and Coal Company, 1; Lowmoor Company Limited, 1. *Derbyshire* (3): Denby Iron and Coal Company, 1; Sheepbridge Coal and Iron Company Limited, 1; Clay Cross Company, 1. *Northamptonshire* (3): Wellingborough Iron Company, 1; Thos. Butlin and Co. Limited, 1; Kettering Iron and Coal Company Limited, 1. *Lancashire* (3): Darwen and Mostyn Iron Company, 1; Barrow Hæmatite Steel Company Limited, 1; Harrison, Ainslie and Co., 1. *Shropshire* (1): Lilleshall Company Limited, 1.

The Board of Trade have recently confirmed the following Order made by the Light Railway Commissioners:—Halesowen Light Railways (Extensions, &c.) Order, 1912, reviving the powers granted by the Halesowen Light Railway Orders 1901 to 1909, and extending the period limited by those Orders for the completion of part of the light railways and works thereby authorised, and authorising the construction of additional light railways in the urban district of Lye and Wollescote, in the county of Worcester, and in the urban district of Rowley Regis, in the county of Stafford, in extension of the said light railways authorised by the said Orders of 1901 to 1909, and for other purposes.

OBITUARY.

The death took place at Swansea last week of Mr. W. Graham Vivian, J.P., of Clyne Castle, former High Sheriff for County Glamorgan. Mr. Vivian, who had been ill for a short period, was 85 years of age. He was a son of the late Mr. John Henry Vivian, who was the first member of Parliament for Swansea, and nephew of the first Baron Vivian, and was the oldest representative of the Vivian family, the pioneers of the copper trade in Wales. He was a bachelor.

Mr. William Francis Williams, aged 71, manager of the Ocean Coal Company's new pit at Cwmparc, was killed under tragic circumstances last week. It appears that some workmen had been driving a heading from the new pit to an adjacent colliery, and Mr. Williams went to visit the spot after shot-firing had taken place. Immediately he reached the place a fall of roof occurred, killing him instantaneously. Mr. Williams had been in the employ of the Ocean Coal Company for a very long period, being one of their oldest officials. He was one of those under-managers whose service qualified him, without examination, to remain in that capacity when the Government imposed the condition that there should be a qualifying examination. Until recently he was an under-manager at the Dare Colliery, but was transferred to the new pit which has been sunk, and in which he met his death. Deceased leaves a widow and one son, Mr. Thomas Williams, who is engaged in an official capacity at the new pit.

A painful shooting fatality occurred on the 23rd inst. on the West Fell, near Saltors Gate, a remote country district situated between Lanchester and Tow Law in County Durham. It appears that Mr. Thomas Cuthbert Whitfield, manager of the William Pit, Whitehaven, Cumberland, and Mr. Edward Rees, a mechanical engineer, were enjoying a few days' shooting at Woodlands Hall, near Consett. They were following the birds with their guns, and Mr. Rees, having pulled the trigger for the second time, the contents of the firearm entered the back of Mr. Whitfield's head. Death was instantaneous. The deceased, who was about 40 years of age, was a member of the Whitfield family of Dyke Nook Farm, near Consett. He served his apprenticeship as a mining engineer at Cornsay Colliery, under Mr. Philip Kirkup, now of Birtley. Afterwards deceased obtained an appointment as a colliery manager in the Kelloe district, and obtained his present position at Whitehaven in May of last year.

Mr. J. Cheatter, managing director of the Monk Bretton Colliery Company, died at his residence, The Croft, Monk Bretton, near Barnsley, on Sunday night after several weeks' illness. Mr. Cheatter, who was 74 years of age, had for many years suffered from rheumatism, and his strength was further impaired by an operation which he underwent 18 months ago for an internal complaint. He was, however, able until a few weeks ago to be conveyed to the office and attend to his duties. Mr. Cheatter, who was a native of Leeds, became commercial manager of the company in 1873, and subsequently was appointed managing director.

A stir is again being made in the Doncaster district in regard to town planning. The Corporation have communicated with the Doncaster Rural District Council asking them if they would send delegates to a further conference on the subject, which it is proposed to hold at the Mansion House at the earliest opportunity. The Council decided to send delegates, and at once proceeded to appoint a special Town Planning Committee to consider the whole question in the Council's area, which comprises several of the new colliery villages of the district. It has been left to this committee to appoint a deputation to the Mansion House conference at Doncaster. The present idea appears to be for a joint town planning scheme, the expenses being apportioned between the several authorities interested, according to the area included in such scheme.

COAL, IRON AND ENGINEERING COMPANIES.

Anthraduff Smokeless Fuel Company Limited.—This private company has been registered, with a capital of £10,000 in £1 shares (6,000 preferred ordinary and 4,000 deferred ordinary), to carry on the business of makers of compressed fuel, &c., and to adopt an agreement with L. J. Thomas. Remuneration of first directors who are to be appointed, £100 each per annum.

Astley and Tyldesley Collieries Limited.—In declaring dividends at the rate of 20 per cent. per annum, the directors state that the Minimum Wage, Mines and Insurance Acts will greatly increase the cost of working. With a view to developing the company's new coalfield, two shafts have now been sunk to the Yard and Arley mines and two other shafts are nearly approaching that depth. It proposed to increase the company's capital by the creation of 20,000 additional ordinary shares of £10 each.

Atlas Steel Foundry and Engineering Company Limited.—Applications have been invited for 13,000 ordinary £1 shares. The company has a capital of £25,000, and has been formed to acquire the works of the Armadale Iron Company Limited, in liquidation. A Siemens-Martin furnace is in course of construction, and crucible or other type of furnace will be added as occasion requires.

Dalmellington Iron Company Limited.—The report for the year ended June 30 last states that the profits, including £4,536 brought forward, amount to £46,014. The directors have transferred £4,536 to general reserve fund, and have written off £14,592 for depreciation and redemption, and they now recommend a dividend of 7½ per cent. on the ordinary shares, free of tax, carrying forward £5,761.

Delcroix (S.) Engineering Company Limited.—This company has been registered, with a capital of £50,000 in £1 shares, to carry on business as iron and metal workers, ironfounders, mechanical engineers, manufacturers of agricultural implements and industrial and other machinery, boilermakers, &c., and to acquire the business and assets of Sylvan Delcroix and C. Van Wymeersch, engineers, &c., of Brussels. Minimum subscription, seven shares. First directors, S. Delcroix, J. Rimbaut, J. Van Steenberghe, A. Marcilhac, G. Le Kay and G. Gillet. Qualification, 200 shares. Remuneration of S. Delcroix, as managing director, £500 per annum; of others £50 each per annum (chairman, £75), and 10 per cent. of the net profits available for distribution. Registered office, 265, Strand, W.C.

Friend Sykes Chemical and Engineering Company Limited.—This private company has just been registered, with a capital of £30,000 in £1 shares, to acquire any interests in inventions, licences, concessions, and the like relating to retorts for drying or carbonising wood, sewage matter, and vegetable or other substances, and to the production, treatment, application, and distribution of charcoal, and any apparatus therefor, and in particular to acquire a certain existing invention and secret information from Friend Sykes, chemical engineer, of Hillside, Dewsbury. Registered office, 150, Leadenhall-street, London, E.C.

Hardy Patent Pick Company Limited.—For the year ending June 30 last, the directors' report states that the net profit was £8,714, and the profit brought forward from last year £8,854 9s. 8d., making a total of £17,568. The directors propose to deal with the profits as follows:—To payment of interest on debentures £1,271, to payment of dividend on the 7 per cent. preference shares £1,736, to payment of dividend of 5 per cent. on the ordinary shares £3,445, to provide for depreciation of tools and patterns £1,000, to provide for depreciation of plant, &c., £2,000, and carry forward to next year £8,116.

Hill (Richard) and Co. Limited.—The annual report for the year ending June 30 last states that the profit on trading for the year amounts to £9,619 16s., to which must be added transfer fees received during the year, £15, the balance brought forward as per last report, £5,037 5s. 10d., making a total of £14,672 1s. 10d., which the directors propose should be applied as follows:—Directors' remuneration, including managing director, £1,314 2s. 7d.; directors' travelling expenses, £94 16s. 9d. Depreciation: On plant, &c., £1,500; on loose plant and tools, £188 16s. 4d.; on office furniture, £12 9s. 2d.—£1,701 5s. 6d.—£3,110 4s. 10d. Dividend on preference shares at 6 per cent. per annum: Half-year to December 31, 1911, paid £2,700, half-year to June 30, 1912, accrued, £2,700—£5,400. Dividend on ordinary shares: Half-year to December 31, 1911, at the rate of 5 per cent. per annum (less income-tax), £2,125; half-year to June 30, 1912, at the rate of 3 per cent. per annum (less income-tax), making 4 per cent. for the year, £1,275—£3,400—£11,910 4s. 10d. Balance carried forward to next year's account for the equalisation of dividends and other purposes of the company, £2,761 17s. Electrical machinery for driving the Newport Wire Mills is being installed, and will shortly be at work.

Hope (J. Barrow) and Co. Limited.—This private company has been registered, with a capital of £10,000 in £1 shares (3,500 5 per cent. cumulative preference), to adopt an agreement with J. B. Hope for the acquisition of the business of a merchant in iron and steel, plates, tinsmiths' machines and tools, carried on by him at 50, Lever-street, Manchester, and to carry on the same and the business of general engineers, &c. First directors, J. B. Hope, A. H. H. Barrison and W. H. Hope (all permanent). Qualification, £100.

Manvers Main Colliery Company Limited.—The directors have declared a final dividend of 2s. per share on the ordinary shares, making 2s. 6d. per share (12½ per cent.) for the past year.

Measures Brothers Limited.—By direction of the Chancery Court a circular letter has been issued to the debenture stockholders, inviting each holder to say whether or not he desires civil proceedings to be instituted against the surviving directors "with a view to recovering from them sums alleged to have been paid by them in dividends out of capital moneys of the company." On the realisation of the property there will be nothing for the creditors, or for the preference (£75,000) or ordinary (£210,000) shareholders, and it is estimated that the debenture-holders will receive only about 15s. in the £ unless the deficiency is recovered by civil action against the directors.

Murcia Copper and Iron Mines Limited.—This company has been registered, with a capital of £60,000 in £1 shares, to carry on the business of copper, iron and general miners, metallurgists, &c., to acquire certain copper and iron mining properties in Blanes, province of Murcia, Spain, and to adopt an agreement with H. Godefroi. First directors, Sir George Kekewich, K.C.B., H. Godefroi, and H. H. F. Hyndman. Remuneration £200 each per annum. Registered office, 14, Bedford Row, W.C.

National Electric Construction Company Limited.—The accounts for the year to December 31, 1911, after deducting expenses of administration, debenture interest, &c., and including £5,156 brought forward, show an available balance of £10,333, which the directors recommend be dealt with as follows:—Transfer to debenture redemption fund, £1,150; depreciation on free wired installations, on Consols purchased for Parliamentary deposits, &c., £4,426; carry forward £4,357.

Olga Iron Ore Company Limited.—This private company has been registered, with a capital of £30,000 in £1 shares, to carry on the business of miners, explorers, promoters, owners of and dealers in mines, mining rights and mineral properties, &c. Every member of the company must execute an agreement, the nature of which is not disclosed. The subscribers are: Mr. A. Glover, Roundhay, Leeds, and Mr. R. Wilson, Shadwell, Leeds. Each of the following members of the company—viz., David Colville and Sons Limited, the Consett Iron Ore Company, Wm. Dixon Limited, the Ebbw Vale Steel, Iron and Coal Company, the Frodingham Iron and Steel Company, Sir B. Samuelson and Co. Limited, the Steel Company of Scotland and Stewarts and Lloyds Limited—may, if holding £2,000 shares, appoint a director. The following members of the company—viz., Bell Brothers Limited, Dorman, Long and Co. Limited and the North-Eastern Steel Company—may, while holding between them £4,000 shares, appoint two directors. The solicitor is Mr. A. D. Brighouse, Prudential-buildings, Leeds.

Penrikyber Navigation Colliery Company Limited.—Interim dividend of 5 per cent. on the ordinary shares.

Sheepbridge Coal and Iron Company Limited.—The directors recommend a final dividend of 1s. 6d. on the fully-paid and of 7.2d. on the partly-paid shares, less income-tax.

South Hetton Coal Company Limited.—Dividend of 7s. 6d. per share, tax free, for the past half-year. Last year the dividend was 5s. per share.

Staveley Coal and Iron Company Limited.—The directors of the Staveley Coal and Iron Company Limited recommend a final dividend of 1s. 3d. per share on the fully-paid shares and 11½d. per share on the part-paid shares, making for the year a total of 10 per cent.

Summerlee Iron Company Limited.—Dividend of 20 per cent. (40s. per share), free of income-tax, on the ordinary shares for the past year, carrying forward £10,525.

Swan, Hunter and Wigham-Richardson Limited.—The directors announce an interim dividend at the rate of 5 per cent. per annum on the ordinary shares.

Vickers Limited.—Interim dividend of 1s. per share on the ordinary shares.

Wallsend Natal Collieries Limited.—This company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of colliery proprietors, ironmasters, steelmakers and converters, miners, smelters, engineers, tinplate makers, ironfounders, &c., and to acquire any coal or other mines and mining rights, minerals and metalliferous land or interest therein in Natal or elsewhere. Minimum cash subscription, seven shares. Qualification of first directors, who are to be appointed (except directors appointed prior to statutory meeting), £100. Registered office, 6, Lloyd's-avenue, E.C.

Mortgages and Charges.—The following have been registered in pursuance of the Companies Acts, 1907:—Amman Valley Collieries Limited (mortgage dated July 20, 1912, to secure £250); Bolckow, Vaughan and Co. Limited (issue on July 25, 1912, of £2,300 debentures, part of a series); Bristol Wagon and Carriage Works Company Limited (issue on July 22, 1912, of £1,000 debentures, part of a series); Britannic Merthyr Coal Company Limited (satisfaction in full on July 8, 1912, of trust deed and debentures dated November 10, 1905, securing £45,000); Broughton and Plas Power Coal Company Limited (particulars of £50,000 debentures created October 25, 1911, and secured by trust deed dated May 29, 1911, present issue, £30,000); Easington Coal Company Limited (issue on July 18, 1912, of £3,400 debentures, part of a series); Glass Houghton and Castleford Collieries Limited (satisfaction to the extent of £10,000 on July 4, 1912, of mortgages dated January 6, 1903, and May 6, 1910, securing £30,000, but subsequently reduced to the above amount); Lincoln Wagon and Engine Company Limited (issue on July 23, 1912, of £15,169 6s. 1d. debentures, part of a series); Pensnett Foundry and Tinning Works Limited (particulars of £1,250 debentures created July 5, 1912, whole amount now issued); Point of Ayr Collieries Limited (satisfaction to the extent of £1,900 on July 19, 1912, of debentures dated March 22 and August 16, 1907, securing £15,500); United Westminster and Wrexham Collieries Limited (issue on July 10, 1912, of £6,300 debentures, part of a series); Empire Colliery (Tipton) Limited (particulars of £2,000 debentures created July 29, 1912, whole amount now issued); Harriseahead Colliery Company Limited (satisfaction in full on May 24, 1912, of charge dated June 25, 1902, securing £992 11s. 6d.); London Flambo Fuel Company Limited (particulars of £2,000 debentures created July 13, 1912, whole amount now issued); Torycoed Colliery Company Limited (issue on August 2, 1912, of £1,700 debentures, part of a series); Wharncliffe Woodmoor Colliery Company Limited (issue on July 3, 1912, of £8,500 debentures, part of a series); Barrow Hæmatite Steel Company Limited (agreement of charge dated May 6, and underlease dated June 12, 1912, to secure £31,500); Blaen Cwm Colliery Company (1911) Limited (issue on July 22, 1912, of £500 debentures, part of a series); Bolsover Colliery Company Limited (satisfaction to the extent of £95,400, on July 1, 1912, of debentures dated April 21, 1892, and January 25, 1893, securing £100,000, notified. Particulars of £150,000 debentures created February 15, 1912, also filed, present issue £116,000. Amended particulars of debentures dated 1892 and 1893, securing £99,800, have also been filed pursuant to section 12 of 1907 Act. The original statement gave amount outstanding as £99,800); Graham Island (B.C.) Coal and Timber Syndicate Limited (particulars of £500 debentures created August 14, 1912, whole amount now issued); Mold Collieries Limited (particulars of £10,000 debentures created August 6, 1912, whole amount now issued).

THE FREIGHT MARKET.

Operations in the outward freight market have been hampered by a shortage of tonnage, which appears to be general throughout the country. On the north-east coast, coasting rates have risen to from 4s. to 4s. 3d. to London from the Tyne, whilst other directions are based on the following figures:—Bay, 7s. 9d. to Bordeaux; Baltic, 6s. 6d. to Cronstadt; and Mediterranean, 12s. to Genoa. At South Wales chartering is dull, and rates for all directions are advancing. South America is firm, and there is a brisk enquiry for the Bay and coast ports. At the Clyde, there is a quiet demand and a moderate amount of business. At the Humber the market is very firmly upheld. Homewards, New York advices report a strong market, with a higher tone than for some considerable time past. There is a good general demand for all shipping centres, and, with light offerings of tonnage, rates are on the up-grade. Eastern markets are active and firm. The Black Sea and Danube show a better demand and a firmer tone. The Mediterranean and ore trades are well maintained, as is also the Baltic. The River Plate is fully steady and fairly busy.

Tyne to Antwerp, 1,700, 5s.; Alexandria, 3,500, 12s. 6d.; Bilbao, 3,400, 8s.; Bordeaux, 1,800, 7s. 9d.; Catania, 3,200, 12s. 3d.; Cronstadt, 2,000, 6s. 6d.; Christianholm, 1,800, 7s.; Christiania, 700, 7s.; Carthagena, 2,000, 11s. 9d.; Cherbourg, 700, 6s. 9d.; Genoa, 600, 12s.; 3,300, 12s.; Geestemunde, 500, 5s. 9d.; Hango, 2,000, 8s.; Karrabeksminde, 1,600, 7s. 6d.; Lisbon, 1,200, 11s.; La Rochelle, 2,000, 7s.; London, 1,200, 4s.; 1,200, 4s. 3d.; Oran, 2,300, 10s. 6d.; Port Said, 6,500, 11s.; Pillau, 2,000, 6s. 6d.; Sulina, 4,000, 14s.; St. Petersburg, 2,100, 6s. 6d.; Teneriffe, 11s. 9d., ppt.; Vranzai, 12s. 3d., bricks, &c.

Cardiff to Aden, 5,000, 13s., mid-September; Algiers, 2,900, 13 fr., ppt.; 3,800, 13 fr., early September; Bahia Blanca, 5,000, 22s. 6d., early September; Buenos Ayres, 4,900, 22s. 6d., September 5; Brindisi, 5,900, 12s., 800; 5,200, 12s.; Colastine, 3,500, 25s., spot; Charlestown, 470, 4s. 9d.; Cadiz, 1,800, 10s., half tax, ppt.; Dakar, 4,000, 12s. 6d., September 10; 2,000, 12s. 6d. coal, 13s. 3d. fuel; Dover, 850, 5s., Admiralty; 750, 5s.; Felixstowe, 750, 5s. 3d., Admiralty; Ferrol, 950, 8s. 9d.; Genoa, 3,300, 11s. 9d., September; 3,600, 12s. 3d., ppt.; 5,000, 12s., ppt.; Havre, 2,000, 5s. 9d., ppt.; 1,100, 6s. 6d.; Lamlash, 2,240, 4s. 3d., Admiralty; Malta, 9s. 8d.; 5,000, 10s. 6d.; Monte Video, sail, 18s. 6d.; Naples, 4,200, 12s.; Port Said, 8,500, 11s. 1½d., September 7; River Plate, 5,400, 22s. 6d., September 10; 22s. 6d., early September; 22s., ditto; 5,600, 22s. 6d., with option; 4,700, 23s., early September; 3,600, ditto; Reval, 2,300, 7s. 9d.; Rio de Janeiro, 19s., with 500, 19s. 6d. with 300, September; Rosario, 5,000, 23s.; Sante Fe, 3,500, 25s., spot; St. Malo, 2,200, 6s.; Teneriffe, 11s. 6d., ppt.; Trieste, 8,500, 12s., 500, September 6; Venice, 5,000, 12s. 6d.; 5,200, 13s.; 5,900, 13s.

Grangemouth to Bergen, 2,400, 6s. 3d.

Forth to Stockholm, 2,400, 7s. 9d.

Barry to Rio de Janeiro, sail, 18s. 6d.

London to Sydney, Newcastle (N.S.W.) or Melbourne, sail, 18s., Melbourne and Adelaide, 20s.

Newport to Gibraltar, 1,200, 9s. 9d., ppt.; Genoa, 5,000, 12s., ppt.; 5,000, 12s., August 30; Barcelona, 3,400, 12s., ppt.; Naples, 4,200, 12s., spot.

Blyth to Kotka, 2,000, 8s.; Caen, 800, 6s. 6d.; Cronstadt, 3,400, 6s. 7½d.; 4,800, 6s. 6d.; 2,500, 6s. 6d.; Oaxen, 3,300, 7s. 8d.; Archangel, 1,100, 7s. 9d.; Havre, 1,400, 6s.; Nykjobing, 2,000, 7s. 3d.; Plymouth, 700, 5s. 6d.

Hull to Cronstadt, 2,600, 6s. 6d.; 4,700, 6s. 6d., early September; 3,500, 6s. 6d.; 3,000, 6s. 6d., September 4; Soundport, 1,700, 7s. 9d., mid-September; 1,100, 7s. 9d., ppt.

Grimsby to Pernau, 1,300, 6s. 7½d.

Seaham Harbour to Randers, 2,000, 7s.

Methil to Middlefahrt, 1,250, 7s. 9d.; Fredrikshaven, 850, 8s. 3d.

Immingham to Pernau, 2,800, 6s. 6d.

Partington to Bona, 10s.

Garston to Huelva, 8s. 6d.

Sundswall to Piræus, 90 fr., d.b. and b. and few baulks, August.

Swansea to Rouen, 1,700, 6s. 3d.; Helsingfors, 1,300, 9s. 3d. coal, 10s. fuel; St. Nazaire, 2,300, 7¾ fr.; Valencia, 1,000, 13s. 3d.; 13s. 1½d., free tax; St. Malo, 600, 6s. 3d.; Tonnay Charente, 1,250, 8¼ fr. coal, 8¾ fr. fuel; Venice, 5,400, 13s. 9d. coal, 14s. 6d. fuel, ppt.; 5,800, ditto.

Glasgow to River Plate, 23s., September.

Llanelly to Dieppe, 1,150, 6s. 9d.

Wales to Monte Video, sail, 18s. 6d.; direct nitrate port, sail, p.t.; West Coast South America and home to United Kingdom-Continent, sail, 44s. in and out, 44s. 6d. stiffened.

Port Talbot to Havre, 1,200, 6s. 4½d.; La Pallice, 2,000, 7¾ fr., ppt.; Rouen, 7¾ fr., ppt.

Rotterdam to Bordeaux, 2,500, 6s. 6d.; 3,400, 6s. 7½d. coal, 7s. 4½d. fuel, August 30; Leghorn, 6,000, 11s. coal, 11s. 9d. fuel, 13s. coke, September 2; Venice, 4,600, 13s. 4½d. coal, 15s. coke, ppt.; St. Servan, 2,000, 6s., ppt.; St. Malo, 2,000, 6s., ppt.; La Rochelle, 1,600, 6s. 4½d., ppt.; Rochefort, 1,600, 6s. 6d., ppt.; St. Nazaire, 2,900, 6s. 3d.; 3,400, 6s. 7½d., Trignac terms, ppt.; 3,200, 6s. 7½d., Trignac terms, September 3; Porto Ferrajo, 5,600, 10s. 9d., ppt.; Bagnoli, 5,600, 11s., ppt.; Port Said, 5,500, 10s. 6d., ppt.; Monte Video, sail, 17s. coal, 500 fuel same rate, August; Havre, 2,050, 5s. 6d.

Homeward charters:—Poti, 5,000, Middlesbrough, 15s. 6d., 700-900, September 1-15; Novorossisk or Theodosia, 3,850 max., Genoa, 13 fr., ppt.; 4,700, London, 12s. 6d., September 1-10; Sulina, 6,300, Antwerp or Rotterdam 12s. 6d., Hamburg 13s. 9d., ppt.; 3,850, Nantes, 15s., ppt.; 6,800, Antwerp or Rotterdam, 12s. 6d., ppt.; 3,700, Marseilles or St. Louis du Rhone, 13 fr. one port, 13½ fr. both ports, ppt.; 5,600, Rotterdam 12s. 3d., Antwerp 12s. 6d., ppt.; 6,000, Rotterdam 12s. 6d., Antwerp 12s. 9d., September 1-15; Durban, 2,826 net, Bombay, 8s. 6d., coal, September; Kurrachee, 2,294 net, p.p. United Kingdom-Continent 20s. 6d., London 21s., net, September; 20s. 6d. one port United Kingdom-Continent, 21s. two ports, ppt.; 3,147 net, United Kingdom-Continent, 20s. 6d., September; 4,414 net, 20s. one port, 20s. 6d. two ports, October; San Lorenzo, 4,500, 10 per cent., United Kingdom-Continent, 25s. o.c., less 6d., September; 4,500, 10 per cent., 22s. o.c., less 6d., November; 7,100, 10 per cent., 24s., p.p. United Kingdom-Continent, no reduction, option full cargo below, 21s. 6d., September; 5,000, 10 per cent., United Kingdom-Continent, 25s. o.c., less 6d., September-October; 3,800, 25s., less 6d., ppt.; 5,100, 10 per cent., 24s. o.c., less 6d., cancelling October 5; 4,500, 10 per cent., 24s. o.c., less 6d., October 1-31; San Lorenzo, not above, 4,000, 10 per cent., United Kingdom-Continent, 24s., less 6d., October; 3,300, 10 per cent., 21s. 6d., United Kingdom-Continent, with Mediterranean options, December-January; La Goulette, 3,400, Middlesbrough or Jarrow, 10s. 4½d., f.t., early September; Vivero, 3,500, Immingham, 7s. 3d., 1,000-700, ppt.; Salts Cabello, 1,800, Middlesbrough, 7s. 6d., ppt.; Huelva, 5,800-6,200, New York, 11s. 9d., f.d., September; 5,500, New York, Philadelphia, or Baltimore, 11s. 6d., end August; Santander, 2,100; Rotterdam, 7s., complement to loading, ppt.; Bilbao, 3,600, Rotterdam, 6s. 9d., ppt.; La Fontaine, 2,500, Middlesbrough, 7s. 3d., ppt.; Wilmington, 2,240 net, Liverpool, 45s., Bremen, 46s. 3d.; time charter, Transatlantic trade, 7,500, 6s. 3d., two round trips, delivery United Kingdom-Continent; 6s. 4½d., delivery and re-delivery United Kingdom-Continent, *via* United States; Buenos Ayres or La Plata, 3,300, 10 per cent., United Kingdom-Continent, 21s. o.c., less 6d., with Danish options, October-November; 6,500, 10 per cent., 19s. 6d., o.c., less 6d., November-December; Gulf, 55s., United Kingdom-Continent, September-October; St. Petersburg, 32s. 6d., Hull, Portland, Or., sail, 42s. 6d., United Kingdom-Continent; 42s. 6d., November; Bombay, 26s., two ports United Kingdom-Continent on d.w., September; 26s. two ports United Kingdom-Continent, 26s. 6d. Hamburg and Dunkirk, on d.w., September; Azof, 5,500, Rotterdam 13s. 9d., Emden 14s., Hamburg 14s. 3d., ppt.; Vladivostock, 5,000, United Kingdom-Continent, 35s., beans, September; Galveston, 60s., Liverpool or Manchester, September-October; 21,000 qrs., 10 per cent., Rotterdam, 4s. 3d., September-October; Nicolaieff, 6,400, Herrenwiech, 12s. 6d., ore, ppt.; nitrate ports, sail, 3,000, United Kingdom-Continent, 30s., October-November; 29s., Calcutta, 30s., United Kingdom-Continent, on d.w., less 2½ per cent.; Kherson, Nicolaieff or Odessa, 5,200, Liverpool, 13s. 3d., ppt.; Nicolaieff or Odessa, 6,800, Hamburg, 13s. 6d. on d.w., grain, ppt.; Smyrna, 4,150, East Coast United Kingdom, basis 13s., with options, ppt.; Malgrat, 6,000, Rotterdam, 9s. 6d., f.t., September; Hornillo Bay, 2,500, Newport, 7s. 1½d., ppt.; Cala Conches, 4,200, Rotterdam, 8s. 9d., September, Melbourne, sail, 28s. 9d., United Kingdom-Continent, January-February; Gulf timber port, sail, about 15½ dols., Rio de Janeiro; Baltimore, 2s. 6d., Rotterdam, oats; Bahia Blanca, 22s. 6d., United Kingdom-Continent.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Abstracts of Contracts Open.

Aberystwyth, September 2.—For either Deep Cannock or Westminster and the Ruabon Main coal and Newport coal, also coke, for the District Education Committee.

Alverstoke, September 3.—For 85 tons of best quality seaborne coal (doubly screened), and 45 tons best Welsh steam coal, for the Guardians.

Bedford, September 3.—For coal, &c., for the Guardians.

Bexley.—For about 2,000 tons of steam coal for the electricity works.

Bingley, September 5.—For gas coal, for the Urban District Council.

Birmingham, September 11.—For slack, for the Guardians.

Blandford (Dorset), September 7.—For coal and coke, for the Guardians.

Boroughbridge, September 4.—For coal, &c., for the Great Ouseburn Guardians.

Bradford, September 2.—For best gas coal, cobbles, nuts, and cannel, for the Corporation.

Bromsgrove, September 3.—For coal and coke, for the Bromsgrove Secondary School, Stourbridge-road.

Bromsgrove, September 2.—For (1) coal, (2) coke, for the Managers of Bromsgrove and Stoke Prior grouped Council Schools.

Buntingford, September 5.—For the supply of coals, &c., to the Guardians.

Chester.—For Cooksbead coal, for the Tarvin and Whitchurch Sub-committee for Education.

Chester-le-Street, September 3.—For coals, coke, &c., for the Guardians.

Chichester, September 3.—For coke, for the Guardians.

Coseley, September 6.—For coke and best quality thick coal, for the Education Committee.

Douglas, September 9.—For four cargoes, of about 170 tons each, of good steam coal, for the Corporation.

Downham Market, September 5.—For about 25 tons best Silkstone house coals, about 35 tons of Annesley picked hards, Portland picked hards, or Bestwood picked hards, and about 20 tons of coke, for the Guardians.

Dundee, September 2.—For about 20 tons of anthracite chirls, for the Burial Board.

East Woodhay, September 2.—For about 30 tons of Griff New Pit coal, or coal of equal good quality, for the Trustees of the East Woodhay Allotment Coal Charity.

Eccleshall, September 4.—For coal, coke, &c., for the committee of the Standon Boys' Home.

Erith, September 5.—For about 5,500 tons of coal, for the Urban District Council.

Exeter, September 7.—For about 1,000 tons of best screened or unscreened Yorkshire, Durham or North Wales gas coals, for the Devon Gas Association Limited.

Fleetwood, September 7.—For coal and coke, for the Fleetwood Urban District Council.

Gillingham, September 5.—For coal and coke, for the Education Committee.

Godstone, September 10.—For coal, &c., for the Rural District Council.

Goole, September 17.—For coal, for the Education Sub-committee.

Hampton, September 2.—For best Welsh double-screened steam coal, for the Urban District Council.

Ipswich.—For coal and coke, for the Council of Girls' Public Day School Trust.

Kendal, September 5.—For coals (screened), coke and slack, &c., for the Guardians.

Kildwick, September 4.—For the whole or part of 4,000 tons of screened or unscreened gas coal, for the directors of the Kildwick Parish Gas Company.

Leek, September 4.—For coals, slack, coke, for the Guardians.

Leytonstone, N.E., September 12.—For coal and coke, for the West Ham Guardians.

London, September 10-11.—For the supply of coal, coke and gas coal, for the Holborn Guardians.

London, September 19.—For coke, for the Stepney Guardians.

London, September 19.—For coals, coke, &c., for the Guardians of Strand Union.

Manchester, September 4.—For coal, for the Guardians.

Mold, September 2.—For coal and coke, for the Flintshire Education Committee.

Portland, September 4.—For between 800 and 900 tons of large Welsh steam coal, for the Urban District Council.

Richmond (Surrey), September 16.—For coal and coke, &c., for the Guardians.

Rochester, September 3.—For coal, for the Corporation.

Sheerness, September 17.—For about 300 tons of good, large north-country steam coal, free from dust, for the Urban District Council.

Sheffield, September 6.—For coal, &c., for the Guardians.

Sligo, September 4.—For from 2,000 to 4,000 tons of best screened gas coal, for the directors of the Gaslight Company of Sligo.

Southend-on-Sea, September 4.—For coal, for the Corporation.

Stanhope, September 4.—For coal and coke, for the Weardale Guardians.

Stoke-on-Trent, September 9.—For coal, slack and coke, for the Education Committee.

Sunderland, September 2.—For coals, for the Committee of Visitors of the Sunderland Borough Asylum.

Tipton, September 2.—For thick coal and best rough slack (chiefly the latter), for the Tipton Urban District Council Education Committee.

Torquay, September 2.—For 3,500 tons of coal, for the Town Council.

Whitehaven, September 7.—For supply of fuel for ensuing 12 months, for the Whitehaven Education Committee.

Windsor, September 16.—For coal and coke, &c., for the Guardians.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Adelaide (Australia), October 8.—*Rails and Fishplates.*—Tenders will be received by the Chairman of the Supply and Tender Board, Adelaide, South Australia, for 4,286 tons of 80 lb. steel rails and 257¾ tons of steel fishplates. A copy of the specification and form of tender may be seen by British makers at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Bradford, September 17.—*Crane, &c.*—For (*a*) one steam locomotive shunting crane, 35 ft. jib, 4 ft. 8½ in. gauge; (*b*) one four-wheel locomotive, 4 ft. 8½ in. gauge, for the Corporation.

Durban (South Africa), October 2.—*Coal Conveyor.*—The Imperial Trade Correspondent at Durban (Mr. A. D. C. Agnew) reports that tenders will be received by the town clerk, Durban, for a coal-handling plant capable of dealing with 25 tons per hour, for the Durban Corporation.

Edinburgh, September 11.—*Petrol Motor Fire Engines, &c.*—For (*a*) three petrol motor fire engines, fitted with pumps to the plunger type, and (*b*) two 50-horse power petrol motor chassis for fire tenders, for the Corporation.

Felixstowe, September 5.—*Accumulators Extension, &c.*—For extensions to the accumulators and balancer booster, for the Felixstowe and Walton Urban District Council.

Hollingbourne, September 4.—*Boiler, &c.*—For a new Cornish steam boiler and boiler house, for the Guardians.

Hoylake, September 6.—*Motor Refuse Lorries.*—For petrol or steam driven motor-tipping lorries, for the Urban District Council of Hoylake and West Kirby.

London, September 3.—*Bearing Plates.*—For supply of bearing plates to the Secretary of State for India in Council. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W.

London, September 3.—*Steel Rails, &c.*—For the following, for the directors of the Madras and Southern Mahratta Railway Company Limited:—(1) About 4,860 tons steel rails, (2) about 161 tons steel fish-plates, (3) about 64 tons steel coach screws, (4) about 2,110 tons steel sleepers, (5) about 635 tons steel material, in accordance with the specifications, which can be seen at the offices of the company. Mr. Percy A. Cory, 91, York-street, Westminster, S.W.

London, September 25, October 1-22, November 5.—*Switchboards, &c.*—For material as follows, for the Postmaster-General's Department, Commonwealth of Australia, viz., telephone switchboards. Forms, specifications, &c., may be obtained, and sealed patterns inspected, at the Commonwealth Office, 72, Victoria-street, London, S.W.

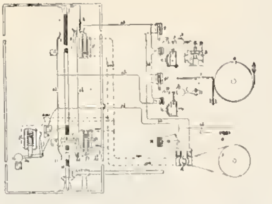
London, September 26.—*Petrol Motor Tip Wagons.*—For one or more (not exceeding four) petrol motor tip wagons, fitted with interchangeable dust and water bodies, for the Westminster City Council.

Tullamore (Ireland), September 2.—*Steam-rolling Plant.*—For a steam-rolling plant, to consist of a compound road roller and scarifier, one living and sleeping van, and one 300-gallon water cart, for the County Council of King's County.

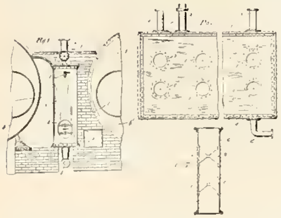
West Hartlepool, September 3.—*Cables, &c.*—For three-core paper-insulated 6,000 volt three-phase high-tension cables, also low-tension rubber cables and wiring, for the Corporation.

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

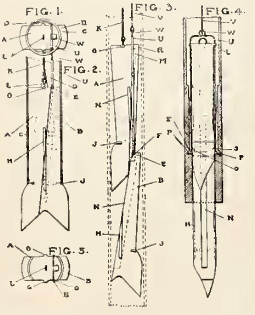
5171 (1912). *Improvements in Means for Preventing Over-winding and Over-speed in Mine Shafts and the like.* H. Hirst, of Crescent House, Moorlands-avenue, Dewsbury, Yorkshire.—This invention relates to means for preventing accidents in colliery and other mine shafts due to over-winding and over-speed of the cages. An apparatus constructed in accordance with the invention comprises:—(1) A small dynamo driven from the engine crank shaft, the excitation for the magnets being supplied from a small storage battery; (2) a mechanically-operated contact maker driven from the crank shaft; (3) an electrically-operated contact maker; (4) suitable solenoid actuated trip devices for causing the closing of the stop valve, and the operating of the brakes, which may be either steam or mechanically actuated; (5) dash-pot devices connected to the stop valve and the brake mechanism. If the voltage rises to a certain predetermined amount, the magnets g and g^1 are energised and draw the fingers d, d^1 into the path of the contact projection e on the nut. This takes place when, owing to failure of the engineman to cut off steam at the proper times, the speed of the winding engine after the cages have passed the positions in the shaft when steam ought to have been shut off, exceeds that which would have resulted had the steam been properly cut off. If at any part of the winding the speed exceeds the maximum speed of normal winding, then the voltage increases still further; and the solenoid l is so adjusted that at a predetermined increase the lever j is moved to make contact with the fixed contact k. The regulating valve of the dash-pot is controlled by the solenoid v, which when energised opens wide the opening through the valve, and allows the stop valve to close quickly. If the engineman fails to shut off steam at the proper moment, the contacts d and d^1 are pulled into the path of the nut b, and the latter makes contact with one or other of them. The current then flows through the solenoids q and q^1, which release the steam valve and brake weight levers, shutting off the steam and putting on the brake. The dash-pots u and u^1 allow the steam valve and brake to come slowly into action and bring the engine gradually to rest, the solenoids v and v^1 not being energised. If, however, the steam is shut off at the proper time, the engine has fallen sufficiently in speed by the time the nut b arrives at d or d^1, so that the current generated is not sufficiently great to enable the solenoids g, g^1 to hold the contacts d, d^1 in the path of the nut b. No contact is therefore made, and the engine comes to rest in the usual manner. If, in being lifted off the fallers, the cage is raised too high, the nut b comes into contact with one or other of the fixed contracts i or i'. The current then flows not only through the solenoids q, q^1, but also through v and v^1, releasing not only the steam valve and the engine brake, but also opening the dash-pot valves, thus allowing the steam valve and the engine brake to act quickly, pulling the engine up dead. If at any time the engine gets up a higher speed than the normal highest speed, the dynamo will generate sufficient current to enable the solenoid l to make contact between j and k. The current will then flow through the solenoids q and q^1, which will act as in the case of the steam not being shut off at the proper place. If it is desired to wind men at a slower speed than that used for winding coal, the resistence R in the dynamo field coil circuit is cut out to such a degree that sufficient current is allowed to pass to cause the dynamo to generate enough current to bring the solenoids g and g' and l into action at a lower speed of the engine than is the case when coal is being wound. (Eight claims.)



6136 (1912). *Improvements in Economisers or Feed Water Heaters and Steam Superheaters for Lancashire and other Boilers.* W. Green, of 380, Main-road, Darnall, Sheffield.—This invention relates to economisers or feed water heaters for Lancashire and other boilers of that type which dispenses with the usual division wall dividing the side flues between two adjacent boilers and which are introduced into the intervening space. A tank or chamber or closed vessel is employed of suitable strength, length, depth, and weight, such dimensions being determined according to the size of the boiler. This closed chamber is adapted to form the division between any two boilers in substitution of the usual brick wall which is removed. The bottom of the economiser chamber is preferably level with the bottom of the side flues, and its height is such that the usual firebrick covers will be supported in position at their proper height. The front end is fitted with a mercury thermometer test tap and manhole. The economiser is fitted with two or more transverse rows of double hollow conoids or other internal transverse passages. These double conoids, which extend from side to side of the said chamber, have their apices closed in the centre where they meet, their expanding mouths opening into the air space of the side flues, thereby permitting the admission and free circulation of the heated gases passing through the side flues into the conical passages thus formed on each side of the said chamber. They are flanged at the mouth, whereby they are riveted to the sides of the tank or chamber. The water circulates through the said tank or chamber in an opposite direction to the flue gases, and becoming heated in its passage leaves by an exit pipe, whence it passes to the boiler feed pump. A pipe leading from the economiser and having its extremity suitably elevated may be open to the atmosphere, so that the economiser will be only subjected to pressure due to the weight of the column of water. The apparatus is also fitted with a blow-off tap and manhole. It may be desirable in some cases to force the feed water into the economiser, in which case the economiser may be made much stronger to resist the extra pressure and fitted with a safety valve. Where the apparatus is to be employed for superheating steam, it is preferable to apply the same to a range of boilers. The chamber would then be used as a steam superheater, steam being fed into the apparatus by the supply pipe, and the exit pipe would be connected to the main steam pipes. The pipe open to the air would be dispensed with. A safety valve, steam pressure gauge, and mercury thermometer would be fitted to serve their respective purposes, and the metal plates of the economiser would be considerably strengthened. Fig. 1 is a front view of two Lancashire boilers (shown detached), in the side flues of which is introduced the improved feed water heater or economiser; fig. 2 is a side elevation; fig. 3 is a cross section of said economiser. (Two claims.)

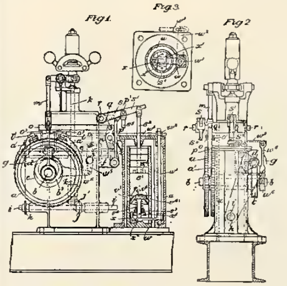


5458 (1912). *Improvements in and relating to Well-boring Rotary Bits.* C. W. Dodge, of Taft, Kern County, California, U.S.A.—This invention relates to well-boring apparatus, and has for its object to provide an improved form of well-boring bit of the kind which may be readily removed without the necessity of withdrawing the casing from the well.



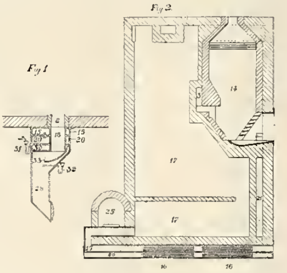
According to the invention, the bit is formed in sections, which, in the operative position are prevented from being withdrawn from the casing as a whole but which, for the purpose of insertion into, or effecting the withdrawal from, the casing, are capable of relative longitudinal movement, and are connected in such manner that they may travel in tandem. Fig. 1 is a plan view of the casing and bit; fig. 2 is an elevation of the bit, with the casing in section; fig. 3 shows the sections of the bit in the positions they occupy in passing through the casing; fig. 4 shows one section of the bit lowered to its extreme position in the casing and the other section raised, the casing being in section; fig. 5 is a plan view of bit. (Six claims.)

7833 (1912). *Improvements in Controlling Gear for Winding and Hauling Engines.* J. W. Melling, of 82, Swinley-road, Wigan, Lancashire.—This invention relates to improvements in controlling gear for winding and hauling engines of the type for which Letters Patent No. 13152 of 1910 were obtained. The present improvements consist of a simpler and cheaper form of controlling gear constituting improved automatic safety appliances for controlling the speed of the engine, for shutting off steam and putting on the brake in the event of the speed becoming excessive during the wind, for insuring a prompt closing of the steam admission valve and effective application of the full power of the brakes as the cage or its equivalent is nearing the end of its traverse or wind in order to bring the same to a dead stop in the event of the ordinary predetermined limits of its traverse having been exceeded owing to the engineman having failed to do his duty. Also in an improved and simplified construction of the extra or emergency device that acts very rapidly to shut off the steam and put on the brakes if by any means the beforementioned arrangement has not effectually brought the engine to a stand, or if the engineman has started the engine in the wrong direction. Fig. 1 is a side elevation, fig. 2 an end elevation, and fig. 3 a plan of the improved controlling gear for winding and hauling engines. When, owing to increase of speed, the governor lowers the catch bars o and o^1 so that the teeth or projections o^2 o^3, come into contact with one of the teeth on the rotating rack wheels a or a^1, the bar o or o^1 being coupled to the double lever n draws or thrusts it, and this lever n being in contact near both ends with the trip lever p, releases it, and thereby closes the stop valve and applies the brake. This is effected through the trip lever p being pivoted at one end and fitted at the other with a tripping piece p^1, which is disengaged from the other tripping lever q that is keyed upon a shaft r, upon which are also mounted two levers s and s^1, of which the lever s is coupled to a rod s^6 in connection with the stop valve and also the brake. The lever s^1 is the resistance lever, chiefly to act in the earlier part of the wind, and is connected with the plunger rod s^2 of a dashpot s^3 which is surrounded by the tank u containing water or other liquid. In the dashpot s^3 is a plunger s^4 that may either be loaded by springs

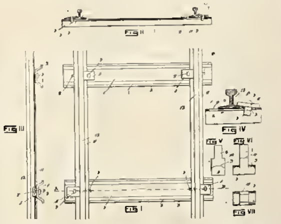


or by deadweights as shown, and which works in the space between it and a false or movable bottom v. The movable bottom v is held in position by its spindle resting on a lever w that fits easily between the spindle and a facing on the bottom of the dashpot s^3, and the movable bottom v is also held up by a weak spring v^5 that fits between it and a crossbar v^6. In the movable bottom v are two recesses v^1 and v^2 for the purpose of allowing the liquid, when the plunger is tripped off, to pass from underneath it and through the ports v^3 and v^4 into the tank u and so circulate freely. The limited area of the recesses v^1 and v^3 prevents the drop of the weighted plunger from being too sudden; but when the end of the wind or haul is approaching and a more rapid action is desirable, the lever w which fits under the spindle of the movable bottom v is withdrawn from underneath the spindle and allows the movable bottom v to descend. The withdrawal of the lever w from beneath the movable bottom v is effected by the shaft w^1, on which is also mounted the lever w^2 coupled by a looped rod w^3 that is actuated through a double lever w^5 by means of an eccentric rod w^6 fitted on an eccentric b^1 on the shaft b. When the movable bottom v is forced down by the pressure of the liquid between it and the plunger s^4 and against the resistance of the weak spring v^5, the catch x is forced by the spring slips over the edge of the nut x^1 and holds the movable bottom v down until the tripping levers p and q have again been connected, then the catch x can be forced back by the shaped projection on the end of the lever w and the nut x^1 released so that the spring v^5 can raise the bottom v and the lever w be passed underneath the spindle. This movement of the lever w is permitted by the looped connecting rod w^3, the slot or loop in which is so long as to allow all the movement of the eccentric b^1 on the shaft to be lost in traversing it except that which is amply sufficient when near the end of the wind to withdraw the lever w from under the spindle of the movable bottom v, and so allow of a rapid closing of the stop valve and application of the brake. (Three claims.)

11209 (1912). *Improved Means for Utilising the Residual Heat of Coke Produced in Vertical Gas Retorts.* Robert Dempster and Sons Limited, of Rose Mount Ironworks, Elland, Yorkshire, and H. J. Toogood, of The Poplars, Elland.—This invention relates to vertical gas retorts of the type known as "continuous" or "semi-continuous," and its principal objects are to cool the coke and to utilise as fully as possible the residual heat therein. After the lower portion of the charge has been fully carbonised, the resultant coke is of course at a high temperature—in fact, much too hot to be dealt with by automatic extracting mechanism, and therefore requires to be cooled. According to this invention this residual heat is recovered from the coke and returned to the setting. For this purpose flues are arranged enclosing the retort extension containing such coke, through which flues is circulated primary air, and a water drip may also be arranged in connection with the said flues. The water being evaporated, the air is thus caused to contain steam in definite proportions; the air and steam being thoroughly mixed and pre-heated are led to the producer. The cooling effect on the coke thus obtained, even considering the latent heat in the water so vaporised, might not be sufficient to extract the heat therefrom, especially in the centre of the mass; there may therefore be employed a U tube or other convenient means for supplying a water drip on the centre of the coke; the steam thus raised passes up through the charge and produces an addition of water gas. An auxiliary flue or flues may also be provided for the partial pre-heating of the secondary air before passing to the regenerator, and where the secondary air is so heated it is passed in the opposite direction to the primary air, so as to cool each retort extension to the same degree. The above flues will extract as much heat as can be profitably utilised in the setting, but to further cool the coke and cause it to contract, so as to facilitate its handling by the discharging mechanism, we may employ a third chamber, connected to the main flue and provided with a damper. By these means cold air would be circulated and the discharging mechanism assisted in doing its work. Fig. 1 is a section through the mouthpiece of a retort and fig. 2 is a section through the producer of a bench of retorts, illustrating by way of example means for carrying out the invention. (Three claims.)

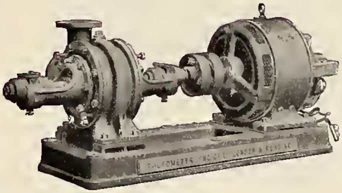


28113 (1911). *Improvements in and relating to Sleepers for Mine Rails.* D. Leyshon, 21, Berw-road, Llwynypia, Glamorganshire, and T. Leyshon, School-road, Llwynypia, Glamorganshire.—This invention concerns improvements in and relating to sleepers for mine rails; and, more particularly, to an improved method of clamping mine rails to rolled steel or iron sleepers of inverted channel section with inclined sides and horizontal longitudinal base flanges thereto. Fig. 1 represents a plan of two consecutive sleepers formed according to the invention; fig. 2 represents a section through A, B, fig. 1; fig. 3 represents an end elevation of the sleepers projected from fig. 1; fig. 4 is a detailed section through the bottom right-hand corner of fig. 1 along A, B; fig. 5 is a side elevation of a bolt before



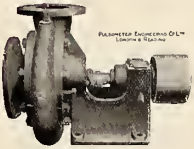
PUMPS

FOR ALL PURPOSES.

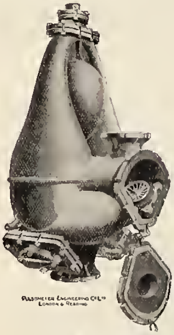


HIGH LIFT CENTRIFUGAL PUMPS.
TYPE C.
For Lifts up to 150 ft.
List No. 522.

CENTRIFUGAL PUMPS.
Volute Type. Belt Driven.
For Lifts up to 80 ft.
List No. 523.

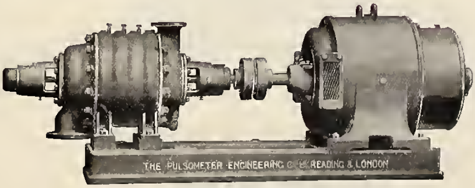


TYPE A.
CENTRIFUGAL PUMPS.
For Lifts up to 40 ft.
List No. 524.



"PULSOMETER"
STEAM PUMP.
List No. 525

TYPE A.
CENTRIFUGAL PUMPS
with Fast and Loose Pulleys.
List No. 524.



TURBINE PUMPS.
Motor or Belt Driven.
For Lifts up to 1,200 ft.
List No. 527.

Pulsometer Engineering Co. Ltd.

Offices—11, Tothill Street,
LONDON, S.W.

Nine Elms Iron Works,
READING.

insertion through the clamping plate; fig. 6 is an end elevation of the bolt; fig. 7 is a plan of the bolt. The clamping plates of alternate sleepers are first slipped to the outer ends of the slots as shown in the bottom sleeper fig. 1. The rails are then laid between the clamping plates, the outer flanges 11 of the rails being clamped by the inside portions of the clamping plates. Sleepers are then laid obliquely between those first laid with clamping plates slipped to the inner ends of the slots to overlap the inner base flanges 11 of the rails. The latter sleepers are then hammered straight to tighten the system. The sleepers are uniform in size, shape, and mechanical structure, the slots and form of the plate 5 allowing the clamps to be used for inside or outside. Rails have previously been secured to sleepers by clamping plates bent at an obtuse angle and secured by fixed rivets, the rails being held by the clamps either inside or outside on alternate sleepers. The centrally bent clamping plate, the position of which is adjustable to either end of the slot, permits, according to the invention, of uniformly-made sleepers being used either inside or outside. (One claim.)

29349 (1911). *Improvements in and relating to Chucks or like Tool Holders for Boring and Drilling Machines and the like.* H. P. Swinburne, of 89, James-street, Bridgeton, Glasgow.—This invention has reference to and comprises improvements in and relating to chucks or like tool holders for boring and drilling machines and the like, and particularly relates to that type of chuck or tool holder which consists of a cylindrical and partly conical sleeve within which is fitted paws or wedges (usually three in number) which are tightened or pressed on to the shank of drill or other tool by the rotation of said sleeve. This invention consists in the construction and combination of the various parts or elements forming the chuck, the principal features of which are that the driving block or stud is secured into the plug on which the cylindrical outer sleeve rotates; said plug being formed with a recess and a collar, flange or head for engagement by the upper ends of the paws or wedges, which are cylindrical or round in cross section, and each paw fits into a groove or recess, similarly shaped, formed at an angle to the longitudinal axis and in the body of the cylindrical and partly conical sleeve, and the aforesaid stud is also formed with grooves or notches for engagement by the projections on the ends of the spindle and tool shank. Fig. 1 is a sectional elevation of the improved chuck or tool holder for boring and drilling machines and the like; fig. 2 is a sectional plan view taken on the line 2—2 of fig. 1; fig. 3 is an inverted plan view of fig. 1. (Five claims.)

Fig. 1.

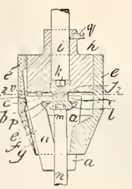


Fig. 2.

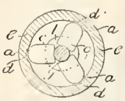
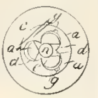


Fig. 3.



The Coal Strike and Gas Profits.—Presiding at the half-yearly meeting of the Commercial Gas Company, Mr. W. G. Bradshaw said that their profit was within £1,400 of the highest in the company's history, and £6,500 more than in the corresponding period of last year. This result was achieved in spite of the fact that they had experienced two strikes in the half-year—the coal strike, which cut off the supply of their raw material for six weeks, and the transport strike, which hampered their operations and hindered the trade of their district for 10 weeks. He was glad, in one sense, that they had had the experience of the coal strike, for it proved the strength of the company and its ability to meet and overcome difficulties. Everything possible was done in the six weeks preceding the stoppage of work at the mines to increase their coal stocks, and they were materially helped in obtaining quick deliveries by having their own ships. He understood that the last cargo of coal to enter the Thames, and the first but one to come into the river after the strike was over, was carried in one of their steamers to their works. At the termination of the dispute the company was still in a strong position, and could have continued its supply of gas for a considerable time. That this was so was an immense boon to the poor people of their district, as well as to various factories and workshops in the East End. They had recently made their coal contracts for the current year, but at greatly increased prices. Very much higher prices would also have had to be paid for freights, but for the fact that they had their own ships. If it had not been for this extra expense in the matter of coal, he had no doubt that it would have been possible to reduce the price of the company's gas.

GOVERNMENT PUBLICATIONS.

⁂ Any of the following publications may be obtained on application to this office at the price named post free.

Consular Reports: Persia, 4d.; Gothenburg, 5½d.; Portland (Oregon), 7½d.; Finances of Denmark, 1½d.; Society Islands, 1½d.; New Orleans, 2d.; Shanghai, 2½d.; Odessa, 9½d.; Savannah, 6½d.; Yokohama, 5½d.; Hakodate, 5½d.; Wuhu, 3½d.

Board of Trade Labour Gazette, August, 2½d.

Colonial Report: Gambia, 8½d.; Falkland Islands, 2d.

Statutory Rules and Orders: MINES, *re* TIME AND PLACES *re* HOLDING EXAMINATIONS, 1½d.; Workmen's Compensation Rules, 1912, No. 1199, 1½d.; ditto, Explanatory Memo, No. 1199, 1½d.; Explosives Order *re* Compressed Acetylene Contained in a Porous Substance, No. 1200, 1½d.

Annual Statement of Trade, Vol. 2, 3s. 11d.

Draft Regulations *re* Contributions to be Paid in Respect of Outworkers, 2d.

Explosives Summary No. IV.: Stores for Gunpowder, 1½d.; Sanatorium Benefit, Order, 1½d.

General Report: Accidents on Railways, 1911, 3d.

Registry of Ships, July 1912, 3½d.

METALLIFEROUS MINES COMMISSION: EVIDENCE—30th and 31st DAYS, 1s. 0½d. each.

Trade Board Regulations, No. 1153, 1½d.

Return of British and Foreign Ships, 1911-12, 1½d.

NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

18924. Means for promoting combustion in steam-boiler furnaces. A. Fullarton.
18932. Regenerators for respiratory apparatus for use in unbreathable atmospheres. D. J. Lewis.
18937. Device for coupling up and uncoupling the three-link railway stock, coal and mineral mine wagons. G. H. Eaton.
18951. System of fuel injection for Diesel engines. G. S. Bent.
18995. Fuel economisers for fire-grates. A. Seagrave.
19008. Catch for securing the doors of railway wagons and the like. Birmingham Railway Carriage and Wagon Company Limited and E. O. Hill.
19025. Centrifugal air-pumps, compressors, and the like. E. S. G. Rees.
19026. Quadruple-acting horizontal suction pump. F. Thould and C. G. G. Hutchinson.
19045. Conveyor belt for pulverised materials. F. Garelly.
19047. Ventilation of mines and the like. W. H. Mansell.
19097. Retort furnaces or the like having upwardly-tapering vertical retorts. Stettiner Chamotte-Fabrik Akt.-Ges. vorm Didier.
19102. Means for telephonic communication with mine cages. J. H. Reineke.
19103. Means for telephonic and telegraphic communication with mine cages. J. H. Reineke.
19138. Apparatus for compressing air or gas. W. M. Melmore.
19165. Centrifugal pumping apparatus. W. S. Simpson.
19172 Electric furnaces. G. Messip.
19174. Miners' electric lamps. O. Oldham.
19222. Friction clutches. W. Green.
19223. Driving-wheels for conveyors. W. G. Read.
19224. Means for facilitating the transfer by conveyors of material stored in bulk. W. G. Read.
19230. Turbine pumps. B. E. D. Kilburn.
19277. Mechanism for pumping or compressing. A. Reis.
19329. Multi-stage gas-compressor. Pokorny and Wittekind Maschinenbau Akt.-Ges.
19381. Explosives. O. Silberrad.
19421. Compressor or air pump. H. Burghard.
19424. Valve apparatus for percussive rock drills and the tools. G. Rayner.
19461. Cementation of metals. G. Sirovich.

Complete Specifications Accepted.

To be published on September 12.

1911.

18464. Operating gear for internal combustion pumps and compressors. Humphrey, Rusdell and North.
18485. Rope pulleys. Lord.
18488. Treatment of ores. Dekker.
18624. Device for the prevention of overspeeding and overwinding colliery winding engines, hoists and the like. Teale.
18931. Steam superheaters. Stirling.
19806. High temperature furnace. Goven.
20279. Driving pulleys for ropes. Atkins and Adams.
23262. Firebars for furnaces. Hill.
24298. Copper alloy and process for manufacturing the same. Pickering.

1912.

282. Cupolas. Barnes.
1492. Means for granulating or agglomerating pulverulent material. Kemball and Kemball.
4941. Apparatus for operating the stop mechanism of colliery winding engines. Shrigley.
10442. Lime cartridges for breaking down coal, rock and other minerals. Storey and Parkinson.
11210. Means for discharging vertical gas retorts. Robert Dempster and Sons Limited and Toogood.
11312. Air compressors. Milne, McCracken and Graham.

Complete Specifications open to Public Inspection before Acceptance.

1912.

16440. Method of and apparatus for preventing the spreading and effect of coaldust and firedamp explosions. Kahler and Junker.
17748. Coke oven doors. Koppers.
18148. Skid furnaces adapted for use with blastfurnace gas. Poetter Ges.

PUBLICATIONS RECEIVED.

National Insurance Questions and Answers. By Gilbert Stone, B.A., LL.D. London: Butterworth and Co. Price 1s. net.

[Deals with the Act in a form that will commend itself to many.]

The Constituents of Coal Soluble in Phenol. B. J. C. W. Frazer and E. J. Hoffman. Washington: United States Bureau of Mines (Technical Paper 5).

[In investigating the nature of the chemical compounds forming coal, two distinct methods of procedure exist, *i.e.*, (1) the conversion of the coal substance into recognisable derivatives, and (2) extraction by means of solvents, and the identification of the constituents thus separated. This memoir is a detailed study of the phenol-soluble constituents of a non-coking bituminous coal from Zeigler, Franklin County, Illinois. The authors believe that some of the substances isolated very closely approach pure compounds, but the lack of substance for study militated against a positive expression of opinion. Some appear to be almost pure hydrocarbons, containing small quantities of oxygenated compounds. A second investigation will now be carried out with larger quantities of coal, and using pyridine as a solvent.]

The Status of the Gas Producer and of the Internal Combustion Engine in the Utilisation of Fuels. By Robert Heywood Fernald. Washington: Government Printing Office. United States Bureau of Mines (Technical Paper 9).

[This summarises the facts and conclusions already presented in previous bulletins, dealing with the tests carried out at St. Louis, Norfolk, and Pittsburg, and is intended mainly for the non-technical reader to whom this branch of conservation may directly appeal. It is stated that nearly a hundred important gas-power problems are at present on file at the Bureau of Mines under the head of "proposed investigations."]

The Factor of Safety in Mine Electrical Installations. By H. H. Clerk. Washington: United States Bureau of Mines (Technical Paper 19).

[This is one of a series dealing with the use of electricity and the prevention of electrical accidents in mines. It deals, in order, with the classification of accidents, fires, explosions, conditions surrounding electrical installations and the prevention of accidents.]

The Slagging Type of Gas Producer. Carl D. Smith. Washington: United States Bureau of Mines (Technical Paper 20).

[Gives the results obtained from an investigation of the value of this type of producer in the utilisation of high-ash fuels. Tests were made with coke, using limestone as a flux, for intermittent and continuous runs up to 100 hours, and the results obtained give promise that such fuels may be successfully utilised in this type of producer.]

Government Coal Purchases under Specifications with Analyses for the Fiscal Year 1909-10. By George S. Pope. Washington: United States Bureau of Mines (Bulletin 41).

[This bulletin is the fourth of a series showing the results of the purchase of coal by the United States Government under specifications. It is stated that the purchase of coal on the dealer's statement as to quality or the reputation of the coal is gradually being discontinued, and large coal consumers are beginning to appreciate more and more the importance of the cost of power as a factor in the cost of producing a finished article. At present 55 per cent. of the large cities in America buy their coal in this manner. This paper explains in general terms the methods that the Government have found most satisfactory for the purchase of a large part of its coal supply, including the consideration of bids, the awarding of contracts, and the analysing of samples on which price corrections are based.]

"Annales des Mines de Belgique" (Tome 17, No. 3); "Trade of the Union of South Africa, Southern and North-West Rhodesia, and British South Africa for the Month of June"; "Transactions of the Manchester Geological and Mining Society" (Vol. 32, Parts 17-19); "Bulletin de la Société d'Encouragement pour l'Industrie Nationale" (Tome 118, No. 1); "List of Members of the Iron and Steel Institute" (price 1s.).

Grimsby Coal Exports.—The following is the official return of the quantities of coal exported from Grimsby during the week ended August 23, 1912, shows a total of 22,875 tons to foreign ports and 490 tons coastwise. The details, according to the official returns, are:—To Westervik, 464 tons; Ysted, 1,788; Antwerp, 715; Christiania, 2,725; Horsor, 1,021; Hamburg, 873; Skien, 94; Reykjavik, 988; Pernau, 1,290; Riga, 2,143; Aalborg, 2,118; Solvesborg, 1,100; Gothenburg, 946; Gefle, 2,924; Malmo, 268; Helmsted, 154; Bornholm, 630; Holmestrand, 694; Xiaris, 610; Restad, 272; and Dieppe, 1,068. Coastwise shipments: Dover, 310; and Fowey, 180 tons. Coal exported from Immingham Dock (Grimsby) during the week totalled 21,096 tons. Of this Hamburg took 8,065 tons; Cronstadt, 5,185; Genoa, 3,005; Trelleborg, 2,832; Ahus, 1,373; and Pernau, 1,136 tons.

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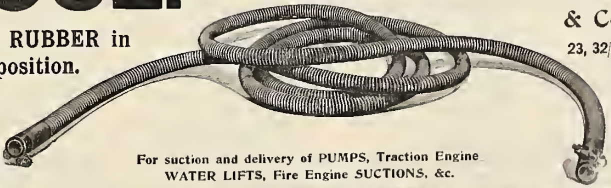

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Purchasers' Guide to Advertisers' Specialities.

Further information can be obtained on reference to the Weekly Alphabetical Index to Advertisers.

Acetylene Lamps
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Accumulators
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent

Acid Plant
Daglish, Robert, and Co. Ld., St. Helens, Lancs.

Air Analysis Apparatus
Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

Air Compressors
Bailey, W. H., and Co. Ld., Salford, Manchester
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co., St. Helens, Lancashire
Davis, John, and Son (Derby) Ld., Derby
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
International Channelling Machines Ld., Sheffield
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Mining Engineering Co. Ld., (The), Sheffield
Nuneaton Engineering Co. Ld., Nuneaton
Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., F. Department, Ipswich
Robey and Co. Ld., Globe Works, Lincoln
United States Metallic Packing Co. Ld., Bradford
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Air Pipes
Allen, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Son, Thompson-street, Bilston
British Mannesmann Tube Co. Ld., London Wall
Lewis, William, and Son, Bilston
Mining Engineering Co. Ld., Sheffield
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C., Ld., Dudley

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Bailey, W. H., and Co. Ld., Salford, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Wood, John, and Sons Ld., Wigan

Alternators
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Mavor & Coulson Ld., 47, Broad-street, Glasgow

Ambulance Stretchers
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley

Anchors
Wright, Joseph, and Co., Tipton

Anemometers
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Humble, Stephen, 9, Victoria-st., London, S.W.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Angles and Sections (Steel)
Firth, Wm., Ld., Water-lane, Leeds

Anthracite Breaking, Sizing and Washing Plant
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Sheppard and Sons Ld., Bridgend
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Anti-Corrosive Compositions
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

Anti-Friction Metal
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

Anvils
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Asbestos
Asbestos and General Paint Co. Ld., Birmingham

Axle Greasers
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Barrows (Ore)
Bagnall, W. G., Ld., Stafford
Haslam and Schontheil Ld., Cardiff
Heenan and Froude Ld., Worcester
Theedam, E. C., Ld., Dudley

Bars (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mining Engineering Co. Ld., Sheffield

Bars (Screen)
Firth, Wm., Ld., Water-lane, Leeds
Head, Wrightson and Co. Ld., Stockton-on-Tees
Renton, B. M., and Co., Sheffield
Wood, John, and Sons Ld., Wigan

Bearings
Bridge, David, & Co. Ld., Castleton, Manchester
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham

Bellows
Hardy Patent Pick Co. Ld., Sheffield
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Bells (Signal)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Humble, Stephen, 9, Victoria-st., London, S.W.
Theedam, E. C., Ld., Dudley

Belt Fasteners
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Belt Food

Belting
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Frost, Albert, and Co., Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Sutcliffe, R., Horbury, near Wakefield
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Belts (Chain)
Ewart's Chain Co., Derby, England
Heenan and Froude Ld., Worcester
Wright, Joseph, and Co., Tipton

Benzol Plants
Coke Oven Construction Co. Ld., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Bitumastic Solution
Wailes, Dove & Co., Ld., Newcastle-on-Tyne

Blasting Apparatus
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Reavell and Co. Ld., Ipswich
Theedam, E. C., Ld., Dudley

Blowers
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
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Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

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Asbestos and General Paint Co. Ld., Birmingham
Kenyon, W., & Sons Ld., Dukinfield, Manchester

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Tangyes Ld., Cornwall Works, Birmingham

Boiler Merchants
Stringer, John, and Son, Blackburn

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Hopkinson, J., and Co. Ld., Huddersfield
Stringer, John, and Son, Dept. 11, Blackburn
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Yorkshire Boiler Co. Ld., Bradford

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Jardine, John, Deering-street, Nottingham
Mining Engineering Co. Ld. (The), Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, & Sons Ld., Darlington
Theedam, E. C., Ld., Dudley
Ward, Thos. W., Ld., Albion Works, Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Books on Mining
Colliery Guardian Co. Ld., 30 & 31, Furnival-st., Holborn, E.C.
Griffin, Charles, and Co. Ld., Exeter-st., Strand
South Wales Institute of Engineers, Cardiff
Southern, T. A., Universal Mining School, Cardiff

Boring Contractors
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Entreprise Générale de Fonçage de Puits, 5, Rue de Suréne, Paris
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New Calyx Drill and Boring Co. Ld., Millwall, E.
Thomson Bros. (Dunfermline) Ld., Glasgow
Trefor Boring and Mining Co. Ld., 41, rue Royale Brussels
Vivian's Boring & Exploration Co. Ld., Parkside, Cleator Moor, Cumberland

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Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln
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Railway and General Engineering Co. Ld., Notts
Russell, John, and Co. Ld., Alma Works, Walsall

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Davis, John, and Son (Derby) Ld., Derby
Evans, D. Llewellin, 120, Bute-street, Cardiff
Meritz, George, Ld., Clayton, Manchester

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Brickmaking Machinery
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Isca Foundry Co., Newport, Mon.
Norton's (Tividale) Ld., Tipton

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Bradley & Craven Ld., Wakefield
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Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

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Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

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Chorley Railway Wagon Co. Ld., Chorley, Lancs.

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Chorley Railway Wagon Co. Ld., Chorley, Lancs.

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Koppers, Coke Oven & Bye-Product Co., Sheffield
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Haslam and Schontheil Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

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Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
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Norton's (Tividale) Ld., Tipton
Ormerod, Edward, Atherton, near Manchester
Thornewill and Warham Ld., Burton-on-Trent
Tickle Bros., Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

"Camel Hair" Belting
Reddaway, F., & Co. Ld., Pendleton, Manchester

Canvas Fire Hose
Jacobson, Rd., 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester

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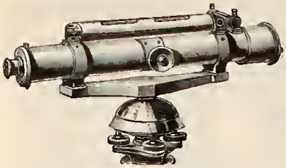

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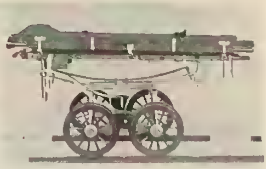

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Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Jacobson, Richard, 70, Shoe-lane, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gear (Special for Motor Lorries Cars &c.)
Brown, David, & Sons (Hudd.) Ld., Huddersfield

Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroën, Andre, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Nuneaton Engineering Co. Ld., Nuneaton.
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Rods Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, R., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan

Heapsteads—continued
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Hoists
Bleichert, A., and Co., 99-100, Palmerston House Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Hooks or Links (Safety)
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Harvey, G. A., and Co., Lampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

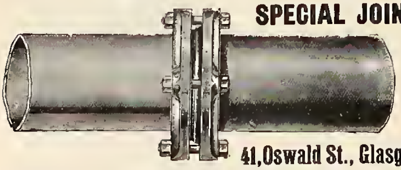
Hydraulic Jacks
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Ryland-street Works, Birmingham

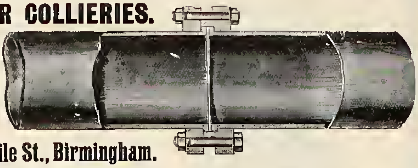
Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hygrometers
Davis, John, and Son (Derby) Ld., Derby

STEWARTS AND LLOYDS LTD.
Wrought Iron and Steel Tubes & Fittings.
SPECIAL JOINT FOR COLLIERIES.



THE "ALBION" LOOSE FLANGE JOINT.



41, Oswald St., Glasgow. Nile St., Birmingham.

These Tubes are specially suitable for use in Mines, being both light and strong; Joints are easily connected, and a Tube can be removed without disturbing the run.

See page Advertisement July 26 issue.

Purchasers' Guide to Advertisers' Specialities—(continued).

Incline Rollers
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Beddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Hyland-street Works, Birmingham

Jointing Cement
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

Jointing (Sheet)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Joists (Rolled Steel)
Heenan and Froude Ld., Worcester
Renton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Keps (for Winding Cages)
Benthaus, D., 45, Bank-street, Sheffield
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Lamp Cleaning Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Gauze Brushes
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Glasses
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Oil Filling Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Re-Lighting Apparatus (Underground)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Arc)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Lamps (Electric)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

Lamps (Electric Safety)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Rd., Ld., Belvedere Works, Belvedere, Kent
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Miners' Safety)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Outdoor)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

Lathes
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

Leather Appliances

Lessons by Post
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

Lifting and Hoisting Tackle
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Renton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Hyland-street Works, Birmingham

Lightning Conductors
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Theedam, E. C., Ld., Dudley

Locknut Washers
Renton, B. M., and Co., Sheffield

Loose Collars
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster, S.W.

Lubricators
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Machinery (Second-hand)
Bute Works Supply Co. Ld., Cardiff
Foot, H. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Renton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

Machine Tools
Foot, H. G., & Co., 11, Queen Victoria-street, E.C.
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

Mathematical Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mechanical Stokers
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

Metal Perforators
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 52, Victoria-street, S.W.

Metallic Packing
United States Metallic Packing Co. Ld., Soho Works, Bradford

Meteorological Instruments
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mills (Grinding)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

Mining Dials
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mining Machinery
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Mining Tools
Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

Motors
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Motors—continued.
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

Motor Starters
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Motor Vans and Wagons
Avonside Engine Co. Ld., Bristol
Foot, H. G., & Co., 11, Queen Victoria-street, E.C.

Nails, Spikes, &c.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Frost, Albert, and Co., Howard street, Sheffield
Renton, B. M., and Co., Midland Works, Sheffield

Office Furniture and Appliances
Glover, M., and Co., Holbeck-lane, Leeds
Thornton, A. G., Ld., King-st. West, Manchester

Oil Bottles
Baker, John, and Son, Bilston, Staffs
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'gham

Oil Cabinets
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Switches
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Oils and Lubricants
Ackroyd and Best Ld., Morley, nr. Leeds
Asbestos and General Paint Co. Ld., Birmingham
Gaunt and Hickman, Oil Works, Wolverhampton
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., & Co. Ld., 23, Southwark-st., E.C.

Overhead Travellers
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Spencer and Co. Ld., Melksham, Wilts
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

Overwinding Gear
Barclay, Andrew, Sons and Co. Ld., Kilmarnock.
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Oxygen Manufacturers
British Oxygen Co. Ld., Elverton-st., Westminster
Knowles Oxygen Co. Ld., Wolverhampton

Packing (Engine)
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Green and Boulding Ld., London, E.C.
Greene, Tweed and Co., Westminster
Lancaster and Tonge Ld., Pendleton, Manchester
Beddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Paint
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Kalbitum Paint Co. Ld., Belvedere, Kent
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

Paint (Fireproof)
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent

Patent Agents
Harris & Mills, 34 & 35, High Holborn, London
Bedford, H. H., Son, and Squire, Sheffield

Pedestals
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham

Perforated Plates
Barns, W., & Son, Queensland-rd., Holloway, N.
Firth, William, Ld., Leeds
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Norton's (Tividale) Ld., Tipton
Theedam, E. C., Ld., Dudley

Picks and Shovels
Baker, John, and Son, Bilston, Staffs
Fell, C. A., Dronfield, near Sheffield
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Theedam, E. C., Ld., Dudley

Pinions
Cort, Arthur & Co., 303½, Camberwell-rd., London

Pinions (Raw Hide and Paper)
Bridge, David, & Co. Ld., Castleton, Manchester
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan

Pipe Joint Paste
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Pipes (Steam and Water)
British Mannesmann Tube Co. Ld., London Wall
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Isca Foundry Co., Newport, Mon.
Lewis, Edwin, and Sons, Wolverhampton
Pulsometer Engineering Co. Ld., Reading
Russell, John, & Co. Ld., Alma Tube Wks., Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Nile-st., Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

Pistons
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

Piston Springs
Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

Pit Props (Steel)
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Bute Works Supply Co. Ld., Bute Docks, Cardiff
Firth, William, Ld., Leeds
Heenan & Froude Ld., Worcester
Henderson and Glass, Liverpool
Lewis, Edwin, and Sons, Wolverhampton
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Spencer, John, Ld., Globe Tube Works, Wednesbury
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton

Pit Props (Wood)
Baird, J. W., and Co., West Hartlepool
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Oebeck and Co., Newcastle-on-Tyne

Pit Prop Withdrawers
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Spencer, Matthias, and Sons, Sheffield

Pit Water Gauges.
John Davis & Son (Derby) Ld., Derby

Planing Machinery and Appliances (Wood)
Glover, M., and Co., Holbeck-lane, Leeds

Plates for Colliery Notices
Davis, John, and Son (Derby) Ld., Derby
Railway and General Engineering Co. Ld., Notts
Theedam, E. C., Ld., Dudley

Plates (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Stewarts & Lloyds Ld., Birmingham & Glasgow
Stringer, John, and Son, Dept. 11, Blackburn

Points and Crossings
Bagnall, W. G., Ld., Stafford
Firth, William, Ld., Leeds
Heenan & Froude Ld., Worcester
Isca Foundry Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Ld., Albion Works, Sheffield

Portable Railways
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington

Preparation for Exams.
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Mining School, Porth, Glam.

Preservative (for Plant)
Kalbitum Paint Co. Ld., Belvedere Works, Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Publications
Colliery Guardian Co. Ld., 30 & 31, Furnival-st., Holborn, London, E.C.
Griffin, Charles, and Co. Ld., London, W.C.
Southern, T. A., Universal Mining School, Cardiff

Pulley Blocks
Deutsche Maschinenfabrik A.G., Duisburg Germany
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Hyland-street Works, Birmingham

Pulleys (Haulage and Shaft)
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Frost, Albert, and Co., Sheffield
Humble, Stephen, 9, Victoria-st., London, S.W.
Jardine, John, Deering-street, Nottingham
Llewellyn and Cubitt Ld., Pentre, R.S.O. Glam.
Spencer and Co. Ld., Melksham, Wilts
Thompson and Southwick Ld., Tamworth
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Pulleys (Pit-Head)
Bever, Dorling and Co. Ld., Bradford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Head, Wrightson and Co. Ld., Stockton-on-Tees
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Spencer and Co. Ld., Melksham, Wilts
Thompson and Co., Wigan
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Pump Buckets and Strips
Cort, Arthur, and Co., Camberwell, London
Daglish, Robert, and Co. Ld., St. Helens, Lancs

Pump (Packing)
Greene, Tweed and Co., Westminster
United States Metallic Packing Co. Ld., Soho Works, Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Pumps and Pumping Machinery
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Cameron, John, Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, John, and Son (Derby) Ld., Derby
Evans, Joseph, & Sons (Wol. Ld.) Wolverhampton

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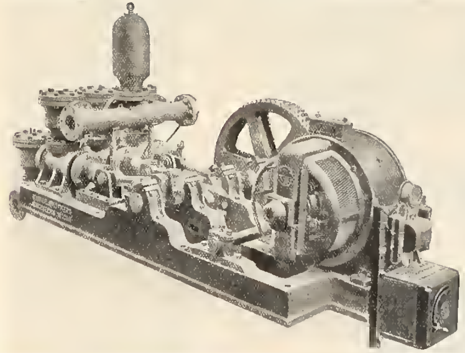

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Purchasers' Guide to Advertisers' Specialities—(continued).

PUMPS AND PUMPING MACHINERY—*continued.*

Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Isca Foundry & Engineering Co., Newport, Mon.
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, H.S.O., Glam.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co. Ld., West Gorton, Manchester
Phillips, C. D., Newport, Mon.
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Willcox, W. H., & Co. Ld., 23, Southwark st., S.E.
Wood, John, & Sons Ld., Brook Foundry, Wigan

UM (TURBINE)

British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Tickle Brothers, Vulcan Ironworks, Wigan

PUNCHING BEARS

Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street, Birmingham

RAIL BENDERS

Deutsche Maschinenfabrik A.G., Duisburg, Germany
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley

RAIL SAWING MACHINES

Deutsche Maschinenfabrik A.G., Duisburg, Germany
Youngs, Hyland-street Works, Birmingham

RAILS (IRON AND STEEL)

Bagnall, W. G., Ld., Stafford
Bute Works Supply Co. Ld., Cardiff
Firth, William, Ld., Leeds
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

RAILWAY CARRIAGES AND WAGONS

Allan, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
Bristol and South Wales Railway Wagon Co. Ld., Bristol
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester
Lancashire and Yorks. Wagon Co. Ld., Heywood
Lincoln Wagon and Engine Co. Ld., Lincoln
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld. Midland Works Birmingham
Moy, Thomas, Ld., Railway Works, Peterboro'
Rigley, Wm., Bulwell, Nottingham
Rolling Stock Co., Darlington
Wigan Wagon Co. Ld., Springs Branch, Wigan

RAILWAY PLANT

Avonside Engine Co. Ld., Bristol
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Bute Docks, Cardiff
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Firth, William, Ld., Leeds
Gt. Central Railway, 216, Marylebone-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester
Isca Foundry and Engineering Co., Newport, Mon.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld. Midland Works Birmingham
Renton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Hyland-street Works, Birmingham

RAILWAY PLANT (ELECTRICAL)

British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester

RAILWAY WAGON ASSOCIATION

Association of Private Owners of Railway Rolling Stock, Clarence Chambers, Gloucester
Chorley Railway Wagon Co. Ld., Chorley, Lancs.

RAILWAY WAGON FINANCIERS

Bristol and South Wales Railway Wagon Co. Ld., Bristol
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lincoln Wagon and Engine Co. Ld., Lincoln

RAILWAY WAGON REPAIRERS

Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, near Birmingham
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Heenan & Froude Ld., Worcester
Lancashire and Yorkshire Wagon Co. Ld., Heywood, near Manchester
Lincoln Wagon and Engine Co. Ld., 11, St Mary-street, Lincoln
Moy, Thomas, Ld., Railway Works, Peterboro'
Rigley, Wm., Forest Wagon Works, Bulwell, Nottingham

RAILWAY WAGONS (TIPPING)

Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester

RAKER (PIT)

Baker, John, and Son, Bilston, Staffs
Hardy Patent Pick Co. Ld., Sheffield

REDUCING GEAR

Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, and Sons (Huddersfield) Ld., Park Gear Works, Lockwood, Huddersfield

REDUCING VALVES (FULL BORE AND STANDARD)

Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield

REFRIGERATORS

Pulsometer Engineering Co. Ld., Reading

REFUSE DESTRUCTORS

Heenan & Froude Ld., Manchester

REGULATING VALVES (FULL BORE)

Auld, D., and Sons, Whitevale Foundry, Glasgow

RESCUE APPARATUS

British Oxygen Co. Ld., Elverton-st., Westminster
Davis, E., 2, Aire-street, Leeds
Jacobson, R., 70, Shoe-lane, London, E.C.
Knowles Oxygen Co. Ld., Wolverhampton
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., 187, Westminster bridge-road, S.E.

RESPIRATORS

British Oxygen Co. Ld., Elverton-st., Westminster
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., Westminster

RIVETS

Baker, John, and Son, Bilston, Staffs
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Renton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley
Ward, Thos. W., Limited, Albion Works, Sheffield

ROCK DRILLS

Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Stephens, B., and Son, Carn Brea, Cornwall

ROLLERS AND PULLEYS (HAULAGE)

Bagnall, W. G., Ld., Stafford
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Renton, B. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

ROOFS AND OUTDOOR BUILDINGS

Heenan & Froude Ld., Newton Heath, Manchester
Isca Foundry & Engineering Co., Newport, Mon.
Norton's (Tividale) Ld., Tipton
Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton

ROPES (COTTON DRIVING)

Kenyon, Wm., & Sons Ld., Dukinfield
Wright, J. and E., Ld., Birmingham

ROPES (DRIVING)

Kenyon, W., & Sons Ld., Dukinfield Manchester

ROPES (HEMP AND MANILLA

Wright, J. and E., Ld., Birmingham

ROPE PRESERVATIVE

Wright, J. and E., Ld., Birmingham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

ROPES (WIRE)

Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Cooke, William and Co. Ld., Tinsley, Sheffield
Elliot, George, and Co. Ld., 16, Great George-st. Westminster, S.W.
Glover, Wm. Jas., and Co., St. Helens, Lancs.
Haggie Brothers Ld., Gateshead-on-Tyne
Latch and Batchelor Ld., Hay Mills, Birmingham
Thompson and Co., Wigan
Wright, John & Edwin, Ld., Garrison st., B'ham

ROPEWAYS

Bleichert, Adolf, and Co., 99-100, Palmerston House, Bishopsgate-st. Within, 60, E.C.
Tickle Brothers, Vulcan Ironworks, Wigan

RUBBER-COVERED ROLLERS

Boddaway, F., & Co. Ld., Pendleton, Manchester

SAFETY VALVES

Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster and Tonge Ld., Pendleton, Manchester

SAWS AND SAWING APPLIANCES

Appleby, E. G., and Co., 10, Victoria street, Westminster
Glover, M., and Co., Holbeck-lane, Leeds

SOOVING FOR COAL AND COKE

Baker, John, and Son, Bilston
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley

SCREENING

Barns, W., and Son, Globe Works, Holloway, N
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

SCREENING PLANT

Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

SCREWING MACHINES

Frost, Albert, and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

SCREWS (STRETCHING)

Youngs, Hyland-street Works, Birmingham

SEWAGE TREATMENT PLANT

Mather and Platt Ld., Manchester

SHAFTING

Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Entreprise Générale de Fonçage de Puits, 5, Rue de Surêne, Paris
Hardy Patent Pick Co. Ld., Sheffield
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Phillips, C. D., Newport, Mon.
Spencer and Co. Ld., Melksham, Wilts
Tickle Bros., Vulcan Ironworks, Wigan
Uskside Eng. Co. Ld., Newport Mon.
Wright, Joseph, and Co., Tipton

SHAFT SINKERS

Trefor Boring and Mining Co. Ld., 41, rue Royale, Brussels

SHEET IRON

Firth, Wm., Ld., Water-lane, Leeds
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

SHEET METAL WORKS (FOR CYLINDER CASINGS

Baker, John, and Son, Bilston
Kenyon, Wm., & Sons, Ld., Dukinfield
Valor Co. Ld., Rocky lane, Aston Cross, B'ham

SHIPPING

Gt. Central Railway, 216, Marylebone-road, N.W.

SHOT-FIRING BATTERIES AND CABLES

British Explosives Syndicate Ld., Glasgow
British Insulated and Helsby Cables Ld., Lancs.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Haslam and Southcott Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

SHOVELS AND SHOVEL TREES

Baker, John, and Son, Bilston Staffs
Fell, C. A., Dronfield, near Sheffield
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

SHOVELS (SPRINKLING)

Fell, C. A., Dronfield, near Sheffield

SIDINGS

Bagnall, W. G., Ld., Stafford
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, & Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

Purchasers' Guide to Advertisers' Specialities.—(continued).

Sleepers (Iron and Steel)
Allen, W. G., & Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
Baird, J. W., and Co., West Hartlepool
Bute Works Supply Co. Ld., Cardiff
Firth, Wm., Ld., Water-lane, Leeds
Benton, B. M., and Co., Midland Works, Sheffield

Smiths' Tools
Hardy Patent Pick Co. Ld., Sheffield

Smith Work
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Wright, Joseph, and Co., Tipton

Smoke Helmets
Siebe, Gorman and Co. Ld., Westminster, S.E.

Speed-Reducing Gears
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Sphincter Grip Armoured Hose
Reddaway, F., & Co. Ld., Pendleton, Manchester

Springs
British Wagon Co. Ld., Rotherham
Lancaster and Tonge Ld., Pendleton, Manchester
Skinner, J. P. and Co. Ld., Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Stampings
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Steam Experts
Fell, C. A., Dronfield, near Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan

Steam Fittings
British Mannesmann Tube Co. Ld., London Wall
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Russell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staffs.

Steam Mains and Pipe Installations
Stewarts and Lloyds Ld., Birmingham & Glasgow
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

Steam-Saving Appliances
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Burnley
Yorkshire Boiler Co. Ld., Bradford

Steam Traps
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster & Tonge Ld., Pendleton, Manchester
Stewarts & Lloyds Ld., Birmingham and Glasgow
United States Metallic Packing Co. Ld., Soho Works, Bradford
Wright, Joseph, and Co., Tipton

Steam Winches
Bridge, David, & Co. Ld., Castleton, Manchester
Clarke, Chapman & Co. Ld., Gateshead on Tyne
Phillips, C. D., Newport, Mon.
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan.

Steel
Cooke, William, and Co. Ld., Tinsley, Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Latch and Batchelor Ld., Hay Mills, nr. B'ham
Mining Engineering Co. Ld. (The), Sheffield
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Stewarts & Lloyds Ld., Birmingham and Glasgow
Thompson and Co., Wigan
Waterfall, H. & R., & Barber, Bridge-st., Sheffield

Steel Blooms Billets
Benton, B. M., and Co., Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Flats and Rounds
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Tinbars
Scott, Walter, Ld., Leeds Steel Works, Leeds

Stone Breakers
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln

Structural Steel Work
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Wright, Joseph, and Co., Tipton

Sulphate of Ammonia Plant
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Sulphur Recovery Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Superheaters
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
Pulsometer Engineering Co. Ld., Reading
Stringer, John, and Son, Dept. 11, Blackburn

Surgical Appliances
White & Wright, 93, Renshaw Street, Liverpool

Surplus Steam Valves (Full Bore)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Hopkinson, J., and Co. Ld., Huddersfield

Surveying (Books on)
Thomas, Wm., Cambrian Mining School, Porth

Surveying (Instruction)
Thomas, Wm., Cambrian Mining School, Porth

Surveying Instrument Makers
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavement, London
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Switch Boards
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Switch Gear
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Swivels (Ball-Bearing)
Bridge, David & Co., Ld., Castleton, Manchester
Youngs, Ryland-street Works, Birmingham

Tamping Plugs

Tanks
Bagnall, W. G., Ld., Stafford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Harvey, G. A., and Co. Loampit Vale, Lewisham
Isca Foundry & Engineering Co., Newport, Mon.
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Valor Co. Ld., Rocky-lane, Aston Cross, Birmingham
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Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

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Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

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Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Telephones
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Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

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Osbeck and Co., Newcastle-on-Tyne

Tipplers.
Bagnall, W. G., Ld., Stafford
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Spencer and Co. Ld., Melksham, Wilts
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

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Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

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Theedam, E. C., Ld., Dudley

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Youngs, Ryland-street Works, Birmingham

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Lewis, Edwin, and Sons Ld., Wolverhampton
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Wednesbury
Stewarts & Lloyds Ld., Birmingham and Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tubes (Iron and Steel)
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Lewis, William, and Son, Bilston
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tub Greasers and Controllers
Theedam, E. C., Ld., Dudley

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Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Humble, Stephen, 9, Victoria-st., London, S.W.
Longbotham, H. H., and Co. Ld., Wakefield
Theedam, E. C., Ld., Dudley
Wigan Wagon Co. Ld., Springs Branch, Wigan
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Baker, John, and Son, Thompson-street, Bilston
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Haslam and Schontheil Ld., Cardiff
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Wood, John, & Sons Ld., Brook Foundry, Wigan

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Bridge, David, & Co. Ld., Castleton, Manchester
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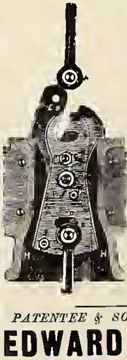

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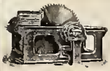
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This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c., as issued.

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Registered No. Please quote when ordering.	NEW FORMS, &c., RECENTLY ISSUED.	
	Statutory Rules and Orders, &c.	
H.O., 511	Explosives in Coal Mines Order of 21st May, 1912 (revoking all previous "Explosives" Orders). Pamphlet Form ...	4d. each. By post 5d.
C.G., 69	The same (without Schedules). Pamphlet Form	4d. each. By post 5d.
H.O., 34	The same (without Schedules). In Sheet Form for posting ...	1d. each. By post 1½d.
☞ H.O., 1149	Mining Examinations. Order Fixing Times and Places ...	1d. each. By post 1½d.
C.G., E.	Special Rules for the Installation and Use of Electricity in Mines.	
	Sheet Form (H.O., 12)	3d. each. By post 3½d.
C.G., K.	Pamphlet Form (H.O., 11)	2d. each. By post 3d.
C.G., L.	Coal Mines Act, 1911. Pamphlet Form	9d. By post 11d.
C.G., L. (Abs)	Coal Mines Act, 1911, Abstract. Sheet (26 in. by 34 in.) (H.O., 2)...	3d. each. By post 4d.
C.G., M.	Coal Mines (Minimum Wage) Act, 1912. Pamphlet Form ...	1½d. By post 2d.
Cd. 6340.	Mines and Quarries: General Reports, &c. Part I. District Statistics	6½d. By post 8d.
C.G., F.	Directions as to the Restoration of Persons suffering from Electric Shock (Silvester or Schafer). Sheets (20 in. by 30 in., and 10 in. by 15 in.)	4d. each. 3s. per doz.
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H.O., 11C	Do. Notice to Inspector of the District under Rule 2 (ii.) ..	1d. each. By post 1½d.
H.O., 11D	Do. Notice to Inspector of the District under Rule 2 (iii.) ..	1d. each. By post 1½d.
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H.O., 36	Form of Report Book for Inspection on behalf of Workmen—Section 16 ..	9d. each do.
H.O., 37	Form of Book for Record of Measurements of Air Currents—Section 29 (2) ..	7d. each, do.
H.O., 38	Form of Book for Daily Record of Damage to Safety Lamps—Section 34 (1) (ii)	1s. 6d. each do.
H.O., 39	Form of Report of Thorough Examination of Steam Boiler—Section 56 ..	1d. each do.
H.O., 40	Form of Book for Report on Quarterly Internal Examination of Steam Boilers—Section 56 (1) (c) and (3)	6d. each do.
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H.O., 43	Form of Book for Daily Report of Examination of External Parts of Winding Machinery, Guides, &c.—Section 66 (a)	1s. 6d. each do.
H.O., 44	Form of Book for Weekly Report of Machinery, Gear and other Appliances (other than Winding Machinery, Gear, &c.)—Section 66 (b)	1s. 3d. each do.
H.O., 45	Form of Book for Weekly Report on State of Shafts in which Persons are Lowered or Raised—Section 66 (c)	1s. 3d. each do.
H.O., 46	Form of Book for Weekly Report on State of Airways—Section 66 (d) ..	1s. 3d. each do.
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H.O., 52	Form of Book for Daily Record of Shots Fired—Explosives in Coal Mines Order	9d. each do.
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O.O., 24	Report of Inspection of Ventilation, &c. Books of 200 pages	4s. each. By post 4s. 5d.
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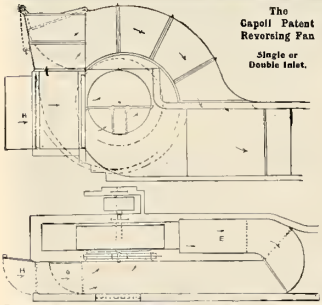

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TENDERS FOR COAL.

The above Council are prepared to receive TENDERS for the supply of Welsh COAL and COAL suitable for chain grate stokers, for use at their Electricity Works, High-street, Mortlake, for six and twelve months respectively, commencing from the 1st October, 1912.

Forms of tender, with particulars, may be obtained at my offices as under.

Tenders must be sent so as to be received by me before 12 noon on Tuesday, the 24th day of September next, marked "Tender for Coal, Electricity Works."

The Council reserve to themselves the right to decline all, or any, or any portion of the tenders received.

By order,
WM. THOS. GOODALE,
Clerk to the Council.
The Council House,
High-street, Mortlake, S.W.,
August, 1912.

URBAN DISTRICT COUNCIL OF BARNES.
YORKSHIRE SILKSTONE.

The above Council are prepared to receive TENDERS for the supply, before the 1st December next, of about 120 tons of best Yorkshire SILKSTONE, to be delivered in barges alongside the Council's Wharf at Mortlake.

Tenders, stating the name of the colliery from which it is proposed to obtain the coal, and marked "Tender for House Coal," must be sent so as to be received by me before 12 noon on Tuesday, the 24th day of September, 1912.

No special tender form will be issued.

The Council do not bind themselves to accept the lowest or any tender.

WM. THOS. GOODALE,
Clerk.
The Council House,
Mortlake, S.W.,
August, 1912.

SALFORD CORPORATION ELECTRICITY WORKS.

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Advertisements can be inserted under a Box number, and replies will be forwarded free of charge.

Copies of Testimonials—*not originals*—should accompany applications for situations.

Where possible, information will be given in these columns when appointments advertised have been filled up.

Wanted immediately, an Assistant in mining engineer's office, must be qualified land and mine surveyor and a good draughtsman.—Apply, with references, stating age and salary required, to **Box 4903,** *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

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⁂ *For* later **Advertisements** *and* **Scale of Charges,** see **Page 440 (Leader Page).**

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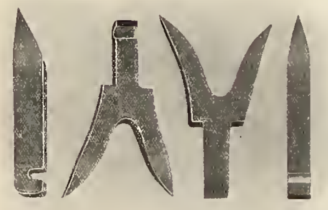

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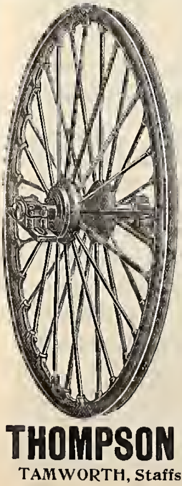

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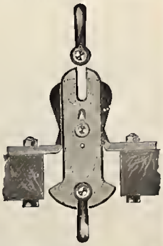

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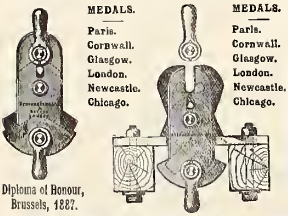

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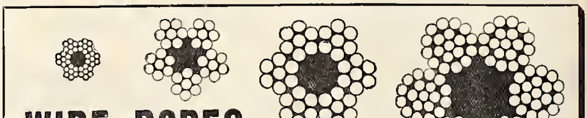

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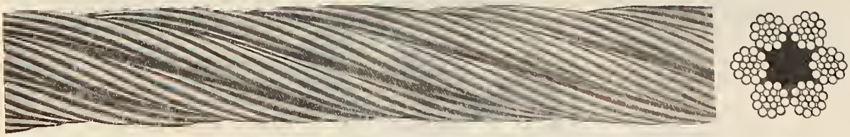

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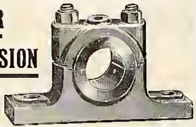

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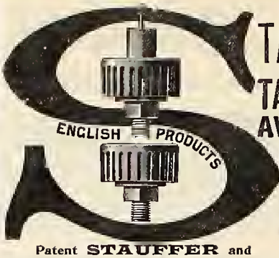

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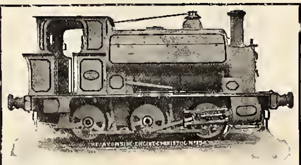

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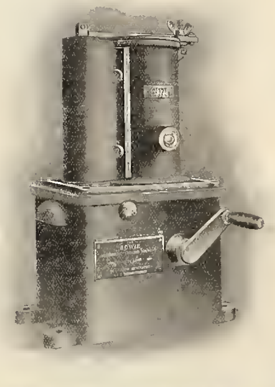

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   - (B) Swansea Valley.
   - (C) Brynamman District.
   - (D) Amman Valley.
   - (E) Ammanford.
   - (F) Loughor Valley
   - (G) Gwendraeth District.
   - (H) Gwendraeth District.

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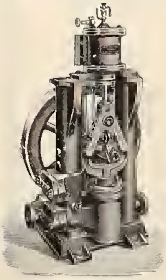

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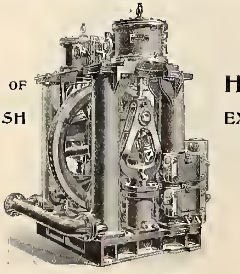

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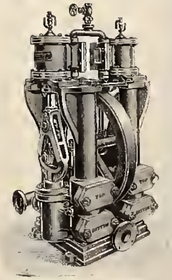

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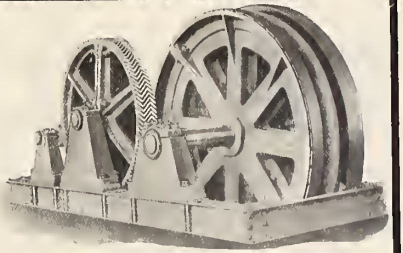

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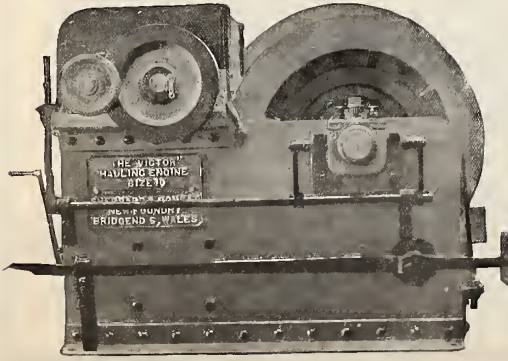

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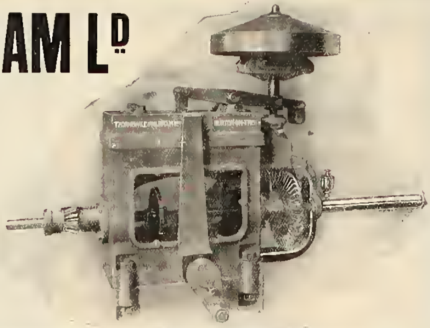

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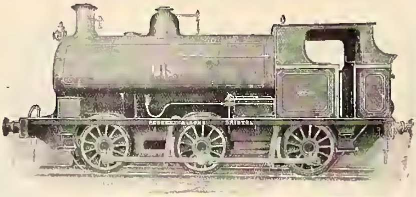

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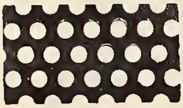

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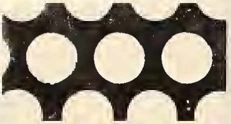

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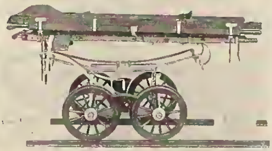

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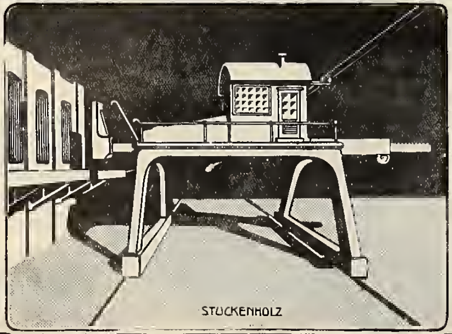

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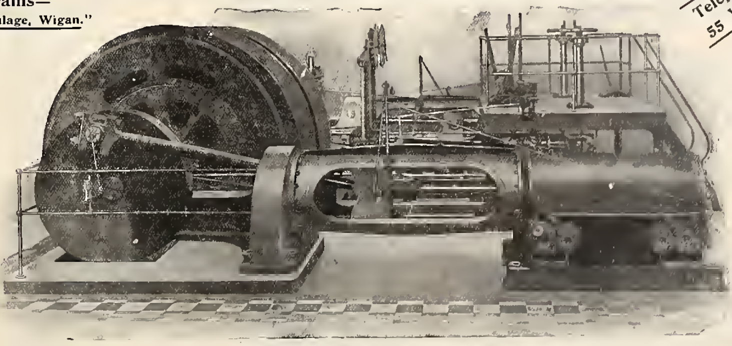

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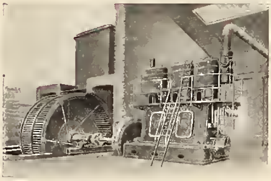

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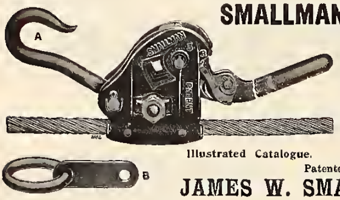

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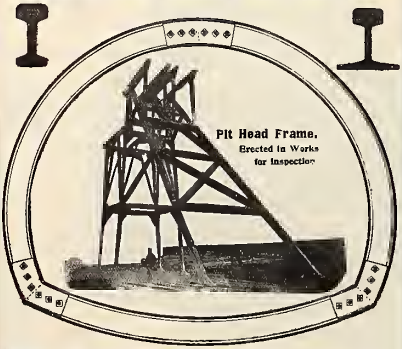

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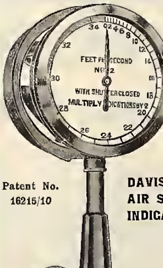

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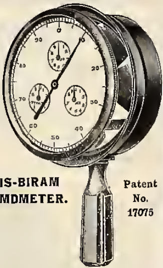

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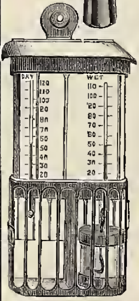

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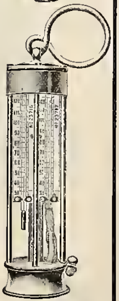

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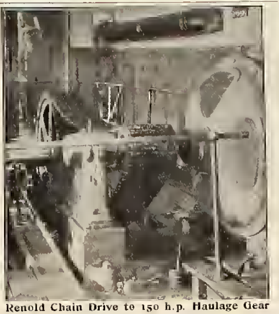

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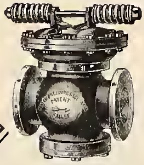

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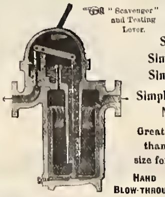

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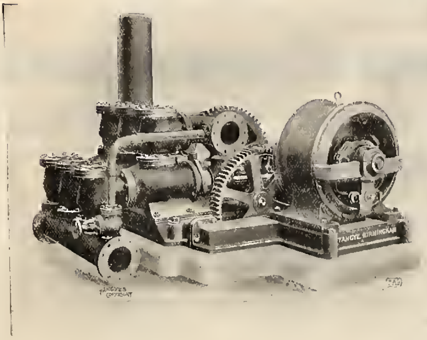

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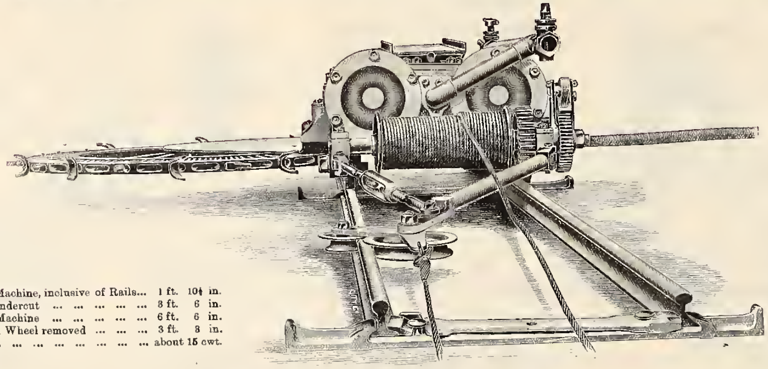

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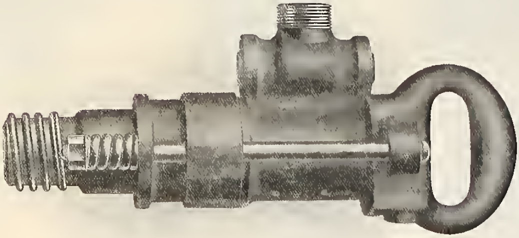

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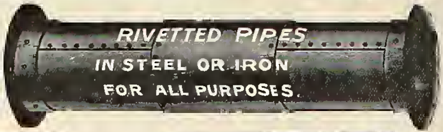

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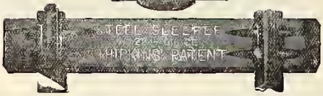

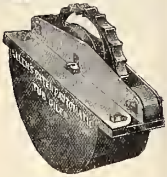

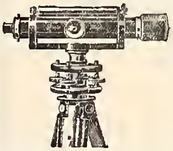

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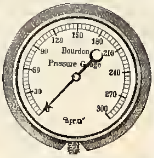

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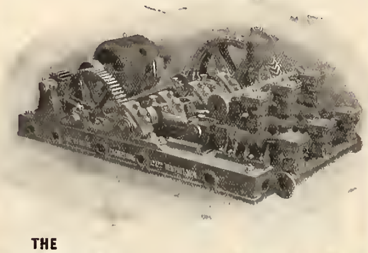

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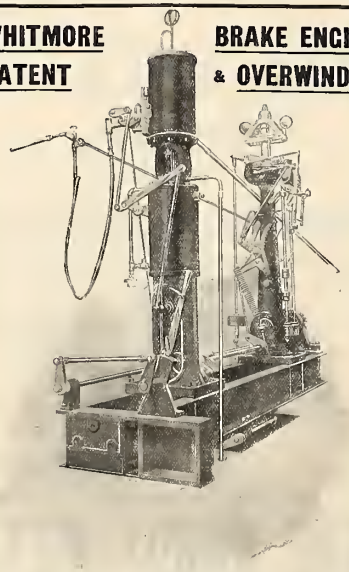

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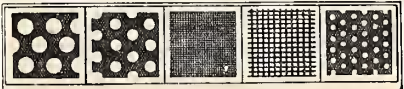

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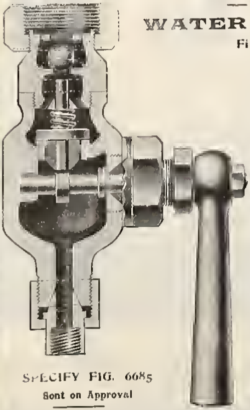

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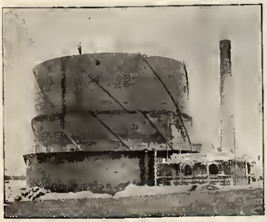

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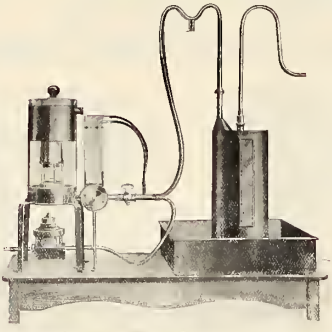

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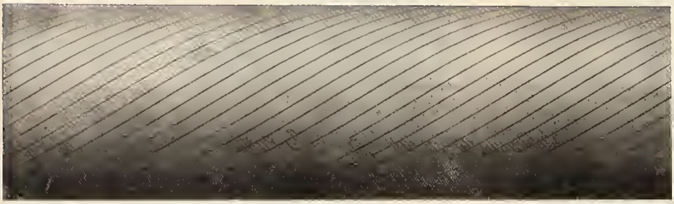

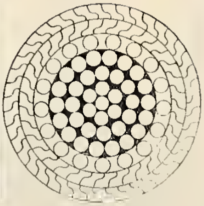

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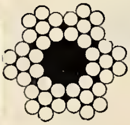

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THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CIV. FRIDAY, SEPTEMBER 6, 1912 No. 2697.

THE MULLER BY-PRODUCT COKE OVEN

In a paper read before the Coalmining Institute of America, Mr. Eugene B. Wilson gives a description of a new type of by-product oven that has recently been introduced in the United States. By reference to fig. 1, which is a section through the oven heating wall, it will be seen that the combustion or heating flues *a* are provided at their lower and upper ends with tuyeres for supplying and mixing gas and hot air for combustion. The tuyeres are constructed, as shown in fig. 2, in a way that will convey the gas and air-current into the heating flues so that their movement will be parallel with and not baffle each other. In this way the flame jets are prevented from impinging at any particular place on the wall of the heating flues; also by this arrangement there is an intimate mingling of air and gas which ensures a rotary movement from the tuyere nozzles into the combustion flues. In the illustration (fig. 2), *a* is the air flue leading to the tuyeres *b*, while *c* is the gas flue leading to the heating flues *d*. In the lower or sole flues, the air flue is used alternately to convey hot air to the heating flues and waste heat to the regenerators. Owing to the large openings, the tuyeres admit of an adequate supply of air closely corresponding to requirements—that is, from four to five times the quantity of gas admitted. Because of the air entering the heating flues through the four nozzles, the air can be blown in by means of a fan, and thus ensure a long flame suitable for the height of the oven walls. This feature has considerable bearing on the height of the oven.

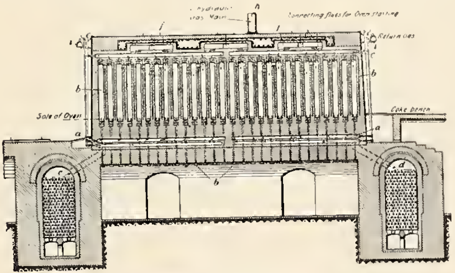

FIG. 1.—SECTION THROUGH HEATING WALL.

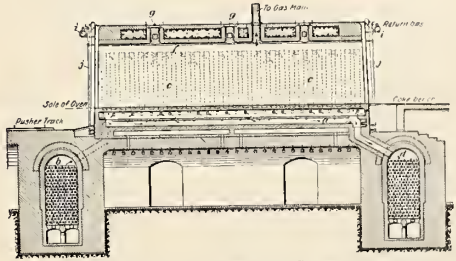

FIG. 3.—SECTION THROUGH OVEN CHAMBER.

For the purpose of conducting away the waste gases, every two or four heating flues are connected by small passages at their upper ends, as shown in figs. 1 and 3. Ordinarily this is done by a horizontal flue extending along the upper part of the oven above the flue walls, a feature which tends to weaken the oven wall. It is evidently better to conduct the waste gases within two combined heating flues than to carry them one-half the length of the oven through a long horizontal chamber to the 15 or 16 heating flues of the other half of the oven, as is done in some oven designs.

Underneath the combustion flues the gas supply channels *a*, fig. 1, are arranged side by side and superposed. These are connected so that the gas supply from below is regulated from each three or four heating flues. Suitable connecting passages conduct the gas upwards through the gas nozzles of the tuyeres into the heating flues. To avoid the connecting passages becoming clogged by obstructions of any kind, vertical openings *b* from the foundation arches are provided and these have removable plugs which enable all the vertical combustion flues *b* to be inspected from time to time.

The sole channels *a*, fig. 3, alternately serve for supplying hot air for combustion from one generator *b* to the heating flues *c* (shown in dotted lines) and for conveying the waste gases from the combustion flues to the other regenerator *d*. The subdivision of this sole channel into four parts, as shown in the section of the ovens, fig. 4, is for the purpose of regulating the incoming air and the withdrawal of the waste heat gases from the heating flues. This arrangement has been adopted to produce a uniform draught and pressure. From the sole channels part of the hot air passes through small passages formed in the intermediate binder bricks of the walls and ascends to the upper tuyere nozzle, where it furnishes hot air from above to the downwardly-flowing products of combustion. In the roof of the oven above the upper tuyeres, one or two gas flues *e* are arranged which are alternately connected with those flues having a downward draught for combustion. Separate passages and connecting flues *f*, leading from the charging holes into the upper gas supply passages and to the heating flues, are provided for use when the oven is being started, or in case the oven should be worked without recovery of the by-products, as a waste-heat oven.

A further improvement is that the crude-gas collecting space *a* above the coking charge in the oven section, fig. 4, is surrounded at the sides and top by special insulating material, which is extended down the heating flues toward the charge in order to keep the heat from the flues from radiating into this space. The gas collecting space thus cooled has a lower temperature than the charge; consequently, since the generated gases passing out of the coking charge its whole length find a cooler space, there is no possibility of the hydrocarbons in the gases decomposing.

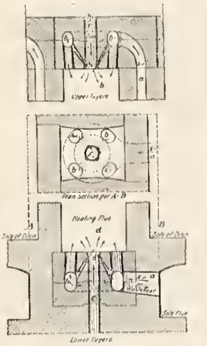

FIG. 2.

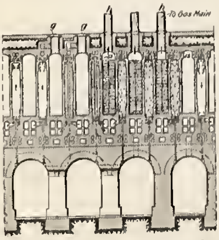

FIG. 4.—CROSS SECTION THROUGH THE OVENS.

The operation of the coke oven is as follows:—The retorts are charged with coal in the usual manner, either from the top through the charging hole *g*, figs. 3 and 4, or through an end door if compressed coal is used. The gases generated are conducted from the collecting spaces above the charge, through vertical offtakes *h*, fig. 4, and standpipes, to the condensing or by-product plant. After the separation of tar, ammonia, and benzol, a small part of the gas to be used for heating the oven walls is conducted through pipes *i* along the sides of the battery of ovens. Small branch pipes *j* provided with valves or stop-cocks project into the upper as well as into the lower gas channels on each side of the oven walls.

Supposing now the regenerative system is employed

The gas passes from the lower channels through the tuyeres alternately into half the number of tuyeres in one wall—that is, into one side of one or two combined pairs of heating flues. Just below the sole of the oven hot air also enters from one regenerator, the sole channel, and lateral passages through the tuyeres, and mixes with the issuing gas which, burning, flows upwards. The resulting products of combustion are now conducted through the upper passages into the next flues of one or two combined pairs. Since much of the heating power is lost on the way upwards, each of the flues having a downward combustion receives through the upper tuyeres an auxiliary supply of fresh gas and hot air in order to enliven the combustion and keep the temperature as high as that in the upward flues, which is easily attained with a small quantity of gas. The waste heat or gases finally descend through the lower tuyeres and passages to the sole channels, and then through one or other of the regenerators to the boiler or chimney stack.

After the reversal of a suitable three-way cock in the branches of the gas supply pipes, and of the reversing valve of the two regenerators alongside the battery, the supply of gas and air flows in the reverse direction, and likewise the flames in the combustion flues. If no regenerators are employed for heating the air, the direction of the flow of gas and air, and that of the products of combustion in the supply pipes and channels always remains the same.

The method of heating the walls permits of efficiently utilising the heating gases, and by means of the continuous upper supply of additional fresh gas and hot air to the waste gases, an extremely uniform heating of all parts of the wall is ensured. The supply of gas and air to every set of three or four flues can be readily controlled and regulated at will by the pipes and stopcocks and the dampers in the sole channels, so that a very uniform distribution of gas and air is attained. On account of the positions of the gas and air supply tuyeres, an exceedingly high temperature is applied exclusively to the coking charge, consequently the oven can be run at a considerable saving of fuel.

Legislative Burdens.—Mr Arthur Keen, the Chairman of Guest, Keen and Nettlefolds Limited, speaking at the ordinary general meeting of the company, held at Birmingham on August 29, referred to the effect of the national coal strike. One great factor, he said, which operated against the possibility of their achieving results such as they had in some former years was the increased cost of production of coal. This was the chief natural product that this country possessed, and he did not see how the cost was to be reduced, which must have a serious effect on manufacturers in the future, as cheap fuel had always been most important to industry. Turning to the Minimum Wage Act and the position of the South Wales owners, he said he felt that it was a retrograde step in business contracts if either side was enabled to break them with impunity. However, the Act had been passed, and they could only hope that further difficulties would be obviated; but from meetings which had taken place since it seemed clear that the colliers were by no means satisfied with the operation of the Act. Mr. Keen, continuing, pointed out that as time went on processes change, and during recent years a demand had grown up for material in an important part of their undertaking for which they were not adapted; and the directors, after giving the matter their careful consideration, came to the conclusion that they would have to do something to meet the situation, but they had to take into account both location of works and the supply of the necessary material. Quite unexpectedly, an opportunity presented itself to them to acquire an interest in an undertaking carrying on the process that they wanted. They found a certain sum to acquire this interest, and they would find further money for the development of the plant, believing that the course they had adopted would be of considerable assistance to them They were very glad to be in a position to recommend the same dividends and bonus as for the previous year, whilst adding the same amounts to the accident and fire insurance fund and general reserve, and increasing the carry forward—a step considered necessary in view of the additional burdens inflicted by the Insurance Act. Looking at the very large number of their employees, the charge would be a very heavy one. They might be able to meet these charges by getting higher prices for their goods, but that time alone could prove. There were several important factors with which they, in common with all industrial undertakings, had to contend—such as labour unrest, and the burdens of legislation, of which they had lately had too much put upon them, to say the least, in too short a time, and the ever-increasing competition at home and abroad. In the steel trade, foreign countries, such as the United States, Germany, Belgium and France, were making great strides in the production and exportation of steel owing, he contended, to the way in which those countries fostered their industries in one way or another. These were the circumstances which the directors were bound to always keep before them, and which justified them in recommending the shareholders to adhere to the policy hitherto adopted.

PIT-SINKING RULES.

Some interesting evidence was given before the Royal Commission on Metalliferous Mines on November 3, 1911, by Mr. Frederick Piggott, the well-known authority on pit sinking. We give below an account of Mr. Piggott's evidence:—

Mr. Piggott said he would make it compulsory with regard to sinking pits to use a safety explosive as against an explosive containing nitro-glycerine. In other words, there ought to be a list of explosives permissible in shaft sinking, and they ought to be chosen with regard to the insensitiveness and the sensitiveness of the explosive itself, arising through the explosive containing nitro-glycerine only. Usually the men could get away from the shot with modern appliances at least 800 or 1,000 yards before the shot need explode. As a rule they considered 100 yards above the shot to be quite safe. All practical miners would light the fuse and time it so that they knew they would be able to get away.

Witness said that guides were used in one or two cases, but it was only where the men concerned asked permission to have the guides put in. A guide was absolutely necessary for safety in lowering a basket after the depth of the shaft had attained 900 ft. or 1,200 ft Up to that point it was safe to work by simply letting the corve down, unless there were obstructions, such as a pump slung in the shaft or platforms and so on, and entrances to different headings and archways, then it should be compulsory from the surface.

It was safer to let a corve down at a medium pace, say a maximum speed of 25 ft. per second. The greater the weight the more tendency there would be to keep in a vertical position.

Witness said he was very much opposed to electrical shot-firing in pits. In all sinking his practical experience had taught him that they got frequent missfires in firing from the electric battery, and he had known several cases where fatal accidents had arisen from the effect of having used the electrical apparatus in firing shots simultaneously, and the men thinking that they were perfectly safe to go back to work, the whole of the holes having exploded. The result had been that the men had struck, with a pick or a shovel or hammer, an unexploded charge which had caused fatal accidents. With a time fuse they knew, as a matter of fact, in 99 cases out of 100 whether the whole of the shots had exploded. They counted the number of reports. He had known, as a matter of fact, where men who had malicious intent would purposely break the connecting wire and prevent the hole from going off. They could not do it with a time fuse. The object was to delay the progress of the sinking, and probably a malicious intent towards the fellow workman who was in charge of the work.

Witness said they usually ventilated a deep sinking by forced draught—sometimes by induced draught—forced and exhaust fans. When a shaft attained a certain depth from the surface it should be compulsory to put in a fan to ventilate the bottom of the shaft, and he would test the air for carbonic acid gas. In starting to sink a shaft the question of ventilation should be taken into account at the start. He would make ventilation compulsory after 60 to 90 feet from the mouth of the shaft—90 ft.—irrespective of the diameter of the shaft.

Mr. Piggott said they had to work movable stages in bricking round shafts, and also had to have the modern method of pumping appliances erected for dealing with the water. There should be movable pumps with platforms attached to them. A "power-driven" capstan engine should be made compulsory for moving these movable pumps and platforms. It depended whether the shaft was round or rectangular, but if there was anything movable in the shaft it ought to be made compulsory, especially in the work of bricking, that capstan engines should be put on the surface to work it. He had often known cases where a hand-worked capstan had run away, and allowed the load to go to the bottom.

Witness said he had a special system of reporting the state of the sides of the shaft, the state of the ventilation in the shaft, and the state of the general work and conditions. There was a report book signed by the man in charge at the bottom each 12 hours. He favoured the uniformity of signals.

Special Rules.

Witness said they had no special rules that really were established for sinking shafts, and it was quite time that something of the sort took place. The same set of rules might be made applicable to every pit in the country, because the method of working was the same. Witness here put in a draft of the special rules and a copy of the report book:—

Copy of Special Sinking Rules

General Instructions.

1. No person shall damage or injure, or without authority remove or interfere with anything provided for, or used in the working of the shaft. No person in or about the shaft shall do any Act likely to endanger the safety of any person, or of the shaft.

2. Intoxicating drinks shall not be allowed in or about the shaft. No person in a state of intoxication shall enter, or be allowed to remain in or about the shaft.

Enginewright.

3. The enginewright is required to see that the authorised signals are understood and strictly observed by the engineman, banksman, and sinkers, or other persons at work in the shaft. He shall cause the code of signals to be fixed and maintained at the top of each shaft and in each engine-house.

4 The enginewright is also required to see that the sinking and water tubs, ropes, chains, pulleys, shackles, hooks, pumps, and other sinking gear and engines are in good working order. Whenever he shall find that any of such machinery, working articles, or materials are defective, he shall immediately order the discontinuance of the use thereof, and he shall see that they are discontinued accordingly, and that other and proper articles are substituted.

5. He must personally examine at least once every day the engines, boilers, ropes, capstans, and other machinery and all parts connected therewith, also the fastening of the ropes to the drums, and all other things appertaining to the sinking arrangements, and shall without delay make a true report of the result of such examination in a book to be kept at the shaft for the purpose.

6. The enginewright or other competent person, whenever a rope requires capping or coupling, shall superintend the same, and shall recap the rope and anneal the working or other chains as often as necessary.

Engineman.

7. Each engineman shall, before commencing work in his shift, examine his engine, and all the machinary connected therewith, and immediately report any defect to the manager, master sinker, or enginewright.

8. The engineman is required personally to work his engine, and he must not under any circumstances leave it, or allow any person to interfere with or to work his engine during his shift, except when personally ordered by the manager, master sinker, or enginewright.

9. The engineman must not move the engine except when he receives the proper and authorised signal, nor under any circumstances must he leave the handle of his engine while the tub, or trunk, or cradle, or any material whatever is hanging on the rope in the shaft, anywhere between the bank and the sinkers, or other persons employed in the works.

10. The engineman shall at all times gently lift the sinking tub from the pit bottom, and carefully drive the engine, and not leave the same whilst in motion, and shall not allow any unauthorised person to remain in the engine-house. When persons are riding in the shaft he shall drive the engine at a reduced speed. He shall pay particular attention to the indicators and signals, and shall stop the engine if he become aware of any defect; and if a signal be indistinct he must not move the engine until it is distinct. He shall not wind the cap of the rope within 1 ft. of the flange of the pulley-wheel, except for the purpose of repairs.

11. He must always personally see that the ropes are properly adjusted on the drum before any persons descend the shaft, and before the sinking operations are resumed, after any stoppage of more than 24 hours at one time; and also after there has been any repairs to any of the winding-tackle or an interval between shifts, he must run the ropes up and down the shaft with an ordinary loaded tub before any person descends the shaft.

12. He must be particular to steady the rope before each tub or load leaves the top, and also specially before each tub or load leaves the bottom of the shaft.

13. He must not allow any person at any time to descend the shaft except in a proper tub, trunk, or cradle. He must also carefully observe and diligently attend to all signals given to him.

14. The engineman must, when lowering the tub or any other material, stop the engine when the load is 8 yards from the bottom of the pit. Under no circumstances must he again start his engine until he has been signalled to do so, and then he must do so carefully and steadily.

15. When men are being raised in a shaft where the winding apparatus is not provided with some automatic contrivance to prevent overwinding, they shall not be wound up at a speed exceeding 3 miles an hour after having reached a point 60 ft. from the top of the shaft. The enginewright shall cause the said point to be marked on the indicator in the engine-house. If the engine is in the act of winding, and the signal "One" is given, the engineman must stop the engine immediately, and wait for further signal. Any omission to observe any of the signals will be punishable as an offence under the Act.

Head Banksman.

16. The head banksman must not leave the pit top while the men are in the pit. He must see that there are sufficient

lights, and that the headstocks, pulleys, ropes, tubs, and chains are in safe working condition, and if he becomes aware of any weakness or defect in anything belonging to the shaft, engine, machinery, ropes, or winding-tackle, he must immediately inform the engineman and the manager, master sinker or enginewright, and not permit any person, except for the purpose of any inspection or repair, to descend or ascend until such weakness or defect has been remedied.

17. He must see that all materials going down are securely fastened to the trunk, or bow, or rope; also that bulky materials are securely slung with a double noose of chain or rope, and that bricks and other building materials are ready loaded at the pit top, and in no case permit them to be filled into a swinging trunk. He must see that the tub or load is properly steadied, and properly secured to the rope before being sent down.

18. He must always run the bridge or trolley over the pit top, before the tub or any material is landed, and when men have ceased working in the shaft, the bridge or trolley shall be left so as not to impede the ventilation, or leave the shaft unfenced.

19. The fencing must be securely fastened by him round the mouth of the pit every time the operations cease, or are suspended. He must not allow an intoxicated person to enter the shaft.

20. The bridge or trolley shall be secured by a catch when on and off. After the firing of a sumping or leading shot, when firedamp is likely to be given off, the pit shall not be re-entered except with a safety lamp; and after an intermission of working, the pit shall not be entered until a light has been lowered to ascertain that no gas be accumulated; and when firedamp may be present a safety lamp shall be used for this purpose.

Sinkers.

21. One man in each shift will have the entire charge of the pit bottom, subject to the orders from time to time of the manager or master sinker. This man, called the chargeman, must, before the sinkers proceed with their work, carefully examine the sides of the pit at the beginning of his shift, and he must remove all loose pieces of stone, bind, or other materials, and satisfy himself by careful personal examination that the shaft is in a safe state for working therein. He must also, whenever the men have been out of the bottom of the pit, before the working operations are commenced or the men descend, examine the ventilation and other arrangements for safety, as directed by the manager or master sinker.

22. The chargeman must also see that the tubs are properly loaded and steadied before being sent away, and that the outside is free from stones or clay. He must also see that the tools and other gear are securely tied to the tub bar before they are sent up.

23. Not more than 10 persons must be allowed to ascend or descend at any one time, and no person at any time except in a proper trunk during the ordinary work of sinking.

24. No person must ride with a loaded tub.

25. The chargeman must see that the lines are properly kept and that all bricking and other works are performed in a workmanlike manner according to the contract, or according to the orders of the manager, or master sinker. In no case whatever, not under any circumstances, must bricking or loose timber be left hanging in the shaft.

26. All persons employed will be under the direction of the manager or master sinker for the time being.

27. The sides of the shaft below last walling curb shall be made secure where necessary by means of temporary curbs and backing deals. No greater distance than 30 yards shall be sunk before the upper part of the shaft is walled.

Shot-firing Rules.

28. The master sinker and chargeman shall enforce the provisions of the Act and special rules relating to the use of explosive substances in the shaft. No gunpowder shall be used.

29. Explosives shall be kept in a box or cage, on top of the pit, which shall be securely locked, and no unauthorised person shall have access to the same.

30. No person shall have in his possession any iron or steel pricker, scraper, charger, tamping rod or stemmer, nor shall he use coal or coaldust for tamping.

31. After a shot has been fired, the chargeman shall, as soon as practicable, examine the place, and, if necessary, take steps for its security.

32. Every case of a shot missing fire shall be reported to the manager or master sinker, by the person in charge of the shot at the time of the missfire.

33. In firing shots by fuse, the chargeman shall see that sufficient length of fuse is attached to every shot to allow of the men firing the shots being drawn out of the shaft before such shots explode.

34. In no case whatever, not under any circumstances, must a shot, which has missed fire, be drilled out. Whenever a shot has missed fire, the working operations must be suspended for at least 20 minutes after the men have come to bank, except where electricity has been used. The chargeman must see that this rule is strictly carried out, and no hole shall be bored for a charge at a distance of less than 6 in. from any hole where the charge has missed fire.

35. Special signals may be ordered by the manager or master sinker, but in all cases they must be in addition to, and not interfere with, the authorised code of signals.

Name of the mine:
Where situated:
Name of the owners:
Name of the agent:
Name of the manager:
Name of the master sinker:
Name and address of the inspector of mines of the district.

(Proposed form.)

SINKING PIT REPORT BOOK.

I have carefully examined the shaft and find the general working conditions as follows:—

Date.

Ventilation—good or insufficient.

State of sides of pit below last walling curb or last frame of timber—in good working order or dangerous.

Presence of gas or foul air—none, or report when found.

General condition—safe or unsafe.

(Signed)
Chargeman.

(Signed)
Manager or Foreman Sinker.

LIST OF SIGNALS.

1	Go on.
1 (when in motion)	Stop.
1 and a hold up	Get ready for firing.
2	Lower.
3	Men coming up.
4	Pull up quietly.
4 (when on top)	Candles.
5	Empty bond.
5 and a hold up	Powder.
6	Side picks.
6 and a hold up	Set wedges.
7	Bottom picks.

Capstan Signals.

2 and a hold up	Lower capstan.
4 and a hold up	Pull up capstan.

Pump Signals.

	Top pump.
	Bottom pump.

Bricking Signals.

(When bucket is on top.)

A hold up	Packing.
1 and a hold up	Mortar.

In further evidence, witness said they had often experienced danger to men working in a sinking shaft from stone or anything that happened to fall down the shaft. They had a method of temporary precaution by putting in wooden or iron rings with wood laggings behind to keep the stuff dribbling from the side of the shaft. As a matter of fact that question also related to the method of shotfiring. With simultaneous electric blasting it shattered the sides so much that danger arose from the effect of simultaneous blasting causing the shattered side to give way. These shelters did not project out from the straight line of the timber or the bricking of the shaft, and were not an obstruction. If a light weight was coming down they would have a horizontal bricking stage suspended by two capstan ropes from the surface and that would catch any light weight which might seriously injure anyone at the bottom of the shaft, but he did not think they could make it compulsory to have a shield to arrest anything which might come down the shaft.

Witness added that the rules had been submitted to Dr. Atkinson, chief inspector of mines for South Wales, and he had practically agreed that they were fit rules to establish for a sinking pit. They had also been submitted to Mr. Tallis, of the Tredegar Iron and Coal Company, and he also agreed. Practically they agreed with the whole thing. These rules are not a complete set of special rules. They are only really a set of rules directed to be observed by the officials and people engaged in doing the work. They do not provide for the use of explosives. To make them complete, of course, there would be many points to be added.

At Rotherham, on Monday, fines of 5s. were imposed on Samuel Hewitt, miner, and Walter Deakin, for a breach of the rules at Silverwood Pit. Each defendant when searched had a cigarette in his pocket. Thomas Melling, miner, was fined 10s. and costs for having refused to allow the deputy to search him.

EXPERIMENTS AT LIEVIN ON THE CLASSIFICATION OF COALDUST DEPOSITS.*

One of the most important matters arising in the struggle against the dangers of coaldust is the determination of the relative inflammability of the dust deposits accumulating in mine roads and of the conditions under which such dust may become a source of danger. The problem is complicated by the circumstance that the danger does not depend solely on the inflammability of the dust, but also on its quantity, fineness of division, percentage of ash, volatile matters and moisture, &c., and finally on the power of the originating cause of the ignition. To obtain a practical solution, it is not sufficient—though very important—to suppress every cause of ignition, but having ascertained the limits beyond which the presence of coaldust is dangerous, and having found practical means for keeping the quantity down within those limits, it is desirable to proceed in a manner analogous to that adopted in the case of firedamp and introduce preventive measures to render the medium uninflammable in the event of any failure occurring in the means employed for suppressing the initial cause of ignition. On this account, attention has for a long time been bestowed at the Liévin station on the question of distinguishing between dusts that are capable or incapable of producing a general dust explosion, and of indicating the means of minimising or suppressing the danger of the different dust deposits found in mine galleries.

The results of the experiments on the first point have already been published in the reports on the third and fourth series of experiments on the ignition of coaldust (*Colliery Guardian*, October 28, November 4 and 11, 1910), which established the following limit values—when considered independently—separating dangerous dust from safe dust: percentage of ash constituents in the dust mixture, 40 per cent.; percentage of volatile matters, 18 per cent.; minimum quantity of dust, 112 grammes per cubic metre; fineness of grain, 1 to 2 mm., with a very low proportion of dust capable of passing through a No. 200 sieve; proportion of water sprayed over the dust without becoming intimately admixed therewith, 1 : 1.

In connection with the second point, numerous experiments have been conducted since the summer of 1911; and though the complex nature of the problem is such that some time must elapse before the complete results can be published, many of those already obtained are capable of practical application and of increasing the safety of working in mines, on which account they will now be summarised in order to furnish the mining engineer with the new data which can be applied in practice. The experiments were carried out with the cannon arranged at the closed end of the gallery, and, in order to imitate the actual conditions in the mine, frame timbers were erected at intervals of 1½ m. In one series the cannon was placed at a height of only 40 cm. (16 in.) above the floor; whilst in the other series a second deposit of highly-inflammable dust, 10 m. in length, was arranged on the floor beyond the layer of dust whose behaviour was under investigation. Although these exact conditions are not likely to be realised in the mine, it is possible that other combinations of circumstances, such as badly-stemmed shots, causing an initial explosion of firedamp, which would ignite coaldust, might produce the same conditions as regards the dissemination of the dust, as prevailed in one or other of the series of experiments.

A large number of tests were made, in the course of which four variable factors—quantity, fineness of division, percentage of volatile matter and ash content—gave different values in succession. In connection with the first of these, it would appear that the amount of the fine particles capable of passing through a No. 240 or No. 200 sieve is the most important feature; thus reducing the variable factors to three. A certain degree of inflammability—characterising, for example, limit 1 (first series)—is defined by a curve in which the abscissæ represent the percentage of ash in the mixture, and the ordinates the weight (grammes) of fine dust per cubic metre of air. The results plotted in this way are reproduced in figs. 1 and 2, representing the limits in the first and second series respectively. In both cases the percentages of volatile matter are those of the coal from which the dust originated, and not those of the dust mixture, whilst the ash content is that of the fine mixture.

In the practical application of these curves, two principal eventualities must be considered. The first is that of a gallery in which the dust is small in quantity or relatively coarse, in which case the important variable is the weight of fine dust per unit space. This can be ascertained with sufficient approximation by collecting all the dust lying within a given zone, say 8 in. in width, extending round the roof, sides and floor of the gallery, or an aliquot portion of same (say one-fourth). The properly mixed sample is then screened through a No. 200 sieve. This can be done even in the mine itself, the total weight being determined with a small scales—such as used for weighing letters—and the fine dust measured by means of a graduated glass, the total volume of dust having previously been measured in the same way.

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* J. Taffanel. Report to the Comité Central des Houillères de France.

A second eventuality is that of a gallery which contains so much dust that the minimum percentage of fine particles is no longer important, the degree of danger in this case being determined by the ash content. In these circumstances the ash content may be ascertained from a few handfuls of dust gathered from the floor or walls of the gallery and examined in the laboratory. Where, however, no combustion apparatus is available, an approximate estimate of the percentage of ash can be made by measuring a given weight of the dust; and since the specific gravity of both the coal and the rock will be known factors, that of the dust will be a linear function of the ash content of the mixture. The measuring apparatus used consists of a 50 cubic centimetres flask, into the neck of which is fitted the widened end of an inverted measuring tube 7 mm. in diameter, graduated in 100 degs. between two terminal marks corresponding to 5 cubic centimetres of tube space, the total capacity of the apparatus to the upper mark being 62 cubic centimetres. This flask is charged with 15 grammes of coaldust and 25 cubic centimetres of alcohol, and after the measuring tube has been placed in position, another 25 cubic centimetres of alcohol are run in and the position of the upper level of same is read off on the scale.

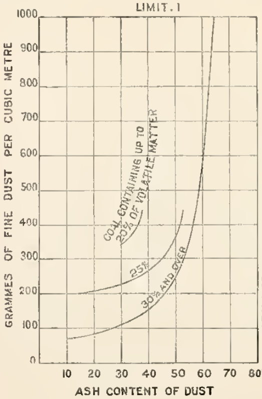


Fig. 1.

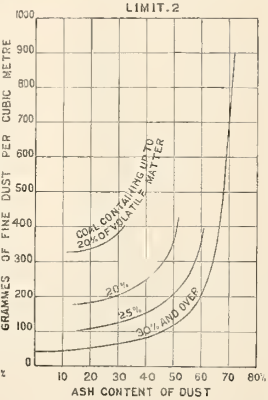


Fig. 2.

The apparatus is standardised by preparing a series of mixtures of pure coal and fragments of the most frequent and friable kinds of rock found in the mine galleries, so as to obtain samples with an ash content of about 20, 30, 40, 60 and 80 per cent. respectively. These being measured in the apparatus, afford a scale of comparison for estimating the ash content of the dust samples collected, the margin of error not being higher than 10 per cent., and probably less than 5 per cent. The data thus obtained show where and to what extent the schistification of the dust should be practised in order to prevent the risk of a coaldust explosion spreading in the mine.

The curves given in figs. 1 and 2 are only to be regarded as approximate and average, the true values being affected by certain secondary factors, the most important of which are the following: Whilst the largest grains which pass through a No. 200 sieve are 0 05 mm., the smallest are only one-hundredth that size, so that a very wide margin exists within which there is room for considerable difference between two specimens of dust yielding the same proportions of fine particles when screened with this sieve. On the other hand, the dust in mines is very often in an oxidised condition, manifested by an increased percentage of volatile matters, in which state it is less inflammable than fresh dust of equal fineness and ash content. These causes of variation have an influence on the limits of inflammability that cannot be revealed by the foregoing method; but for practical purposes that method is sufficient, it being rare that the dust found in mine galleries is so little oxidised and at the same time so fine as to be more inflammable than is indicated by the curves in figs. 1 and 2; and any error in estimation on the basis of these curves will generally be on the safe side.

A more exact idea of the inflammability of a sample of coaldust may be obtained by means of the hot-tube test already described in previous reports, or by the aid of another apparatus in which a sample of dust is blown through a tube into the flame of a Bunsen burner or spirit lamp by compressed oxygen liberated from an oxygen bottle and forced through the mass of dust by a constant pressure of water. If this test be carried out in a darkened room, the flame may be photographed, a permanent record being thus produced for comparison with the flame furnished by standard samples of dust, which can be obtained from the Liévin station on application, these samples corresponding to the limits in figs. 1 and 2.

Other experiments still in progress comprise: The influence of extreme fineness of dust, the composition of the extra fine particles, the degree of oxidation and the contingent presence of various organic substances; the influence of humidity and of the percentage of firedamp in the atmosphere of the gallery.

Grimsby Coal Exports.—The following is the official return of the quantities of coal exported from Grimsby during the week ended August 24.—To foreign destinations: Westervik, 464 tons; Ystad, 1,788; Antwerp, 715; Christiania, 2,725; Horsor, 1,021; Hamburg, 873; Skien, 84; Reykjavik, 988; Pernau, 1,200; Riga, 2,143; Aalhorg, 2,118; Solvesborg, 1,100; Gothenburg, 946; Gefle, 2,924; Malmo, 268; Halmstad, 154; Bornholm, 630; Holmestrand, 694; Xiaris, 610; Restad, 272; and Dieppe, 1,068; total, 22,875 tons. Coastwise: Dover, 310; Fowey, 180 tons; totel, 490 tons.

Northumberland and Durham Miners' Permanent Relief Fund.—The fiftieth annual report of the above states that the membership during last year increased by 4,758, and now stands at 206,867. The income from members' contributions was £204,462 14s 3d., an increase of £12,257 5s. 1d. The income from all sources was £222,022 6s. 5d. The total expenditure for benefit and management amounted to £207,276 9s., showing a balance on the year's transactions of £14,745 17s. 5d. At the end of 1911 the capital stood at £511,161 13s. 11d. There were 222 fatal accidents to members during the year, leaving 120 widows, one guardian, and 202 children chargeable to the fund. The death-rate for the year is returned as 1·073 per 1,000 members. The number of non-fatal accidents to members was 45,734, an increase of 3,465. Permanently disabled members placed on the fund amounted to 803, an increase of 80. At the annual meeting severe strictures were passed on the administration of the fund, particularly in regard to the society having to appear in the courts as defendants against claims of members. Lord Joicey was re-elected president of the society. This year is the jubilee year of the fund, the formation having taken place in 1862, and steps are being taken to celebrate the event in fitting form.

UNITED STATES COAL PRODUCTION, 1911.

Final figures of production have been compiled by the United States Geological Survey, which show a total production in 1911 of 496,188,308 tons. Of this production Pennsylvania anthracite amounted to 90,464,067 tons, and bituminous coal and lignite to 405,724,241 tons. The decrease in production in 1911 was 5,408,070 tons, or a little over 1 per cent. The decrease is attributed wholly to the depressed condition of iron and steel trade in 1911, which was reflected in decreased production of coke. The three leading coke-producing States alone showed an aggregate decrease of nearly 9,000,000 tons of coal. Decrease in the production of bituminous coal compared with 1910 was 11,386,901 tons, but this loss was largely made up by increase in the production of anthracite, which was 5,978,831 tons greater than in 1910.

Considering the marked decrease in production and consumption of coke, and the fact that large quantities of coal in addition to that used for cokemaking are consumed in the iron trade, the comparatively small net decrease of less than 6,000,000 tons in coal production must be taken as an indication that other manufacturing industries, transportation companies, and the country generally were prosperous.

Production of States in 1910 and 1911 is shown in the following table:—

State or territory.	1911. Tons.	1910. Tons.
Alabama	15,021,421	16,111,4 2
Arkansas	2,106,789	1,905,958
California and Alaska	11,647	12 164
Colorado	10,157,383	11,973,736
Georgia	165,330	177,245
Idaho	1,821	4,448
Illinois	53,679,118	45,900,246
Indiana	14,201,355	18,389,815
Iowa	7,331,648	7,928,120
Kansas	6,254,228	4,921,451
Kentucky	13,706,839	14,623,319
Maryland	4 685,795	5,217,125
Michigan	1,476,074	1,534,967
Missouri	3,750,607	2,982,433
Montana	2,976,358	2,920,970
New Mexico	3,148,158	3,508,321
North Dakota	502,628	399,041
Ohio	30,759,986	34,209,668
Oklahoma	3,074,242	2,646,226
Oregon	46,661	67,533
Pennsylvania, bituminous	144,721,303	150,521,526
Tennessee	6,433,156	7,121,380
Texas	1,974,593	1,892,176
Utah	2,513,175	2,517,809
Virginia	6,864,667	6,507,997
Washington	3,572,815	3,911 899
West Virginia	59,831,580	61,671,019
Wyoming	6,744 864	7,533,088
Total bituminous	405,724,241	417,111,142
Pennsylvania anthracite	90,464,067	84,485,236
Grand total	496,188,308	501,596,378

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ended Tuesday, August 27, 1912, is as follows:—Antwerp, 385 tons; Amsterdam, 821; Alexandria, 5,333; Bandholm, 2,086; Bremen, 791; Buenos Ayres, 4,612; Bombay, 1,426; Copenhagen, 337; Christiania, 261; Civita Vecchia, 4,475; Cronstadt, 30,436; Carlscrona, 1,203; Dronthsim, 166; Gefle, 3,351; Guernsey, 316; Gothenburg, 196; Ghent, 1,696; Hamburg, 842; Harnas, 2,428; Harlingen, 1,441; Husum, 487; Kiel, 1,697; Konigsberg, 3,725; Libau, 400; Malaga, 949; Nykjobing, 225; Oporto, 1,492; Oran, 2,844; Pernau, 1,626; Port Said, 5,777; Rouen, 6 321; Rotterdam, 9,797; Riga, 492; Raa, 257; St. Petersburg, 2,464; Stockholm, 190; Stettin, 567; Sannesund, 331; Stege, 1,232; Tromso, 1,327; Venice, 748; total, 105,660 tons; corresponding period August 1911, total 65,258 tons.

Coalweighing.—The General Purposes Committee of the Middlesex County Council, in their annual report for the year ended March 31 last, state that the sale of coal is regulated by Part II. of the Weights and Measures Act, 1889, and by the bye-laws made by the County Council in 1908 in pursuance of that Act. The duties of the inspectors include the testing of the weight of quantities of coal carried or exposed for sale or delivery, and the administration of the Council's bye-laws. During the year 1,054 coal carts were examined, 6,106 bags weighed by inspectors, 66 cases considered by committee, 39 cases in which cautions in writing were sent, and 27 cases in which prosecutions were authorised; 21 summonses were issued with respect to the sale or delivery or exposure for sale of coal of less weight than represented. For the most part coal dealers are careful to see that the Act and by-laws are properly observed by their servants. But some are strangely careless, and leave the weighing entirely in the hands of one or two loaders, with no supervision and no such checking process as that of taking the weight of a cart on a weighbridge after the cart is loaded with coal. The system of guessing the tare weight of sacks is very prevalent. As sacks vary greatly in weight (from a variety of causes) it frequently happens that insufficient weights are used to counterbalance the weight of the sacks, and that the contents of every bag are therefore found to be of short weight—sometimes as much as 3 lb. or more in a 56 lb. sack—a serious deficiency.

"NEW CENTURY" MINE LOCOMOTIVE.

It may be remembered that, in reviewing the various features of the Coal Mines Act, we drew attention to the fact that Clause 58 (2), prohibiting the use of internal-combustion engines underground, was considerably amended before the third reading of the Bill, and that these engines may still be introduced at the discretion of the Secretary of State. We also drew attention to the fact that internal-combustion locomotives had been largely used on the Continent for some years back, even in gaseous mines. Nevertheless, the internal-combustion engine is a rarity in British mines, even where the dangers of firedamp and coaldust are not in evidence. It will therefore interest our readers to have particulars of one of these engines, which has been at work in a north of England lead mine for a considerable period with most satisfactory results. The engine fitted is of the single-cylinder slow-speed type, having a normal rate of revolution of 300 revolutions per minute and fitted with a governor. The control of the engine is simple, the mere movement of a band-wheel giving the engine a forward or backward motion as desired.

This particular engine, which is rated at 12-horse power, hauls 24 wagons of 25/30 cwt. each, and is driven by an ex-pony driver. It is equivalent to the work of four horses and drivers, working at a much slower rate of speed than the locomotive. The engine in question is fitted with a two-speed gear, so designed that it may run at 2½ or 5 miles per hour, as required. The level in which it is employed, as will be seen from the accompanying view, is exceptionally narrow, measuring only 5 ft. 3 in. high by 3 ft. 4 in. wide. It contains several "reversed" or "S" curves, grades of 1 in 68, and for a considerable distance inside the mine the rail-tops are submerged by water. The track is about 22 in. gauge.

LOCO. STANDING AT COMMENCEMENT OF SUBMERGED PORTION OF THE TRACK.

We understand that it has proved so satisfactory that another order has been given by its owners for a duplicate machine for another portion of their workings.

It may be observed that similar machines to that illustrated have been supplied by Messrs. Ironside, Son and Dyckerhoff (manufacturers of the "New Century" mine locomotive) to various colonial collieries.

In one particular case, where a couple of these machines are at work in a gaseous colliery, the owners calculate the actual cost of the machines per ton-mile of mineral hauled at 0·02d.

At Hanley County Police Court, on Monday, Herbert Hancock claimed from the Sandbach Colliery Company at Cobridge, £6 12s. in respect of wages and damages in lieu of notice. A counter-claim was entered for £100 in respect of repairs necessitated by plaintiff's alleged negligent winding. The stipendiary allowed the plaintiff £2 8s. wages due, but in regard to a claim for £4 4s. put up by the plaintiff in lieu of notice, and the counter-claim, he reviewed the evidence at some length. Eventually he gave judgment for the plaintiff for the amount of the claim, and also gave judgment in his favour on the counter-claim.

REFRACTION OF LIGHT IN FIREDAMP.

In a recent issue of *Coal Age* there is an interesting article, by O. H. Hahn, describing an instrument known as an "interferometer," which was originally devised by Professor Haber, of Karlsruhe, and Dr. Löwe, physicist to the firm of Carl Zeiss, at Jena, Germany. The instrument consists of the following parts:—

1. A telescope with a cylindrical eyepiece and an achromatic object-lens provided with an adjustable shutter having two vertical slits.

2. A Jamin compensator consisting of two plane-parallel gas plates, which are set at an acute angle to the telescope. One of these is immovable; the other one rests on a spindle connected with a lever which can be raised or lowered at the option of the operator by means of a micrometer screw, thus changing the angle of inclination, and consequently the thickness of the glass stratum through which a ray of light is to be transmitted.

3. An air chamber with two parallel brass tubes of square section soldered together with silver, and lying side by side. The one to the left is intended to be filled with atmospheric air for purposes of comparison, the other one with the gas to be tested. At each end the tubes are closed with plane-parallel glass plates, and at the sides near each end there is a nipple to which a rubber hose may be attached, one serving for filling the chamber with gas or air, the other one for discharging the same.

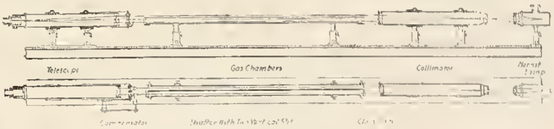


FIG. 1.—HABER AND LOWE INTERFEROMETER.

4. A collimator with an achromatic object glass at the end toward the air-chamber and a brass cover with a vertical slit in it at the other end. The width of this slit can be changed by a micrometer-screw attachment.

5. A Nernst lamp facing the slit end of the collimator, from which light is thrown through a condenser into the slit of the said collimator.

All of these parts are resting on brass standards, which are screwed on an 8 in. by 4 in. channel bar 6 ft. 6¾ in. long, as seen in fig. 1.

The pencil of parallel rays produced by the light of the Nernst lamp, after passing through the objective of the collimator, is transmitted to the telescope in three sections. The upper half of the whole beam of rays passes unchecked and unchanged through the shutter of the telescope into the upper half of its objective. In its local plane this beam of rays produces a spectrum of Fraunhofer lines consisting of two straight and parallel black bands in a white field with coloured fringes adjoining on both sides.

The lower half of the pencil of rays is cut into two equal parts by the metallic partition between the two chambers. Each part of the ray pencil enters through a compensator plate and by the right or left slit of the shutter into the telescope. By taking off the eye-piece of the telescope and looking through it, four luminous rectangles will be observed. The two upper ones belong to the upper half of the pencil of rays; while of the lower ones, the one to the right represents that part of the pencil of rays which has passed through the test-gas chamber and the movable glass plate, and the one to the left represents the part which has passed through the atmospheric air chamber and the stationary glass plate of the compensator. The rays passing through the lower half produce the same interference phenomenon as those going through the upper when the apparatus is set to zero; that is, as long as both chambers are filled with gases of equal refraction and the compensator plates are exactly parallel. On replacing the eyepiece of the telescope and looking through it, one sees the spectra of both halves separated by a horizontal black line, formed by the opaque metal roof of the chambers.

Substituting now another gas for the air in the right or test chamber—for example, a mixture of air and carbon dioxide containing 1 per cent of the latter—the upper spectrum does not change, while, in gradually charging the gas mixture, the bands of the lower system will slowly move to one side. As soon as the charging of the gas chamber is completed they remain stationary. Now, the same bands of the upper and lower systems do not coincide any more. By turning the graduated micrometer screw of the compensator, the lower system has to be brought back to its original position at the zero mark, when the same bands of both spectra will be as one again. The difference in the readings of the compensator before and after charging the gas mixture is a measure of the difference of refraction between this and atmospheric air of equal temperature and pressure.

From observations with varying percentages of gas, Dr. Löwe has tabulated the percentages of methane and other gases corresponding to different revolutions of the micrometer, complete or partial. The instrument has been in use now for a number of months at several schools of mines and collieries, and has given entire satisfaction.

Its only drawback is its size and weight, which preclude its easy transportation in the mines from place to place. Dr. Löwe has, therefore, studied out and constructed an instrument of reduced size which, though not as accurate as the larger one by one-fifth part, has the advantage of being portable. Its length is only 18 in. and its weight 10 lb., including the covering. Instead of a Nernst lamp which requires a current of 110 or 220 volts, which voltage is not always at the disposal of the operator, the smaller apparatus is provided with an osmium lamp which needs only a small portable accumulator to supply it with current. As the lamp is attached to one side of the telescope, it is necessary to place a mirror opposite the gas chambers. The construction of the instrument is shown in fig. 2 here below and the legend will explain its parts.

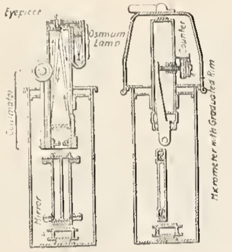


FIG. 2.—PORTABLE INSTRUMENT FOR GAS DETECTOR.

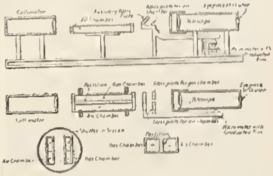


FIG. 3.—INSTRUMENT FOR EXAMINING GASES LEAVING AIR SHAFT.

The larger instrument is in daily use at a State colliery at Gelsenkirchen for the examination of gases passing out of the air shaft.

For fuller information on the subject, especially on its mathematical aspects, the reader is referred to the *Zeitschrift fur angewandte Chemie*, xxiii., 1910, vol. ii., part 30, p. 1393, and *Zeitschrift fur Elektrochemie*, vol. xvi., 1910, p. 39.

Both instruments are manufactured solely by the well known optical firm of Carl Zeiss, Jena.

At the annual meeting of the Workington Iron and Steel Company Limited, Sir John Randles, M.P., in presiding, said the company had had four strikes, which had seriously interfered with their operations. He estimated that the loss thus sustained amounted to not less than £60,000.

TESTING FOR GAS: A POPULAR FALLACY.

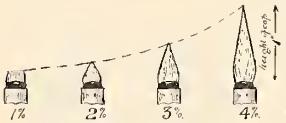
By M. E.

There is little doubt that many skilled firemen and mining officials of higher rank conceived it impossible to detect the presence of firedamp when the percentage was less than two and a-half; and while many yet remain pessimistic with regard to the point, it is quite evident that, as a result of the great amount of research work which has recently been carried through, most mining men have now become convinced that their preconceived notions as to gas testing were fallacious. Were it impossible to detect the presence of gas in a working place when the percentage was as low as, say, 1¼ per cent., of what avail would the stipulation of section 29 (1) of the Coal Mines Act, 1911, be?

The Coal Mines Act does not state by what method the gas has to be estimated to 1¼ per cent. in a working place of a mine, and that were unnecessary since it is well known that many so-called delicate instruments and lamps may be used to estimate percentages less than 1¼.

The late C. le Neve Foster, when discussing the "Testing Air of Mines," stated:—"Experienced observers do not profess to be able to detect the presence of gas in this manner [by the use of an ordinary safety lamp] if the percentage falls below 2½."

At the time the foregoing was written by such an eminent man, little experimental work had been done to show the connection between the percentage of gas in mine air and the height of cap which surmounted the testing flame of the lamp used, but recently a vast amount of work of this kind has been done, and if there is one thing that stands out more clearly than another as a result of that work, it is the ease with which gas can be detected by the use of any ordinary safety lamp when the percentage is much less than 2½; in fact, it is the writer's experience that, with a well-trimmed lamp of the ordinary type, skilled observers have little difficulty in detecting the presence of gas when there is only 1 per cent. in the air under examination. In this connection it must, of course, be pointed out that the Davy lamp is more or less useless as a gas-detecting device. At a recent meeting of a branch of the Institution of Mining Engineers, one of H.M. inspectors of mines pleaded most eloquently and most pathetically that the Davy lamp should not be altogether condemned. He, for one, was really loth to part with the friend of his youth, but when it becomes a question of conforming to the Coal Mines Act in respect to the amount of gas in a place, sentimentalism is out of the question. With a Davy lamp it is almost impossible to detect the presence of 2½ per cent. of firedamp, principally on account of the visibility of the cap being reduced by the presence of the gauze surrounding the flame.



Whether a person of normal eyesight will be able or not to detect 1¼ per cent. of gas in a working place will depend—(1) on the arrangement whereby the size of the testing flame is reduced, and (2) on the observer's conception of what a satisfactory testing flame is.

The method of adjusting the wick should be fine and easily operated, by a screw preferably, and no attempt should be made to set a standard testing flame by the height of it.

The writer is aware that certain persons who speak and write authoritatively on the subject of gas testing specify the testing flame by its height. It is practically impossible for a mine deputy to adjust the flame of his lamp to a tenth of an inch—a commonly specified height.

If instead of being 0·1 in. as intended, it was 0·13 in. high, the testing flame would show an abnormal cap—that is, considering that 0·1 in. gives a normal cap. If the person whose business it is to estimate the percentage of firedamp by the use of a safety lamp will lower the flame until the yellow light has diminished to a mere speck covered by a thin film of blue, he will, by the use of any form of lamp in common use, and any quality or kind of oil in common use, be quite able to detect the presence of gas when there is anything more than 1 per cent. In fact, he will find that 1 per cent. of gas will, with such a testing flame, give a cap which, although incomplete, is ¼ in. high, 2 per cent. a cap ⅜ in. high, 3 per cent. a cap ½ in. high, 4 per cent. a cap 1 in. high, and when the percentage increases to 4½ per cent. it will be found that the cap reaches almost to the top of the inner gauze.

The foregoing results can be easily verified by subjecting any lamp, burning any oil or spirit in common use, to tests with the various percentage mixtures of inflammable gas and air.

THE KROS REGENERATIVE COKE OVEN.

In a recent issue of the *Montanistische Rundschau*, Herr Alfred Gobiet, engineer at the Witkowitz Collieries in Mahrisch-Ostrau, gives a description of the Kros regenerative oven, in which draught changes are avoided in the heating walls, being limited to the reversal of the regenerators. An experimental section of four of these ovens was installed at the Holland Colliery near Wattenscheid over a year ago, and they have given every evidence of meeting with the results expected from them during the period of operation since that time. In the accompanying illustrations are shown several sectional views of the Kros ovens.

The heating gas flows through a main *a*, under the oven, through the nozzles *b* into the pressure-equalising chamber *c*, and then through the nozzles *d* into the heating flues, where combustion takes place with the preheated air which flows in through the two openings *e* arranged slightly above each gas burner. (*See* section J-K.) The heated gases rise through the flues along the entire oven side, and the combustion products then pass through the passage *h* near the top of the ovens and descend through the main *k* at the back and into the checker brickwork regenerators below, the slide gate *m* being open. The exhaust gases of the two heating walls are drawn out of the regenerator, the slide gate *q* being closed, and escape through the chimney flue and out into the chimney at a temperature of about 290 degs. C.

Under each oven chamber is a regenerator extending half the length of the chamber, as shown in section G-H. As already mentioned, the draught reversal is limited to the regenerators, draught conditions in the heating walls being constantly maintained the same. From each pair of heating walls the exhaust gases flow into the same regenerator, while the next regenerator is furnishing these two heating walls with preheated air for combustion. Thus during the period when the odd-numbered regenerators are running on exhaust gas, the even-numbered ones are being traversed by fresh air.

The reversal of the generators is performed by means of the slide gates *m* and *q*, made of a special quartz material, and by means of the cast iron slide gate *n*. These gates are operated by means of a sprocket chain meshing on a sprocket wheel; these wheels are mounted on shafts under the battery of ovens, and are turned by a hand crank positively connected with both shafts. The gate *n* is also opened and shut by means of a shaft on the machine side.

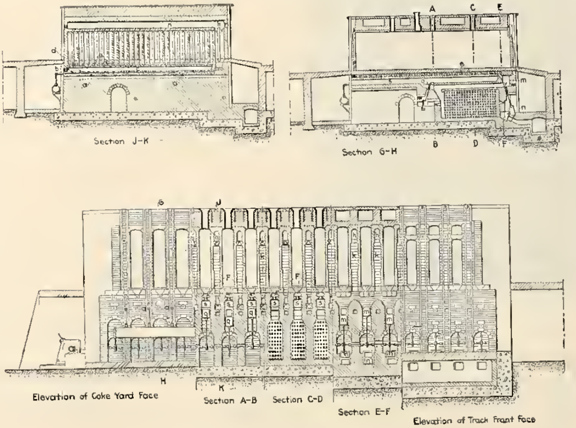
In sections A-B and E-F the positions of the gates *m*, *q* and *n* are shown when the exhaust gases are passing through the regenerator. During the same period the neighbouring regenerator serves for preheating the air of combustion when the gates *m* and *q* are closed, and the gate *n* is open. The preheated air flows out of the regenerator chamber through the main *s* and by means of the nozzles into the pressure-equalising main F, and hence on through the openings *e* to the points of combustion in the two heating walls.

According to the conclusions arrived at by Dr. Otto after various experiments, a pure coke oven gas, when burned with air, yields higher temperatures than are necessary for coking; only care must be taken to avoid too early escape of the heat, or, in other words, the gas velocities or pressures in the oven passages must be low. Since, however, when employing small velocities, there is trouble in supplying regular quantities of gas from this comparatively small-sized piping, and since, with the increasing distance of the burners from the inlet of the gases to the connecting pipe of the burner, the pressure, and with it the flow-velocity, is reduced, the system here described has been designed with a pressure-equalising main for the purpose of overcoming these difficulties.

This collecting main, shown at *c*, is connected with the lower gas main *a* by the interchangeable regulating nozzles *b*. The cross-section of the main *c* is considerably larger than that of the gas main *a*. By a proper adjustment of the nozzles *b*, a uniform pressure is obtained throughout the whole length of the passage *c*.

Vertically below each heating flue the gas collecting main has an opening covered with the nozzle plates *d* of equal orifice. Since the outflow velocity of the heating gas at each nozzle is the same, a like quantity of gas flows through each nozzle plate into the heating chamber, which is equivalent to supplying equal quantities of heat for each heating flue. Care is also exercised to regulate the exhaust gas of the flues by provision of interchangeable regulating nozzles between the heating flues and the exhaust main *h*.

In order to furnish a regular supply of combustion air, there is likewise provided for this purpose a pressure-equalising main F. The interchangeable regulating nozzles, which are made with openings of different sizes, are all of plate form, and are set in hollows of the masonry deep enough to allow for pushing the new nozzle directly over the old one when interchanging nozzles.



Section through a Battery of Kros Ovens.

The coal coked at the Holland mine contained about 18 per cent. of volatile constituents, and the resulting coke was of good composition. The time of coking was 28 hours for a charge of 8 tons of dry coal per oven. The water content of the coking coal averaged 13 per cent.

The production of gas per ton of coal amounted to 240 cubic metres, of which about 110 cubic metres were expended per ton of charge in heating an oven. The gas remaining for other purposes amounted, therefore, to about 54 per cent.

It is interesting to note that the results of the experiment with the four ovens originally installed were sufficiently satisfactory to cause the same concern to construct a large plant of these ovens, which is now in successful operation.

THE COAL AND IRON TRADES.

THURSDAY, SEPTEMBER 5.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 111,032 tons of coal and 230 tons of coke were despatched from Tyne Dock, a decrease of 43,964 tons of coal and 2,454 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 70,934 tons of coal and 1,352 tons of coke, an increase of 3,599 tons of coal and a decrease of 2,616 tons of coke. The Blyth shipments totalled 95,725 tons of coal and coke, an increase of 6,082 tons. It is stated that recently an aggregate of 100,000 tons of Durham blastfurnace coke has been purchased for delivery on the west coast over the next six months at prices ranging from 26s. to 27s. per ton delivered at Workington. There is a very brisk demand for bunkers for forward delivery. Sales of good unscreened Durham sorts for delivery over next year have been made to the extent of from 40,000 to 50,000 tons at about 12s. 6d. f.o.b. A large quantity of special Durham bunkers for shipment to a coaling station next year has been sold at about 13s., and another substantial lot at about 13s. 6d. For a quantity of Northumberland unscreened bunkers for delivery over the same period 11s. 6d. f.o.b. has been paid. Best Blyth household coal has been sold for shipment from October to April at 13s. 6d. f.o.b., and a quantity for January-June delivery has realised from 13s. 4½d. to 13s. 6d. It is reported from Genoa that a prompt cargo of 3,000 tons of Tyne gas bests has been sold at 24s. 9d. c.i.f. For September shipment, sellers ask 25s. 6d., whilst buyers offer 1s. less. For shipment to Genoa over next year, six cargoes of this class of coal have been purchased at 12s. 6d. f.o.b., and another six cargoes have been bought for delivery over the first six months at 12s. 9d. For next year's shipment, buyers are offering 13s. f.o.b. for Blyth best steams and 8s. for smalls. These offers, however, are not regarded by the collieries as being good enough. Tenders of 90,000 tons of locomotive coal for the mechanical department and 30,000 tons of best steams for the marine department, shipment over the winter months, have been forwarded to the Danish State Railways. The local market has firmed up to some extent during the week, tonnage supplies having improved and there being a more active demand. Quotations for prompt shipment are as follow (steady where not otherwise stated):—Best steams, Blyths (D.C.B.), 13s. 9d. to 14s. per ton f.o.b., an advance of from 1½d. to 3d. on the week; Tynes (Bowers, &c.), 13s. 6d., a reduction of 3d.; seconds, Blyths, 12s. to 12s. 3d., an increase of 3d.; Tynes (Hastings or West Hartleys), 12s. 3d. to 12s. 6d., an advance of 3d.; unscreened, 11s. to 11s. 6d.; smalls, Blyths, 9s. to 9s. 3d.; Tynes, 8s. 6d.; specials, 10s., a rise of 6d.; smithies, 12s. 3d. to 12s. 6d., from 3d. to 6d. higher; gas bests (New Pelton or Holmside), 12s. 9d., firmer; seconds (Pelaw Main or similar), 12s. to 12s. 6d., 3d. more; specials, 13s.; unscreened bunkers, Durhams, 12s. to 12s. 6d., in seller's favour; Northumbrians, 11s. to 11s. 6d.; coking coal, 12s. to 12s. 6d., from 6d. to 9d. up; smalls, 11s. 9d. to 12s., 3d. to 6d. higher; households, 14s. 6d.; coke, foundry, 23s. to 24s., 1s. dearer; blastfurnace, 21s., 1s. advanced; and gas coke, 21s., similarly improved. The market for coke is very strong at present. An enquiry for from 4,000 to 5,000 tons of Durham coke for shipment to the west coast of South America is in circulation.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 117,660 tons of coal and 1,565 tons of coke, as compared with 111,460 tons of coal and 1,455 tons of coke for the corresponding period of 1911, being an increase of 6,200 tons of coal and 100 tons of coke. The shipment of coal and coke for last week constitutes a record for the Wear, the previous highest being in September 1905, when 116,000 tons were shipped. The coal market has a distinctly steady tone, the enquiry is good, the only trouble being the scarcity of tonnage. Best gas qualities are steady to firm at 12s. 6d. to 13s., with seconds 12s. to 12s. 6d. Coking unscreened are a little improved at about 12s. to 12s. 6d. per ton, and the same price is ruling for good ordinary bunkers. Forward business is still in evidence, especially for gas coal on Italian account; also a further sale of 25,000 tons of good ordinary bunkers is reported at 12s. 6d. f.o.b. for delivery over next year. The Danish State Railways are inviting tenders for 120,000 tons of steam coal, and the Berlin Gasworks are also enquiring for 250,000 tons of Durham gas coal for delivery over 12 months. Large sales of blast-furnace coke for the blastfurnaces on the west coast have taken place, the price reported varying from 26s. to 27s. per ton delivered. Gas coke is steady with a fair export demand. Good furnace coke is also in request. Household coals are dull. Quotations are:—Special wear gas, 13s. 6d.; smalls, 12s. to 12s. 6d.; household, ordinaries, 14s.; best, 15s.; coking unscreened, 11s. 9d. to 12s. 6d.; smalls, 11s. 6d.; smithies, 14s. to 15s.; peas and nuts, 14s. to 15s. 6d.; foundry coke, 23s. to 24s.; gas house coke, 21s.; blast-furnace coke, 21s. to 22s.; ordinary bunkers, 11s. 6d. to 12s. 6d.; bests, 12s. 9d. to 13s.; superior quality, 13s. 6d. to 14s.—all free on board South Dock. The freight market continues very firm, rates having further advanced all round owing to tonnage showing up slowly. Fixtures are:—Coasting: London 4s. 6d., Havre 6s. 6d. Baltic: Cronstadt 7s., Helsingfors 8s., Fairwater 6s. 9d. Bay: Bilbao 8s. 3d., Lisbon 10s. 6d., Oporto 12s. Mediterranean: Genoa 13s. 6d., Port Said 13s., Alexandria 13s.

Middlesbrough-on-Tees.

COAL.

The fuel trade is steady to firm, with a fair amount of business passing, and prices all round are strong. Deliveries of gas coal are increasing, as is usual at this season of the year, and best kinds command 12s. 9d. to 13s., whilst seconds are 12s. 3d. to 12s. 6d. Bunker coal is in good request, and 11s. 9d. to 12s. f.o.b. is quoted for ordinary kinds, but that there is confidence in the future is emphasised by the fact that 25,000 tons have been sold at 12s. 6d. for delivery over next year. Household coal is quiet at 14s. to 15s. Coking coal is in good request, and unscreened kinds are 12s. to 12s. 6d., whilst smalls are 11s. 6d. to 11s. 9d. There is a good demand for coke both for home consumption and for shipment. Local requirements are heavy, and average blast-furnace kinds are 22s. to 23s. delivered at Teesside works. Gas coke is in the neighbourhood of 21s. Foundry coke for shipment is 23s. to 24s. f.o.b.

IRON.

Iron and steel shipments for August came up to expectations. Clearances of pig amounted to 115,323 tons, 102,475 tons of which went from Middlesbrough, and 12,848 tons from Skinningrove. For the previous month the loadings of pig totalled 123,498 tons, and for August last year the despatches were returned at 101,336 tons. Of the pig iron shipped from Skinningrove last month 11,768 tons went to Scotland and 1,080 tons to the Continent, whilst of the pig iron loaded at Middlesbrough 69,521 tons went to foreign ports and 32,954 tons to coastwise customers. Once more Scotland was the largest receiver of pig iron, taking 21,025 tons, Italy being second with an import of 11,316 tons, and other principal importers were: Japan, 9,967 tons; Germany, 8,813 tons; France, 7,409 tons; Sweden, 7,098 tons; Belgium, 7,007 tons; Wales, 4,588 tons; Holland, 3,435 tons; and the United States, 3,000 tons. Of the 21,715 tons of manufactured iron shipped at Middlesbrough last month, 14,907 tons went abroad and 6,808 tons were despatched coastwise, India being the largest customer with an import of 7,377 tons, whilst the Argentina was the second largest importer with 4,585 tons. Steel shipped from the Tees last month reached 59,700 tons, 54,559 tons going abroad and 5,141 tons coastwise. West Australia was the largest receiver of steel, taking no less than 14,748 tons, whilst India took 6,591 tons, New Zealand 4,426 tons, the Argentina 3,924 tons, Cape Colony 3,782 tons, Norway 3,464 tons, and Natal 3,071 tons. A good business is passing in Cleveland pig iron, and values are higher than they have been for close on 12 years. Up to 65s. has been paid for early f.o.b. delivery of No. 3 g.m.b., and that is now the general market quotation. No. 1 has advanced to 70s., No. 4 foundry has become 64s. 9d., No. 4 forge 64s. 7½d., and mottled and white iron each 64s. to 64s. 3d. There are good enquiries for east coast hæmatite pig, but they do not lead to much business. Producers, however, take a very firm stand, and they quote 75s. to 76s. for this month's delivery of mixed numbers. Foreign ore is very dear, sellers basing quotations on 23s. ex ship Tees for best rubio, and holding out for that price, with the result that the feature of the market is a desire to buy Cumberland ore for the manufactue of east coast hæmatite. One large firm of hæmatite makers have purchased 20,000 tons of Cumberland ore. Prices for all descriptions of manufactured iron and steel are very firm and may be advanced at any time.

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South-West Lancashire.

COAL.

The inland household trade still continues much above what is normal for the time of the year, and collieries are experiencing a little difficulty in dealing with the demand. Prices are firm at list rates, but as yet there is no official notice of any advance. Screened coal for forges and manufacturing purposes continues in good demand. Bunker trade continues brisk, and although the consumption by excursion steamers is beginning to ease off, they continue to take a very fair amount of coal. Regular liners are taking quite their contract quantities, and there is not much coal on offer for outside orders. Prices are still on the up grade, screened Lancashire steam coal ruling from 12s. to 12s. 9d. for better sorts. The pressure in the coastwise and cross-Channel trade for household fuel still continues, and prices are firm at last week's rates—viz., best coal 15s. 6d. net f.o.b., with good seconds 14s. to 14s. 3d. net f.o.b. The annual holidays at the various towns in Lancashire are now coming to an end, and after this week the little surplus of slack that has been apparent will be absorbed in the ordinary course. List prices remain unchanged at from 9s. 9d. to 10s. for best rough slacks, with 9s. to 9s. 3d. for good medium qualities, and 8s. 6d. or thereabouts for the commoner and finer grades—all into wagons at the pit.

South Lancashire and Cheshire.

COAL.

The Coal Exchange at Manchester was well attended on Tuesday. The demand for house coal is brisk. There has been no official change in prices, and they remain firm at late rates; 16s. to 16s. 9d. for best house coal, with good medium qualities 14s. 6d. to 15s. 6d., and kitchen qualities 11s. 9d. to 12s. 9d. all at the pit. Furnace coal keeps very steady, the price being about 12s. 6d. per ton at the pit. Shipping coal is brisk and prices firm at about 12s. to 14s. f.o.b. Partington. Slack is in good demand, and prices are very firm at 9s. to 9s. 9d. for best, with seconds at 8s. to 8s. 6d.—into wagons at the pit.

IRON.

The markets continue very firm and all supplies are hard to get hold of; everybody is pulled out of the place for material. There is no alteration to report in prices, with the exception of iron hoops advanced to £8 12s. 6d. and steel hoops to £8 7s. 6d. Bars remain as they were—£8 5s., with second quality £7 15s. Steelworks are exceptionally busy, with bars at £8 and billets £6 5s.

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Yorkshire and Derbyshire.

Leeds.

COAL.

The attendance at the Yorkshire Coal Exchange on Tuesday was scarcely up to the recent average, many of the members being away on holiday. The gathering, however, was thoroughly representative, and included a good many exporters from Hull and Goole, and a large number of local merchants. It was expected that some announcement with regard to local pit prices would be made, but nothing was done officially, although it was felt that something would be done in this direction at an early date. The market concluded, after a large turnover, with prices all round firmly held. The trade has been very brisk since our last report. The pits have worked full time, and nearly all siding stocks have disappeared; during the earlier part of the week the demand from the distant markets was unusually heavy. Since the revision of price lists, consequent on the 1s. advance in public prices in London, the orders have dropped off to some extent, but the following quotations are steady:—Haigh Moor selected, 14s. to 14s. 6d.; Wallsend and London best, 13s. to 13s. 6d.; Silkstone best, 13s. to 13s. 6d.; (special qualities, 13s. 6d. to 14s.); Silkstone house, 12s. 6d. to 13s.; house nuts, 11s. 6d. to 12s. The coastwise trade is still hampered by scarcity of tonnage, but prices are firmer on the week. Quotations given in Hull since the turn of the month show the following f.o.b. figures for prompt shipment:—Haigh Moor best, 16s. 6d. to 17s.; Silkstone best, 15s. 6d. to 16s. 3d.; Silkstone house, 14s. 6d. to 15s.; large house nuts, 13s. to 13s. 6d. Local merchants in Leeds, Bradford, Halifax, Huddersfield, and the heavy woollen district report a considerable increase in the retail demand. Higher prices are expected, and the public generally are laying in stocks for winter. Current pit prices average as under:—Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. 6d. to 16s.; Silkstone house, 14s. 6d. to 15s. 6d.; ordinary house coal, 14s. to 15s.; secondary qualities, 12s. to 13s. 6d. In spite of the large output, manufacturing fuel is in active demand at firm prices. Industrially the position is strong, many of the factories and other concerns working overtime. Contracts have been renewed this week at fully 2s. 6d. per ton advance on the prices ruling 12 months ago, and there are many enquiries for quotations over the whole of next year. Current pit prices:—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slacks, 8s. to 9s.; small slacks, 7s. to 7s. 6d.; coking smalls, 6s. 9d. to 7s. 3d. Supplies of washed furnace coke are quite inadequate to meet the demand, and spot lots have changed hands this week at 17s. per ton at the ovens. The gas coal pits are fully employed, stocks in colliery sidings being practically nil. Nearly all the new contracts have been secured, and nothing is now being offered at less than 2s. per ton advance on the rates quoted last summer. Current pit prices:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal 9s. to 10s. The export of gas coal continues active, but supplies are less plentiful as the inland demand increases. For fairly prompt shipment the following f.o.b. Hull prices are accepted:—Screened gas coal, 12s. 6d. to 13s. 6d.; gas nuts 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d. to 12s. 6d.

Barnsley.

COAL.

In several respects the market is being severely tested this week. Though by no means united, many collieries have determined that the prospect of the trade is now settled and are seeking to obtain very substantial advances on the prices which have been prevailing for some weeks. Opinions are divided as to the success of the strong action which the collieries referred to have adopted. For the moment, however, buyers have no alternative but to pay the price asked for to obtain the certain qualities of coal they are wanting, for the export demand continues very vigorous in spite of the occasional shortage of tonnage, and sellers are adopting a very confident attitude as to the extent of business over the present month at the least. The dislocation of the railway facilities in the heart of the South Yorkshire district during the coming week owing to Doncaster races has had a very marked effect on the rush for fuel during the present week, though, on the other hand, collieries will only be able by big efforts to obtain during the coming week anything like an average output. On export account forward business is again practically impossible, for coalowners have advanced the prices of best hards to 13s. per ton, and secondary qualities have also jumped up, but quotations vary a great deal, and are from 11s. to 11s. 9d. per ton. These higher prices are apparently firmly established, for, in addition to the large tonnage on foreign account, the supplies taken by the railway companies and large industrial concerns were probably never equalled. The price for the smaller classes of steam coal have also been increased by something like 9d. to 1s. per ton, and the best quality washed nuts are now quoted from 11s. to 11s. 6d. per ton, though secondary sorts are hardly so strong, but though no increase has generally been made, late prices from 9s. 3d. to 9s. 9d. per ton are very firmly held. The demand for slacks is also very brisk, and the better-class fuel is making slightly more money, though perhaps large orders may yet be placed at late prices—about 8s. per ton—while for smaller lots such is the strong enquiry that a considerable advance is being obtained. The rougher qualities of slack are again in something like ordinary demand, though the bulk of this oal is being retained for cokemaking in the district, and prices range from 7s. to 6s. 6d. per ton. The position in the house coal trade is again peculiar, and coalowners are complaining of the mild sort of panic which has seized the public, resulting in merchants rushing in with orders which cannot be supplied during the ordinary period. Knowing that the bulk of this coal is not required for immediate consumption, many large collieries who are well placed with contracts have attempted to put a stop to this by enforcing an immediate increase of prices instead of waiting, as usual, until the opening of next month. The best quality is advanced at from something like 1s. 6d. to 2s. per ton, and secondary sorts about 1s. per ton, whilst nuts have also been increased by about 1s. 6d. per ton. The action taken, as already hinted, is not by any means general, and merchants feel that it cannot be sustained and there is little likelihood of a similar attempt being made on the part of collieries which produce a secondary grade of house coal. The quotations at the present are now about as follow:—Best Silkstone 14s. 6d. to 15s. per ton, Best Barnsley softs 13s. 9d. to 14s. per ton, seconds 11s. 6d. to 12s. per ton, and best house nuts 11s. 6d. to 12s. 3d. per ton. The gas coal trade has become more of a settled character now that there are very few contracts outstanding, and the collieries are able to deal expeditiously with a full output. The demand for coke from the North Lancashire districts still continues to be very active, and producers are able to maintain prices as last quoted, 16s. per ton at the ovens for ordinary qualities.

Hull.

COAL.

The market opened firm at the beginning of the week, and, after some indications of easiness, has recovered itself, business both prompt and forward on the Exchange to-day being brisk. In anticipation of next week, being Doncaster race week, and a consequent curtailment of supplies from South Yorkshire, the demand quickened and buyers came into the market more freely to obtain their requirements. Best Yorkshire steam hards are still firmly held at 15s. 6d., at which prompt business has again been done, while secondary sorts are a strong market. Owing to a very great shortage of tonnage and the difficulty of getting suitable vessels, foreign exporters have not been so active, and have been inclined to stand off until more tonnage is in sight and prices ease off a bit. What with high freights and the high price of coal, the export business is considerably handicapped. Nevertheless, there seems plenty of forward business in prospect, pointing to a continuance of the present busy period to the end of the Baltic season. Gas coal has been in good request and large quantities have been shipped to London, while the demand for rough slacks for industrial purposes continues unabated. House coal is also going off very freely, and merchants are actively engaged in fixing their requirements for the winter. A very large quantity is being exported at the docks. Though the pressure is not so great as it was, loading conditions are much improved, prompt turns at the appliances now being available. Stocks in the sidings are fairly large, but none too great to meet the expected lessened supply from the collieries next week. The official returns of the August export will not be ready until next week, but a forecast shows that they are expected to be 75,000 to 100,000 greater than August last year, when the export was adversely affected by the railway strike, and consequent dislocation of the coal traffic. The freight market has been dull, chartering being restricted by the scarcity of tonnage. The Baltic rate remains firm on the basis of 6s. 6d. Hull to Cronstadt, while other steamers have been fixed Reval 6s. 9d. (and from Grimsby 7s.), Hamburg and Rotterdam 4s. 9d., Dahlsbruck 8s., London 4s. to 4s. 6d., Barcelona 13s. 6d. The Mediterranean market is quiet, 12s. 6d. to 13s. being asked for Genoa, and 11s. 6d. for Alexandria and Port Said. For a steamer for Buenos Ayres 22s. has been paid. The following are the approximate prices for prompt shipment f.o.b. at Hull, &c., quoted on the Humber Coal Exchange to-day:—South Yorkshire: Best steam hards, 15s. 3d. to 15s. 6d.; washed double-screened nuts, 13s. 9d. to 14s. 6d.; unwashed double-screened nuts, 12s. 6d. to 12s. 9d.; unwashed single-screened nuts, 11s. 6d. to 11s. 9d.; washed smalls, 11s. 9d.; unwashed smalls, 10s. 6d.; West Yorkshire: Hartleys, 12s. 9d. to 13s.; rough slack, 10s. 3d. to 10s. 6d.; pea slack, 8s. 3d. to 9s.; best Silkstone screened gas coal, 12s. 6d. to 13s.; best Silkstone unscreened gas coal, 12s. to 12s. 3d., Parkgates, 14s.; Derbyshire: Best steam hards at Hull, 14s. 3d. to 14s. 9d.; best steam hards at Grimsby, 14s. 6d.; Derbyshire nuts (doubles) at Hull, 12s. 9d. to 13s.; Derbyshire nuts (doubles) at Grimsby, 12s. 6d. to 12s. 9d.; Derbyshire large nuts at Hull, 13s.; Derbyshire large nuts at Grimsby, 12s. 9d. to 13s.; Nottinghamshire hards at Hull, 14s. 6d. to 14s. 9d.; Nottinghamshire hards at Grimsby, 14s. 3d.

Chesterfield.

COAL.

While prices of house coal have not yet been officially advanced in this district, it is probable that these will be put up at an early date. In the meantime, the demand is steadily increasing, enabling the pits to work full time. There is every indication of a brisk autumn trade. Stocks are exceptionally small. There is a very heavy demand for fuel for manufacturing purposes, all classes of coal being urgently needed. Steelmaking kinds, such as cobbles and nuts for gas-producers, are in particularly strong request, but the supply is far from being sufficient to satisfy customers' requirements. Slack for boiler firing is in great request, and the stoppage of work in the cotton industry caused by the annual "wakes" of Lancashire does not appear to have effected the demand, which is now stronger than ever. Prices are very firm, and the quantity that collieries have now for sale is of a very limited character; indeed, many of them are now off the market altogether. Steam coal for locomotive use moves freely, heavy deliveries going forward daily to the various depots. It is evident that the consumption is increasing substantially, as the tonnage of coal contracted for does not appear to be equal to the requirements of several of the railway companies, who are only too willing to purchase additional lots whenever these are available. Collieries are, however, so heavily committed in other directions that the quantity of steam coal they have to spare is exceedingly limited. Prices are hardening, and a substantial advance will be required by the collieries for the renewal of such contracts as expire at the end of this month. There is considerable activity in the export trade, and, with an improved supply of tonnage, prices are again hardening. The demand for Derbyshire Top Hards is strong, and for such lots as are available 11s. 3d. per ton at the pit is readily paid. A satisfactory business is being done, and prospects are encouraging. There is a very heavy demand for slack and nuts for shipment, and small cobbles are also in good request. Washed fuel finds a ready sale for current delivery, while there are numerous enquiries for this class of fuel for shipment over the first six months of next year. The coke trade maintains the strong position which has characterised it now for many months. There is a full demand for all qualities. Coking fuel finds a ready sale at firm prices. To-day's prices are as follow:—Best 13s. 6d., seconds 12s., cobbles 11s., nuts 10s., slack 8s.

IRON.

The pig iron market is remarkably strong. The demand is very heavy, and prices are higher than they have been for many years. The finished iron branch of the trade is in an equally satisfactory position. Work is plentiful, and, to all appearances, it is likely to be abundant for some months to come.

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Nottingham.

COAL.

The position of the coal trade in Nottinghamshire has, if anything, been somewhat strengthened during the past week, the continued cold weather having materially assisted in this direction. In regard to the house coal section, merchants are beginning to purchase larger quantities following on the increased public demand, and the fact that prices are not likely to decline; indeed, if the weather continues in its present mood, the probability is that a general increase will be made at the end of the month. The stocks at collieries are less weighty, and most of the soft coal pits are turning from four to five days per week. A good tonnage is being sent to London, and a fair business is being done at the local landsale depots. Values are hardening, and on some qualities a slight advance, it is reported, is being asked by some owners. Quotations generally are:—Hand-picked brights, 12s. 6d. to 13s. per ton; good households, 10s. 6d. to 11s. 6d.; seconds, 10s. to 10s. 6d.; nuts, 9s. to 10s.; cheap kitchens, 7s. 6d. to 8s. 6d. The steam coal branch has retained its activity in nearly every department, and industrials particularly are in brisk demand. Values are very firm, best hards being quoted at 11s. to 11s. 9d. per ton, seconds 10s. 6d. to 11s. Slacks of practically every kind are selling freely, especially best qualities, while gas fuel is in good request.

Leicestershire.

COAL.

There is a cheerful feeling pervading this district. Most of the collieries are very well supplied with orders, both for present and forward delivery, sufficient to give very full employment. The output is as promptly delivered as possible, so that there is but a very small amount of stock on hand. The result of the brisk business doing is manifested in the prices now current. It may be taken that at the moment, prices are up one shilling or more on all descriptions of coal, and this value is likely to be maintained if not further advanced. The principal business now doing is for prompt delivery, forward buying is not very generally entertained. The present demand for best household coals is showing a considerable improvement, and also there is a much better enquiry for middle qualities. Household small coals, nuts and cobbles are in much improved request. In the steam coal market, there is much activity, and prices are very firm. Steam coals have further improved. There is a better enquiry for cobbles and coal. Special slacks for automatic stokers are in very good request, and there is also a good demand for the ordinary sorts of slack. Local merchants are considerably busier, and may be said to be doing a good business, better than for some time. The prospects of business here are quite of a satisfactory nature, and a good time is anticipated.

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South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL.

The activity experienced during the past few weeks in the coal trade of the Cannock Chase district is well maintained. Prices on the whole are satisfactory, with an upward tendency, and orders are coming freely to hand. The collieries in the district are busy, most of them now working full time. The demand for fuel for manufacturing purposes is in much the same satisfactory condition as when last reported, and there is a good enquiry for house coal. There is not much change this week in business at the landsale depots.

Birmingham

COAL.

The higher prices are now in operation, but they do not seem to have checked the demand. There is not the rush that usually comes with September, but, what is more to the liking both of owners and merchants, there has been a steady trade during August. Buying is going on for deliveries during the next three and six months. The call for all kinds of manufacturing fuel is of an extending character, and is likely to continue. There is a fair supply of slacks at prices ranging from 6s. to 9s.

IRON.

The market was well attended and exceedingly active. In a number of departments prices were still further advanced as a result of the extraordinary demand, and the increased cost of production caused by higher wages and the Insurance Act. Naturally, with so little material available, current transactions were not of large dimensions. Pig iron quotations were maintained at last week's high rates, namely, South Staffordshire common 60s., Northamptonshire 62s. to 63s., and Derbyshire 64s. to 65s. There are no stocks, and producers are in a very strong position. Bar producers are making a very heavy output, and for good second-class merchant bars the general price has reached £8 7s. 6d. a ton, delivered, which is about 2s. 6d. above recent rates. The demand exceeds that experienced for many years. There is also a good demand for puddled bars at £5 17s. 6d. to £6 a ton. The action of the South Yorkshire barmakers in raising prices 5s. to £8 10s. a ton has been promptly followed by Lancashire and North Staffordshire makers, whose rates have been raised to the same level. Prices in the galvanised sheet trade have also undergone a welcome improvement. The chief houses gave their agents instructions to quote £12 7s. 6d. to £12 10s. Certainly nothing was sold under £12 5s. A good export demand is experienced, the principal markets being South America, India, New Zealand and Australia. There is abundance of work on hand. There is also plenty doing in the gas strip trade, but in this branch prices were unaltered. Steel strips, however, were a shade dearer, quotations ranging from £8 12s. 6d. to £8 15s. for the customary merchant sizes. Steelmakers are overwhelmed with work, and complaints are loud of inability to get supplies. Some firms are actually refusing more orders because they have already fully as much as they can cope with. Sheet bars range from £6 2s. 6d. to £6 5s., according to quality. Angles remain at £7 15s. to £7 17s. 6d., and joists £7 5s. The Small Steel Bar Association moved quotations up by 5s. to £8 a ton. Copper sheets are £95 a ton, and naturally at this high price consumers are very sparing in their purchases. The majority work on old contracts.

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Forest of Dean.

Lydney.

COAL.

Whilst there is not such a brisk enquiry ruling at present as was experienced during the last couple of weeks of August, the demand for house coals is still good and the pits are all working well this week. Now that the weather is finer, some of the overdue sailing tonnage will be coming along, which will mean activity in the shipping department at the docks. The orders from the inland merchants are coming to hand steadily, and at present there is every prospect of a good month's trade. Prices are unchanged—block 15s. 6d., rubbles 14s. 9d., nuts 13s., rough slack 6s. 6d. at pit. The steam coal pits are all busy and prices show a tendency to increase. One or two of the pits have experienced trouble with the water, in consequence of the heavy rains, and things look very serious in the case of one or two of the smaller places.

Plymouth.

COAL.

Messrs. W. Wade and Son report a good demand for house, steam and gas coal, with advanced prices and freights for most descriptions of seaborne fuel. It is calculated that these advances when combined amount to about 2s. 6d. per ton above the rates prevailing in June, but up to the present local merchants have been lacking in unity in regard to advancing retail prices beyond those which then prevailed. Very full loading turns are reported at many of the coal ports, and it is evident that those buyers who require prompt shipments must be prepared to give still higher prices.

THE LONDON COAL TRADE.

Thursday, September 5.

The demand for house coal on the London market still continues good. The change to warmer weather has somewhat influenced the demand, but although the orders have lessened slightly in volume, the pressure for the coal on order has become more keen and orders are beginning to grow from many outside sources. In the seaborne market the demand is limited, but as there is very little coal on offer the prices are still nominal. Sellers are not pushing the trade, and everywhere the desire to hold the coal on hand is making itself felt. Bakers' nuts are increasing in demand and kitchen cobbles also are extending. Manufacturing qualities are moving freely and the brisk demand all along the Thames-side factories is becoming every week more marked. The heavy leeway occasioned by the long continued stoppage over the dock strike and the labour troubles is making a good volume of trade along the river. Inland coals are bought fairly freely for prompt and forward delivery, and in many cases the cheap classes of fuel have been very firm, with only a moderate tonnage coming forward. Considerable discussion was evinced on Friday's market in connection with the public prices, but in the end the merchants decided not to make any alteration in the advertised prices, although in many cases this was fully anticipated. Colliery prices were in a good many cases advanced from 6d. to 9d. per ton. Merchants for the most part are not over supplied with stock, and collieries are evidently sending short supplies to the metropolis. Seaborne house coals are only limited. The demand is good, but the prices are considered high. No cargoes, however, are offering either of Durham or Yorkshire. Twenty-two cargoes were reported on Monday in the Thames and 12 on Wednesday, but all sold. The prices remain at 21s. for the best and 20s. for seconds. Inland coals are selling only in small lots, as the collieries do not wish to crowd their books with orders just before the winter season sets in. Late on Monday last, after a somewhat protracted discussion, the merchants decided to advance all public prices 1s. per ton—making best Wallsend 28s., best Silkstone 27s., Derby brights 26s. and kitchen coal 26s.; and 6d. in dealers' prices. This is the first advance on best coals since the settlement of the lowest summer prices, but it is the second advance for kitchen and the lower qualities. This somewhat earlier advance than usual foreshadows the fact that prices may be very irregular and subject to a variety of influences during the winter period, when the demand is stronger and the consumption of coal more regular. The decision was not arrived at until late in the afternoon, as so many of the merchants are said to have fairly heavy stocks on hand and were disposed to wait. There are not wanting many of the London merchants who thought the wholesale prices and the public prices too would slacken as the summer season advanced, more particularly as the two earlier months of the summer were accompanied with a brisk demand, and the general public were buying so freely. The demand, however, continues good, and the shipping trade is evidently absorbing a much bigger tonnage than usual. Collieries are working full time. The local feasts and festivals have somewhat interfered with the tonnage, and the time is gradually drawing near when so many of the empties withdrawn from the ordinary run of the coal trade will be again available. The highest advance in the price of fuel belongs to the various qualities of slack, for at the present moment slacks are freely selling at prices very near approximately to some of the large coals, during the summer season of last year; 6s. and 6s. 6d. are freely quoted now for good nutty slack, and as freely given, whilst smudge and fine dust are selling at from 3s. to 4s. pit. Leicestershire qualities of steam coal find themselves very full of orders at the low prices accepted, and with the local current demand in view are endeavouring to husband their resources and are already putting up their prices to a level of other competing districts.

From Messrs. Dunham, Fawnns and Co.'s Report.

Friday, August 30.—The seaborne house coal market was steady to-day, no cargoes of either Durham or Yorkshire being sold. Cargoes 26.

Monday, September 2.—There was no alteration in the seaborne house coal market to-day, which continued steady, with no sales reported of either Durham or Yorkshire. Cargoes 22.

Wednesday, September 4.—There was a very good enquiry for seaborne house coal at to-day's market, but no supplies available of either Durham or Yorkshire. Cargoes 12.

THE SCOTCH COAL AND IRON TRADES.

Thursday, September 5.

Glasgow and Lanarkshire.

COAL.

The coal trade has been very active in Scotland since last report. No doubt the shipments are somewhat behind what they were in the preceding week, but the total is still a very high average. The shrinkage of 5,898 tons has occurred entirely on the west coast, there being a substantial increase in the east coast shipments. The aggregate clearances at the Scottish ports amounted to 355,009 tons, being 5,898 less than in the preceding week, but 25,392 tons more than in the corresponding week of last year. At Glasgow, 46,650 tons were despatched abroad and 33,370 tons coastwise, the total of 80,020 tons comparing with 96,837 in the preceding week and 83,639 in the corresponding week of last year. The foreign shipments are 11,000 tons better than in the preceding week, so that the decrease in the total at Glasgow has occurred entirely in coastwise business, and some part of it may be due to loss of time occasioned by the "Comet" centenary celebrations, in which the local shipping interest was much involved. There has been a very confident feeling in the coal market, due to the great activity that prevails in manufacturing circles, both at home and abroad. From the beginning of this week, coalmasters and merchants have intimated advances in prices. Whole coal has been raised 1s. per ton, and smalls and dross 3d. to 6d. per ton. It is believed that so far as regards manufacturing qualities and the better sorts of house coal, the advance may be generally secured, but this is not so certain in the case of secondary qualities, the supplies of which are pretty heavy and not so easily cleared. Steam coal has been selling very well, and there is an increasing demand for splint, while the better qualities of house coal meet with a ready market. The quotations f.o.b. at Glasgow are for steam coal 12s. 6d. to 13s. 6d., ell coal 13s. to 13s. 6d., splint 13s. 6d. to 14s., washed treble nuts 14s. to 14s. 6d., doubles 13s. 6d. to 14s., and singles 12s. 6d. to 13s. per ton. The demand for manufacturing qualities of coal is exceedingly strong for the home market, and there is every prospect of the activity being maintained throughout the present year. Enquiries from the Mediterranean and South America seem to indicate that a good business will be done in those directions. The export trade generally might be greater but for the high cost of tonnage.

IRON.

The pig iron market has continued very active, and prices have shown a further advance. The impression is prevalent in the market that, despite the fact that warrants have risen about 12s. per ton during the past three months, prices are likely to go substantially higher. Up till now buying has been mainly on account of consumers, but the speculative element is becoming more evident, and should it increase, fluctuations in prices may be more general. Business has been done in Cleveland warrants, since last report, from 63s. 8d. to 64s. 6½d. cash, 63s. 11d. to 64s. 5d. one month, and 64s. 3d. to 64s. 9d. three months. The demand for future delivery has been comparatively strong, and transactions have taken place at 63s. 10d. 14 days, 64s. 29 days, and 64s. 3d. to 65s. 6d. for delivery in November. Hematite pig iron has also been tending higher. Scotch pig iron has again responded to the position of warrants in the matter of prices, which have been advanced all round. F.a.s. at Glasgow, Govan and Monkland Nos. 1 are quoted 70s. 6d., Nos. 3, 69s.; Carnbroe, No. 1, 74s., No. 3, 70s.; Clyde and Calder, Nos. 1, 78s., Nos. 3, 73s.; Summerlee, No. 1, 78s., No. 3, 74s.; Gartsherrie and Langloan, Nos. 1, 79s., Nos. 3, 74s.; Coltness, No. 1, 94s., No. 3, 76s.; Eglinton at Ardrossan or Troon, No. 1, 71s., No. 3, 70s.; Glengarnock at Ardrossan, No. 1, 79s., No. 3, 74s.; Dalmellington at Ayr, No. 1, 72s., No. 3, 70s.; Shotts at Leith, No. 1, 79s., No. 3, 74s.; Carron at Grangemouth, No. 1, 78s. 6d., No. 3, 73s. 6d. per ton. Scotch hematite is quoted 81s. for West of Scotland delivery. There are 47 furnaces making hematite, 37 ordinary and 4 basic iron, the total of 88 thus blowing in Scotland comparing with 83 at this time last year. Scotch consumers are using increasing quantities of Cleveland iron, and the imports from that district during August amounted to 32,793 tons. The shipments of Scotch pig iron in the past week were 4,685 tons, showing an increase of 1,529 over those of the corresponding week of 1911. The manufacturing branches of the iron trade are fully employed, and in some cases, such as that of shipbuilding steel, there is great pressure for delivery.

Renfrew, Ayr and Dumbarton.

COAL.

There has been an active business in the coal trade throughout this district. Home requirements are extensive and seem to be increasing; and while the shipments fall somewhat behind those of preceding weeks, they are still a very good average. The quantity of coal sent abroad was comparatively small, amounting to only 2,424 tons, and the coastwise shipments totalled 29,377 tons. At Bowling 137 tons were cleared, Troon 7,938, Ardrossan 2,571, Irvine 500, Greenock 3,071, Ayr 17,584—total 31,801 tons, compared with 34,663 in the preceding week and 35,320 in the corresponding week of last year. Both shipping and inland supplies are generally well maintained, and prices have been advancing. The best qualities of manufacturing coal have been raised 1s., and other sorts in different localities 3d. to 9d. per ton.

Stirling, the Lothians and Fife.

COAL.

At some of the Firth of Forth ports there has been rather less doing owing to a scarcity of vessels, and coastwise business fell off to a considerable extent. But the activity prevailing at Grangemouth and Leith fully made up for diminished business elsewhere, and on the whole the shipments showed an increase of fully 10,000 tons. The quantity sent abroad was 99,669 tons, and the coastwise shipments 17,619 tons. At Granton 6,172 tons were shipped, Bo'ness 13,124, Leith 44,828, and Grangemouth 53,209—total 117,288 tons, compared with 106,574 in the preceding week and 85,303 in the corresponding week of last year. Prices of shipping coal, which had lately been somewhat easy, are now firming up owing to advances elsewhere. Best steam screened coal is quoted at Leith 13s. to 13s. 6d., secondary qualities 12s. to 12s. 6d., treble nuts 13s. 6d. to 14s., doubles 12s. 6d. to 13s., and singles 12s. to 12s. 9d. per ton. There has been an improving tendency in the inland branches of the trade, and the coalmasters in the Lothians have raised their prices 1s. per ton. Business at Fife ports has been well maintained, with an active demand for all classes of coal. The shipments in the past week were at Methil 59,425 tons, Burntisland 61,860, Alloa 1,348, Wemyss 1,482, Charleston 655, Dysart 623, Tayport 557—total 125,800 tons, against 122,833 in the preceding week, and 125,346 in the corresponding week of last year. First-class screened navigation coal is quoted f.o.b. at Methil or Burntisland 16s. to 17s., unscreened 13s. 6d. to 14s. 6d., first class steam coal 13s. 6d. to 14s., secondary qualities 1s. to 1s. 6d. lower, treble nuts 14s. to 14s. 6d., doubles 13s. to 14s., and singles 12s. 6d. to 13s. per ton. The demand for nuts has been particularly good. It is reported that contract business is on the increase.

THE IRISH COAL TRADE.

Thursday, September 5.

Dublin.

The local coal trade is still fairly active, and at the moment prices generally are unchanged, although advances are now daily expected to be made owing to the position across the water. Quotations in the city are as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; best coke, 23s. per ton; "bell" coal, 1s. 5d. per sack; steam coals, from 20s. per ton upwards. The import trade continues to be active, and merchants are stocking very extensively. The coaling vessels arriving during the week totalled 54, as compared with 49 the week previously, chiefly from West Bank, Irvine, Preston, Whitehaven, Garston, Troon, Glasgow, Cardiff, Newport, Point of Aire, Burryport, Workington, Ayr, and Campbeltown.

Belfast.

Greater activity prevails in all branches of the coal trade than is usual at this season, and many householders have been purchasing winter supplies a month or more before the ordinary time in anticipation of an early advance in prices. City prices are 1s. 6d. per ton higher all round this week, quotations being as follow:—Giant's Hall Arley coal, 26s. 6d. per ton; Hartley, 25s. 6d.; Wigan, 24s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 22s. 6d.; Orrell slack, 22s. 6d. Supplies to the port are now moderate, owing to the large demand on the part of householders for the past week or two, which has reduced stocks considerably. Cargoes arriving during the week were chiefly from Ayr, Maryport, Garston, Campbeltown, Preston, Girvan, Workington, Troon, North Abbey, Ellesmere Port, Partington, Point of Aire, and Rothesay.

THE BY-PRODUCTS TRADE.

Tar products:—The market generally is rather quiet, though most products are steady. Benzols are dear, and so are naphthas. Pitch is quiet, and crude carbolic on the downward turn. Creosote steady at full prices. Nearest closing values are:—

Benzols, 90's, 1s. 1d.; ditto 50's, 11½d.; toluol, 1s.; carbolic acid, crude (60 per cent.), 2s. 6d. to 2s. 7d.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 1s. 1½d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 3¼d. for ordinary qualities; pitch, 51s. to 52s. f.o.b. east coast; ditto, 50s. 6d. to 51s. 6d. f.a.s. west coast; ditto 55s. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—The market is very firm and prices are on the advance, although there is the increasing output of carbonising works to be considered at this time of year. Nitrate of soda is decidedly dearer. The forward position is very strong, and £15 is now asked for future long-date deliveries, while prompt prices are as follow:—

London (ordinary makes), £14; Beckton, £14 2s. 6d.; Liverpool, £14 12s. 6d.; Hull, £14 10s.; Scotch ports, £14 12s. 6d. to £14 15s.; nitrate of soda (ordinary), per cwt., 11s. 4½d.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

THE TIN-PLATE TRADE

Liverpool.

The tone of the market is firm with a distinct upward tendency. Enquiries were numerous during the week, and a fair amount of business resulted. Some good parcels of oil sizes were put through at 15s. 1½d. for shipment within the next couple of months. Works are all comfortably booked up to November at least, and some of them a good way beyond this. Current quotations may be called:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 14s. 9d. to 14s. 10½d. per box; I C 28 × 20 (112 sh. 216 lb.), 29s. 6d. to 29s. 9d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 3d. to 15s. 4½d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. 1½d. to 15s. 3d. per box; I C 14 × 19½ (120 sh. 110 lb.), 15s. 1½d. to 15s. 3d. per box; I C 20 × 10 (225 sh. 168 lb.), 21s. 6d. to 22s. per box; I C squares and odd sizes, 15s. to 15s. 3d. basis. Ternes are steady and in fair demand at 26s. and upwards for I C 28 × 20. Charcoal tins rule firm at 17s. 6d. and upwards according to tinning. Coke wasters are quoted:—C W 14 × 20, 13s. 9d. per box; C W 28 × 20, 28s. 3d. per box; C W 14 × 18¾, 13s. 9d. per box; C W 20 × 10, 19s. 6d. per box—all f.o.b. Wales, less 4 per cent.

It is stated that the Admiralty have decided to construct additional tanks at the Medway oil fuel station, between Chatham and Sheerness, in order to provide oil fuel reserves for the Navy. Five more oil fuel reservoirs have been ordered for Portsmouth Harbour, making a total of 17.

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Forthcoming Annual Meetings.

Institution of Mining Engineers—
Provincial Meeting (Birmingham) September 11, 12 & 13, 1912
Midland Counties Institution of Engineers Sept. 1912
Manchester Geological and Mining Society, Oct. 8, 1912
North Staffordshire Institute of Mining and Mechanical Engineers ... October 14, 1912
South Staffordshire and Warwickshire Institute of Mining Engineers ... October 1912 (2nd week)
Iron and Steel Institute—
Autumn Meeting ... September 1912
Association of Mining Electrical Engineers—
October 4 & 5, 1912 (Provis.)

The Colliery Guardian.

LONDON, FRIDAY, SEPTEMBER 6, 1912.

Mr. G. T. Beilby, F.R.S., has been appointed a member of the Royal Commission on Oil Fuel, in succession to Mr. H. Owen Jones, deceased.

Important developments are to take place shortly to increase the storage of naval oil fuel at Portsmouth Harbour. Five new oil-fuel reservoirs are to be constructed during the winter.

At the Miners' Federation of Great Britain annual conference at Swansea, in October next, there will be a debate on the proposal to apply for a general advance of 20 per cent. for all workmen employed in mines. Following this will come a proposal for the establishment of a working week of five days.

The autumn meeting of the Institute of Metals will be held in London on Wednesday and Thursday, September 25 and 26.

At a meeting of the Scottish Coal Trade Conciliation Board last week, the employers claimed a reduction of the miners' wages to the extent of 12½ per cent. on the 1888 basis. No agreement was reached, and the meeting was adjourned for a fortnight.

The British Association opened its annual meeting at Dundee on Wednesday, when the president, Professor Schäfer, gave an address on "The Origin of Life."

A new rescue station was opened on Monday in the Rhondda Valley.

An important test case was brought before the Pontypridd stipendiary's court last week, dealing with the operation of the Minimum Wage Act. Since the passing of the Act collieries have been worked on day-to-day contracts, but this the men contend is a breach of the Conciliation Board agreement. The magistrate stated that in the absence of any agreement or custom he had to decide what constituted reasonable notice, and this he fixed at four weeks. It is probable that this case will go to the House of Lords.

The South Yorkshire coalowners have made important concessions, by which the men secure a reduction of hours and an advance in wages.

A terrible mining disaster took place in the Clarence Coalmine in the Pas-de-Calais on Tuesday, caused by an explosion of firedamp. The death roll is reported to have reached 60.

The Trade Union Congress was opened at Newport on Monday, and several labour questions have been discussed.

The twenty-third annual general meeting of the Institution of Mining Engineers will be held in Birmingham on Wednesday next, when papers will be read by Mr. Alex. Smith, M.Inst.C.E., on "Recent Legislation in Relation to Land and Mines"; and by Mr J. T. Stirling and Dr. Cadman on "A Series of Explosions in the Bellevue Mine, Alberta."

A disastrous accident occurred at the Shakespeare Colliery, Dover, last evening, in which two men lost their lives and several others were injured.

COALMINING IN FRANCE.

The Comité Central des Houillères de France has recently published an extract from their annual report, in which a general view is given of the main characteristics and progress of development of the French coal trade.

Fatal Accidents.

In the first place, reference is made to some reduction in the accident death-rate in French collieries, which fell from 1·17 per 1,000 men employed in 1909 to 1·08 in 1910, and although the figures for 1911 are not yet published, there is reason to believe that these will prove equally satisfactory. An interesting table is given showing the accident death-rate per 1,000 persons employed in the four countries, France, Prussia, Belgium and Great Britain. In view of our comment upon death-rate statistics in last week's issue, it will be of interest to reproduce these figures for comparative purposes:—

Year.	France.	Prussia.	Belgium.	Great Britain.
	Per cent.	Per cent.	Per cent.	Per cent.
1901	1·21	2·34	1·17	1·36
1902	1·09	1·99	1·07	1·24
1903	1·02	1·92	1·14	1·27
1904	1·07	1·80	0·93	1·24
1905	1·04	1·86	0·98	1·35
1906	7·17	1·97	0·95	1·29
1907	1·10	2·39	1·04	1·32
1908	0·91	2·71	1·07	1·32
1909	1·17	2·04	0·95	1·43
1910	1·08	1·97	0·95	1·69

Except in 1906, when the death-rate was swelled by the Courrières disaster, the French figures compare favourably with those of Belgium and form a distinct contrast with the higher figures obtained in Great Britain, and the still higher death-rate in Prussia. Thus, although at the time of writing the news of a big catastrophe at the Clarence Pit, Lens, painfully recalls us to a sense of the continued uncertainty of the miner's vocation, there can be no doubt that, from a statistical standpoint, France occupies a good position in regard to mining fatalities.

The Lievin Tests.

There is, too, abundant reason to hope for still better results in the future, in view of the excellent work now being carried on at the Liévin experimental station, where M. Taffanel has lately been reinforced by M. Dautriche, a noted expert on explosives, who has been placed by the Minister of War at the disposal of the Liévin Committee. Already important results seem to have been established by these two investigators with regard to the influence of the nature of the explosive upon the ignition of firedamp. The favourable action of alkaline salts, the influence of density of the explosive, the effect of the method of detonating a series of cartridges, and many other points have been methodically studied with encouraging results. These researches have been carried out in addition to the coaldust experiments with which the name of M. Taffanel has been so long associated, and it is of interest to note that the Comité Central has by no means reached the end of these investigations, for the further prosecution of which the experimental gallery has now been lengthened to 400 m. (434 yards). The active researches now being prosecuted at Liévin by the Comité Central, and also those of the British Government at Eskmeals, may be expected to yield ultimately a rich harvest of knowledge respecting the cause and prevention of pit explosions.

Output of Coal.

The consumption of coal in France is steadily rising, and the total for 1911 of 59,342,000 tons exceeded that of the previous year by approximately 2½ million tons. The production from French mines for the same year was 39,350 000 tons, as compared with 38,350,000 tons in 1910. The output figures for recent years make an interesting study. The restriction of the hours of work in French mines, which first showed its effect on the output of 1908, has had the anticipated effect of seriously diminishing the normal rate of increase, which fell to 1·70 per cent. in 1908, 1·22 per cent. in 1909, and 1·34 per cent. in 1910. Last year's rate of increase was 2·60 per cent. Although this shows a distinct improvement, it falls considerably behind the increases of previous years, which, however, for various reasons were erratic, reaching in 1903 the high percentage of 16·36, and in 1906 the negative value of 4·82. Notwithstanding occasional reverses, the French coal trade has shown a mean rate of increase for the 16 years from 1896 to 1910, of 2·175 per cent.

Another feature in the French coal industry revealed in the output returns is that, for the first time for the last five years, the output per man has increased, wages having in the meantime also been slightly higher. Previous experience in the French coalfield has been similar to that in other countries, inasmuch as higher wages have been accompanied by a diminished individual output on the part of the miner. Prosperity has hitherto invariably been an incentive to absenteeism and slackness, and this exception to what has always been considered in the light almost of a natural law, is noteworthy. In the report it is referred to as a phenomenon, and we may hope that the expression can be applied in its true etymological rather than in its journalistic sense. The view of the French mineowners seems to be that it is a result of several causes, amongst which are improved relations between master and man, the weakening of the authority of the Syndicalist, and the abandonment by the men generally of a restrictive policy. To some extent it appears as if the productive energies of the men have been checked by the insufficiency of the equipment of the mines, but few of the older mines being in a position to take advantage of even an extra 10 per cent. of output.

The Labour Problem.

In the meantime, in view of the future expansion of the French coal trade, the question of adequate labour is becoming a problem of which the solution is not yet apparent. The suggestion of recruiting from other industries seems to be futile. A fisherman cannot be transformed at will into a miner. It is from the ranks of the miners themselves that the new generations of miners must spring. In the microcosm of the mining industry the population question seems to be reflecting a condition to which the larger France, in common with other countries, is approaching. Throughout the whole of Western civilisation declining birth rates seem to be becoming a serious social question.

The Import Trade.

The importation of coal into France is increasing at a less rapid rate than the home production. Imports from Great Britain still head the list, and in 1910 were nearly equal to the combined quantities contributed by Germany and Belgium. It is expected, however, that while Belgium promises to have in future continually greater home demands upon its coal production, with a comparatively stationary output, the imports of Belgian coal into France will tend to diminish. The English imports are regarded in France as likely to be stationary, and it is to Germany that the French coal market seems destined in time to turn for the bulk of its surplus requirements. It is interesting to note that on the other side of the Channel the view is held that the permanent increase in the cost of production of British coal caused by the recent labour crisis in this country, and the restriction of output due to recent labour legislation in Belgium, are merely playing into the hands of the Westphalian Syndicate.

The New Mining Laws.

It is natural that reference should be made in this report to the new Mining Law, to which we have already drawn attention in the *Colliery Guardian*.* It is needless to remark that French coalowners are looking forward to greater difficulties in working and to increased cost of production in consequence of an amount of State control which is, in some cases, deemed excessive. Amongst the especially oppressive sections are felt to be the regulations dealing with hygiene. It appears also that the Finance Act of 1911 has been used by the Government as a means of still further increasing the burdens of the French colliery owner, and apparently has been adopted as an expeditious and effective way of passing over to the mining industry the whole of the expense of treating ankylostomiasis, perhaps, under the plea that it is an industrial disease peculiar to miners. This same Finance Act also introduces restrictions with regard to the sale or mortgage of mining concessions, and is thought to interfere with the rights of property to an alarming degree. It is evident, therefore, that Great Britain is not the only country which is passing through a phase of novel, if not dangerous, Social legislation, prompted by political rather than by industrial needs.

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* *See Colliery Guardian*, July 26, 1912.

Trade Summary.

The London coal trade for the past week continues good. The warmer weather somewhat influences the demand, but on all sides a steady growing trade is manifest. Public prices were discussed on Friday last, but it was not settled until late on Monday's market, when all advertised prices were advanced 1s. per ton, thus bringing best coal to 28s. per ton. Kitchen and Derby brights are at the same figure, 26s. Manufacturing qualities are in good demand and all kinds of slacks are selling freely. The seaborne market has had no cargoes on offer lately. All the ships coming forward are sold. Small nuts have not been quite so brisk, but bakers' nuts and kitchener cobbles are eagerly bought up. The riverside trade is appreciably increasing.

The shipments from the Tyne last week were rather less, but the demand for bunkers for forward delivery was very brisk. The market for coke is very strong.

The Durham coal trade is steady. Shipments from the Wear were the highest on record. Scarcity of tonnage is still felt. Forward business is promising, especially in gas coals. Coke is in request, but household coal is dull. Freights are very firm.

The Lancashire house coal trade continues to be active, and prices are firm. Manufacturing coal is in good demand. Bunkers are active, and prices are on the upward grade. Slack is very firm.

The coal market in West Yorkshire is firm, and prices are steady, with an upward expectation. Manufacturing fuel is in active demand. Furnace coke is scarce. Gas coal pits are fully employed, and the demand is active, both inland and for export.

In South Yorkshire the export demand is vigorous, and prices have advanced both for best and secondary kinds. Washed nuts are also strong, and slack has risen. The house coal trade is in a state of rush, and prices have been put up as a check in some cases.

The Derbyshire coal trade is steady, with an upward tendency. Cobbles and nuts are in strong demand, and slack is active. Prices are firm for all sorts. Steam coal moves freely, and the export demand is active. Coke continues strong.

In South Wales the scarcity of tonnage is still acute and freights continue high. Shipments were nevertheless heavy. Patent fuel is dull. Coke remains firm.

The Scottish coal trade keeps active, and shipments are still heavy. Prices have advanced for best manufacturing qualities and better sorts of house coal. Steam coal is strong and house coal is in good demand.

CONTINENTAL MINING NOTES.

Austria.

Wholesale Coal Prices in Vienna.—Ostrau-Dombrau-Karwin large coal, 28·10 to 29·10 kronen; cubes, 27·60 to 28·60 kronen; nuts, 26·60 to 27·60 kronen; smalls, 22·50 to 22·70 kronen; washed smithy coal, 29 to 29·20 kronen; coke, 38 to 40 kronen per metric ton, ex shutes Nordbahnhof, net cash. Upper Silesian coals: Best large, 31·70 to 32·50 kronen; cubes, 31·70 to 32·50 kronen; medium large, 30·90 to 31·70 kronen; cubes, 30·90 to 31·70 kronen; seconds, large, 26·10 to 27·20 kronen; cubes, 26·10 to 27·20 kronen; nuts I., 32 to 32·90 kronen, II., 29·10 to 29·60 kronen; smalls, best, 23 to 23·20 kronen; seconds, 22 to 22·50 kronen, ex shutes Nordbahnhof, net cash. In 10-ton loads: Best, large, 30·10 to 30·90 kronen; cubes, 30·10 to 30·90 kronen; nuts, 30·50 to 31·10 kronen. [Gas coal from Vienna gasworks, 32·60 to 37·20 kronen. Lignite: Dux large, 21·70 to 23·20 kronen; Brüx or Dux cubes, 21·70 to 23·20 kronen; nuts, 21·20 to 22·70 kronen; Mariaschein cubes, 23·70 to 25·20 kronen; nuts, 23·20 to 24·70 kronen, ex Franz-Josefs or Nordwest Bahnhof.

Belgium.

A new company has lately been formed in Brussels with a capital of £9,600, and the title La Société des Agglomérés du Hainaut, to establish a plant for the manufacture of patent fuel.

The Charbonnages de l'Espérance et d'Enooz has been formed to develop the concessions, covering 942 hectares, at Moka, Couthouin, Bas-Oha and Wanze. The capital is 1,200,000 fr. The directors are M. E. Schildge, Comte René du Changy, and A. Vigo.

Three of the colliery companies in the Liège district have just joined together in the formation of a company, with a capital of £24,000, and the title La Société de Electricité de Genck. The object is to establish a central station for the supply of the electrical energy required for lighting and power purposes by the collieries interested.

France.

A new company has lately been formed in Paris with a capital of £33,600, and the title La Société des Mines de Fer de Laizon.

La Société Métallurgique de l'Ariège is carrying on coal prospecting operations at its Bouquies concession at Decazeville (Aveyron, France).

Serious Mining Disaster.—An explosion of firedamp occurred in the Clarence Coal Mine near Bruay, in the Pas-de-Calais, on Tuesday, which has since been followed by two further explosions, which have resulted in the death of one of the members of the rescue party and serious injury to two others, while two more are missing, and it is feared that they have perished. The mines of La Clarence are situated at Calonne-Ricouart, in the Pas-de-Calais, and employ some 800 hands. The majority of the morning shift, composed of 350 miners, had fortunately just left the pit when the explosion took place. Between 70 and 80 miners, however, of the afternoon shift had already proceeded down the shaft, and it is feared that the majority of these have perished. According to the latest reports, 29 bodies have already been recovered; 26 injured, some of whom are not expected to recover, have been removed to hospital; and a further 20 are still missing. A rescue party from Liévin, provided with special oxygen helmets, at once made a descent, but work in the mine was found to be extremely difficult owing to a fire which had broken out. For some time the work of rescue had to be suspended, and it is now stated that, owing to the progress of the fire, the mine may have to be closed. Large falls have taken place. It is reported that there was a fire in the mine earlier in the year which was carefully isolated, but it is suggested that it may have continued to smoulder and may ultimately have reached a pocket of firedamp.

Germany.

Ruhr Coal Market.—The situation remains very satisfactory, the volume of business increasing progressively. The supply of railway wagons, however, is becoming scarce, the number supplied during the week being 2,089 less than ordered. Deliveries to the Ruhr harbours are extensive, and tax the resources of the loading plant, the work of shipping being retarded by unfavourable weather. As the Rhine is in good condition for traffic, very large consignments are going up river, and the trade with Holland and Belgium is also satisfactory.

Coal Market in Upper Silesia.—The average volume of coal traffic per day is nearly 20 per cent. greater than this time last year, and business in industrial coals is particularly good. The house coal trade is also becoming very active, and in some cases the calls for delivery cannot be satisfied promptly. Gas coals are in improved request, and the supply of coking coals is insufficient. The State Collieries have issued the following new price list:—Large coal, 13·50 to 13·80 marks per ton, free on rail at pit; cubes, 13·50 to 13·80 marks; nuts I., 13 to 13·80 marks, II. 11·80 to 11·90 marks; washed nuts II., 11·90 to 12·40 marks; peas, 9·80 to 10·50 marks; washed peas, 9·70 to 10 marks; through-and-through, 11·70 marks; small I., 9·80 to 9·90 marks, screened smalls 8·70 to 8·90 marks; washed slack, 8·80 marks; dust, 4·90 to 5·40 marks.

Hamburg Coal Trade.—Mr. H. W. Heidmann, of Hamburg, writes as follows:—The imports of coal into Hamburg in in August were:—

From	1912. Tons.		1911. Tons.
Northumberland and Durham...	244,381	...	156,970
Yorkshire, Derbyshire, &c.	68,616	...	48,301
Scotland	139,536	...	88,024
Wales	5,872	...	3,041
Coke	104	...	764
Total........................	458,509	...	297,100

MINING AND OTHER NOTES.

Mr. George Thomas Beilby, F.R.S., LL.D., has been appointed a member of the Royal Commission on Oil Fuel, in succession to Mr. H. Owen Jones, deceased. Mr. Beilby has made a special study of fuel economy and smoke prevention, and has invented processes which are in use in several departments of industry. He was president of the Institute of Chemistry in 1909, and is chairman of the Glasgow and West of Scotland Technical College.

The Home Secretary has appointed Mr. Philip Thomas Jenkins to be a junior inspector of mines, and has directed him to act also as an inspector for the purposes of the Metalliferous Mines Regulation Acts and of the Quarries Act, and has further appointed him to be an inspector of factories and workshops.

A seam of hard coal, 11 ft. 4 in. thick, has, it is stated, been discovered at one of the borings of the Kent Coal Concession group of collieries.

A serious fire broke out on Friday at Minto Colliery, Lochgelly. Efforts were made to extinguish the fire by pumping water on it, but this was found useless, the smoke driving the firemen back. Two pits are worked in conjunction with Minto Colliery, and, as both are connected, the smoke travelled into the workings. The fire originated in an old aircourse, but how it commenced is a mystery. Eventually the fire was got under, and the 1,200 workers who were thrown idle have now resumed work.

As a consequence of heavy rainfalls in the Dean Forest, the Royal Colliery at Parkend, where 150 persons are usually employed, is flooded out. The horses are being withdrawn.

We are informed that Sir Hugh Bell and Mr. Walter Lyulph Johnson, of Messrs. Bell Brothers, Middlesbrough, have been elected directors of the Slag Power Company Limited.

At the Auckland Petty Sessions on Monday, James Taylor was charged with riding in a tub at Willington Colliery without permission. The Bench imposed a fine of 10s., including costs.

The attention of the trustees of the Carnegie Hero Fund being drawn to the case of Sergeant A. T. Winborn, James Leach, and Llewellyn Howells, members of Tredegar rescue brigade, Crumlin, Monmouthshire, and W. D. Woolley, manager of the colliery, Hollybush, near Newport, Mon., who rescued a man who was in danger of suffocation owing to an explosion of gas that occurred, the trustees have awarded Sergeant Winborn and Mr. Woolley an honorary certificate, and James Leach and Llewellyn Howells are to receive the sum of £5 each.

Mr P. C. C. Phillips has been appointed manager of Hall's Collieries Limited, Swadlincote, in succession to Mr. G. J. German. Mr. Phillips has held similar appointments in the north of England, and at the Flintshire Colliery, North Wales.

The belief is held that there is a valuable bed of the Barnsley coalseam in the neighbourhood of the estate of Sir Archibald White, at Wallingwells, near Carlton, and boring operations are said to be in progress.

Yarmouth Town Council has accepted the tenders of Thomas Moy Limited and J. S. Sterry and Co. Limited for annual supplies of house coal at 19s. 1d. per ton and for steam coal at 19s. 11d. per ton respectively.

The Dullas Colliery, Llwydcoed, was flooded on Friday last through the men striking into old workings containing water. There were some 300 colliers engaged at the colliery at the time, but they all managed to wade out through torrents of water. Some men were up to their necks in the water.

Mr. John Mackie, New Stevenston, has been appointed under-manager at Holytown Colliery (Messrs. Nimmo and Co.). In view of his transference he has been presented by the workmen at No. 4 Thankerton Colliery with a handsome aneroid barometer and thermometer, while Mrs. Mackie was the recipient of a beautiful gold-mounted umbrella.

At a Local Government Board enquiry which Mr. A. G. Drury, M.I.C.E., held at Bentley last week into the application of the Urban Council to borrow £12,225 for a new sewerage scheme, it was stated that whereas the population in 1901 was only 2,403, the present population, through the coming of the colliery, was 8,390.

Messrs. W. T. Glover and Co. Limited, advise us that the telegraphic address of their London office will henceforward be "Phonoscope, Vic., London."

Considerable interest has been aroused in Doncaster by an announcement that Messrs. Craven and Speeding Brothers, wire rope manufacturers, of Wearmouth, propose to set up new works in the town. Another firm, Messrs. W. Firth Limited, iron and steel merchants, of Leeds, have acquired a site near the Great Northern Railway, at Doncaster, and are about to erect a depot there for the storage and distribution of steel girders, in which they do a considerable business with the new collieries in the Doncaster area.

Mr. C. W. Phillips, who has had charge of the new sinkings at Rossington since their commencement, has been appointed agent to the Cadeby Colliery Company, Mr. Witty, the present agent, taking up another important position under the same company. Mr. W. H. Dyson, manager at Maltby Main, will succeed Mr. Phillips at Rossington, and Mr. T. L. Soar, manager at Dinnington Main, will take the management at Maltby.

A serious accident occurred at the Douglas Bank Colliery, Wigan, last week, one man, named Thomas Sherrington, a metalman, being killed, and two others injured. At the inquest the jury returned a verdict of "Accidental death," and recommended that when bars were used they should be left flat where the caps fitted.

George Edwards, fireman, in the employment of the Bryncethin Colliery Company Limited, Bridgend, Glamorganshire, on July 22, 1911, endeavoured to rescue some workmen who had been overcome by gas in the above colliery. The attention of the Carnegie Hero Fund trustees has been drawn to this case, and Edwards is to receive the sum of £10.

Excellent progress is being made in the construction of the new joint line projected by the Hull and Barnsley and Great Central railway companies, which is to run from Gowdall to Braithwell, near Doncaster. Although the line was primarily designed for mineral and goods traffic, it is now stated that passenger stations are to be built at Pollington and Snaith, Sykehouse, Thorpe-in-Balne, and Edlington, in addition to a station originally contemplated at Doncaster.

Salford Town Council has accepted the tender of the Clifton and Kersley Coal Company Limited for the supply of 1,300 tons of No. 4 washed steam nuts at 12s. 11d. per ton.

The following tenders have been accepted by Eccles Town Council for annual supplies of coal:—Samuel Hooley and Sons, 5,000 tons slack, 10s. 3d. per ton; T. Slack, 144 tons screened washed nuts, 13s. 4d. per ton; J. and W. Aldred, 102 tons best selected house, 19s. 5d. per ton, and 75 tons screened ordinary quality house, 13s. 7d. per ton.

Mr. R. R. Bevis has, it is stated, resigned his position as managing director of the shipbuilding and engineering works of Messrs. Cammell, Laird and Co., at Birkenhead, but will retain his seat on the board. Mr. Bevis was formerly with the old company of Laird and Co., and has been managing director at Birkenhead since the amalgamation of the two concerns.

Plant for loading coal from the dock level by means of a continuous conveyor is now in course of erection for the Workington Harbour Board by Messrs. F. Turnbull and Co., of Heaton Junction, Newcastle-upon-Tyne. It is expected that from 400 to 600 tons of coal an hour will be shipped with this new plant.

New coaling staiths have recently been erected at the south dock at Seaham Harbour in order to provide facilities for the greatly increased coal shipping traffic. The staiths are 720 ft. long, and consist of two gantries 27 ft. wide, each carrying two lines of rails. The whole of the work was carried out at a cost of about £22,000.

The Hon. Henry Duncan McLaren, M.P., it is stated, has been elected a director of Bolckow, Vaughan and Co. Limited, in the place of the late Mr. W. S. B. McLaren.

The Bolton Corporation Gas Committee last Friday accepted the subjoined tenders for coal:—Messrs. Ackers, Whitley and Co. Limited, for 9,000 tons; Bispham Hall Colliery Company, 5,000 tons; Mr. Thomas Brocklehurst Limited, 2,000 tons; Earl of Ellesmere, for 2,000 tons; Ellerbeck Collieries Limited, 6,000 tons; Hulton Colliery Company Limited, 7,500 tons; Low Laithes Colliery Company Limited, 3,000 tons; Moss Hall Colliery Company Limited, 8,000 tons; Moss Hall Colliery Company, 500 tons; Messrs. Pearson and Knowles Coal and Iron Company Limited, 6,000 tons; Pemberton Colliery Company Limited, 3,000 tons; Tyldesley Coal Company Limited, 3,000 tons; Wigan Coal and Iron Company Limited, 3,000 tons; Winstanley Collieries Company, 5,000 tons; and Messrs. Wm. Woods and Sons, 4,000 tons. The Committee deferred the tenders of two firms.

Messrs. Albert Frost and Co., Sheffield, advise us that they have appointed Mr. W. Pegler, 7, Australia Road, Cardiff, as their representative in South Wales for all classes of colliery and ironworks supplies.

We are informed that at the Hotel Metropole, Swansea, on Tuesday next, at 3.30 p.m., the sale will take place of the Blaen-Hirwain Collieries, Cross Hands, Carmarthenshire, together with the sidings, plant and machinery.

LABOUR AND WAGES.

North of England.

The miners of Newburgh Colliery have decided that work be resumed, and that an early meeting with the management be arranged, with a view to a settlement of their grievances. The strike has lasted a week, and has laid the whole of the workmen idle during that time.

The majority of the putters and fillers engaged in the Low Main and Hutton seams of East Hetton or Kelloe Colliery, who gave in their notices a fortnight ago, ceased work on Monday afternoon and night, when they brought their gear to bank. The dispute first arose through a young man being set on to curve or hew, the putters and fillers, or "the lads," as they are called, contending that he had no right to be set on, and that there were plenty of them waiting for such work. The dispute was practically between the men and the lads until Tuesday, when it was stated that some of the old wastemen, who are considered too old for hard work, were asked by some of the officials to fill coals, and, on refusing to do so, were sent back home. The men got to hear of this when they went to work, and held a meeting, when they decided that they would not fill any coals either. This means that the two seams, in which a large number of hands are employed, will be laid idle.

Twenty-five men and boys employed at Fourstones Colliery have received notice to terminate their employment on the 9th inst., on account, it is stated, of the management stopping a flat.

The New Hartley miners have made a request to be allowed to hand in 14 days' notice to come out on strike with regard to the dispute with the management as to the system of cavilling. The trouble is of recent origin, and it is stated that, for the last 14 years, and up to a fortnight or three weeks ago, it had been the practice of the management to give men who were working in a "mother gate" or "board" the work in a new heading which might be turned away, as there was the advantage of higher tonnage price being gained. Latterly, however, the management has introduced a practice by which they put other men into these places. A final interview is to be sought with the management before permission is given to tender the notices.

The threatened strike at Seghill Colliery commenced on Friday, and 1,000 men and boys are affected. A letter giving details of the grievances was sent by the Seghill lodge to the Northumberland Miners' Association, and it was considered by the executive committee on Thursday. For many fortnights past there has been trouble at the colliery on account of allegations that men have been paid short, and there being no itemised pay notes in use for the purpose of checking the payments made, the men are insisting upon the issue of this kind of note. The answer of the management to this request is that the introduction of itemised pay-notes must be concurrent with the institution of weekly pays which have not yet commenced at the colliery. Another long standing grievance with the men is in respect to the supply of fire coal, which the employees allege is of very inferior quality. The putters also have some differences which they wish adjusted. The men further assert that the management will not appoint office hours in which to meet men who desire interviews in regard to claims for the minimum wage. Then again the workmen contend that they are being charged ¼d. per pound for powder more than is charged at other collieries. There are questions arising out of minimum wage awards which are calling for adjustment, and there is dissatisfaction at the allegation that men have been given work on the understanding that they will not claim the minimum wage. One case is cited of a man having received notice to leave on account of "inefficiency" as understood under the Minimum Wage Act. The sanction of the executive committee was not obtained for the handing in of notices, and therefore the strike has not official recognition.

Federated Area.

Last week end between 400 and 500 surface workers employed by Messrs. A. Knowles and Sons Limited, Pendleton and Pendlebury, received advances in wages from 3s. 7d. to 4s. per day. This is equal to an increase of 2s. to 2s. 6d. per week according to the number of days worked.

South Yorkshire coalowners on Saturday night agreed to make important concessions in working hours and wages to the majority of 11,000 surface workers employed at their pits. This is the result of negotiations extending over six months between representatives of the South Yorkshire district of the Colliery Surface Workers' Federation and the South Yorkshire Coal Trade Association. The agreement is as follows:—

Where pits are worked double shift, each shift of banksmen and screenmen and manipulators of coal shall be allowed to work and be paid a full shift for each shift when coal drawing is carried on for two full shifts. There is to be no interference with any existing practice of men working partly on the pithead and the screens and partly at other work, and nothing in this clause shall prejudice either side in making arrangements at new collieries starting after this date.

Where pits are worked single shifts of less than 10 hours, banksmen and screenmen and manipulators of coal shall not be required to remain at work longer than the period of coal drawing, except as regards the time necessary for them to clear up the pithead and screens where this is now the practice, which work in such cases is to form part of the work of each shift, but in all cases shall be paid a full shift if the coal-winding has continued for a full shift.

The basis wages of all able-bodied men over 22 years of age shall not be less than 3s. 7d. per day, plus 17½ per cent., to rise and fall as regards those employed as banksmen and screenmen and manipulators of coal at the same rate as miners are raised or lowered by the decision of the Conciliation Board; those otherwise employed to be raised or lowered 3 per cent. for every 5 per cent. rise or fall in miners' wages. The coalowners also agree that there shall be no reduction of wages in the above classes where higher rates are now paid.

Chargemen and firemen to work eight hours' shifts, and be paid 5s. 2d. and 4s. 10½d. per shift respectively. This does not apply to isolated pumping or ventilating stations. Where in such cases men are working 24 hours continuously at the week-end, they may, on application to the management, work one shift of 12 hours only.

The coalowners do not admit that surface fan enginemen, surface pumpmen, and surfacemen in charge of electric generating machinery have any grievances in respect of the time they now work, except at week-ends. They are therefore not prepared to alter the present hours of every shift of such men, but in order to dispense with the long hours now worked in some cases at the week-ends they agree that all time worked between 6 a.m. Saturday and 6 a.m. Monday shall be paid at the rate of eight hours.

The scale for boys is to commence at 1s. 2d. per shift for lads of 13 years, and will be advanced each half-year until at 22 years of age the employee will be receiving 4s. 2½d.

Retrospective payment shall be satisfied by the owners paying the rates hereby agreed as from the making-up day in the week commencing June 17, 1912.

Scotland

At a meeting of the Scottish Coal Trade Conciliation Board in Glasgow last week, Mr. Adam Nimmo, chairman of the Scottish Coalmasters' Association, read a letter on behalf of the employers, in which they claimed a reduction of the miners' wages to the extent of 12½ per cent. on the 1888 basis. A few months ago, it may be recalled, the miners asked for an advance of 25 per cent. and Lord Hunter, who acted as neutral chairman, awarded an increase of 12½ per cent. The coalmasters contended that this increase, added to the Minimum Wage Act and the Insurance Act, had told heavily on them. Mr. Robert Smillie, chairman of the Scottish Miners' Federation, made a statement on behalf of the miners. No agreement was reached, and the meeting was adjourned for a fortnight.

No settlement has been arrived at between Wemyss Coal Company and the 800 employees at Michael Pit, East Wemyss, and a strike was therefore entered upon on Monday. The men would not listen to any settlement which did not include the abolition of the "Billy Fairplay" system of weighing, the cause of the strike, and acceptance of their figures for new tonnage rates based on the triping system of weighing. There is a feeling that on the result of the strike depends the continuance or abolition of "Billy Fairplay" at the pits of the united counties of Fife and Kinross.

The dispute amongst the miners of Haddingtonshire and Midlothian has been settled by the masters consenting to pay the wages weekly in the future.

Miners' Federation of Great Britain.

At the annual conference of the Miners' Federation of Great Britain, which will be held at Swansea in October, the surface workers, who were not included within the scope of the Minimum Wage Act, will ask the Federation to deal with their application for higher pay, probably at the rate of 5s. a day. The agitation for this advance, which began in Lancashire, has spread to other parts of the country. Another resolution will be proposed asking for a general advance of 20 per cent. in the wages of all workmen employed in mines. Notice has also been given of a resolution in which it is proposed to establish a working week of five days. Mr. R. Smillie will probably be elected president in room of the late Mr. Enoch Edwards.

Trades Union Congress.

The 45th Trades Union Congress was opened at Newport on Monday under the chairmanship of Mr. W. Thorne. The president, in his address, gave an interesting review of the work during the past year. He said two important industrial battles had been fought—the coal miners' and the transport workers' disputes. He believed the outcome of the coal strike would be to take them one step nearer to the nationalisation of mines. He understood the Miners' Federation had already drafted a Bill to empower the State to take over the coalmines. Continuing, Mr. Thorne said that when the governing classes of the present day talked about the methods adopted now in carrying on trade disputes, they had to realise that the element of force was not so conspicuous as in bygone days. The present-day struggle was economic. The Government had intimated that they intended to introduce a Bill in the next session to deal with industrial disputes. He hoped that organised labour would meet it with all the opposition possible.

On Tuesday the chief topic of debate was the Osborne judgment, and a resolution was passed by an overwhelming majority that the following should be inserted in the Trades Union (No. 2) Bill:—"Unless in Committee the trade unions are completely restored to the position which until 1908 they held unchallenged, the Parliamentary Committee will actively and strenuously oppose the third reading of the Bill at all costs." Mr. R. Smillie (acting president of the Miners' Federation), in reply to a question by Mr. John Ward, M.P., said that the miners could not allow the statement to circulate that had the Government accepted the 5s. and 2s. in the Minimum Wage Act, the men would have been satisfied. If these figures had been in, the Bill would have been more satisfactory, but if the wages scheduled had been included the Bill would have been satisfactory.

On Wednesday, the Miners' Federation moved:—"That the question of secular education be eliminated from the questions for discussion at any future Trade Union Congress." This was carried.

Mr. B. Tillett moved a resolution to instruct the Parliamentary Committee to prepare a report and recommendation as to the basis of conciliation, arbitration, and trade agreements between employers and employees in each trade, to be presented at the next annual congress. This was opposed on the ground that it was an admission for the necessity of compulsory arbitration. The debate was adjourned until the following day.

The Congress, resuming on the following day, rejected Mr. Tillett's motion. A resolution was passed protesting against what were described as methods of cajolery and intimidation adopted by employers and insurance companies in order to dissuade men from making their trade union their approved society under the Insurance Act.

An Improved Ambulance Carriage.—We have had brought to our notice an improved ambulance carriage for conveying injured workmen from the mine, which has been placed on the market by Mr. S. D. Roberts, of the County Ambulance and Carriage Works, Pontypridd, South Wales. One of the advantages claimed for this carriage is that, being built upon four wheels, it is quite safe from tipping, &c., and that by the help of only a few men the injured can be conveyed to their destination; also the wheels can be adjusted to any ordinary gauge instantaneously. It is mounted upon very long, easy springs, which prevent much of the unnecessary suffering and further injury as is now caused by jolting and jarring over rough roads. Being built upon telescopic axles, the carriage may be reduced to such dimensions that narrow places can easily be passed through; and a detachable stretcher is fitted to the carriage in such a way that the injured person's head may be raised to suit the incline of the road.

THE WELSH COAL AND IRON TRADES.

Thursday, September 5.

North Wales.

Ruabon.

COAL.

The coal trade of North Wales still continues in a satisfactory condition, and the continued bad weather is helping it. During the past week the household trade has been fairly thriving, there being a good demand for this class of fuel and best quality coal is now gradually on the advancing scale, and the ruling price is 17s. per ton. Cheaper grades fetch from 1s. to 2s. per ton less, but no colliery is holding any stocks. With regard to other fuel, steam and gas coal is being taken freely against contracts, and apart from these there is a tendency to advance, the average price obtainable apart from contracts being 14s. per ton, though some small-sized fuel is disposed of at a less figure. Nuts still maintain their standard price of 11s. f.o.r., and good rough slack is easily sold at 7s. 6d. per ton. Gas coke also maintains the standard rate of 15s. per ton at works.

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Monmouthshire, South Wales, &c.

Newport.

COAL.

The strength of the steam coal market continues to be confined to forward business, for which sellers are as determined as ever to uphold their quotations. The prevailing scarcity of tonnage, and the extreme difficulty of securing sufficient empties to keep pits going effects to-day's values, and those fortunate shippers who have tonnage available can now secure favourable terms. Just at the moment chartering is not over active, but the continued firmness of freights, and the facility with which fixtures can be effected must have the result of attracting tonnage, when the present tension may be relieved. Smalls continue in good request, and show no sign of any weakness, house coals rule firmer, patent fuel and coke are steady trades, with values fully maintained. Pitwood has shown little variation, last week's values prevailing to-day, although buyers with empties ready can obtain slightly better terms. Latest ruling quotations may be taken as follows, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 6d. to 15s. 9d.; western-valleys, ordinaries, 14s. 6d. to 15s.; eastern-valleys, best, 14s. 3d. to 14s. 6d.; other sorts, 13s. 6d. to 14s.; colliery smalls, best, 8s. 6d. to 9s.; seconds, 8s. 3d. to 8s. 6d.; inferiors, 7s. 9d. to 8s. 3d.; screenings, 8s. 9d. to 9s.; through coals, 10s. 9d. to 11s.; nuts, best washed, 11s. 3d. to 11s. 6d.; house coals, best, 18s. to 18s. 6d.; seconds, 16s. 6d. to 17s. 6d.; patent fuel, 17s. 9d. to 18s. 3d. Coke: Foundry, 26s. to 30s.; furnace, 22s. to 25s. Pitwood: Best French fir, 24s. to 24s. 6d. ex-ship.

IRON.

The recently reported strong tone of the local iron and steel markets is well maintained, and manufacturers in all departments are well booked with orders for some time ahead. Prospects generally indicate a continuance of these satisfactory conditions for some time to come. Rail mills are busily employed in the endeavour to keep pace with the large amount of specifications that are coming to hand, and officially, quotations are unaltered on the week, remaining on the basis of £6 7s. 6d. to £6 10s. for heavy sections. At tinplate bar and sheet bar mills, there is also a heavy pressure of work, and manufacturers are finding themselves unable to promise anything like prompt delivery, but if makers are in a position to do this, they are easily able to obtain increases on to-day's figures of £5 12s. 6d. to £5 15s. Bessemer, and £5 15s. to £5 17s. 6d. Siemens. The satisfactory tone continues at blast furnaces, which are busily employed. Values remain strong, latest official prices for Welsh hæmatite being 81s., delivered to works in the district. The market for tinplates appears to be slightly firmer on the week, with a better enquiry coming to hand. With raw materials at high prices, makers do not seem inclined to commit themselves very much further at present quotations. Prices have improved since last week and now rule upon a basis of 15s. to 15s. 1½d. Bessemer, and 15s. 1½d. to 15s. 3d. Siemens for I C 20 × 14 × 112.

Cardiff.

COAL.

The tonnage question is still the factor which is ruling this market. There are a good many orders about, but tonnage is so scarce, and rates so high, that buyers are holding off as much as possible, with the result that a large number of collieries, even those producing the best descriptions of coal, are able only with the greatest difficulty to provide work for their men. Unfortunately, from all appearances, this state of things is likely to continue indefinitely. As an illustration of the high freights at present prevailing in all directions, it is stated that a large number of steamers have actually left this country in ballast for the United States in order to avail themselves of the splendid opportunities offering for return cargoes. Under such circumstances, it is not surprising that supplies of coal are cut off, and that stoppages are almost daily becoming more frequent. It is true last week the shipments from Cardiff were very heavy, amounting in the aggregate to nearly 423,000 tons, an increase of over 70,000 tons as compared with the corresponding week of last year. But unless more vessels come forward than has lately been the case, such a record is not likely to be soon repeated. The quantity of tonnage taken up last Monday was only 13,400 tons, being a smaller quantity than has been scheduled for some considerable time. When the present week opened, the number of vessels in the whole of the docks at this port was only 160, as against 229 for the corresponding day of the previous week. The lack of tonnage naturally makes the market weak, because when a buyer has a ship ready to load, he is able to get very good terms from coalowners anxious to provide the empties necessary for the regular working of their mines. Some of the best collieries still quote 17s. 6d. for best Admiralty coals for prompt shipment, and have not as yet taken less than 17s. 3d., but it is an open secret that there are others selling equally good coals which have come down to 17s. Of course those who stand by the higher figure are doing very little current business. Second-class Admiralties are quoted at about 16s. 6d., but as low as 16s. and even less has been accepted through some channels for anything approaching prompt loading. From now to the end of the year the best collieries are asking from 17s. 6d. to 17s. 9d., whilst for next year they quote from 18s. to 18s. 3d. per ton. A considerable amount of business has already been done at 18s., and though many buyers kick at this figure, there are others who recognise the reasonableness of collieries, in face of the increasing cost of production, holding out for more than they accepted when making last year's contracts. For second-class Admiralties over next year the quotation is 16s. 6d. to 16s. 9d. Of course the high rates of freights are keeping a good many contractors off the market, though what they hope to gain by delay it is hard to conceive. If there were the slightest prospect of freights coming down in the near future their inaction would be understandable, but at present there is not the slightest indication of such a thing happening. As is well known to everybody, since the opening of the year there has been a very substantial increase in freights to all foreign ports. For instance, the average freight to Genoa in the past eight months has ruled at 11s. 1d., as against 8s. 1d. in the same period last year. The average for Marseilles is 12 fr., as against 9·43 fr.; Venice 12s., as against 8s. 11½d.; Algiers 11·37 fr., as against 8½ fr.; Alexandria 10s. 9d., as against 7s. 4d.; Constantinople 11s. 3½d., as against 7s. 7d.; and the River Plate 19s. 7d., as against 18s. 2d. Of course, the present market freight is much higher than the average. Naturally, when buyers are faced with prices such as these they are extremely reluctant to enter into any contracts over an extended period. As the miners are now getting back from their holidays the output of coal will no doubt soon assume normal proportions, when, if tonnage comes forward better than it has done, the receipts for extra shipping facilities will be greatly accentuated. The small coal market just now, on account of the Italian vintage, is very quiet, and prices continue to fall. Best bunkerings are 10s. to 10s. 3d., best ordinaries 9s. 6d. to 9s. 9d., and cargo qualities 8s. 9d. to 9s. per ton. Washed nuts are 14s. 6d. to 15s., and washed peas 12s. 9d. to 13s. There is no improvement in the market for Monmouthshire coals. Tonnage arrivals are much below the average, and many collieries complain of the want of empty wagons. Black Vein coals are offering at 15s. 6d. to 15s. 9d., western valleys 15s., and eastern valleys (best) 14s. 9d., and seconds 14s. to 14s. 3d. f.o.b. Cardiff. The Danish State railways are in the market for the supply of about 90,000 tons of locomotive coals, 23,600 tons of smokeless coals or briquettes, 30,700 tons of best steam coals for ships' use, and 4,100 tons of smokeless briquettes; but it is probable, as on former occasions, that the bulk of the orders will go to north country collieries. There is no enquiry for bituminous coals, and though sellers quote 17s. 6d. for No. 3 Rhondda large, they would probably accept 1s. less if a firm offer were made. Through-and-through coals are 14s. 6d., and small 11s. 6d. to 12s. per ton. No. 2 large is round about 13s., through-and-through 11s., and small 9s. per ton. The following table gives the exports of coal from the Bristol Channel ports to foreign countries for the seven months from January 1 to July 31, together with the increase or decrease as compared with the corresponding period of last year:—

	Exports Jan. to July. Tons.	Increase. Tons.	Decrease. Tons.
Russia	235,231	90,315	—
Sweden	105,025	34,931	—
Norway	63,572	10,432	—
Denmark	21,944	3,039	—
Germany	136,790	—	12,404
Netherlands	76,195	—	7,205
Dutch possessions in Indian Seas	9,910	—	1,678
Belgium	165,739	—	122,833
France	2,792,051	—	134,219
Algeria	276,824	—	44,940
French Somaliland	18,762	4,810	—
Madagascar	9,359	—	223
Portugal	346,016	—	475
Azores	17,342	2,842	—
Madeira	59,349	16,349	—
Spain	578,556	42,157	—
Canary Islands	411,860	—	67,744
Italy	2,679,588	—	218,090
Italian East Africa	26,112	21,718	—
Austria-Hungary	66,344	—	35,308
Greece	126,266	—	55,175
Bulgaria	16,251	—	11,424
Roumania	73,790	6,688	—
Turkey (European)	58,444	—	21,054
„ (Asiatic)	75,248	—	20,149
Egypt	872,099	—	223,747
Tripoli	7,836	3,759	—
Tunis	62,129	8,939	—
Siam	1,966	—	6,148
China (exclusive of Hong Kong)	12,962	5,600	—
Japan	15,521	15,370	—
Mexico	14,571	308	—
Peru	13,377	7,627	—
Chili	336,579	55,000	—
Brazil	717,638	—	22,774
Uruguay	361,365	—	88,932
Argentine Republic	1,409,287	—	117,986
Channel Islands	41,490	3,878	—
Gibraltar	137,468	12,332	—
Malta	140,400	—	41,447
Cape of Good Hope	11,309	—	2 669
Mauritius	9,500	2,489	—
Aden	107,880	17,247	—
British India	37,938	—	24,064
Straits Settlements	11,481	699	—
Ceylon	138,893	—	9,547
Hong Kong	20,708	—	2,665
Newfoundland	7,664	3,635	—
British West Indies	6,169	557	—
West Africa, French	54,463	—	5,186
„ Portuguese	180,022	7,949	—
„ British	40,665	—	12,302

To Java, from January to July 31, there were exported 23,642 tons, as against *nil* for the same period last year. The patent fuel trade is dull, and the shipments for the week were only a little over 20,000 tons. The Crown and other Cardiff makers shipped 9,095, and Swansea 11,231 tons. Best brands are 18s. to 18s. 6d. per ton. Coke keeps very firm, special foundry being 27s. 6d., and ordinary qualities 25s. per ton. Furnace coke is 20s. Pitwood remains steady at 24s. per ton.

IRON.

There has been a large increase in the shipment of tinplates, the vessels at the loading berths taking in no less than 167,000 boxes. As receipts from works only totalled 124,117 boxes, shippers had to fall back upon stocks, which were depleted to the extent of 42,883 boxes, and are now down to 177,761 boxes. The cost of production is increasing to a very serious extent, block tin having gone up during the week £7 per ton, and standing now at £217 10s. This has naturally had a stimulating effect on the prices of plates, which are about 3d. per box dearer, Bessemer standard cokes being quoted at 15s., and oil sizes 15s. 3d. to 15s. 6d. per box. For 10 × 20 sizes for October shipment 21s. 3d. has been paid, and makers are disinclined to repeat that figure, and are asking 21s. 6d. There is nothing doing in oil sizes for the United States, but a fair number of orders have been received from the Far East. Imports of foreign steel bars, billets and blooms have been very heavy, the total for the week being over 10,000 tons. Notwithstanding, however, this competition, a good demand is maintained for home-rolled bars, and all the mills are operating. Prices are without alteration, Siemens bars being £5 15s. to £5 17s. 6d. and Bessemer £5 12s. 6d. to £5 15s. Works that can give reasonably prompt deliveries can command at least 2s. 6d. per ton more. Owing to accidents to machinery no less than 12 tin and sheet rolling mills have been rendered idle, and it is not expected that 10 of these will work again for about a fortnight. More business is doing in galvanised sheets, especially for export, but prices are without alteration. For 24-gauge corrugateds £12 to £12 2s. 6d. is quoted. There is very little enquiry from the Argentine, and it is feared that most of the orders that usually come to this country have been taken by American makers. There is a strong demand for pig iron and Welsh hæmatite has further advanced, being now 79s. 6d. to 80s. f.o.t. In rubio iron ore there is practically no change, the price being still 21s. 3d. to 21s. 9d. Holders, however, are not pressing sales, but are showing some inclination to keep off the market in anticipation of an improvement.

Swansea.

COAL.

The trade of the port during last week was satisfactory. The coal trade was active, but the exports of patent fuel were much below the average. The shipments of coal and patent fuel were 99,292 tons. There was a capital attendance on 'Change this morning, and there was no material alteration to report in the general condition of the anthracite coal market; the undertone was from steady to firm. Swansea Valley large was firm at last prices, whilst quotations for Red Vein large were again marked up. Machine-made nuts were a very hard market, and cobbles were moving off well. Beans and peas were not quite so firm. Rubbly culm and duff were both in good demand. There was a better feeling in evidence in the steam coal market; large was in better demand, and prices for all descriptions were well maintained. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 17s. to 19s. 6d., less 2½ per cent.; Red Vein large, 13s. 6d. to 14s. 6d., less 2½ per cent.; machine-made cobbles, 22s. to 24s.; Paris, French, and German nuts, 23s. 6d. to 26s. 6d.; beans, 21s. to 23s. 9d.; machine-made large peas, 13s. to 14s. 6d.; ditto fine peas, 11s. 6d. to 13s., all net; rubbly culm, 7s. 6d. to 8s., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 18s. to 19s.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 9d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 18s. 6d.; through-and-through, 15s. to 16s. 6d.; small, 12s. 6d. to 13s. 3d.; No. 2 Rhondda large, 14s. to 15s. 6d.; through-and-through, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 6d., all less 2½ per cent. Patent fuel, 17s. 6d. to 18s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

Last week the yield of pig iron at Messrs. Baldwin's furnace, Landore, compared favourably with that of any similar period of the past two months. There was a steady demand for bars, and all the steel-smelting furnaces were fully operating. Owing to accidents to machinery there were no less than 12 tin and sheet rolling mills inoperative, and it is not expected that 10 of these will work again for quite a fortnight. The shipments of tin-plates were 167,000 boxes, receipts from works 124,117 boxes, and stocks in the dock warehouses and vans 177,761 boxes.

Llanelly.

COAL.

The demand for all coals in this district is keeping very satisfactory, and the market has every appearance of becoming very strong during the next few weeks. Both from foreign and inland, enquiries are plentiful, and the collieries are unable to supply anything like the quantity required of some sorts. It is anticipated that the demand will continue for several months to come, and prices will doubtless become firm. There has not been so little stock in the sidings for a long time, and if sufficient boats could only be got there will be but very little coal under load. Several works are already trying to book contracts for their requirements over the first three months of next year, fearing that the colliers' wages will advance, and consequently prices, but sellers are not prepared to do this. Anthracite machine-made kinds are in excellent request at good prices, and smalls of all kinds have a strong enquiry. Prices this week are:—Best malting large, 22s. to 24s.; second malting large, 20s. to 22s.; Big Vein large, 16s. 6d. to 18s. 6d.; Red Vein large, 13s. 6d. to 14s. 6d.; machine-made large cobbles, 21s. to 23s.; German nuts, 22s. to 23s.; French and Paris nuts, 22s. to 24s.; machine-made large beans, 22s. to 24s.; ditto, second quality, 20s. to 22s.; machine-made large peas, 14s. to 15s.; rubbly culm, 8s. to 8s. 6d.; duff, 5s. to 5s. 6d.; large steam, 13s. to 14s.; through-and-through, 10s. 9d. to 11s. 3d.; small steam, 8s. 6d. to 9s. 6d.; bituminous small 10s. 6d. to 11s.—all f.o.b.

Excellent progress is being made with the Askern Spa Colliery, near Doncaster. If the present rate of working is maintained it is hoped that coal will be reached within a comparatively short time from now, and there is every likelihood of the sinking proving to be a record in point of time.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Large Addition to Barry Tips—Increase in Charges for Mixing Coal—Joint Action by Local Railway and Dock Companies—Discussion by Chamber of Commerce Strong Committee Appointed to Consider Action—The Disputed Interpretation of New District Rules: Partial Agreement Reached—Quadrupling the Railway at Newport—Federation again seeks Joint Audit—New Rescue Station opened in the Rhondda—Favourable Comparison of British Life Statistics in Mining—Are Day-to-day Engagements Legal: Adverse Decision—Important Litigation Commenced — Successful Sinking at Pwll.

Barry Railway Company are evidently determined to keep fully abreast of the requirements of trade, for they announce that a number of new tips are to be erected at their dock, thus in some degree meeting the demand which was voiced at the meeting of the Cardiff Chamber of Commerce. At the south-eastern end of their No. 1 dock it has been decided to put up five new high-level tips, the whole to be completed within a twelvemonth; and these, it is estimated, will add to the shipping power by as much as a million tons per annum. The site of the new tips is on the island, where several lines of railway are already in use. Some reference has been made in current discussion to the possibility of the company exercising powers for extension of their No. 2 dock; but at present there is not any likelihood of steps being taken to that end. For one thing, this would entail the raising of new capital; and the time is not favourable for any issues of railway stock.

Increase in the charges for mixing coal at the docks has led to the Cardiff Chamber of Commerce appointing a committee to go into the whole question—preparatory, no doubt, to approaching the several companies with a view to modification. As from October 1, so the shippers have been notified, the rates will be:—

	Per ton.
Single wagons	2d.
Lots of two wagons	1¾d.
Lots of three wagons	1½d.
Lots of four wagons	1¼d.
Lots of five wagons	1d.
Lots of six wagons	¾d.
Lots of seven wagons	½d.
Lots of eight wagons	¼d.

The notice of these new rates (which are stated to be, in some cases, an increase of 100 per cent. on the old charges), states further that the companies reserve to themselves the right to decline to perform any mixing of an intricate or complex character, but that if such work is performed by them a charge of 1s. per wagon will be made, in addition to the charges set out above. The notice is signed by the managers of the Alexandra (Newport), Barry, Cardiff, Great Western, London and North-Western, Midland, Port Talbot, Rhondda and Swansea Bay, and the Taff Vale companies.

In directing the attention of the Chamber of Commerce to this matter, Mr. North Lewis, president, said that the existing agreement had been in force for some years, and had been arrived at after a deal of discussion, and it was a great pity that the railway companies should have formulated the increased scale without first consulting the traders. Possibly there should be increases in certain directions, but the companies had adopted the simple expedient of doubling their charges all round. They did not like mixing, and put charges upon the trade with a view to throttle the mixing. It was a very serious matter indeed. The mixing of coal had come about because of a demand for certain descriptions of coal, and unless they were prepared to ship coal such as a buyer wanted he would go elsewhere for it. Mixed coal had become a necessity, and no doubt the mixing had directly interfered with the shipment of coal at the docks; but the solution of the whole difficulty lay in increasing the dock facilities. Unless better facilities were provided they would be very much crippled in the near future. He suggested that a committee should be formed to consider the question in all its bearings.

Several other speakers who followed the president also dwelt upon the need of greater dock facilities, and one speaker said that the cost of mixing would be very much smaller if they had four roads to each tip. Ultimately the suggestion was adopted, and the following gentlemen were named as a committee to deal with the matter:—The president, Mr. H. Griffin (Cory Bros. and Co.), Mr. T. E. Watson, Mr. J. A. Jones (chairman of the Freighters' Association), Mr. D. A. Thomas (Cambrian Combine), Mr. Hugh Watts, and Mr. J. T. Duncan.

From the fact that the railway companies have issued a joint notice, it is evident that any further steps will also be taken jointly. Their case is that the practice of mixing is becoming more prevalent every month, and that the delays occasioned in handling traffic, caused thereby, is reducing seriously the earning power of their plant, as well as occasioning them much friction with freighters, who complain of the delays. Not only is there the actual work of mixing, but there are delays due to the non-arrival of particular sorts of coal needed to make up a cargo, so that the railway companies have to provide siding accommodation during the interval, and then to sort out and get to the dock those wagons which have been waiting. The whole matter is a very difficult one to handle, but the committee appointed is a strong one, composed of gentlemen of much experience and accustomed to negotiation, and doubtless the Chamber will entrust them with the further conduct of affairs after they have reported their initial enquiry

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Agreement has been reached upon two or three of the matters which have been under discussion by the joint committee appointed by the Conciliation Board to settle disputed interpretation of the rules made under the Minimum Wage Act. Where a collier or other workman is unable to earn his minimum on piecework, the notice to be given may be verbal; when a man is called upon to submit to examination by the employer's doctor, he is allowed to be examined in his own house and in the presence of his own medical man; where two adults work together, both will be regarded as in charge and therefore entitled to payment of the minimum applicable to them.

Addressing the Rhondda miners, Mr. Watts Morgan (agent), declared that if it were found that the employers were right in their contention that they could exclude certain portions of the agreement and the Act which were not favourable to them, then the men ought to find means for expunging certain clauses which were repugnant to them.

Concerning the stoppage at Gelli, which has now lasted more than two years, it was reported to the Rhondda district meeting, on Friday, that all efforts to reach agreement had failed.

It is indicative of the growth of coal traffic on the local railways that the Great Western Railway Company are now completing their great scheme of enlargement at their Newport station and its immediate vicinity. A second tunnel on the west of the station has been constructed; and the additional work now authorised will make the final link in quadrupling the line to Cardiff. It will join up the lines now laid from the Alexandra Dock junction, through the tunnel, to the existing quadruple lines east of the River Usk.

The executive committee of the South Wales Miners' Federation has resolved to again approach the employers with a request for joint audit of the coalowners' books for Conciliation Board purposes.

With regard to the custom of men ceasing work on the occasion of a fatal accident, which has occasioned the dispute and the short stoppage at Glamorgan colliery, Mr. Dituas, of Resolven, makes a notable suggestion. His proposal is that the men should continue at work, and that they should give the amount of their day's pay to the widow or other dependants of the deceased. This, he points out, would more strongly emphasise their respect for their dead comrade; and would render material aid to the widows and others.

Mr. David Hannah, of Ferndale, opened on Monday the fifth rescue station in South Wales, there being four others in course of erection. It is situated at Dinas, in the Rhondda Valley; and the building is said to be the largest in the country. With its equipment, which includes a motor car, the total outlay incurred has been £7,000, subscribed by the 20 companies owning 73 collieries in the district, contributions being on a tonnage basis.

Among the company attending the ceremony were Mr. W. Stewart (chairman of the Coalowners' Association), Dr. Atkinson (inspector of mines), Mr. T. Griffiths, J.P., Mr. Hugh Bramwell, and many other leaders in the coal industry in the locality. Mr. D. A Thomas (Cambrian), in the course of a speech, made some interesting statements. He first bore testimony to the work of Mr. F. L. Davis (Ferndale) in bringing about the establishment of the station; and then said that coalmining, though dangerous, was a healthy occupation. Taking all things together, the expectation of life to those engaged in South Wales collieries—although one of the most dangerous districts in the kingdom—was one of the highest in manual occupations in the kingdom. The death-rate in Germany was 50 per cent. higher than ours; and in the United States it was double. Last year our death-rate was lower than ever before; and, with regard to explosions, the loss of life now was only one-fourth or one-fifth what it was fifty years ago.

For three sittings the magisterial Bench at Abertillery have been occupied hearing charges against a number of colliers arising out of the strike last July. Owing to a dispute in the washery, affecting only 200 to 300 men, the whole of the employees at Lancaster's collieries, Cwm Tillery, 2,800 in number, struck, and during an endeavour to bring operations to a standstill and get out officials who were in the washery, some riotous scenes occurred. The house of the manager of the washery was attacked, and for some hours the police had a very heavy time, until finally they charged the crowd. The hearing had not concluded on Monday last, and a week's adjournment was then ordered.

Litigation, which will, in all probability, be carried to the House of Lords, commenced in the Pontypridd stipendiary's court on Friday last. Since the Minimum Wage Act came into operation, collieries have been worked on day-to-day contracts; but this, the workmen contend, is a breach of the Conciliation Board agreement. A man having been dismissed at 24 hours' notice from the Glamorgan Colliery, a test action has been instituted; and at Pontypridd there was an array of counsel such as is very seldom seen in a police-court. For the collier plaintiff it was stated that the action had been brought under the Employers' Liability Act to obtain damages for wrongful dismissal; and the stipendiary would have to determine whether the defendants were entitled to dismiss their men at 24 hours' notice, or whether the miners were entitled to a month's notice under the terms of the Conciliation Board agreement. It was urged that for 10 years, under all the agreements fixing wages, the term of notice had been fixed at one month; and the agreement of 1910 was cited as containing such a provision. Counsel described the circumstances of recent history, leading to the passing of the Minimum Wage Act; and said that when the trouble was over both parties were anxious to resume work as soon as possible. Representatives of the owners and men met at Cardiff; and the owners handed a notice to the men, but were informed that the men would decline to go in under that notice. As a matter of fact, the men went back without anything further being done; but when the men reached this colliery (and this was also the case in some others) they found a notice exhibited which stated that—pending the fixing of minimum rates—the colliery was open for work upon the terms and conditions of the Conciliation Board agreement:—

> Except that the contract of service shall be from day to day, terminable upon one day's notice.

It could not be contemplated, counsel contended, that this special term of day-to-day contracts should extend beyond the time when the award of Lord St. Aldwyn was made. Under that award, unless a man worked a fortnight, the Act itself would be useless; and the last paragraph in Clause 5 of the award referred to the fact that the men had to give notice to the officials "And the management shall be at liberty to remove the man to any other part of the colliery." He was not to be dismissed in 24 hours. That paragraph in the award would be quite unnecessary if they had power to dismiss at 24 hours' notice. Clause 10 of the award provided that all customs, usages, and conditions were to remain in full force until altered by mutual agreement. Both under the terms of the Conciliation Board contract, which was intended to be in force after the award, and according to usage, one month's notice was a reasonable notice to be given. The real question, said counsel (Mr. E. Tindal Atkinson, K.C.), to which the learned stipendiary would have to direct his attention was that the Conciliation Board agreement was independent of the individual contract between a workman and his employer; and it was obvious that the giving notice by one man or one company did not put an end to that agreement. He admitted that up to the time of the award they worked under the terms of the notice; but if it were really intended to alter the whole status, and the men were intended to understand that they were to work for all time under 24 hours' notice, it hould have been stated. The notice was intended to operate only for a certain period—pending the fixing of the minimum rates. The men's wages, percentages, and conditions of labour were determined under the Conciliation Board agreement, and the only alteration was to be that, during the limited period, the contract of service was to be from day to day.

Evidence as to the general and long-continued practice of a month's notice was then given by Mr. T. Richards, M.P., secretary of the South Wales Federation, and subsequently by Mr. W. Brace, M.P., president of the Federation.

For the defendant company, it was then submitted that the question depended entirely upon the terms of the actual contract made between the plaintiff and the defendant; and he argued that there had been complete failure to prove any contract at all except under the notice of April 4—which was the Conciliation Board contract agreement with the variation that there should be a day-to-day contract instead of a monthly. Prior to March, the 1910 agreement was the basis of contract; but when that contract came to an end by reason of the expiry of notices given by all the men, from that day no contract existed between the plaintiff and the defendants. It had been said that the Conciliation Board agreement existed until 1915; but the whole object of the men in giving notice was to get another agreement. The owners could have opened their collieries at any time they liked, upon any terms they liked. The whole conditions of employment in the coalfield had been altered, because now the men had contracted to get the minimum rate of wages; and under the circumstances the owners were entitled to protect themselves by having the stipulation that if they were not satisfied they were entitled to give a man notice and put another man in the place. The onus was upon plaintiff to prove that the owners were prepared to work on the old agreement with the new wages conditions and a month's notice. The Bench had to determine whether the owners and men should work under the agreement of 1910, which the men had ended.

Replying for the plaintiff, Mr. Atkinson held that there was continuity of existence on the part of the Conciliation Board. If it was not intended that the men should continue under the old agreement, what was the object of putting the word "pending" into the notice? The Conciliation Board was still in existence, for as soon as Lord St. Aldwyn's award had been announced an increase of wages had taken place under the old agreement, which was recognised everywhere with the exception specified by the temporary notice. By allowing the men to work after the award had been given, the terms of the old agreement were revived by both parties. In order to create an average upon which the minimum wage was to be determined, it was necessary that a man should work two weeks. There could be no proper minimum wage given to a man who was under 24 hours' notice.

The stipendiary magistrate (Mr. Lleufer Thomas) delivered judgment on Monday in favour of the plaintiff stating that in the absence of both agreement and custom on the point, he had to decide what was reasonable notice, and this he fixed at four weeks. He allowed costs, and expressed his willingness to state a case. In his opinion, after Lord St. Aldwyn's award, the parties were never of one mind as to the length of notice; and there was therefore never any actual agreement between them. Length of notice having been so long a matter of general contract, custom was excluded altogether. No single instance had been given where customary, as distinct from contractual, notice prevailed.

The first question to decide, he said, was whether the Conciliation Board agreement had been wholly terminated by the ending of the individual contracts of the men on February 29; and he held that it had been so terminated. After that date it could have had no existence, apart from the individual contracts of the men. Was there any evidence that it was revived later on or after publication of the award? On behalf of the plaintiff, it was submitted that expressions in the award implied a distinct recognition of the agreement; continued existence of the agreement; but if it purported to do so, it would have gone outside its terms of reference or jurisdiction, and would be *ultra vires*. All that had been referred to the chairman were—the first general minimum rates of wages and the district rules which the Act required to be made. The only way in which the Conciliation Board agreement could have been revived was by mutual agreement, expressed or implied, between the parties; and it was submitted for plaintiff that such an implied agreement should be inferred (in so far as the employers were concerned) from the terms of their poster of April 4, especially the expression "pending the award"—implying that after the award the terms offered in the poster were to be replaced by those of the Conciliation Board agreement. Neither in the documents nor in the admitted facts had he been able to discover sufficient evidence from which to infer that the employers assented to the Conciliation Board agreement being revived in its entirety, or that its provisions as to length of notice formed part of their continuation of the contract after the date of the award. The terms offered on April 4 were to apply only till the publication of the award. He could attach no other meaning to the expression "pending the award." The arrangement proposed was of a purely temporary character. It must be assumed that the parties contemplated that after the award was issued employment would be subject to district rules and to all such conditions necessarily following from or implied therein. The only construction he could put upon the district rules was that a day-to-day contract would be wholly incompatible with them. Therefore, the inference he was asked by defendants to draw—as to the continuance of terms embodied in the poster of April 4—was rebutted. He failed to find a contract governing the length of notice. Mr. Thomas then made a striking declaration:—

> A careful consideration of the principles of the Minimum Wage Act and also the district rules made thereunder lead me to the conclusion that the day-to-day contracts are an attempted evasion of the Act—a means of trying to contract out of the Act.

The very precariousness of day-to-day contracts seemed to him to be incompatible with the spirit and principles of the provisions which required a standard of regularity on the part of the workmen in order to entitle him to the benefit of the Act. The award assumed continuity of employment as the basis for arriving at the average earnings of a workman. The new rules had no binding effect of a contractual nature upon the parties, or the length of notice required. Among the implications of the award, clearly implied, he found (1) distinct recognition of the Conciliation Board agreement; and (2) an assumption that the period of service extended for a period of at least two weeks. He therefore found as stated.

Sinking operations at the Crown Colliery, Pwll, have proved successful after four years' work, which is said to have entailed an outlay of no less than £30,000. An excellent seam of coal was reached at the end of last week. Mr. Evan Jones, Llanelly, is generally congratulated upon the satisfactory result of his enterprise and persistence. He has, it is said, arranged to take over the New Pool Colliery, the Achddu Colliery, and the New Lodge Brickworks; and it is confidently anticipated that, very shortly, employment will be given to a large number of men, and a heavy output be attained.

To the monthly meeting of anthracite miners, at Swansea, on Saturday, it was reported that 175 men had been stopped at Ystradowen Colliery, on the ground that concessions in the price list were necessary. At the same meeting the employees at Cross Hands Colliery were given permission to tender notices upon the non-unionist question, and against the action of a section of the day-wage men who are attempting to establish a new union outside the Federation.

The Institute of Metals.—The autumn meeting of the Institute of Metals will be held in London on Wednesday and Thursday, September 25 and 26, 1912, commencing on both days at 10 a.m. On the first day visits will be paid to the works of Messrs. Fraser and Chalmers Limited, Erith, and to the National Physical Laboratory; while on Thursday, Woolwich Arsenal, and the Brooklands motor race course and aviation ground, will be visited. A special council meeting will be held in London on September 10, for the express purpose of considering applications for membership of the institute.

Mining Education in Gloucestershire.—The Gloucestershire Education Committee, in conjunction with the Bristol Education Authority, has again arranged for the opening of Saturday afternoon classes for working miners. These classes are to be held at the Bristol Merchant Venturers' Technical College, and will be taught by members of the University staff in the faculty of engineering. Not only mining, but subjects underlying it, such as mining calculations, science, mechanics and drawing, will be taken up; and the nominal fee of 1s. which is to be charged will be returned to students attending regularly. Provision is made for three sets of classes—the preliminary course, for new students, the intermediate section for those who have passed the examination of the initial section, or whose previous education is adjudged adequate, and the certificate course.

THE GERMAN COAL TRADE IN 1911.

Mr. Koenig, the British consul-general at Düsseldorf, in his annual report on the trade of Westphalia, gives some interesting facts relating to the progress of the mining industry in that district during 1911. From this some extracts appear below:—

In the district of Westphalia and the Rhenish provinces the output of coal, coke and briquettes increased in 1911, and exports were pushed more than in former years. Coke exports increased by nearly 20 per cent. and the production of briquettes increased by approximately 500,000 tons. In 1911 coal sales suffered owing to the low level of the waterways caused by the unprecedented drought; a great deal of the coal had to be freighted by rail, and the number of trucks at the disposal of the Government railways proved totally inadequate to cope with the traffic and the increased demands of the mining companies. During the year 1911 more coals were used by industrial works than ever before; in the three preceding years 138,200,000, 137,600,000 and 139,700,000 tons were used; in 1911 the home consumption was 144,000,000 tons. The following table shows the imports, exports, German production and home consumption of coal, lignite and coke in 1910-11:—

	In 1,000 metric tons.			
	Imports.	Exports.	German coal output.	Home consumption.
1910—				
Coal	11,196	24,257	152,827	139,766
Lignite	7,398	62	69,547	76,883
Coke	623	4,128	23,600	20,095
Total	19,217	28,447	245,974	236,744
1911—				
Coal	10,914	27,412	160,742	144,244
Lignite	7,069	58	73,517	80,528
Coke	598	4,554	25,405	21,449
Total	18,581	32,024	259,664	246,221

The by-products, such as sulphuric ammonia, tar and benzol, produced in the manufacture of coke are greatly on the increase; prices of these by-products rose in spite of their larger production. Whereas, formerly, these by-products were wasted, they are now used as fuel and in many different ways. In many cases liquid gas or oil is produced from the by-products, and sold at handsome profits to other companies for stoking purposes.

Towards the end of the year 1911 the Prussian Government began to negotiate with the Rhenish-Westphalian Coal Syndicate with a view to handing over the whole coal production of the Government mines for sale through the Syndicate. Early in 1912 an arrangement was concluded between the Government and the Coal Syndicate, under which the whole of the coal produced at the Government's mines in Westphalia and the Rhenish provinces is sold by the Syndicate. Previous to the Government's decision there seemed to be doubts as to whether the Syndicate would be renewed, as there were a number of private mineowners who were not desirous of remaining members of the Syndicate. Now, however, that the Government has joined the Coal Syndicate all the coalmining companies will, *nolens volens*, also be compelled to join it.

The Prussian Government owns and works a large area of coalfields in the Saar district of the Rhenish province, and also holds large interests in shares in some of the most important coalmining companies in Westphalia. It is a well-known fact that the coalmines managed and worked by the Government do not pay as well as those in private hands. Up to the present the Government's policy has been to try to counteract exorbitantly high prices and to endeavour to be independent of the private coalmining companies. The recent agreement signed between the Prussian Government and the Rhenish-Westphalian Coal Syndicate points to a change in that policy. The competition which formerly existed between the Government and the mining companies will cease. The result of this agreement is that from April 1, 1912, onwards the Rhenish-Westphalian Coal Syndicate has raised the price of coal and coke all round. The rise is considered slight, but the miners took advantage of it in order to bring pressure to bear on the companies.

The Miners' Strike.

The miners struck in March 1912, and hoped to attain their ends, particularly as their strike took place at the same time as the strike in the United Kingdom. With regard to the wages earned by the Rhenish-Westphalian miners, the general tendency has been for them to rise. In 1907, a year of exceptional prosperity, they reached their high-water mark; then they fell, till in the second quarter of 1909 they reached an average of 4s. 5½d. for all miners and 5s. 3½d. for coal hewers and trammers; after that they gradually rose, slowly at first and more

Table showing Percentages of Coalminers in the Ruhr Valley Earning up to 5s. 9d. and Over.

	1900.	1901.	1902	1903	1904	1905	1906.	1907.	1908.	1909	1910.
Number of miners	235,226	253,680	247,707	260,341	275,219	269,699	286,731	309,311	313,825	348,389	351,188
Division with percentages of wages earned:—											
Up to 1 m. 40 pf.	5,460	6,404	6,847	7,935	8,481	8,264	8,221	7,490	6,506	7,650	7,748
1 m. 41 pf. to 1 m. 80 pf.	2,274	2,499	2,398	2,235	2,219	2,273	2,473	3,634	5,151	4,544	4,490
1 m. 81 pf. to 2 m. 20 pf.	1,864	2,705	3,491	3,316	2,840	2,665	1,071	1,498	1,674	2,130	1,916
2 m. 21 pf. to 2 m. 60 pf.	4,160	5,722	6,614	5,946	5,344	4,891	3,756	2,127	2,211	3,485	3,111
Percentage...	5·9	6·8	7·8	7·5	6·9	6·7	5·7	4·7	4·9	5·4	4·9
2 m. 61 pf. to 3 m.	9,106	12,302	13,248	12,143	10,903	9,540	6,695	3,884	3,708	4,854	4,675
3 m. 1 pf. to 3 m. 40 pf.	14,150	17,850	17,695	17,679	17,997	16,267	12,470	7,141	6,316	8,042	7,020
3 m. 41 pf. to 3 m. 80 pf.	17,944	20,532	20,793	20,136	19,892	18,373	17,794	13,012	13,820	17,770	14,626
Percentage...	17·7	20·0	20·9	19·2	17·7	16·4	12·9	8·1	6·9	8·8	7·5
3 m. 81 pf. to 4 m. 20 pf.	18,091	20,777	25,486	23,450	21,613	20,477	18,840	18,767	21,291	21,389	19,731
4 m. 21 pf. to 4 m. 60 pf.	17,916	22,630	32,173	30,515	27,155	26,780	21,838	19,732	20,834	22,519	21,008
4 m. 61 pf. to 5 m.	21,521	29,957	40,529	42,919	40,193	40,136	29,103	21,162	21,780	30,708	29,510
Percentage...	24·4	28·9	39·6	37·2	32·3	32·4	24·3	19·3	18·6	21·4	20·0
5 m. 1 pf. to 5 m. 40 pf.	25,624	34,6..4	36,172	43,208	52,631	53,912	41,941	22,589	240,070	225,292	237,384
5 m. 41 pf. to 5 m. 80 pf.	28,501	32,717	21,941	26,530	35,545	35,018	45,002	27,213			
Over 5 m. 80 pf.	68,255	44,981	20,330	24,319	30,307	30,473	76,628	160,264			
Percentage...	52·0	44·3	31·7	36·1	43·1	44·5	57·1	67·9	69·0	64·7	67·6
Total percentage...	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

rapidly later on, so that for the third quarter of 1911 they averaged 4s. 9d. for all miners and 5s. 7d. for hewers and trammers; for the fourth quarter of 1911 the wages averaged 4s. 9½d. and 5s. 8d. respectively. Since January 1, 1912, the upward movement is still more pronounced.

The coalmining companies do not in any way recognise trade unions or miners' associations, and will not discuss any differences they may have with their workmen through these channels. There exist, however, numerous trade unions and coalminers' associations. Three of the largest unions held a conference in February 1912, and a resolution was passed to present the following demands at all the coalmining companies' head offices, and to request an early favourable settlement:—

1. A rise of 15 per cent. in the average wage for all workmen, and abolition of the large differences in the scale of wages.

2. Payment of wages in part by the 25th of the month and the balance by the 10th of the following month at latest.

3. An eight-hour shift as a maximum. Seven hours when working in a temperature of 22 degs. Cent., and a six-hour shift for temperatures of 28 degs. Cent.* These shifts to include time occupied in getting to the face of work and back.

4. Overtime to be only allowed in cases of accidents to the men or horses, or to the pit workings.

5. Monthly notices to be given to families living in the company's houses; freedom to join any association or union; free choice in selection of shops belonging to a union; freedom as regards keeping or refusing to keep lodgers.

6. No surcharges or deductions to be made beyond those allowed by law for insurance against invalidity and illness or insurance subscriptions to the pensions funds.

7. Labour exchanges to be managed by employers and employed jointly. Abolition of the employers' mutual agreement of no re-employment within a 15-mile circuit of men who have been discharged or have broken their contracts.

8. Curtailment of fines; all fines to be enquired into and confirmed by a special committee of employers and employed.

9. Courts of appeal to be established, consisting of employers and employed, with an impartial chairman to be elected by both parties.

10. Establishment of shops for the sale of non-alcoholic drinks at all the mines.

Demand No. 7 needs some explanation. In the Rhenish-Westphalian district there are special labour exchanges for miners, and they are managed by the coalmining companies. From the companies' point of view they are very satisfactory, as they keep a record of the behaviour of every one of the miners in the district. Some miners are very restless, and keep moving from one mine to another, if possible and as often as possible, as soon as they have any real or imaginary grievance. To prevent these useless removals, the labour exchanges have agreed not to re-employ a miner within a circuit radius of 15 miles, thus causing the miner considerable annoyance and removal expenses.

On March 11, 1912, 150,000 coalminers in the Ruhr Valley of Westphalia struck without giving due notice as required by their contracts; these miners consisted of the members of three unions, which are mainly managed and led by Social-Democratic leaders. In the Ruhr Valley of Westphalia there are a total of 367,000 miners; of these, 225,000 to 240,000 were against striking, and the strikers did their best in inducing them not to go to work. Out of the 367,000 miners, 52 per cent. are German-speaking Germans, 40 per cent. are Polish-speaking Germans, and 8 per cent. foreigners—chiefly Austrians, Hungarians, Dutch and Italians. The strike was caused by the mining companies refusing to confer with the unions as to the 10 demands which they had sent in. The companies were, however, prepared to confer with deputations of workmen from their separate works, not collectively, but singly. A great number of the mining companies stated that they were prepared to take into consideration an early rise in wages. Some of the mines, in fact, have already raised the miners' wages by 5 to 8 per cent. The Government took every possible precaution to protect those willing to work by sending constabulary, mounted police, infantry and cavalry to the Ruhr Valley. All the mines where strike outbreaks were expected received sufficient reinforcements to deal with any riots and possible disturbances. The Government considered that the mining companies had dealt fairly with their men in offering to consider an immediate rise in wages and in offering to listen to any complaints the men might have to make. Among the demands made by the unions, the two most important are the rise in wages of 15 per cent. and the reduction of the miners' shift to eight hours under ordinary circumstances, including the journey to and from the face of work to the pit's mouth, and the reduction to seven hours where the temperature in the mine is up to 71½ degs. Fahr. The present shift of eight hours does not include entry and exit to and from the face of work to the pit's mouth, and under the present arrangement the shift is actually eight and a-half hours.

The following are the average wages paid in 1909-11 in the Ruhr, Saar and Aachen districts:—

District.	Year.	Wage per shift.	Annual wage.	No. of shifts.	Average wages of hewers and trammers* per shift.
		M. pf.	Marks.		M. pf.
Ruhr.........	1909 ...	4 49 ...	1,356 ...	301 ...	5 33
,, ...	1910 ...	4 54 ...	1,382 ...	304 ...	5 37
,, ...	1911 ...	4 69 ...	1,446 ...	308 ...	5 55
Saar	1909 ...	3 96 ...	1,136 ...	287 ...	4 51
,, ...	1910 ...	3 97 ...	1,122 ...	283 ...	4 50
,, ...	1911 ...	4 6 ...	1,168 ...	288 ...	4 60
Aachen......	1909 ...	4 45 ...	1,344 ...	302 ...	5 1
,, ...	1910 ...	4 49 ...	1,375 ...	306 ...	5 9
,, ...	1911 ...	4 59 ...	1,395 ...	304 ...	5 19

* "Unterirdisch beschäftigte eigentliche Bergarbeiter."

The Prussian Government issued notices through its district governors that all possible protection would be provided to the men willing to work, and it has amply provided for the protection of the mines and private property; constabulary, infantry and cavalry had been drafted from all the neighbouring provinces, and had been given instructions to prevent riots and destruction of property at all costs. Supplies of coal were very large, and the amount of coke stored up at all the mines was unusually great, so that there was no possibility of coal getting scarce or of trade getting dislocated; most industrial works had ample supplies of coal and coke, and the railways cannot be said to have been affected at all. During the first four days of the strike a good deal of rioting occurred, which, however, ceased as soon as the infantry and cavalry arrived, when the miners willing to work and who had been intimidated by the strikers returned to work at once. Five days after the outbreak of the strike the miners' leaders realised the hopelessness of continuing the strike, and held meetings recommending the strikers to return to work. The strike had collapsed sooner than had been expected, and in eight to ten days it was practically over.

The strike collapsed without having achieved anything. The miners lost in every possible way. As they had broken their contracts they all lost six shifts, which the mining companies were entitled under contract to deduct from their next wages; they all had to return to work unconditionally, and the mining companies even struck some of them off their lists and would not re-employ them under any circumstances.

The miners lost wages amounting to £350,000, and it is calculated that during that time 1,102,830 tons less of coal were raised, valued at £600,000. The net profit lost to the mining companies, calculated at 9d. per ton, amounts to £41,350. The companies were able to sell a portion of their surplus stocks at good prices, and all coal company shares have since risen and not fallen. The railways were not in the least affected, as they held sufficient stocks for two or three months. Trains ran as usual during the whole of the strike. As only a portion of the miners struck, the mines were kept in good working order and the coke ovens were kept going all the time. All the larger ironworks and other industrial concerns largely dependent on coal held sufficient stocks to keep themselves going, and no works had to stop running owing to shortness of coal.

Hydraulic Stowage of Wastes in Coalmines.

Hydraulic stowage in Westphalia is at present increasing from year to year, and it is considered that the majority of coalmines will in the near future be obliged to adopt the system. The method is to replace the coal withdrawn by material carried down the mine by water.

Formerly coalmining companies produced as much coal as possible at the least expense; but now the surface damages and claims for compensation are getting very frequent. Every year large sums have to be paid, and it is to prevent these yearly compensations that hydraulic stowing is being introduced where the damages are heaviest. As the population increases, the value of landed property rises and the damages increase enormously. It is maintained that hydraulic stowing supports the surface and prevents buildings from cracking. It is also of great importance to prevent the surface-carrying roads and railways from subsiding in the natural course of time. When available, the ideal material for hydraulic stowing is sand. In Westphalia sand is not available, and a mixture of pit waste, blast-furnace slag and ashes are ground down and well mixed and then flushed down the pipes with water. The material chiefly used in the Saar district is furnace slag mixed with brick clay and boiler ashes. In many cases, where hydraulic stowage has been introduced, the pillars of coal, which formerly had to be left to support railways and buildings, have been dispensed with. In Westphalia there are cases in which the coal is being worked from under the town by means of hydraulic stowage without causing any damage. The pipes used for hydraulic stowing are a matter of considerable expense; the diameter of the pipes is about 7 in., and consists at present mostly of steel or wrought iron with a cast iron lining. Where sand can be used, hydraulic stowage is cheap and is said not to amount to more than 6d. per ton, but in cases where more expensive material has to be mixed and ground down before use, the cost of stowage is 1s. per ton of coal. It is maintained that with hydraulic stowage the expenses for pit timber are reduced and the total coal output per annum increased.

Coal Substitutes.

In many industrial works requiring a large amount of coal, steam engines have of late years been partly replaced by engines worked with benzol and oils of various kinds. As coals become more expensive, technical improvements in oil engines are being made, which will in time cause the use of coal to decrease. Public attention during the coal strike was drawn to the question as to how far coal can be substituted. Oils of all kinds, particularly petroleum, suggest themselves as substitutes for coal. Doubtless important developments have taken place, particularly in the use of coal tar oils as fuel. Where petroleum is produced in large quantities and is cheap enough, it would naturally be used on a large scale. Of late the Diesel engine has attracted a great amount of attention, and in connection therewith the improvement in the process of obtaining oils from coal. It is only quite recently that the difficulties experienced with these oils have been overcome. They consisted chiefly of muddy deposits of solid hydrocarbons, which made the working of the fuel pumps difficult. Furthermore, the composition and quality of the unclean tar oils made their use difficult. Chemical industries, however, have improved methods of refining and selecting material and can now supply coal tar oils of excellent quality. It is stated that there will be a revolution in the present system of generating power through the development of oil fuel. Engines built on the Diesel principle effect great economies in cost and require less room for plant and storage of fuel. The day is not far ahead when there will be a great saving of coal and a larger use of oil. The oil may be solidified, pure, or in combination with coaldust. Oil may be used in a liquid state under a boiler to produce steam; it can be also used, as in the case of the Diesel engines, where it is ignited, under pressure and by exploding produces power. When burnt in a liquid state under a boiler the oil is sprayed through a burner beneath the boiler, with or without red hot coals to assist combustion. This method is applied to furnaces and boilers, as well as to locomotives. Since the last coal strike many firms have turned to oil in order to lessen the danger of running short of coal. Many firms have made slight alterations in portions of their furnaces in order to be able to burn the oil fuel in case they run short of coal. Coal tar oil promises to have a great future as a general fuel.

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* 22 degs. Cent. = 71½ degs. Fahr.; 28 degs. Cent. = 82½ degs. Fahr.

Coalminers' Wages.

The "Allgemeiner Knappschafts-Verein" in Bochum has published very interesting tables with regard to the wages earned by the miners of the Ruhr Valley. The highest class of wages—that over 5 marks—shows an increase of from 64·7 per cent. in 1909 to 67·6 per cent. in 1910. Of the 67·6 per cent., the miners earned from 5s. to 5s. 9d. and over, and it will be seen, from the table on preceding page, that the percentage of miners earning lower wages has gradually fallen from year to year.

In 1910, out of the 351,000 miners of the Ruhr Valley only 4·9 per cent. earned 1s. 5d. to 2s. 7d., only 7·5 per cent. earned 2s. 7d. to 3s. 9d., only 20 per cent. earned 3s. 9d. to 5s., and 67·6 per cent. earned as much as 5s. to 5s. 9d. and over.

INDIAN AND COLONIAL NOTES.

Africa.

In the course of his report for 1910, Mr. A. W. Rogers, the Director of the Cape Geological Commission, states that a survey has been made of the country surrounding the recently-opened coal in the Laingsburg and Sutherland divisions. The immediate object of the work was to discover the nature of the bodies of coal, and to furnish advice as to the prospects and future developments of the coal-bearing area. The occurrences at Wilgebosch Kloof and Hartebeestfontein proved to be fresh examples of the type of coal-filled fissures long known to exist in the Beaufort West and Aberdeen divisions, on which much time and money have been spent in vain since the late seventies of last century. "It is certain," observes Mr. Rogers, "that the discoveries yet made have at the present time no economic value; and from the apparent absence of coalseams from the Great Karroo, a country singularly favourable to the discovery of seams if they exist, the chances of the fissure coal being in any way connected with seams of coal are very remote. The fissures filled with coal offer a very interesting problem, but it is more than doubtful whether further investigations will prove of commercial use, at any rate, in the near future."

Australia.

Trials on H.M.S. "Cambrian" with coal supplied by the Mammoth Admiralty Coal Company Limited, of Rockhampton, Queensland, have proved unsatisfactory, the consumption being high, whilst trouble from fusing was experienced.

The expansion of the coalmining industry continues in Queensland. New mines were opened in 1911, and new machinery was being introduced. During the year, 42 collieries produced 891,568 tons, valued at £323,998 or 7s. 3d. per ton, being, when compared with the previous year, an increase in the number of collieries of five, in output of 20,402 tons, in value of £1,176, but a decrease in average value of 2d. per ton. The approximate apportionment of output was: Bunker coal, 221,821 tons; cargo coal, 100,443 tons; railway and other Government departments, 316,684 tons; gas, meatworks, all other purposes, 252,620 tons. Prices had been well maintained, the average value at the pit's mouth throughout the year being—in the Ipswich district, 6s. 5d.; in the Darling Downs district, 8s. 5d.; in the Wide Bay district, 10s. 10d.; at Clermont, 7s. 6d.; and in the Rockhampton district, 10s. 4½d.

Picks versus Machines.—A serious crisis is threatened in the northern coal trade, writes our Sydney correspondent, and a special meeting of the Miners' Delegate Board has been called for the purpose of deciding whether machines shall be employed in place of picks for under-cutting pillars. At the time of writing, the difficulty was confined to a single colliery, where the men have gone on strike against the use of the machine, and upon the decision of the conference will depend whether there shall be a general strike or lock-out, both sides being equally determined. In support of the contention that only picks should be used in high seams of coal, it is asserted that where machines are used, the timbering cannot be brought sufficiently close to the working face, while the noise makes it difficult to hear the movements of the roof. On the other hand, the mineowners have to consider the increasing cost of production, also the loss of capital invested in the machines if their use is prohibited. Unless the cost of production can be kept down, several of the mines will have to be closed.

Increasing Coal Trade.—Despite the ceaseless unrest among the coalminers in the northern parts of the State, writes our Sydney correspondent, the prospects of the coal trade generally are good, the exports from Newcastle during the first half of the present year being 2,218,802 tons, value £1,151,512, against 1,846,632 tons, value £964,991, during the corresponding period of 1911, an increase of 371,989 tons, value £186,521. The shipments to the other States all showed increases as under:—

	1911. Tons.	1912. Tons.
Victoria	338,389	486,620
South Australia	300,165	349,083
Western Australia	84,945	112,475
Tasmania	83,860	73,845
Queensland	50,386	60,840

Shipments to Oversea Ports.

	1911. Tons.	1912. Tons.
New Zealand	161,637	234,711
Chili	300,136	347,412
Java	77,422	148,270
Canada	14,986	17,520
Sandwich Islands	15,930	28,588
Argentine	*Nil*	27,541

The decreases were as follows:—

	1911. Tons.	1912. Tons.
United States	108,860	46,474
Philippines	88,099	48,189
Straits Settlements	80,870	52,768
Peru	44,583	25,467
Fiji	29,792	27,019

The increased shipments to other Australian ports and New Zealand were largely a result of local industrial disputes, save in Queensland, while the decreased exports to the United States, Philippines, Straits Settlements, Peru, and Fiji illustrated the steadily increasing amount of Japanese and other Asiatic competition influenced by the continual unrest in the Australian coal trade.

THE FREIGHT MARKET.

There has been some improvement in the supply of outward tonnage during the past week, but the quantity to hand is still inadequate, and rates are generally very firmly held. On the north-east coast, coasting business is being done at about 4s. 6d., Tyne to London, and 4s. 10½d. to Hamburg. The Baltic is based on from 6s. 9d. to 6s. 10½d. to Cronstadt, the Bay on 7s. 9d. to Bordeaux, and North France on 6s. 3d. to Havre. The Mediterranean is increasingly dear at 13s. to Genoa. At South Wales chartering is active, and rates in all directions more than hold their own. At the Clyde a fair business is reported at very firm figures. The Humber is quiet, with rates maintained as at other ports. Homewards, the volume of business done has been moderate. The Black Sea, Danube and Azof have a steady enquiry at unaltered rates. The Mediterranean and ore trades are firm, as is also the Baltic. There is a fair demand at improving figures from the Eastern ports. America shows a strong enquiry at fully late figures. The River Plate is steady.

Tyne to Azores, 1,500, 14s. 3d.; Bilbao, 3,300, 8s. 3d.; Barcelona, 3,400, 13s. 6d.; Cronstadt, 2,500, 6s. 9d.; Civita Vecchia, 5,800, 13s. 9d.; 2,800, 13s. 6d.; Fairwater, 1,500, 6s. 7½d.; Genoa, 4,800, 13s.; Hernosand, 1,000, 8s.; London, 2,000, 4s. 6d.; 2,000, 4s. 6d.; 2,700, 4s. 3d.; 3,000, 4s. 3d.; 1,500, 4s. 4½d.; Las Palmas, 4,800, 11s. 6d.; Libau, 2,200, 7s.; Lisbon, 1,700, p.t.; 1,900, 10s. 6d. coal, 13s. coke; Nice, 3,000, 13s.; Oporto, 1,500, 12s.; Porto Ferrajo, 4,800, 12s. 6d., ppt., from Dunston; Port Said, 6,000, 12s., from Dunston; 5,300, 13s.; Rotterdam, 1,400, 4s. 9d.; Sveaborg, 2,000, 7s. 3d.; Venice, 5,000, 14s. 3d.

Cardiff to Alexandria, 5,200, 12s., September 4; 5,000, 12s., 500, early September; 5,000, 12s. 8d., ppt.; 4,500, ditto; Barcelona, 3,600, 12s. 6d.; Brest, 2,400, 6s. 1½d.; Cherbourg, 850, 6s.; 1,600, 6s.; 1,600, 6s. 9d.; 850, 6s. 9d., ppt.; Colombo, 14s., mid-September; Dartmouth, 500, 5s.; Granville, 680, 6s. 9d.; Ghent, 500, 5s. 3d.; Genoa, 2,600, 12s. 3d.; Haiffa, 15s. 8d., ppt.; Havre, 1,150, 6s. 9d.; Honfleur, 2,100, 8s. 9d.; 1,200, 6s. 9d.; Las Palmas, 2,500, 11s. 8d., September 10; 4,000, 11s. 9d., ppt.; 5,400, 11s. 8d., September 15; Lerwick, 400, 8s. 6d.; Lisbon, 2,300, 9s. 6d.; Leghorn, 3,000, 12s. and 13s. 3d.; Marseilles, 4,700, 14½ fr.; 4,500, 14½ fr., ppt.; 5,200, 14½ fr., ppt.; Malta, 4,500, 10s. 6d., September 6; Malaga, 2,300, 12s.; Naples, 3,000, 12s. and 13s. 3d.; Port Said, 5,800, 12s. 8d., ppt.; 6,500, 12s., September 9; 6,500, 12s., ppt.; 4,500, 12s. 6d., ppt.; 6,000, 12s. 3d., ppt.; 8,000, 12s. 9d.; Passages, 950, 8s. 6d.; Portland, 500, 5s.; Palermo, 4,000, 13s., ppt.; Plymouth, 700, 5s. 6d.; River Plate, 4,500, 21s. 6d.; 5,000, 21s. 6d., September 10; 4,200, 22s., ppt.; 4,800, 22s., ppt., lower ports; Reggio, 2,600, 13s. 3d., 400, ppt.; Rosario, 22s. 6d., September; Sveaborg, 2,800, 7s. 9d.; 2,000, 7s. 9d.; Sulina, 5,200, 13s. 3d., ppt.; Sicily, 3,600, 13s., September 5; 2,600, 13s., 600, ppt.; St. Helena, sail, 21s., September; Teneriffe, 2,500, 11s. 6d.; 5,400, 11s. 6d., September 15; Tarragona, 2,700, 11s. 9d. coal, 12s. 6d. fuel, ppt.; Torre, 3,000, 12s. and 13s. 3d.

Blyth to Havre, 1,000, 6s. 6d.; St. Petersburg, 2,800, 7s., ppt.; Libau, 2,700, 6s. 6d.

Hull to Cronstadt, 2,000, 6s. 7½d.; 2,300, 6s. 4½d., September 10; Pernau, 1,500, 6s. 9d., early September; Barcelona, 2,000, 13s. 6d., ppt.; Reval, 2,500, 8s., ppt.

Burntisland to Buenos Ayres, 23s., end September.

Fife port to Cronstadt, 2,800, 7s.

Grangemouth to Monte Video, 3,500, 22s., 200, ppt.

Newport to Marseilles, 5,200, 14½ fr.; Naples, 3,000, 12s. and 13s. 3d.; Torre, 3,000, 12s. and 13s. 3d.; Leghorn, 3,000, 12s. and 13s. 3d.; Dartmouth, 480, 5s.; Portland, 480, 5s.; La Pallice, 1,800, 8¾ fr.

Swansea to Valencia, 1,300, 13s. 9d., 400, free tax; Bougie, 1,650, 18 fr., ppt.; Hamburg, 1,300, 6s.; Belfast, 480, 8s. 9d.; St. Servan, 750, 7s., ppt.; St. Brieux, 580, 8s. coal, 8s. 6d. fuel; Naples, 3,000, 12s. and 13s. 3d.; Torre, 3,000, 12s. and 13s. 3d., Leghorn, 3,000, 12s. and 13s. 3d.; Alicante, 1,000, 14s., September 10; Barcelona, 2,000, 13s., ppt.; Bari, 3,000, 14s., ppt.; Cagliari, 1,800, 14s. and 14s. 9d.; St. Nazaire, 2,200, 9 fr., spot; Havre, 750, 6s. 9d.; Caen, 700, 6s. 10½d.

Wyborg to Alexandria, 87 fr., baulks.

Baltic to Alexandria, 93 fr., September-October.

Antwerp to Caldera, sail, 25s., coke, September-October.

Port Talbot to Nantes, 2,300, 8¼ fr.; Dieppe, 1,700, 7s. 6d.; 1,700, 7s., ppt.; Havre, 680, 6s. 9d.

Glasgow to Genoa, 12s. 1½d.; Savona, 12s. 1½d.; Leghorn, 12s. 1½d.

Llanelly to Rouen, 850, 7s. 9d.

Immingham to Pernau, 2,700, 6s. 9d., September 10; 1,300, 6s. 9d., ppt.

Garston to Santos, 22s. 6d., September.

Emden to Algiers, 4,500, 13 fr.

Wales to Maranham, sail, 18s. 8d., ppt.; nitrate port and home to United Kingdom-Continent, sail, 44s., in and out; Naples, 8,000, 12s. 6d. coal, 13s. 3d. fuel, ppt.; Torre, ditto, Leghorn, ditto.

Hartlepool to Marseilles, 4,400, 12s.

Grimsby to Reval, 2,200, 7s., ppt.

Wear to Cette, 3,300, 13s.

Methil to Thistadt, 800, 9s. 3d.

Rotterdam to Chantenay, 1,550, 6s. 10½d. coal, 9s. coke, September; Havre, 2,050, 5s. 6d., ppt.; Bordeaux, 2,500, 6s. 6d. coal, 7s. 3d. fuel, 1½d. less if more than 600 tons, discharging September 10; 3,400, 8s. 7½d. coal, 7s. 4½d. fuel, ppt.; Monte Video, 2,205 net, 17s. coal, 500 tons fuel same rate, ppt.; La Rochelle, 2,450, 6s. 6d., September 16.

Homeward charters:—Kherson, Nicolaieff or Odessa, 6,200, Rotterdam, 12s. 9d., ppt.; 5,800, London or Rotterdam, 12s. 6d., ppt.; Novorossisk, 7,500, Rotterdam, 12s. 6d., ppt.; 5,200, Rotterdam 12s. 9d., Hamburg 13s. 3d., September 10-20; Sulina, 4,590, Antwerp or Rotterdam, 12s. 9d., ppt.; 6,000, Rotterdam 12s. 9d., Antwerp 13s., Hamburg 13s. 3d., ppt.; Japan, 3,054 net, Sabang, 7s. 9d., end September; Calcutta, 7,300, United Kingdom-Continent, 28s. 9d., p.p., d.w. basis, net terms, September; 2,472 net, Boulogne, 33s. 9d., jute, October; 2,625 net, 27s., ore, end September; 2,385 net, Bombay, Rs. 8·4, September; Kherson or Nicolaieff, 6,700, 13s. 3d. any, 13s. 9d. Hamburg, ppt.; 5,000, United Kingdom, 13s. 9d. p.p., 3d. extra both loading, ppt.; Philippines, 2,806 net, United States, 38s. 6d., two ports to two, on d.w., September; 38s. 9d.; Savannah, 2,129 net, Liverpool or Bremen, 55s., cotton, September 20; 2,464 net, 160 ft., Liverpool 60s., Bremen 61s. 3d., cotton, October; Gulf, 2,851 net, 139 ft., Liverpool or Bremen, 60s., cotton, September-October; Buenos Ayres or La Plata, 5,300, 10 per cent., United Kingdom-Continent, 20s. 6d. o.o., less 6d., November; 5,500, 10 per cent., 21s. 9d. o.c., less 8d., October 1-November 5; 7,300 max., p.p., 23s. 6d., ppt.; Sagunto, 3,000, Newport, 7s., ppt.; Bilbao, 900, Rotterdam, 8s. 8d., ppt.; 2,800, Middlesbrough, 7s. 3d., ppt.; 3,000, 7s. 3d., September 10; North Pacific, 3,207 net, United Kingdom-Continent, 48s. 9d., September-October; Hornillo Bay, 4,800, Glasgow, 8s., ppt.; Newcastle, N.S.W., sail, 21s., West Coast South America; Buenos Ayres, sail, 27s., Libau, quebracho; Miramichi, 60s., United Kingdom-Continent; Santa Fe, 28s., o.c., United Kingdom-Continent; Wilmington, 46s. 3d. Liverpool, 48s. 9d. Bremen; 50s., Liverpool or Bremen, two voyages, commencing October-November; Bombay, 25s., Northern States, ore, November; Danube, 4,400, Rotterdam 13s. 6d., Antwerp 13s. 9d., ppt.; Delagoa Bay, 3,067 net, Bombay, 8s. 6d., September; Galveston, 2,299 net, Liverpool or Bremen, 70s., 16 days, cotton, mid-September; 2,213 net, Bremen, 62s. 6d., cotton, October; Carthagena, 3,400, Maryport, 9s., September; Azof, 4,400, 14s. n.c. or any, 15s. Hamburg, ppt.; 4,400, Rotterdam, 13s. 3d., ppt.; 5,500, 13s. 3d., ppt.; 4,000, 15s. 6d. n.c., September 10-20; 4,500, Rotterdam 13s. 6d., option Marseilles or Genoa, 14½ fr., ppt.; 5,200, Rotterdam 13s. 6d., option Genoa 14½ fr., ppt.; 3,200, 15s. 9d. n.c. or any, 16s. 3d. Hamburg, August; 5,500, max., Dublin, 15s. 6d., barley, ppt.; 8,200, Rotterdam 14s., Antwerp, Emden, Weser 14s. 3d., Hamburg 14s. 6d., with 3d. less barley, mid September; 4,600, Rouen, 15s. 6d., September 10-20; 3,500, 15s. 8d. n.c. or any, 16s. Hamburg, option Barcelona-Valencia, 16½ fr. one port, 17 fr. both ports, ppt.; Baltimore, 28,000 qrs., 10 per cent., United Kingdom-Continent, 3s., p.p., oats, September-October; 2,008 net, 3s. 3d. p.p., oats, October; 10,100 qrs., 10 per cent., 3s. 3d., p.p., oats, September-October; 35,000 qrs., 10 per cent., Cardiff, Avonmouth, London, Antwerp or Rotterdam, 3s. 3d., oats, October; San Lorenzo, 5,200, 10 per cent., United Kingdom-Continent, 24s. 8d. o.o., less 6d., October 1-31; 4,200, 25s. o.c., less 6d., October 1-31; 7,000, 10 per cent., p.p. 26s. 3d., no reduction direct, ppt.; 5,300, 10 per cent., 21s. 9d. o.c., less 6d., November 5-December 5; 6,000, 10 per cent., 22s. 6d. o.o., less 6d., October 20-November 30; 4,000, 10 per cent., 23s. o.o., less 6d., November 1-30; Kurrachee, 21s., Liverpool; 24s. 6d., three ports Denmark, end September; 5,000, 10 per cent., p.p. United Kingdom-Continent, 21s., less 2 per cent., September; 20s. 8d., United Kingdom-Continent, net; 5,500, 10 per cent., 20s. 6d. p.p., barley, October; Vladivostock, 3,026 net, United Kingdom-Continent, about 35s., October; Pensacola, 1,918 net, 133 ft., Hamburg, 62s. 6d., Form O, September-October; Huelva, 4,500, Port Inglis, 10s. 8d., Tinto terms, ppt.; Mejillones, sail, 30s., United Kingdom-Continent, less 9d., September-October; Melbourne, sail, 30s., United Kingdom-Continent, December; South Australia, sail, 30s. 9d., United Kingdom-Continent, December-February; time charter, Australian trade, about 5s. 8d., 12 months, delivery and re-delivery Australia; Norfolk, 51s. 3d., Liverpool, Manchester, or Bremen, October-November; Buenos Ayres, 4,700, 10 per cent., Genoa, 25s., September-October; Smyrna, 2,450, London or Hull, 14s. 6d., mid-September; Columbia River, sail, 80s. one port, 82s. 6d. two ports United Kingdom; Puget Sound or Columbia River, sail, 52s. 6d., Sydney or Newcastle, N.S.W.; Gulf port, sail, 16½ dols., Buenos Ayres or La Plata, November; time charter, Transatlantic trade, 6s. 3d., two round trips, United Kingdom and United States.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Abstracts of Contracts Open.

Bicton Heath, September 16.—For coal, for the Salop County and Wenlock Borough Lunatic Asylum, Bicton Heath, near Shrewsbury.

Birmingham September 11. — For slack, for the Guardians.

Bournemouth, September 10.—For about 300 tons of coal and about 150 tons of coke, for the directors of the Canford Cliffs and Norfolk Hotels, Bournemouth, Limited.

Bridgnorth, September 14.—For coals, for the Guardians.

Bristol, September 16—For coal, for the Corporation.

Bromsgrove, September 16—For coal and coke, for the Bromsgrove, Droitwich, and Redditch Hospital Committee.

Carnarvon.—For coal, for the Carnarvonshire Education Committee.

Castlebar (Ireland), September 20.—For best double-screened Wigan coal, quantity required estimated at 40 tons.

Coatbridge (Scotland), September 10—For supplying the Monkland School Board, with coals, nuts, peas and coke.

Croydon, September 12.—For coal and coke, for the Croydon Rural and Merton Joint Hospital Board.

Croydon, September 26.—For coal and coke, for the Rural District Council.

Darlington, September 20—For steam coal, for the Corporation.

Douglas, September 9.—For four cargoes, of about 170 tons each, of good steam coal, for the Corporation.

Edinburgh, September 16—For coal, for the Edinburgh and District Tramways Company Limited.

Exeter, September 9—For from 120 to 130 tons of best large South Wales smokeless steam coal, for the Corporation.

Godstone, September 10—For coal, &c, for the Rural District Council.

Goole, September 17.—For coal, for the Education Sub-committee.

Granard (Ireland), September 16—For 110 tons best Whitehaven or First Wigan, free from slack, and 40 tons of best Irish coal, free from slack, for the Guardians.

Grimsby, September 17—For about 300 tons of house coal, 100 tons of steam coal, and 300 tons of the best gas-house coke, more or less, for the Education Authority.

Halifax, September 9—For gas coal, for the County Borough Council.

Hemel Hempstead, September 9—For coal and coke, for the Education Committee.

Heswall, September 9—For coal, &c., for the Committee of the West Derby, Liverpool, and Toxteth Park Joint Hospital, Heswall, near Birkenhead.

Leytonstone, N.E., September 12.—For coal and coke, for the West Ham Guardians.

London, September 10-11.—For the supply of coal, coke and gas coal, for the Holborn Guardians.

London, September 19.—For coke, for the Stepney Guardians.

London, September 19.—For coals, coke, &c., for the Guardians of Strand Union.

Nenagh (Ireland), September 12.—For 50 tons of best double-screened Scotch coal, for the Guardians.

Newport (Mon.), September 17.—For coal, for the Corporation.

Richmond (Surrey), September 16.—For coal and coke, &c., for the Guardians.

Sheerness, September 17.—For about 300 tons of good, large north-country steam coal, free from dust, for the Urban District Council.

Sheffield, September 10.—For coal, for the Corporation.

Staines, September 14.—For the following kinds of steam coal, for the Urban District Council, viz.:—"Hard R ffer," from Babbington Colliery, or "best selected hand-picked" from Mapperley Colliery, or "best main hard" from Hucknall Torkard Colliery, or "best hard" from Linby Colliery.

Stoke-on-Trent, September 9—For coal, slack and coke, for the Education Committee.

Swinton, September 12—For from 2,000 to 5,000 tons of screened or unscreened gas coal or nuts, for the Swinton and Mexborough Gas Board.

Withnell, September 11—For gas slack, for the Urban District Council.

Windsor, September 16—For coal and coke, &c, for the Guardians.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Broadstairs, September 23—*Water softening House, &c*—For (*a*) softening-house and ferro-concrete tank (Hennebique system) at Rumfields Pumping Station; (*b*) cast iron pipes and specials; (*c*) sluice valves, &c., for the Broadstairs and St. Peter's Urban District Council.

Edinburgh, September 11.—*C I. Pipes.*—For a quantity of cast iron pipes from 2 in. to 12 in. in diameter, weighing about 255 tons, for the Edinburgh and District Water Trustees.

Lower Penarth (near Cardiff), September 9—*Constructional Steelwork.*—For the constructional steelwork required in the extension of their works at Lower Penarth, near Cardiff, for the Directors of the South Wales Portland Cement and Lime Company Limited.

Madras (India).—*Pipes, &c.*—For about 9,500 tons of cast iron pipes and special castings, together with valves and other works, for the Corporation.

Middleton, September 11—*Steam Dynamo*—For one 300-400 kw. steam dynamo, for the Corporation.

Rottingdean, September 10.—*Boiler.*—For a Hartley and Sugden's wrought welded domestic supply independent wide-waterway hospital boiler, for the Brighton Guardians

Stamboul (Turkey), September 28—*Fire-extinguishing Pumps.*—Tenders will be received at the "Consul de la Préfecture," Stamboul, for the supply of from 40 to 100 fire-extinguishing pumps and accessories required for the Préfecture and the municipalities, and for some provincial towns.

West Hartlepool, September 14.—*Steam, Exhaust, and other Pipework.*—For steam, exhaust, and other pipework, for the Corporation.

COAL, IRON AND ENGINEERING COMPANIES.

Bolckow, Vaughan and Co. Limited—The directors have decided to recommend the payment of a dividend at the rate of 5 per cent. per annum for the year ended June 30, 1912, free of tax, less the interim dividend paid in March last. They also recommend the appropriation out of profit for the year of £50,919 for extensions of plant, &c, carrying forward £135,651.

Bradford Briquette Works Limited.—This private company has been registered, with a capital of £2,000 in £1 shares (500 deferred), to carry on the business of coal and iron masters, smelters, engineers, founders, &c., and to adopt an agreement with Yeadon, Son and Co. Qualification of first directors, who are to be appointed, £100.

Burnley Utility Coal Company Limited.—This private company has been registered, with a capital of £800 in £20 shares, to carry on the business of dealers in coal, coal products, and metals, &c. First directors, G. Hugill, J Richardson, R. Healey, T. E. Whittam, J. E Gowling, S Sackeld, and J. Talbot. Registered office, Goods Yard, Manchester-road Siding, Manchester-road Station, Burnley.

"Climax" Humidity Boiler Limited—This private company has been registered, with a capital of £1,500 in £1 shares, to carry on the business of makers of humidity and other boilers, gas stoves and fittings therefor, iron and steel founders, &c., to acquire any inventions relating to hygienic humidity boilers for greenhouses, hospitals, and the like, and to acquire from J. Rigg the benefit of certain existing patents. Qualification of first directors, who are to be appointed, £20 shares. Registered office, 11, Queen Victoria-street, E.C.

Dundee Coal Company Limited.—A dividend of 5 per cent. has been declared.

Hawthorn (R. and W.), Leslie and Co. Limited.—The annual meeting of this company was held on Monday at Newcastle. Sir Benjamin C. Browne (chairman) presided, and in moving the adoption of the annual report, said they had been busy during the year, and, as far as they could judge, their prospects were quite satisfactory; but, in the present state of the political and industrial world, the most careful forecast must be looked upon with great uncertainty. They had continued to spend money on buildings and machinery, and might probably have to continue to do so. They would observe that they still had £25,261 18s. 5d. set aside as a provision for this. They were also adding £12,000 to their reserve fund, which would now stand at £130,000 The company had plenty of orders on hand, and their works were being kept fully occupied. A dividend of 10 per cent. for the year was recommended. The adoption of the report was seconded and carried.

Hosking Brothers Limited—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of mechanical and general engineers, machinists, millwrights, &c., as carried on by R. H. Macdonald at Love-lane, Southwark, S E., as J. Hosking. First directors: T. E. Hosking and W. E. Hosking. Qualification, £100. Registered office, Love-lane, Sumner-street, Southwark, S.E.

Insoles Limited. — The directors, in submitting the accounts to June 30, 1912, state that the balance to the credit of profit and loss account is £54,890 11s. 7d., after charging debenture interest and interim dividend on preference shares to December 31, 1911. In consequence of strikes and labour troubles, the year's working has been seriously interfered with, the collieries having been stopped on no less than 56 working days, in addition to the usual Bank and other holidays. The directors recommend the following payments:—A dividend at the rate of 6 per cent. per annum on the preference shares for the six months ended June 30 last; a dividend on the ordinary shares of 10 per cent.; a further sum of £3,000 to be placed to the credit of the debenture redemption and general reserve fund; leaving a balance to be carried forward to the next account of £38,090 11s. 7d.

Lincoln Wagon and Engine Company Limited.—The directors have declared an interim dividend at the rate of 10 per cent. per annum, free of income tax.

Meldrums Limited.—This private company has been registered, with a capital of £20,000 in £1 shares, to carry on the business of manufacturers of furnaces, mechanical stokers, steam-jet apparatus and other engineering specialities, iron-founders, manufacturers of agricultural implements, &c.; to take over (1) the freehold hereditaments and premises known as the Engineering Works, Timperley, Cheshire, and (2) the business of an engineer formerly carried on by T. Gregory, as liquidator for and/or on behalf of Meldrum Brothers Limited, and recently by J. W. Meldrum. First directors, J. W Meldrum and J. B. Meldrum. Qualification, £250 shares. Registered Office, Engineering Works Timperley, Cheshire.

Moss (W. T) and Co. Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of makers of tools used by mechanics, engineers, &c., and to acquire the business carried on by W. T. Moss at Statham, in Lymm, Cheshire. Registered office, Statham, Lymm, Cheshire.

New Monckton Collieries Company.—The profits for the year ended June 30 were £16,405. and £18,622 was brought forward. Debenture interest absorbs £4,294, and a final dividend of 4 per cent. is proposed on the ordinary shares, making 6 per cent, free of income-tax, for the twelve months, and carrying forward £20,533.

Old Silkstone Chemical Works Limited—This private company has been registered, with a capital of £5,000 in £1 shares, to carry on the business of manufacturers and dealers in gases produced from coke ovens, coal tar, pitch, creosote, benzol, and other residuary products obtained from coke ovens, tar distillers, manufacturing chemists, dealers in chemical, industrial and other acids and compounds, &c., to acquire the benzol and tar plant erected or in course of erection on land leased or agreed to be leased from, and situate adjacent to the works of the Old Silkstone Collieries Limited, situate at Barugh, near Barnsley, Yorks, and to adopt agreements with Henry Ellison Limited, and the said Old Silkstone Collieries Limited. The first directors are H. Ellison, jun., F. Ellison, F. Middleton, and L. C. Parker (governing directors). Qualification £250. Registered office: Whitechapel-road, Cleckheaton, Yorks.

Price, Pryse and Co Limited.—This company has been registered, with a capital of £55,000 (£1), to acquire certain inventions relating to shot-firing appliances for use in mines and quarries; to manufacture, repair, and deal in such appliances; to carry on business as mine owners, quarry-owners, smelters and merchants, engineers, &c., and to adopt an agreement with A. Price, W. Pryse, and J. Zussman. Purchase consideration, £35,000, payable in shares. First directors, A. Price, W. Pryse, and B. Zussman. Registered office, 32, Victoria-street, Westminster, S.W.

Simpson (F. R.) and Co. Limited.—This private company has been registered, with a capital of £30,000 (£1), (23,000 8 per cent. cumulative preference), to take over the business of an ironmaster carried on by F. F. Simpson at Park-lane Ironworks, Oldbury, Worcestershire, as F. R. Simpson and Co.

Steel Company of Scotland.—The report for the year ended July 11 last states that throughout the year great activity prevailed in the steel trade, and had it not been for the stoppage caused by the miners' strike and some dislocation which ensued on other labour troubles, the company's output of finished steel would have exceeded that of any previous year. At both works considerable improvements and extensions have been carried out. During the year the trustees for the debenture stockholders redeemed by drawing, carried out in accordance with the provisions of the deed of trust, £5,040 of the A first mortgage debenture stock, and the total amount of this stock now redeemed is £64,400. This year the company have provided £510 for premiums and other expenses, which sum has been charged to profit and loss account. The net profit for the year, after writing off special expenditure of £27,551, providing for interest and all other charges, and for depreciation of collieries and of Hallside dwelling houses, amounts to £82,848. Adding to this sum the balance of £8,277 from previous year, there is available for disposal £91,125. The directors have placed £25,000 to credit of reserve fund, and from the balance of £66,125 they recommend that £47,083 be appropriated to the payment of a dividend on the paid up capital at the rate of 10 per cent. per annum less income tax, and that the balance of £19,041 be carried forward.

Super-Vapour Syndicate Limited.—This private company has been registered, with a capital of £1,000 (3,000 ordinary shares of 1s. each, 2,000 preferred ordinary shares of 1s. each, and 750 preference shares of £1 each), to acquire from F. Lamplough, of 53a, Pall Mall, S.W., the benefit of an invention relating to the super-vaporisation of steam and the production of superheated vapour, &c.

Stewarts and Lloyds Limited.—The directors have declared an interim dividend at the rate of 10 per cent. per annum on the preferred ordinary shares for the half-year ended June 30, 1912.

Talana Collieries Limited.—The Official Receiver to the above company has now issued his report to the creditors and shareholders. The accounts filed under the liquidation show liabilities £4,771, against assets valued at the same amount, and a deficiency of £15,046 with regard to contributories. The receiver reports that in August 1910 a scheme of reconstruction was agreed to by the shareholders, under which the undertaking (consisting of collieries in Natal) was transferred to the Talana Collieries Limited (registered in England) for £80,530, satisfied by the issue to the shareholders of the Rhodesian company of 105,337 shares of £1 each in the new company credited 17s. per share paid up. The new company in June 1911 entered into bonds charging all its property and assets in Natal as security for a sum of about £17,000 owing to the bankers of the Rhodesian company. In consequence of the refusal of the voluntary liquidator of the Rhodesian company to transfer the property in accordance with the scheme, unless security should be given for payment of the company's English creditors, the new company, in September 1911, granted to the voluntary liquidator a second mortgage for £5,000 on the mines, and this now constitutes the only asset available for payment of the English creditors of the Rhodesian company. The value of this is, however, doubtful. On February 8, 1912, the new company passed a resolution for voluntary liquidation, and the bank shortly afterwards gave notice of their intention to enforce their security. A receiver was appointed by the South African courts on May 30 last, and the property is about to be sold. The Official Receiver is informed that the amount now due to the bank is about £14,500.

A new edition of the British Standard Specification for Structural Steel for Bridges and General Building Construction (Report No. 15, revised August 1912; Engineering Standards Committee; 5s. 2d.), has been issued. Its importance may be seen from the fact that the London County Council (General Powers) Act, 1909 requires that all rolled steel used in the construction of skeleton framework for buildings shall comply with the requirements of this specification. The committee have made several important modifications from the first issue of June 1906, namely:—The classification of the material dealt with into two categories, A steel and B steel; the increase of the allowable phosphorus content in B steel from 0·07 to 0·8 per cent.; the increase of the upper limit of tensile strength for plates, sections, and bars (other than rivet bars), from 32 to 33 tons per square inch; the reduction of the lower limit of tensile strength for rivet bars from 26 to 25 tons per square inch; the insertion of clauses dealing with (*a*) tests by an independent expert, (*b*) rejection after delivery, and (*c*) arbitration in cases where this is not otherwise provided for.

No. 17.

THE COLLIERY GUARDIAN

MONTHLY LIST OF RECENT COAL LITERATURE

The following is a list of abbreviations used below :—

AEG-Ztg. = AEG Zeitung.

Allg. Oesterr. Chem. Ztg. = Allgemeine Oesterreichische Chemiker- und Techniker-Zeitung.

Am. Gas Jl. = American Gas Light Journal.

Ann. Mines = Annales des Mines.

B'ham Eng. Min. Jl. = Birmingham Engineering and Mining Journal.

Brit. Columb. Min. Rec. = British Columbia Mining Record.

Bull. Am. Inst. Min. Eng. = Bulletin of the American Institute of Mining Engineers.

Bull. Soc. Chim. Belgique = Bulletin de la Société Chimique de Belgique.

Bull. Soc. Ing. Civ. France = Bulletin de la Société des Ingénieurs Civils de France.

Canad. Min. Jl. = Canadian Mining Journal.

Colliery Guard. = Colliery Guardian.

Dinglers Polytechn. Jl. = Dingler's Polytechnisches Journal.

D. Kohlen-Ztg. = Deutsche Kohlen-Zeitung.

El. Engin. = Electrical Engineering.

Engin. Min. Jl. = Engineering and Mining Journal.

Geol. Rdsch. = Geologische Rundschau.

Inst. Mech. Engin. = Institution of Mechanical Engineers.

Jl. Chem. Soc. S. Africa = Journal of the Chemical, Metallurgical and Mining Society of South Africa.

Jl. Soc. Chem. Ind. = Journal of the Society of Chemical Industry.

Kohle Erz = Kohle und Erz.

Kraftsmasch.-Bau. = Kraftsmaschinen Bau.

Mid. Inst. Min. Eng. = Midland Institute of Mining, Civil and Mechanical Engineers.

Min. Eng. World = Mining and Engineering World.

Mines Minerals = Mines and Minerals.

Min. Sci. = Mining Science.

Min. Scient. Press = Mining and Scientific Press.

Portefeuille Econ. Machines = Portefeuille Economique des Machines.

Prakt. Masch. Konstrukr. = Praktische Maschinen Konstrukteur.

Proc. Eng. Soc. West. Penns. = Proceedings of the Engineers' Society of Western Pennsylvania.

Rev. Métallurgie = Revue de Métallurgie.

Rev. Noire = Revue Noire.

Rev. Univ. Mines = Revue Universelle des Mines.

School Mines = School of Mines Quarterly.

S. Staffs. Inst. Min. Engin. = South Staffordshire Institute of Mining Engineers.

Stein-Braunkohle = Stein und Braunkohle.

Techn. Echo = Technische Echo

Times Eng. Supp. = Times Engineering Supplement.

Trans. Min. Inst. Scot. = Transactions of the Mining Institute of Scotland.

Vermlandska Bergmannaför Annaler = Vermlandska Bergmannföreningen Annaler.

Z. Oberschles. Berg- Hütten- Ver. = Zeitschrift der Oberschlesischen Berg- und Huttenmannischen Vereins.

⁂ We shall be glad to obtain for readers, where possible, copies of the papers referred to at the prices named, which are inclusive of postage.

I.—General.

Mining Casualties in Newfoundland. F. L. Hoffmann. "Eng. Min. Jl.," vol. 94, 3, p. 126-8. (An analysis of the causes of the accidents in five years, which average 2·6 deaths per 1,000.) 1s. 6d.

Coal and Its Products. (Kul og. kulprodukter,) Alf. Stage. Treatise for University Students. 8vo. 16 p. Ereley, Kjoebenhavn. 1s. 3d.

Conservation of Coal. (Conservation du charbon.) "Bull. Soc. Ing. Civ. France," vol. 65, 1912, 3, p. 468-9.

System of Keeping Underground Costs and Records. G. H. Smith. "Jl. Chem. Soc. S. Africa," vol. 12, 11, p. 447-56; 7 fig., 1 dble. plate. 4s.

Statistics of the Upper Silesian Mining and Metallurgical Works for the First Quarter of 1912. (Statistik der oberschlesischen Berg- und Hüttenwerke fuer das 1 Quartal 1912.) "Z. Oberschles. Berg- Hutten- Ver.," 1912, 6, p. 265-78. 2s. 6d.

Central Coalfields in Colorado. F. W. Whiteside. "Coal Age," vol 2, 1, p. 1-5, 6 fig. (The Walsenburg and Canon City districts. Each field has central power installations, notes are given of the construction of an aerial rope tram about a mile long, for mine car conveyance.) 1s. 3d.

Accidents in Bituminous Mines, Penna. F. L. Hoffman. Vol. 2, 4, p. 119-21; 7 tab.

Fatal Mining Accidents in the Dortmund District in 1911. (Die toetlichen Verunglueckungen beim Bergwerksbetrieb im Oberbergamtsbezirk Dortmund im Jahre 1911.) "Glückauf," 1912, 25, p. 1005-7. 2s. 9d.

Germany's Mineral Wealth. (Deutschlands Bodenschaetze.) I. Coal and Salts, 8vo., 151 p., 41 ill., 1 map. Leipzig: Quelle and Meyer, 1912, 2s.

The Coal Export of Germany and its Importance for the Various Districts of the Country. (Die Steinkohlenausfuhr Deutschland und ihre Bedeutung fuer die verschiedenen Berghaureviere des Landes.) Ernst Jüngst. "Glückauf," 1912, 24, p. 955-62. 2s. 9d.

Graphical Tables of the Share Quotations of Collieries in the Nord district of France, and comments on same. (Graphiques des Valeurs de Charbonnages du Nord de la France et Commentaires.) Saint-Maur. "Rev. Noire," vol. 15, 1912, 391, p. 207; 3 fig. 2s.

Coalfields and Collieries of Australia. F. D. Power. 8vo. London: Critchley Parker, 1912. 25s.

Mineral Resources of the Philippine Islands. R. Arthur. "Min. Eng. World," vol. 37, 3, p. 107-9; 1 map. 1s. 3d.

Government Mining and the Premium-Wage System. (Der Staatsbergbau und die Prämienlohnsysteme.) Wiesner. Collection of Mining and Metallurgical Essays, No. 101. "Kattowitz," Bohemia, 1912. 2s.

Alaska's Lamented Coalmining Industry and Conservation. A. H. Brooks. "Min. Eng. World," vol. 37, 4, p. 139-40 and p. 153-61; 1 map, 1 tab. 1s. 3d.

The Coal Supply of Manchuria. E. Di Villa. "Min. Scient. Press," vol. 105, 2, p. 53-4; 1 map. 1s. 4d.

Remarks on the Minimum Wage and Agreement by Piecework. (Einiges ueber Mindestlohn und Gedinge.) E. Graf. "Stein Braunkohle," 1912, 11, p. 131-3. 1s. 6d.

Coalmining in New South Wales. "Colliery Guard.," vol. 104, 2696, p. 429. (Report for 1911.) 6d.

Mineral Statistics for 1911. "Colliery Guard.," vol. 104, 2695, p. 393. 6d.

Coalmines Inspection, 1911. "Colliery Guard.," vol. 104, 2695, Supplement, 28 pp.; 10 fig. 6d.

II.— Education.

Examination Questions. "Colliery Guard.," vol. 104, 2696, p. 434. (Text of questions set by York and N. Midland Board in 1911.) 6d.

Board of Mining Examinations: Arrangements for Forthcoming Examinations. "Colliery Guard.," vol. 104, 2695, p. 382. 6d.

III.—Geology.

Prospecting for Minerals. S. H. Cox. Sixth edition, revised and enlarged, crown 8 vo., 8 by 5½, 272 p. C. Griffin. London. 5s.

A New Marine Bed in the Flaming Gas Coal Section of the Ruhr Coalfield. Kukuk. (Eine neue marine Schnicht in der Gasflammkohlenpartie des Ruhrkohlenbezirks.) "Glückauf," 1912, 24, p. 947-9. 2s. 9d.

The Geological, Mineralogical and Palæontological Literature concerning the Saar District up to 1910. (Die geologische, mineralogische und palæontologische Literatur des Saarbeckens bis zum Jahre 1910.) Paul Kessler u. H. Willing. 8vo., 138 p. Saarbruecken: Schmidtke.

Coal Prospects in the Fraser Valley, B.C. "Brit. Columb. Min. Rec.," vol. 17, 10, p. 316-21.

Bear River Coalfield, B.C. C. F. J. Galloway. "Canad. Min. Jl.," vol. 33, 10, p. 335-6. 1s. 6d.

Bibliography of the Mineral Wealth and Geology of China. C. Y. Wang. 8vo. London: C. Griffin. 1912. 3s.

Geological Research in the Coalfields. "Colliery Guard.," vol. 104, 2692, p. 229; 1 fig. (From the "Summary of Progress" (continuation): Scotland.) 6d.

Geology of the South Warwickshire Coalfield. "Colliery Guard.," vol. 104, 2696, p. 430. (Abstract papers read before Geol. Soc. by R. O. Vernon and W. H. Hardaker.) 6d.

International Geological Congress. "Colliery Guard.," vol. 104, 2696, p. 445. (Programme of Toronto meeting in 1913.) 6d.

IV.—Mine Surveying.

The Rapid Traverse, as used in Cornwall Surveys. "Engin. Min. Jl.," vol. 94, 2, p. 78-9; 5 fig. 1s. 6d.

VI.—Working of Minerals.

The Burnwell Coal Company in Illinois. "Coal Age," vol. 2, 2, p. 38-40; 3 fig. (The seam is about 8 ft. thick, and is worked on the panel system, the mule haulage is being replaced with electricity.) 1s. 3d.

Electric Coal Cutters. "Times Eng. Supp.," vol. 8, 386, p. 21. (Considers some of the difficulties found in working.) 9d.

VII.—Boring, Shaft Sinking, and Tunnelling.

Brazilian Carbons. J. K. Smit, "Mines Minerals," vol. 32, 12, p. 732-4. (How to judge the values of the different varieties used for diamond drilling.) 2s. 2d.

Measuring Air Consumption in Drilling. G. H. Gilman. "Engin. Min. Jl.," vol. 94, 1, p. 28-9; 2 fig. (A displacement tank measuring apparatus.) 1s. 6d.

Two Concrete-lined Mine Shafts. F. C. Auld. "Coal Age," vol. 2, 2, p. 43-6; 5 fig. (Records of construction work on two 300 ft. shafts at Annabelle, W. Va. The account discloses some advantages of the circular form of shaft section.) 1s. 3d.

Application of Reinforced Concrete in the Place of Brickwork for Shaft Sinking. (Verwendung von Eisenbeton beim Schachtbau an Stelle von Mauerwerk.) Elwitz. "Gluckauf," 1912, 23, p. 910-3. (Discussed the conditions to be fulfilled if reinforced concrete is applied.) 2s. 9d.

Further Contributions on the Question of the Resisting Properties of Shaft Linings during the Sinking Process. (Weitere Beiträge zur Frage der Widerstandsfähigkeit des Schachtausbaues während der Abteufarbeiten.) Leo Herwegen. "Braunkohle," 1912, 10, p. 146-52. 8d.

Method of Shutting Off Water-bearing Strata or the like by Means of Concrete. (Verfahren zum Abdichten wasserfuehrender Schichten oder dergleichen mittels Betons.) Georg Pauli. "Allg. Oesterr. Chem. Ztg.," vol. 30, 8, p. 90-1; 1 fig. 1s. 10d.

Impregnating the Walls in Colliery Workings. (Das Stosstraenken in Kohlenbergwerken.) "Kohle Erz," 1912, 18, p. 410-11. 2s.

Device for Driving Deep Boreholes by Means of a Conical or Similar Mandrel Driven by a Tup. (Vorrichtung zum Bohren von tiefen Bohrloechern mittels eines durch einen fallenden Baer getriebenen, kegelig oder aehnlich geformten Dornes.) "Vulkan," 1912, vol. 12, 10, p. 40; 2 fig.

Progress Made in Deep Prospecting at the Present Time. J. Stiny. (Fortschritte des Tiefenschurfes in der Gegenwart.) "Geol. Rdsch.," 1912, 3, p. 166-9.

Timbering a Small Shaft. J. T. Fuller. "Mines Minerals," vol. 32, 12, p. 743-4; 9 fig., 1 tab. 2s. 2d.

The New "Hardy-Simplex" Hammer Drill. "Colliery Guard.," vol. 104, 2693, p. 280; 5 fig. 6d.

IX.—Timbering, Packing, &c.

Hydraulic Machine for Bending Roof Timbers for Mine Galleries. (Press Hydraulique pour Cintrer les Chaneaux de Boisage des Galéries de Mines.) "Portefeuille écon. Machines," vol. 10, 1912, 678, p. 93-6; 5 fig.

Preservation of Mine Timber, Cost and Results. E. W. Peters. "Min. Eng. World," vol. 37, 1, p. 7-11; 5 fig., 1 tab. 1s. 3d.

Hydraulic Filling in European Mines. "Mines Minerals," vol. 32, 12, p. 715-8; 8 fig. 2s. 2d.

X.—Surface Arrangements.

Electric Mine Locomotive Operation. A. F. Elliott, "Engin. Min. Jl.," vol. 94, 2, p. 55-6; 2 tab. (Tables and formulæ are given for use in determining the haulage capacity and efficiency.) 1s. 6d.

XI.—Winding and Haulage.

Automatic Weighting Device for Determining the Weight of the Content of Cars. (Selbsttaetige Wiegevorrichtung zur Ermittlung des Wageninhaltgewichts.) Ernst Blau. "Glückauf," 1912, 22, p. 871-3. (Description of entirely automatic device for determining the weight of minerals hauled in regular intervals.) 2s. 9d.

Engine Calculations for Main Winding Shafts. (Die Berechnung der Hauptschacht-Foerdermaschinen. A. Wallichs. "Foerdertechnik," 1912, 2, p. 25-31; 3 fig.; 3, p. 49-53, 5 fig., 3 tab.; 5, p. 97-100; 6 fig. (Conclusion of series of articles.) 2s. 6d.

The Winding Plant at the Pit Rheinelbe II. of the Gelsenkirchener Mine. (Die Foerderanlage auf Schacht Rheinelbe II. des Gelsenkirchener Bergwerkes A.-G.) "Prakt. Masch.-Konstruktr.," 1912, 19, p. 163-6, 2 fig., 1 tab.; 21, p. 178-80; 1 fig., 1 ill. (Description of the plant. Drive, safety of working, discussion of the Leonard connection.)

The Application of Steam Turbines for Main Winding Plants. (Die Verwendung der Dampfturbinen bei Hauptschacht-Foerderanlagen). Ernst Blau. "Dinglers Polytechn. Jl.," 1912, 25, p. 385-90; 5 fig., 4 ill. (Discussion of tendency to reduce the first cost of electric winding plants, so that they may successfully compete with steam engines. Description of the Brown-Boveri system characterised by the application of steam turbines.)

The Development of Electric-driven Winding Engines. Die Entwicklung der elektrisch betriebenen Foerdermaschine.) "Bergbau," vol. 25, 21, p. 293-4. 2s.

Electric-driven Hauling Engine. (Elektrisch betriebene Foerdermaschine.) J. J. Recktenwald. 8vo., 10 p. Collection of mining and metallurgical treatises.) "Kattowitz," 1912. 1s. 9d.

Hauling Ropes. (Schachtfoerderseile.) "Glückauf," 1912, 23, p. 897-908. (Considerations concerning the co-efficient of safety with increasing depths and loads.) 2s. 9d.

A Method of Capping Winding Ropes. D. Jackson. "Trans. Min. Inst. Scot.," vol. 34, 5, p. 161-3; 6 fig. 5s.

Colliery Mine Car Construction. "Coal Age," vol. 2, 4, p. 114-7; 10 fig. 1s. 3d.

Recent Hauling Devices in Mines. (Neuzeitliche Foerdermittel in Bergbaubetrieben.) "Techn. Echo," vol. 3, 1912, 3, p. 36-8; 6 ill. (Belt-conveyors and self-emptying cars for rapid discharge.) 1s. 2d.

Winding Ropes and Capels. W. D. Lloyd. "Colliery Guard.," vol. 104, 2693, p. 277. (Abstract paper read before Mid. Inst. Min. Engin.) 6d.

Conveyance of Workmen Underground. "Colliery Guard.," vol. 104, 2695, p. 379; 2 fig. 6d.

XII.—Signalling.

Mine Telephone of To-day. E. L. Cole. "Coal Age," vol. 2, 4, p. 108-11; 10 fig. 1s. 3d.

XIII.—Lighting.

The Safety of Various Kinds of Safety Lamps. (Die Sicherheit verschiedener Arten von Sicherheitslampen.) A Comparison of the Construction of Various Lamps, Fuel, Upkeep, Ignition Devices, &c., 8vo., 13 p. (Collection of Mining and Metallurgical Treatises.) "Kattowitz," 1912. 1s. 9d.

The Smith Gas Pump and Lamp. W. B. Lloyd. "Mines Minerals," vol. 32, 12, p. 705-6; 3 fig. (A lamp test for gas in the air back of stoppings, and in roof gas traps as well as for testing samples from air of workings). 2s. 2d.

A New Electric Miners' Lamp. D. B. Rushmore. "Bull. Am. Inst. Min. Eng.," No. 67, p. 739-46; 2 fig. 3s. 6d.

The "Ceag" Miners' Electric Lamp. "Colliery Guard.," vol. 104, 2695, p. 384; 3 fig. 6d.

The "Stach" Miners' Electric Lamp. "Colliery Guard.," vol. 104, 2696, p. 428; 2 fig. 6d.

The Gray-Sussmann Miners' Electric Lamp. "Colliery Guard.," vol. 104, 2696, p. 431; 1 fig. 6d.

The "Fors" Miners' Electric Lamp. "Colliery Guard.," vol. 104, 2695, p. 380; 2 fig. 6d.

Ministerial Decree of February 23, 1912. Specifying Various Patterns of Safety Lamps Suitable for Use in Fiery or Dusty Mines. (Arrêté Ministériel du 23 Février, 1912, Agréant divers Types de Lampes de Sûreté pour être Employés dans les Mines Grisouteuses ou Poussiéreuses.) "Ann. Mines," vol. 1, 1912, 4, p. 186-214, 14 fig.

XIV.—Ventilation.

Proposed Ventilation System. J. Davies. "Coal Age," vol. 2, 2, p. 48-9; 1 plan; (A four-entry system embracing a 100 ft. carrier pillar of coal which serves to divide the mine into four separate districts, any one of which can be quickly converted into a rescue chamber of large size.) 1s. 3d.

The Dandy Ventilator. "Colliery Guard.," vol. 104, 2692, p. 226; 1 fig. 6d.

Facts and Theories relating to Fans. D. M. Mowat. "Colliery Guard.," vol. 104, 2694, p. 329; 5 fig. (Abst. paper read before Min. Inst. Scotland.) 6d.

XV.—Mine Gases, Testing.

Asphyxiation by Blastfurnace Gas: Analytical and critical summary of the accidents in Belgium from 1906 to 1911. Ad. Breyre. (Administration des Mines. Service des accidents miniers et du grisou, monographie d'accidents. Les asphyxies par les gaz des hauts-fourneaux. Revue analytique et critique des accidents survenus en Belgique de 1906 à 1911.) Lex 8vo., 92 p. Brussels: Lucien Narcisse. 1912, 2s. 6d.

Testing with Safety Lamp for Firedamp and Blackdamp. H. Briggs. "Trans. Min. Inst. Scot.," vol. 34, 5, p. 135-52; 1 diagr. 5s.

Refraction of Light in Firedamp. O. H. Hohn. "Coal Age," vol. 2, 4, p. 122-3; 10 fig. (Testing apparatus for detecting minute percentages of firedamp and based on the difference in the refraction of light when methane is present.) 1s. 3d.

New Apparatus for Sampling Air in Mines for Dust. E. J. Laschinger. "Jl. Chem. Soc. S. Africa," vol. 12, 11, p. 443-7; 1 fig., 1 pl. 4s.

Ministerial Decree of February 23, 1912. Specifying the Firedamp Indicators Suitable for Use in Fiery Mines. (Arrêté Ministériel du 23 Février, 1912, Agréant les Indicateurs de Grisou Susceptibles d'être Employés dans les Mines Grisouteuses.) "Ann. Mines," vol. 1, 1912, 4, p. 183-6; 1 fig.

Physiological Effects of Carbon Monoxide. H. S. Munroe. "School Mines," vol. 33, 4, p. 340-4. (A critical consideration of the Bureau of Mines pamphlet and the publications of J. S. Haldane on the subject.)

Fireman's Certificates. "Colliery Guard.," vol. 104, 2693, p. 296 (Home Office Memorandum). 6d.

A New Gas-cap Observation Machine. "Colliery Guard.," vol. 104, 2692, p. 225; 2 fig. (The Hailwood apparatus.) 6d.

XVI.—Coaldust.

Dust Determination in Mines by Filtration through Sugar. A. McA. Johnston. "Jl. Chem. Soc. S. Africa," vol. 12, 11, p. 442-3; 1 fig. 4s.

Explosions in Mines. "Colliery Guard.," vol. 104, 2692, p. 220; 9 fig. (First report of Explosions in Mines Committee.) 6d.

Oxidation and Distillation of Coaldust. J. Taffanel, G. F. Floch and A. Durr. "Colliery Guard.," vol. 104, 2693, p. 294. 6d.

The Explosibility of Carbonaceous Dust. "Colliery Guard.," vol. 104, 2694, p. 335. (Report [Cd. 6223] on Explosions in Mills.) 6d.

XVII.—Explosions.

Earthquake Strains and Stresses in Relation to Colliery Explosions. F. N. Denison. "Min. Sci.," vol. 66, 1695, p. 40-1; 1 tab. 1s. 4d.

Mine Disaster, Hastings, Colorado. F. W. Whiteside. "Coal Age," vol. 2, 1, p. 5-7; 6 fig. (The cause is ascribed to the improperly fitted gasket in a Wolff lamp; the mine is a new one and quite wet, but the workings showed some gas; the explosion was heavy and was followed by numerous falls). 1s. 3d.

Coaldust Explosions and Their Prevention. J. Harger. "Jl. Soc. Chem. Ind.," vol. 31, 9, p. 413-6. 4s.

XVIII.—Mine Fires.

Deterioration and Spontaneous Heating of Coal in Storage. H. C. Porter and F. K. Ovitz. "Colliery Guard.," vol. 104, 2695, p. 381. 6d.

Gas Analysis as an Aid in Fighting Mine Fires. G. A. Burrell and F. M. Seibert. "Colliery Guard.," vol. 104, 2695, p. 383; 1 fig. 6d.

XIX.—Rescue and Ambulance

Durham and Northumberland Collieries Rescue Stations. "Colliery Guard.," vol. 104, 2694, p. 331; 1 fig. 6d.

XX.—Drainage, Pumping, &c.

Pumping Plant in the Sloss Pits. (Pumpenanlage in den Sloss-Gruben.) "Kraftmasch.-Bau," 1912, 7, p. 105-7; 1 fig., 1 ill. (Description of a modern generating plant, the sole purpose of which is the electric drainage of a pit.)

Shaft-sinking Pump, Output 6 cubic metres (300 m. height.) (Abteufpumpe. Leistung 6 cubic metres auf 300 m.). "Foerdertechnik.," 1912, 5, p. 106-107; 2 fig., 2 ill. (Description of pump built by the Maffei-Scharwtzkopff Works, Berlin. 2s. 6d.

The "Ravensbourne" Pump. "Colliery Guard.," vol. 104, No. 2694, p. 333; 2 fig. 6d.

XXI.—Preparation.

Washery Plant Control. G. R. Delamater. "Coal Age," vol. 2, 3, p. 82-3; 1 fig. (By selecting a fluid of the correct specific gravity, and dropping a sample of the waste from the washer into it, coal having less than the predetermined impurities, floats and shows the proportion of purer coal in the sample.) 1s. 3d.

XXII.—Briquettes

Briquetting Presses with Flywheels. (Brikettpressen mit einem Schwungrade.) E. Frerichs. "Braunkohle," vol. 11, 3, 19 April, p. 35-40; 1 ill., 4 fig. (Disadvantages of flywheels, lack of data on working results) 8d.

The Causes of Spontaneous Ignition of Briquettes. (Die Ursachen der Brikettselbstentzuendung.) Hempel. "Stein Braunkohle," 1912, 11, p. 128-9. (Ignition experiments with briquette piles carried out by the Imperial Testing Station.) 1s. 6d.

XXIII.—Coke Ovens

Critical Study of the Technics of the Coke-oven Industry. C. Still. (Etude Critique de la Technique de l'Industrie des Fours à Coke.) "Rev. Métallurgie," vol. 9, 1912, p. 322-7. (The most interesting problem in the present direct sulphation processes is to find whether external heat is needed to keep the mass and aggregate of substances forming the bath in a permanent condition. The paper is an attempt to solve this theoretically.)

By-product Ovens, Johnstown, Penn. R. D. Hall. "Coal Age," vol. 2, 3, p. 72-7; 11 fig., 1 tab. (The operating details of the Cambria Steel Company's plant of Otto-Hoffman coke ovens.) 1s. 3d

A New Direct By-product Process. "Coal Age," vol. 2, 3, p. 77-9; 1 fig. (A description of the Simon-Carvès direct by-product recovery process, which takes advantage of the high specific gravity of the coal tars, which are separated by a rapid centrifugal action.) 1s. 3d.

The Kros Regenerative Coke Oven. A. Gobiet. "Coal Age," vol. 2, 3, p. 84-5; 3 fig. (The Kros design maintains a constant temperature in the oven walls, draught reversal is eliminated except in the regenerators, and constant gas and air pressures are obtained by equalising chambers). 1s. 3d.

Notes on Starting and Stopping By-products Recovery Coke Oven Plant. (Note sur la mise en service et l'arrêt des fours à coke à récupération des sous produits.) René Gillon. "Rev. Univ. Mines," 1912, vol. 38, 1, p. 106-16. (Working without recovery of by-products; connecting up with recovery plant; stoppages, disconnecting.)

What System of Coke Ovens is most Suitable for Sweden for the Production of Best Blastfurnace Coke? (Hvieket koksugnssystem ar lampligast for framstallander i Sverige af prima masugnkoks?.) G. H. Hultmann. "Vermlandska bergmannafør. Annaler," 1911, p. 31-51, 6 fig.

By-product Coke Ovens of the United States. W. E. Hartmann. "Am. Gas Jl.," vol. 97, 5, p. 65-6. 1s. 6d.; also "Proc. Eng. Soc. West. Penns.," vol. 28, 4, p. 311-57, 8 tab.

Coke Oven By-products in 1911. "Colliery Guard.," vol. 104, 2692, p. 219. (From the annual report on Alkali Works, &c.) 6d.

XXIV.—Fuels, Testing, &c.

On the Utilisation of Storage Waste. (Ueber Verwertung von Lagbrabfaellen.) "D. Kohlen-Ztg.," 1912, 6, p. 62. (Utilisation of small coke in brickworks for the manufacture of porous bricks; application of anthracite powder for coaldust furnaces, &c.) 1s. 3d.

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Continued on Page 503.

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Continued from Page 502.

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Further Notes on Coal Impurities. W. B. Phillips. "Coal Age," vol 2, 4, p. 111-12. (A readjustment of present methods of writing coal specifications is advocated.) 1s. 3d.

Combustion of Coal Power. E. A. Vehling. "Power," vol. 36, 2, p. 43-4. (The chemistry and conditions of complete combustion.) 1s. 3d.

Commercial Utilisation of Peat for Power Purposes. H. V. Pegg. "Colliery Guard.," vol. 104, 2693, p. 282. (Paper read before Inst. Mech. Engin.) 6d.

XXVI.—Compressed Air.

Compressed Air, its Generation and Application. V. E. Green. "B'ham. Eng. Min. Jl.," vol. 10, 4, p. 216-23; 5 fig.

On the Extensive Application of Compressed Air in Coalfields. (Om udstraeckt anvaendnin af komprimerad luft vid vara gruffaelt). K. G. Brunnberg. "Vermlandska bergmannaför. Annaler," 1911, p. 3-30; 8 fig.

Tests on an Electric Driven Piston Compressor. (Abnahmeversuche an einem elektrisch angetriebenen Kolbenkompressor.) "Glückauf," vol. 48, 16, p. 636-41; 14 fig. 2s. 9d.

Use of Turbo-compressors in the Mining Field. G. E. Edwards. "Min. Eng. World," vol. 37, 1, p. 3-6; 8 fig. 1s. 3d.

XXVII.—Electricity.

Electricity in Mines. (L'Electricité dans les Mines.) H. Marchand. "Electricien," vol. 43, 1119, p. 353-6, 3 ill; 1120, p. 378-82, 4 ill. (Advantages of electricity. Electric locomotives, ventilators and compressors. Electric drills. Signalling and communication devices.) 1s. 2d.

Electric Mining Applications. E. A. Lof. "School Mines," vol. 33, 4, p. 317-39; 10 fig.

Electric Mine Operations: Rotary Converters. S. Rice. "Min. Eng. World," vol. 36, 26, p. 1353-4. 1s. 3d.

Controlling Set for Hauling Plants. (Steueraggregat fuer Foerderanlagen.) L. Schroeder, "Helios," 9, p. 113-4.; 3 fig. (The voltage of the booster is proportional to the output of the hauling motor; system Siemens-Schuckert.)

Fault Localisation on Mining Cables. "El. Engin.," vol. 8, 18, p. 28; 2 fig. (Drop of potential method, loop test with a slide wire.) 5d.

Portable Mining Cables. (Das Abteufkabel.) "AEG.-Ztg.," vol. 14, 12, p. 1-7; 1 fig., 19 ill. (Conditions for portable mining cables; great flexibility, strength, protection of against dampness; types of cable drums. The sides of the drum are provided with slits for ventilation. Earthing and cable fittings.)

Fan-driving by Three-phase Cascade Motors at the "Werne" Pit. (Ventilatorantrieb mit Drehstrom-Kaskadenmotor auf der Zeche Werne.) Zederbohm. "Glückauf," 1912, 24, p. 949-55. (Advantages of the Cascade motor as compared with the ordinary three-phase motor for fan-driving on account of its simple speed-regulation.) 2s. 9d.

The Armearth System of Cable Protection. "Colliery Guard.," vol. 104, 2695, p. 383; 1 fig. 6d.

XXVIII.—Surface Transport.

The Importance of the Rhine Navigation for the Coal Trade. (Die Bedeutung der Rheinschiffahrt fuer den Kohlenhandel.) "D. Kohlen-Ztg.," 1912, 6, p. 59-61, 7, p. 72-4. 1s. 3d.

The Development of the Traffic on the Dortmund-Ems Canal. (Die Entwicklung des Verkehrs auf dem Dortmund-Ems-Kanal.) "Glückauf," 1912, 23, p. 917-20. (Statistical data showing the continually-growing importance of the canal.) 2s. 9d.

XXX.—Mining Laws, Royalties.

The Coal Mines Act, 1911, and Other Acts Affecting Mines and Quarries. With a commentary. R. F. MacSwinney. Ryl. 8vo. Sweet and Maxwell, London, 5s. net.

Defects and Deficiencies of American Mining Laws. H. V. Winchell. "Min. Eng. World," vol. 37, 4, p. 145-7. 1s. 3d.

Mining Laws in the Province of Quebec. J. Obalski. "Canad. Min. Jl.," vol. 33, 13, p. 431-2. 1s. 6d.

Mining Regulation of September 20, 1906, for the Portuguese Colonies. (Réglement minier du 20 Septembre 1906 des colonies Portugaises.) "Ann. Mines," vol. 1, 1912, 5, p. 457-68.

Report Books and Forms under the Coal Mines Acts. "Colliery Guard.," vol. 104, 2693, p. 291. 6d.

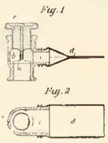
The Valuation of Mineral Property. "Colliery Guard.," vol. 104, 2692, p. 226. (Discussion on O'Donahue's paper read before the South Staffs Inst. Min. Engin.) 6d.

Awards under the Minimum Wage Act. "Colliery Guard.," vol. 104, 2693, p. 293 (Bristol District). 6d.

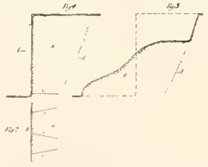
Report Books and Forms in Regard to Coalmines under the Indian Mines Act, 1911. "Colliery Guard.," vol. 104, 2694, p. 334. 6d.

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

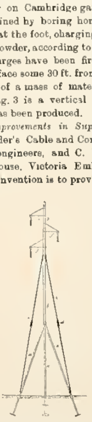
12142 (1912). *Improvements in Air-relief Valves for Diving Apparatus or Equipments.* Armaturen- und Maschinenfabrik "Westfalia" Aktiengesellschaft, of Gelsenkirchen, Westphalia, Germany.—This invention represents an improvement in relation to or a modification of air-relief valves of the character described in the specification of the main Patent No. 12062 of 1912. According to the present invention the lip valve is not passed over the entire valve casing, but only over the outlet for the air. Thus the lip valve does not need to be turned or moved together with the adjusting screw or device in regulating the valve, which is an advantage in view of the mobility of the lip valve. Fig. 1 is a longitudinal section of the valve, and fig. 2 a cross-section on the axial line of the outlet nozzle end lip valve. (Two claims.)



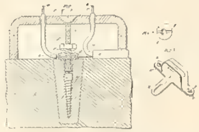
17048 (1911). *An Improved Method of Getting Clay, Chalk or the like, applicable also to the Working of Mines or Making of Railway Cuttings.* R. B. Lucas, of Shillington Manor, Hitchin, Herts.—This invention relates to improvements in getting clay, chalk or like materials—that is, materials in which a landslide can be started when they are acted upon by water. The invention is also applicable to the working of open mines or excavating especially railway cuttings or harbours. The material to be removed is worked to a vertical face, and holes are bored of considerable length at intervals at the foot of the material, the holes being preferably in a horizontal plane but not parallel to each other. The holes are then charged with gunpowder or like blasting material, tamped with clay and fired. It will be found that a crack is made in the top surface of the material without blowing out the foot. Into this crack water is run in sufficient quantities to start a landslide which causes the whole of the face to slide slowly towards the direction required, and the material can then be removed by steam diggers or otherwise. In practice, working on Cambridge gault 40 ft. in height good results are obtained by boring horizontal holes 14 ft. long and 10 ft. apart at the foot, charging each of them with 5 lb. to 10 lb. of gunpowder, according to the condition of the gault. After the charges have been fired a crack will be found in the top surface some 30 ft. from the edge. Fig. 1 is a vertical section of a mass of material, and fig. 2 is a horizontal section; fig. 3 is a vertical section of the mass after the landslide has been produced. (Two claims.)



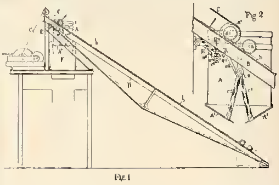
17294 (1911). *Improvements in Supports for Electrical Conductors.* Callender's Cable and Construction Company Limited, electrical engineers, and C. W. Kay, engineer, both of Hamilton House, Victoria Embankment, London.—The object of this invention is to provide improved means for supporting electrical conductors, especially those used in high-tension power transmission. According to the invention a pole or standard is formed with a base composed of three or more struts, the lower ends standing at the corners of a plain regular polygon, while the upper ends meet at a point some distance above the ground. Standing on the apex of the pyramid whose edges are outlined by the above mentioned struts, is a vertical strut which is prolonged to a sufficient height to carry the brackets or arms which support the insulators and to give the necessary clearance between the metal work of the pole structure and the conductor wire. The lower end of each inclined strut is joined to the vertical one by a single-tension rod. Where a flexible pole line is desired the joint at the foot of the vertical strut may be arranged so as to allow a small angular movement of that strut in any direction, the movement being opposed by suitable springs introduced in the tie rods. Stops may be provided to prevent undue distortion of the springs and so to limit the movement of the strut. The accompanying drawing shows a support made in accordance with the invention. (Two claims.)



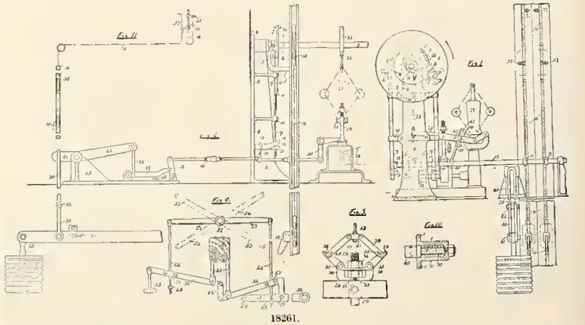
17347 (1911). *Improvements in Connection with Earthing or Bonding Devices for Electric Conductors.* W. T. Henley's Telegraph Works Company Limited, 13 and 14, Blomfield-street, London Wall, London, E.C., and W. F. Bishop, 13 and 14, Blomfield-street, aforesaid.—This invention relates to wiring for electric lighting and for analogous purposes, and especially to systems of wiring in which a metallic cover on the insulated conductor is employed as a return conductor or earth sheath, and in which the screw to which such metallic cover is connected is also employed for securing a block for carrying a fitting, and the invention relates particularly to earthing or bonding devices for use in such systems. According to the invention a binding screw, which is made in such manner that it may be readily secured to the wall or the like where the fitting is required, is employed at each point where a fitting is to be attached, and the block for carrying said fitting is also secured by means of said binding screw and a nut. To these ends the head of an ordinary wood screw is tapped axially to receive a threaded stud, on which are carried the usual washers and nut, the tapping being of such size relatively to the head of the screw that the cross cut therein is not substantially affected, and a nut of a kind well known in electrical fittings, and having bevelled sides and a cross cut in the top, is adapted to be screwed on said threaded stud for the purpose of securing the block for carrying the fitting. Fig. 1 is a sectional elevation showing one form of device made in accordance with this invention, and also showing how the connections are made with one particular kind of insulated conductor; fig. 2 is a face view of the head of the screw *a*. If desired, a saddle piece, shown in fig. 3, having a projecting tongue *t*, may be clamped to the metallic sheath, said tongue *t* having a slotted aperture *u* adapted to pass over the threaded stud *c*. As shown, this saddle piece comprises a ⊤-shaped and a ⋃-shaped piece which are adapted to be secured together by screws *v* passing through lugs *w*. The ⊤-shaped piece is preferably scored or otherwise weakened along the line *z* in order that the tongue *t* may, if required, be bent relatively to the saddle piece. (Three claims.)



17457 (1911). *Improvements in Apparatus for Raising or Lowering Materials.* Heenan and Froude Limited, 4, Chapel-walks, Manchester, Lancashire, and R. H. Hood, of the same address.—This invention relates to improvements in apparatus for raising or lowering materials from one level to another of the type in which a skip or other receptacle is mounted on an inclined runway or gantry and raised and lowered thereon by any suitable motive power, the skip or receptacle being constructed with bottom door or doors capable of being opened and closed by any suitable means when it has reached the point where it is desired to discharge its contents. The invention consists essentially in attaching the bottom door or doors to the actuating rope so that when the tension on the latter is released the doors will open and discharge the contents of the skip or container. It also consists in mechanism for holding the skip or container in position on the gantry or runway when the tension on the rope is released. Fig. 1 is a side elevation of the runway showing the skip at the discharged end; and fig. 2 is an enlarged view of the skip and part of runway showing one form of the mechanism for operating the bottom doors of the skip.



18261 (1911). *Improvements in and relating to Gearing or Appliances for Preventing Overwinding in Colliery Engines and the like.* J. Walker, of 1, Launcher Head, Lochgelly, Fifeshire.—This invention relates to overwind and (or) overspeed prevention devices for colliery engines and the like of the type comprising trigger devices operated from the depth indicator or other shaft through the intermediary of rods and levers so as to apply the brake and shut off the steam supply, and, when required, to centre the reversing lever, should the engineman fail to perform the operations required to stop the engines in time when nearing the end of a wind, or should the engines be started in the wrong direction, without, however, interfering with the ordinary working of the engines. The invention may be regarded as an improvement on previous constructions wherein trip rods, levers or the like formed with catches or the like and mounted on fixed supports or supported by a rotatable element, *e.g.*, a disc or the like mounted on the depth indicator or other shaft and provided with a pin or projection, are interposed between the rotatable element and the trigger devices, &c.; the improved construction being differentiated from such known constructions *inter alia* by the feature that the rod or rods contacted by the rotatable element and serving to actuate the trigger devices, &c., is or are free to slide bodily in a vertical path or paths only in guides, being freely supported independently of the disc or the like or of a fixed pivot or pivots or the like or of any moving part of the mechanism. The invention is also to be differentiated from prior constructions, including a floating lever or the like having a connection with the engine governor and adapted to be engaged by an eccentrically mounted disc operated from the indicator shaft, which lever, in case of overspeed or overwind, is moved to produce actuation of the trigger mechanism. The invention contemplates an arrangement wherein one end of the floating lever is connected to an eccentric rod and the other end to the sleeve of the governor, and is fitted with catch and pin devices, which at the beginning of a wind hold the sleeve down in order that speed may be accelerated, while, after said devices have released the floating lever and therefore the sleeve, the floating lever, being mounted on a floating guide and trip rod, will, if the speed is not reduced at the proper time, raise said guide rod, which in turn actuates the trigger mechanism through the intermediary of rods



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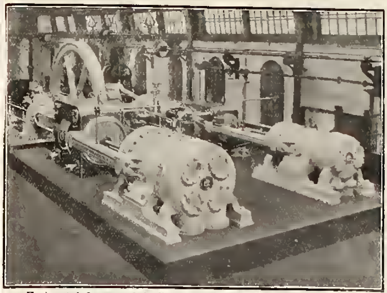

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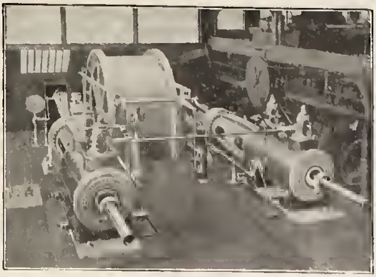

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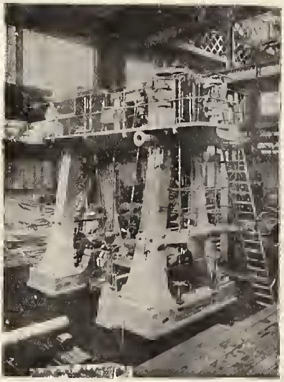

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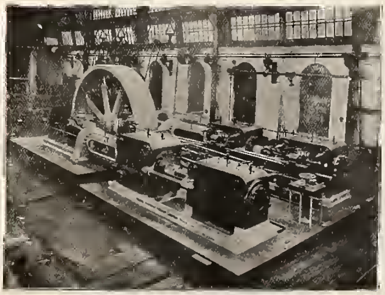

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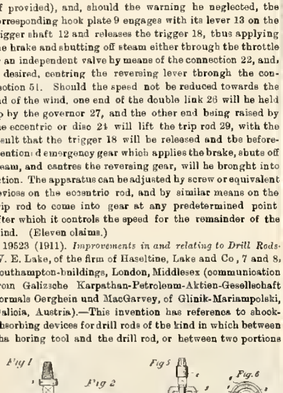
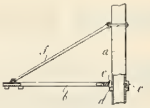
and levers. Fig. 1 is an elevation of the devices; fig. 2 is an elevation at right angles thereto; fig. 4 is an elevation of a lever arrangement for centring the reversing lever; fig. 5 is an elevation of an arrangement of levers for permitting the engines to travel at a greater speed when winding coal than is desirable when winding men, and shows said arrangement arranged or set for winding men; fig. 10 is a sectional elevation of the pin which actuates the sliding bars; and fig. 11 is a diagrammatic view of the cage indicator connections. The operation of the mechanism is as follows: When the engines are at rest at the end of a wind the mechanism is, approximately, in the position shown by fig. 1, and when the steam is applied to the engines the clutch plate 1 is automatically moved on shaft 3 into position by the linkage 5. The shaft 3, carrying plate 1 with pin 2 and the eccentric 24, are rotated in the direction of the arrow. The pin 2 passes the first head 8 of the bar 7, as before described. Should the engineman close the steam stop valve at the proper time, that is when nearing the end of a wind the operation of closing this valve will effect disengagement of the clutch through the intermediary of the levers and rods 5; and the plate 1 carrying the pin 2 will be withdrawn along the shaft so that said pin will clear the other head 8. From this point to the end of the wind the mechanism is controlled by the governor 27 and devices operated therefrom. Just before the completion of the wind the cage moves a stop or catch 55 that is free to slide on a rod 56 fixed at the pithead 57, and lifts it up about 18 in., or any predetermined distance, for the purpose of actuating by means of chain or like connections 16 the cage indicator 58 in the engine room which indicator 58 shows the engineman the exact place 72 at which to stop the cage. If the engineman does not stop the engines at the mark 72, but allows them to run on, however slowly, the cage will continue to lift the stop 55, and therefore the indicator 58, until the catch 15 engages with its lever 14, and therefore causes the application of the brake, &c., say, at about 2 ft. or any predetermined distance above the stopping place. The same action takes place should the engines be started in the wrong direction, that is—the catch 15 comes in contact with its lever 14 when the cage is up, say, 2 ft., or any predetermined distance over its mark, with the result that the trigger 18 is released, thus applying the brake, shutting off steam, and centring the reversing lever. Should the engineman fail to shut off steam at the proper time, the contact pin 2 engages with the head 8 of one of the sliding bars 7, according to the direction of motion, and, raising the bar 7, rings the warning bell through the connections 11 (if provided), and, should the warning be neglected, the corresponding hook plate 9 engages with its lever 13 on the trigger shaft 12 and releases the trigger 18, thus applying the brake and shutting off steam either through the throttle or an independent valve by means of the connection 22, and, if desired, centring the reversing lever through the connection 51. Should the speed not be reduced towards the end of the wind, one end of the double link 26 will be held up by the governor 27, and the other end being raised by the eccentric or disc 24 will lift the trip rod 29, with the result that the trigger 18 will be released and the beforementioned emergency gear which applies the brake, shuts off steam, and centres the reversing gear, will be brought into action. The apparatus can be adjusted by screw or equivalent devices on the eccentric rod, and by similar means on the trip rod to come into gear at any predetermined point after which it controls the speed for the remainder of the wind. (Eleven claims.)

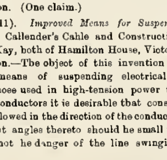
19523 (1911). *Improvements in and relating to Drill Rods.* W. E. Lake, of the firm of Haseltine, Lake and Co., 7 and 8, Southampton-buildings, London, Middlesex (communication from Galizsche Karpathan-Petroleum-Aktien-Gesellschaft vormals Oergheim und MacGarvey, of Glinik-Mariampolski, Oalicia, Austria).—This invention has reference to shock-absorbing devices for drill rods of the kind in which between the boring tool and the drill rod, or between two portions of the rod, a casing is interposed, said casing containing a resilient element intended for absorbing the shocks and relieving the driving mechanism from shock. The object of the present invention is to provide an improved shock-absorbing device of this kind which can be employed equally well for solid or hollow drill rods, and by means of which the drilling operation can be effected in an improved manner. In the shock absorber according to the invention the casing is rigidly connected with a portion of the rod or with the drill, and the driving spindle is rigidly connected with the next upper portion of the rod, this spindle being capable of a limited displacement in its axial direction relative to the casing, and being so arranged that when the upper portion of the rod to which it is connected rotates, it causes the casing and consequently the lower portion of the rod and the drill to participate in the rotation, while when it is reciprocated its longitudinal movement in the direction of the work is transmitted to the casing and the driven drill rod by a positive stop, and its longitudinal movement away from the work is transmitted to the casing through the intermediary of an elastic element, the tension of which may be varied if necessary. Fig. 1 is a longitudinal section of the shock absorber employed with solid drill rods. Figs. 2 and 3 are cross-sections on the lines A—A and B—B in fig. 1, and fig. 4 shows the arrangement of the absorber in a solid drill rod for drilling with a jumper action. Fig. 5 is a longitudinal section of the resilient shock-absorber employed with hollow drill rods. Figs. 6 and 7 are cross-sections on the lines C—C and D—D in fig. 5, and fig. 8 shows the arrangement of the absorber in a hollow drill rod for drilling with a jumper action. (Three claims.)



23565 (1911.) *Improvements in Supports for Electrical Conductors.*—Callender's Cable and Construction Company Limited and C. W. Kay, both of Hamilton House, Victoria Embankment, London.—The object of this invention is to provide improved means for supporting electrical conductors, especially those used in high-tension power transmission. According to this invention, a line wire is supported by means of a horizontal member fixed to a collar, which is prevented from rotating round the pole by a pin of such a strength that in the event of the line wire breaking and setting up a big unbalanced pull on the arm, the pin will be sheered and permit the arm to rotate. The sag in the unbroken span is thus increased, the tension in the conductor reduced, and the abnormal load on the pole structure kept within a safe limit. The accompanying drawing shows part of a support made in accordance with this invention. (One claim.)



23566 (1911). *Improved Means for Suspending Electric Conductors.* Callender's Cable and Construction Company and C. W. Kay, both of Hamilton House, Victoria Embankment, London.—The object of this invention is to provide improved means of suspending electrical conductors, especially those used in high-tension power transmission. With such conductors it is desirable that considerable play should be allowed in the direction of the conductor, while the play at right angles thereto should be small in order that there may not be danger of the line swinging to within striking distance of any of the metal of the support. These conditions are obtained by suspending the insulator from an arm so hung upon a horizontal pivot that it cannot swing at right angles to the line wire. The arm and insulator can swing together about this pivot in the vertical plane of the wire, while the insulator itself can only swing at right angles to the wire about the bottom of the arm. The accompanying drawing shows means in accordance with the invention for suspending a conductor. (One claim.)



PUBLICATIONS RECEIVED.

"Bulletin of the American Institution of Mining Engineers" (No. 68); "Journal of the American Peat Society" (vol. 5, No. 1), April, price 1½ dols.; "Trans. of the North-east Coast Institution of Engineers and Shipbuilders" (vol 28, part 8); "Bulletin et Comptes Rendus de l'Industrie Minerale, Août (tome 2, No. 8); "Engineering Standards Committee: British Standard Specification for Structural Steel for Bridges, &c., and General Building Construction," published for the Committee by Messrs. Crosby Lockwood and Son, price 5s.

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18670. Tube coolers for multi-stage gas compressors. Pokorny and Wittekind Maschinenbau Akt.-Ges. and Pick.
19172. Electric furnaces. Massip.
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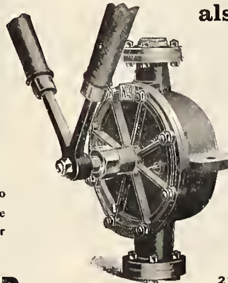

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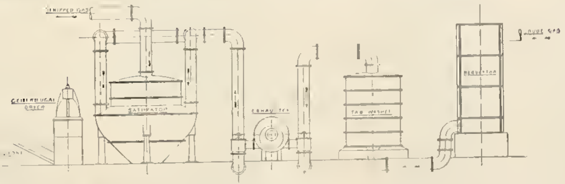

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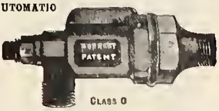

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Coke Oven Stamping Machinery
Coke Oven Construction Co. Ld., Sheffield
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

Coke Ovens
Coke Oven Construction Co. Ld., Sheffield
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Lührig Coal and Ore-Dressing Appliances Ld., 32, Victoria-street, S.W.
Simon-Carves Ld., 20, Mount-street, Manchester

Coke Rams or Pushers
Coke Oven Construction Co. Ld., Sheffield
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport, Mon.

Coke Screens
Coke Oven Construction Co. Ld., Sheffield
Cousland, Alex., and Son, 3, Mitchell-st., Glasgow
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Colliery Plant
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Son, Bilston, Staffs
Bever, Dorling and Co. Ld., Bradford
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, E., 2, Aire-street, Leeds
Davis, John and Son (Derby) Ld., Derby
Fraser & Chalmers Ld., 3, London Wall Bldgs, E.C.
Hardy Patent Pick Co. Ld. Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Haslam and Schontheil Ld., Cardiff
Hathorn, Davey and Co. Ld., Leeds
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Improved Coal Mining Co., Sacriston, nr. Durham
Isca Foundry Co., Newport
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, R. H., and Co. Ld., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld. 47, Broad-street, Glasgow
Mining Engineering Co. Ld., (The), Sheffield
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Pillatt & Co. Ld., Stapleford, Nottingham
Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
Railway and General Engineering Co. Ld., Notts
Reavell and Co. Ld., Ipswich.
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Waddle Patent Fan & Engineering Co., Llanelly
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton
Yeadon, Son and Co., Albion-place, Leeds
Yorkshire Engine Co. Ld., Sheffield

Condensers & Condensing Plant
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Constructional Steel and Iron Work
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Cantrell, W. E., and Co. Ld., Beeston, Notts
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Newton Heath, Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Norton's (Tividale) Ld., Tipton
Longbotham, R. H., and Co. Ld., Wakefield
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Conveyor Belts
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, R., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Conveyors and Elevators
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Cantrell, W. E., and Co. Ld., Beeston, Notts
Chain Belt Engineering Co., Derby, England
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Diamond Coal-Cutter Co. Stennard Wks. Wakefield
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Improved Coal Mining Co., Sacriston, nr. Durham
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Mather and Platt Ld., Manchester
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Primus Patents Co., Falcon-street, Oldham
Reddaway, F., & Co. Ld., Pendleton, Manchester
Sheppard and Sons Ld., Bridgend, South Wales
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts.
Sutcliffe, R., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Yorkshire Engine Co. Ld., Sheffield
Wright, Joseph, and Co., Tipton

Corner Plates
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

Couplings
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Crab Winches
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Hyland-street Works, Birmingham

Crane Makers
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Middleton, Robert, Sheepscar Foundry, Leeds
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

Cranes
Appleby, E. G., and Co., 10, Victoria-street, Westminster
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Gt. Central Railway, 216, Marylebone-rd., London
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Hyland-street Works, Birmingham

Creepers
Tickle Bros., Vulcan Ironworks, Wigan

Cut-off Gear
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Thornewill and Warham Ld., Burton-on-Trent
Wood, John, and Sons Ld., Wigan

Detonators
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Disintegrators
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Middleton, Robert, Sheepscar Foundry, Leeds
Simon-Carves Ld., 20, Mount-street, Manchester
Yeadon, Son and Co., Albion-place, Leeds

Diving Apparatus
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Pulsometer Engineering Co. Ld., Reading
Siebe, Gorman and Co. Ld., Westminster S.W.

Docks
Gt. Central Railway, 216, Marylebone-road, N.W.

Dog Spikes
Frost, Albert, and Co., Sheffield
Benton, B. M., & Co., Midland Works, Sheffield

Double Helical Gear (Machine Cut)
Brown, David, and Sons (H'd'd) Ld., Huddersfield
Citroen, Andre, and Co., 27, Queen Victoria-street, London
Deutsche Maschinenfabrik A.G., Duisburg, Germany

Drain Cocks
Appleton and Howard, St. Helens, Lancs.
Hopkinson, J., and Co. Ld., Huddersfield

Drawing Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drawing Office Stationery
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drills (Electric)
United States Metallic Packing Co. Ld., Soho Works, Bradford

Driving Pulleys
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Duplex Pumping Engines
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Evans, Joseph, and Sons Ld., Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Pearn, F., and Co. Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Dustbins (Sanitary)
Baker, John, and Son, Bilston, Staffs
Harvey, G. A., and Co., Lewisham, London, S.E.
Lewis, Wm., and Son, Bilston
Theedam, E. C., Ld., Dudley

Dynamite, &c.
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Nobel's Explosives Co. Ld., Glasgow

Dynamos
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Sutcliffe, Richard, Horbury, near Wakefield

Ebonite and Vulcanite
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Electric Detonators and Fuses
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Electrical Engineers
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mather and Platt Ld., Manchester
Theedam, E. C., Ld., Dudley

Electrical Fault Indicators
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield

Electric Haulages
Avonside Engine Co. Ld., Bristol
Bridge, David, & Co. Ld., Castleton, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davis, John, and Son (Derby) Ld., Derby
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, R. H., and Co. Ld., Wakefield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Electric Meters
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Electrical Plant
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Gt. Central Railway, 216, Marylebone-rd., London
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Ward, Thos. W., Limited, Albion Works, Sheffield

Electrical Pumps
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Electrical Stores
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C., Ld., Dudley

Emery Wheels

Enamelled Plates for Notices for Mines
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Theedam, E.C., Ld., Dudley

Enamel Manufacturers (for all Metals)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalbitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Engineers (Consulting)
Entreprise Générale de Fonçage de Puits, 5, Rue de Suresne, Paris
Fell, C. A., Dronfield, near Sheffield
Radford, R. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

Engines (Blowing)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Gas-Compressing)
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Hauling and Winding)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, R. H., and Co. Ld., Wakefield

Engines (Hauling and Winding)—*continued.*
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, R., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

Engines (Locomotive)
Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)
Mather and Platt Ld., Manchester

Engine Merchants
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

Engines (Oil)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping) (See Pumps)

Engines (Rolling Mill)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany

Engines (Steam)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Exhaust Turbine Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanell
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Files
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'gham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

Fire Appliances
Fell, C. A., Dronfield, near Sheffield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'gham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Purchasers' Guide to Advertisers' Specialities. – (continued).

Firelighter Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Fishplates
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

Fittings (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

Forced Draught
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

Forges
Hardy Patent Pick Co. Ld., Sheffield

Forgings
Bagnall, W. G., Ld., Stafford
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Renton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld., Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, H. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Fuel Economisers
Fell, C. A., Dronfield, near Sheffield
Pillatt and Co., Stapleford, Nottingham
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld., Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Oakside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Hammerton-st., Burnley
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall

Fuses (Safety)
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Bricks

Gas Engines
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Glover, M., and Co., Holbeck-lane, Leeds
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Gas Exhausters
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Gas Plant
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Tipton

Gas Valves
Haslam and Schonthell Ld., Bristol

Gauge Glasses
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Jacobson, Richard, 70, Shoe-lane, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gear (Special for Motor Lorries Cars &c.)
Brown, David, & Sons (Hudd.) Ld., Huddersfield

Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroën, Andre, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Nuneaton Engineering Co. Ld., Nuneaton.
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Rods Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, H., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Hoists
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

Hooks or Links (Safety)
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Harvey, G. A., and Co., Leampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Hydraulic Jacks
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Hyland-street Works, Birmingham

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Byland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hydrometers
Davis, John, and Son (Derby) Ld., Derby

Incline Rollers
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Reddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Byland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Byland-street Works, Birmingham

Jointing Cement
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

Jointing (Sheet)
Thomas and Bishop, 119-125, Finsbury Pav., E.C

Joists (Rolled Steel)
Heenan and Froude Ld., Worcester
Renton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Keps (for Winding Cages)
Beatheus, D., 45, Bank-street, Sheffield
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Lamp Cleaning Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Gauze Brushes
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Glasses
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Oil Filling Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C. Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Re-Lighting Apparatus (Underground)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Arc)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schonthell Ld., Cardiff
Theedam, E. C., Ld., Dudley

Lamps (Electric)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schonthell Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

Lamps (Electric Safety)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Miners' Safety)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Outdoor)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

Lathes
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

Leather Appliances

Lessons by Post
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

Lifting and Hoisting Tackle
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Renton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Byland-street Works, Birmingham

Lightning Conductors
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Shaw, John, Ld., Sheffield
Theedam, E. C., Ld., Dudley

Locknut Washers
Renton, B. M., and Co., Sheffield

Loose Collars
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster S.W.

Lubricators
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C

Machinery (Second-hand)
Bute Works Supply Co. Ld., Cardiff
Foot, R. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Renton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

Machine Tools
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

Mathematical Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mechanical Stokers
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

Metal Perforators
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 39, Victoria-street, S.W.

Metallic Packing
United States Metallic Packing Co. Ld., Soho Works, Bradford

Meteorological Instruments
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mills (Grinding)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

Mining Dials
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C
Thornton, A. G., Ld., King st. West, Manchester

Mining Machinery
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Mining Tools
Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

Motors
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

Motor Starters
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Motor Vans and Wagons
Avonside Engine Co. Ld., Bristol
Foot, R. G., & Co., 11, Queen Victoria street, E.C.

Nails, Spikes, &c.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Frost, Albert, and Co., Howard street, Sheffield
Renton, B. M., and Co., Midland Works, Sheffield

Office Furniture and Appliances
Glover, M., and Co., Holbeck-lane, Leeds
Thornton, A. G., Ld., King st. West, Manchester

Oil Bottles
Baker, John, and Son, Bilston, Staffs
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Cabinets
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Switches
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Oils and Lubricants
Ackroyd and Best Ld., Morley, nr. Leeds
Asbestos and General Paint Co. Ld., Birmingham
Gaunt and Hickman, Oil Works, Wolverhampton
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Overhead Travellers
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Spencer and Co. Ld., Melksham, Wilts
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Byland-street Works, Birmingham

Steam Winding Gear
Barclay, Andrew, Sons and Co. Ld., Kilmarnock,
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Deutsche Maschinenfabrik A.G., Duisburg, Germany
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Oxygen Manufacturers
British Oxygen Co. Ld., Elverton-st., Westminster
Knowles Oxygen Co. Ld., Wolverhampton

Packing (Engine)
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Green and Boulding Ld., London, E.C.
Greene, Tweed and Co., Westminster
Lancaster and Tonge Ld., Pendleton, Manchester
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

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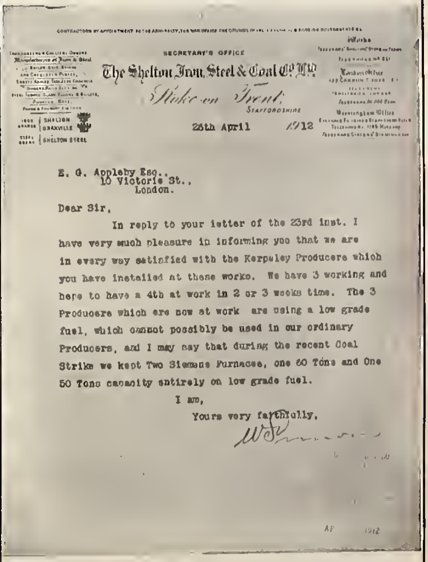

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The Shelton Iron, Steel & Coal Co. Ltd.

Stoke-on-Trent,

STAFFORDSHIRE

26th April 1912

E. G. Appleby Esq.,
10 Victoria St.,
London.

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⁂ *For* later **Advertisements** *and* **Scale of Charges,** *see* **Page 490 (Leader Page).**

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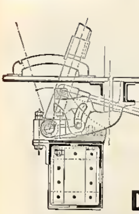

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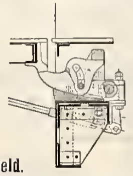

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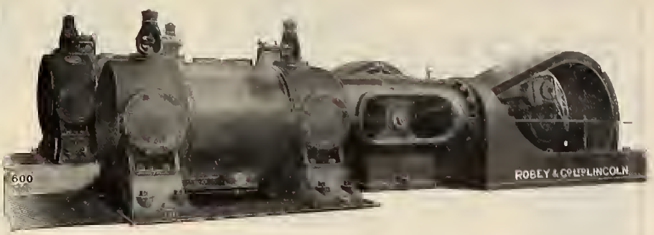

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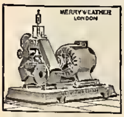

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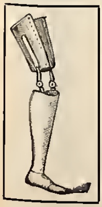

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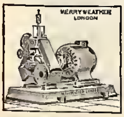

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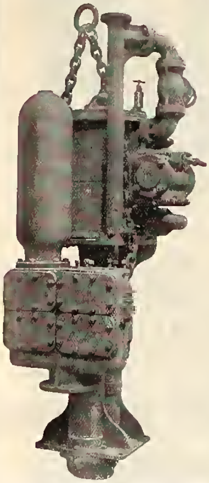

Fig. 620.—"CORNISH" SINKING PUMP, "Bucket" Type. 300 feet Pattern.

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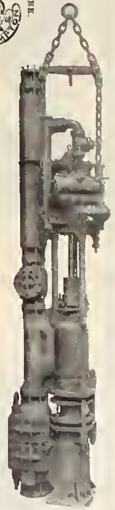

Fig. 622.—"CORNISH" SINKING PUMP, "RAM" TYPE, 600 feet Pattern.

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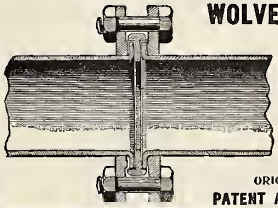

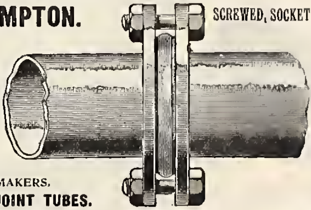

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Patent No. 29939—1910

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Lighthouse Type 2/1404.

SPECIFICATION:

Dimensions—
Diameter 2¾ in.
Height 11 in.

Weight, 5 lb.

Capacity, 2, 1½ c.p. bulbs from from 18 to 20 hours.

Price 37/6.

For use in Gas Works, Oil Tanks, Mines, Garages, Submarines, Sewers, &c.

Type 2/1402.

Dimensions,
10 in. by 3¾ in. diameter.
Weight, 3 lb.
Capacity, 1½ c.p. for 12 hours.

Price 30/.

This lamp has been designed for use by the men in coal mines. The Accumulator is of a specially strong type, and has been manufactured to stand rough usage, to give long life and very low cost of maintenance. The actual capacity also is about 25 per cent. more than is claimed above, which will be found useful in emergencies.

This lamp can also be supplied in quantities on a maintenance contract at a fixed price per lamp per week.

Write for full particulars of our maintenance agreement.

Inspection Type 4/1303.

SPECIFICATION:

In stout Aluminium or Gunmetal Case, fitted with safety locking and sealing devices and Bull's-eye Lens.

Weight in Aluminium, 6½ lb.; Gunmetal, 9½ lb.

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Capacity, 4 candle-power for about 8 to 10 hours.

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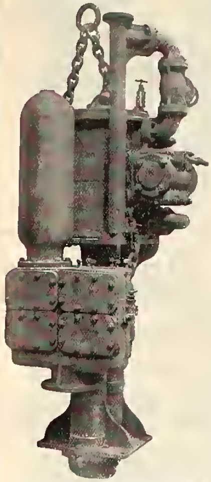

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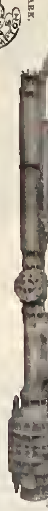

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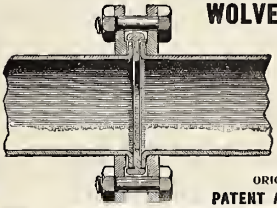

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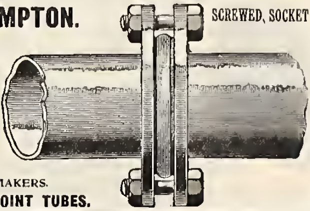

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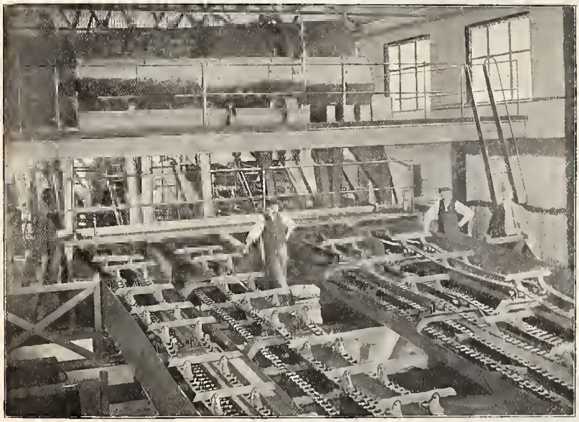

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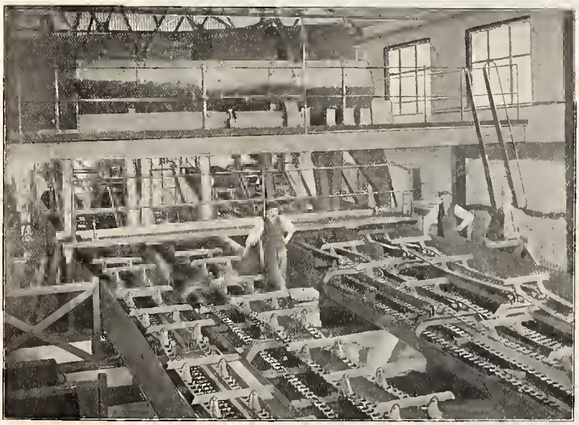

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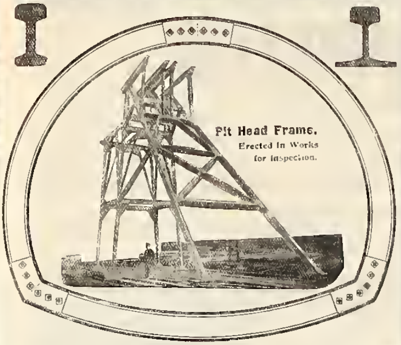

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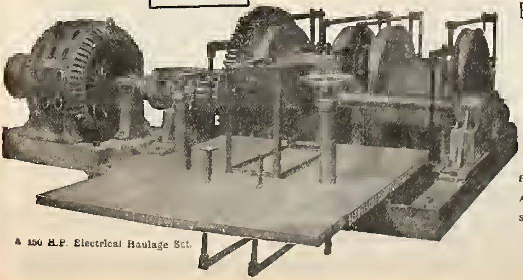

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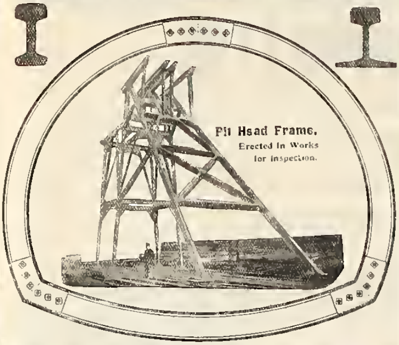
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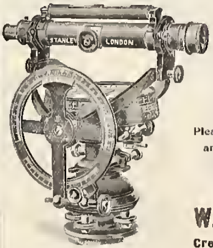

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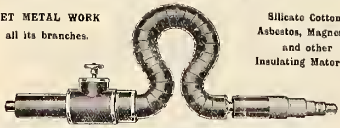

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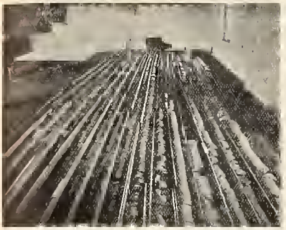

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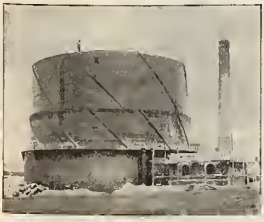

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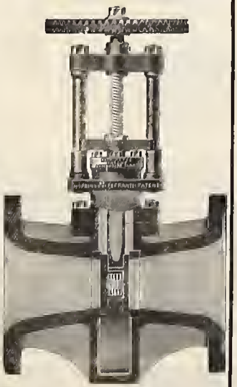

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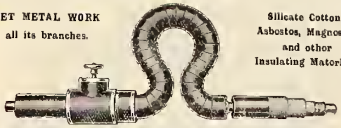

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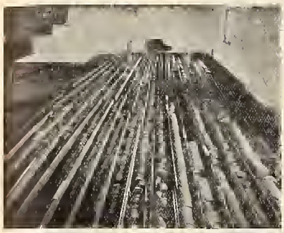

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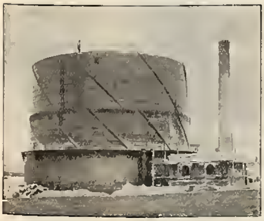

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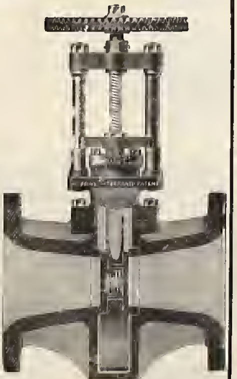

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AND JOURNAL OF THE COAL AND IRON TRADES.

Vol. CIV. FRIDAY, SEPTEMBER 13, 1912 No. 2698.

RECENT LEGISLATION IN RELATION TO LAND AND MINES.[*]

By Alexander Smith, M.Inst.C.E.

The writer at once disclaims any intention of reviewing or criticising Mines Regulation Acts, as he is of opinion that it is the province of the owners' associations to influence such legislative measures as far as they consistently can whilst in the process of drafting; and as the main objects of these Acts are identical with those of the Institution of Mining Engineers—that is, the safe working of mines—mining engineers, as members of that institution, are anxious to further these objects in every way in their power. That this is so is shown by the good feeling that exists between the institution and the Government mines inspectors, who are all prominent members. The institution can also point with pride to the fact that its president (Dr. Garforth) has done perhaps more than any other man living for the advancement of what may be fairly called the science of life-saving, and that Birmingham University has been the first to recognise it publicly.

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The writer contends that the Mineral Rights, Increment, and Undeveloped Land Duties are impositions upon capital, and that the just and reasonable source of taxation should be revenue; and that if capital is so diminished in order to provide Imperial revenue, the property and industries dependent thereon must eventually suffer.

All wealth comes primarily from the soil through agriculture and mines, and the very vitality of the kingdom depends upon the mineral fuel; if, therefore, these industries are unduly handicapped, it is unfair, and is virtually killing the goose that lays the golden eggs. There is one point quite clear, and that is that the properties mentioned are diminished in value to the extent of the capitalised value of these taxes.

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By Clause 20 of the Finance Act, 1910, this Mineral Rights Duty is levied upon the rental value or rent, and there is apparently no provision for deductions; consequently it is, in the writer's opinion, very unfair to make the mineowner in the case of leases, as the Commissioners of Inland Revenue have always tried to make him, pay taxes in every case, and rates where they are paid by the owner, as in ironstone mines. For example, if the gross rental value is £10,000—

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If the lessee is tenant for life, and has granted his leases under the powers of the Settled Land Act, a fourth of his royalties have to be capitalised, so that the tax is directly on capital in this instance.

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The writer's firm has invariably returned the gross rents, but has shown and deducted the foregoing items. The assessments have been returned on the gross, but notice of appeal has been given, and the duty paid less the deductions, which the Commissioners have accepted subject to the result of the appeals.

For the Finance Act of 1911 a solicitor friend drew for the writer the following suggested clauses:—

1. For the purpose of section 20 of the Finance (1909-1910) Act, 1910, there shall be deducted from rental value as defined by that section:

(a) Where the right to work the minerals is the subject of a mining lease, any sum or sums payable under any Act for the time being in force for any tax, rate, or other statutory payment or outgoing in respect of rent constituting the rental value.

(b) A sum equal to a twentieth part of such rent, as being the estimated expenses incurred by the person entitled thereto in the ascertainment of the amount thereof and otherwise in connection with the survey and management of the property out of which the same arises, and Mineral Rights Duty shall only be charged, levied, and paid for the financial year ended March 31, 1911, and every subsequent year on the rental value as defined by the said section after the deductions mentioned in this section shall have been made therefrom.

2. Where minerals are being worked by the proprietor thereof, a sum or sums equal to the sum or sums which would be deducted in case the right to work the minerals had been the subject of a mining lease.

3. The sum which may be deducted from rent under section 21 of the last-mentioned Act shall be a sum equal to the Mineral Rights Duty on rental value of the same amount as the rent payable after deductions mentioned in this section shall have been made in respect thereof.

These clauses were rejected by the Government.

However, in March 1912, in the case of the Duke of Beaufort *v.* the Commissioners of Income Tax, Mr. Justice Hamilton ruled, with regard to the foregoing Clause 1 (*a*) rejected by the Government, as follows:—

> "Then came the question as to the £18 15s. [income tax], it being said that this ought not to be included in the assessment, which ought to include only the amount actually received by the appellant. The tenant was not bound to pay this tax by the lease, but the obligation arose by reason of the provisions of the Income Tax Acts, which also provide for the measure of recoupment. The deduction was made under the ninth rule of No. 4 Schedule A (section 60) of the Income Tax Act, 1842. The whole assumption was that the tenant did not pay the deducted sum to the landlord, as it was argued by the Solicitor-General, but he did in effect. Cumming *v.* Bedborough (15 M. & W., 438); Denby *v.* Moore (1 B. and Ald. 123).
>
> "It was contended for the appellant that having regard to the word 'paid' in section 20 (2) (*a*), and applying it to a case already covered by another taxing statute—namely, the Income Tax Act, 1842, he ought to read it strictly and limit it to the amount which actually reached the landlord. It might be said that the rent was paid when it was discharged, but in cases where there was no item to set against the amount so paid, because there had not been a request to pay the item, but only a payment under statutory obligation, it could not be said that the whole rent had been paid when, in fact, a lesser sum was paid to the landlord. To that extent, therefore, the appeal succeeded."[*]

On April 2, 1912, the Crown was given leave to appeal, but the appeal has not yet been heard.

In the same case judgment was given upon claims for duty upon arrears of rent; for instance, it is possible that 10 years of arrears might have been paid in the first year of assessment, so that the duty would be for 10 years before the Act was passed. Mr. Justice Hamilton decided that as the duty was upon the "right" to work the minerals under the lease, and not to work them in the last working year or in any year, the arrears were part of the rent paid by the working lessee in the last working year. The argument that probably influenced the judge considerably was the circumstance that in all cases where the rent was constantly paid in arrear, the revenue might lose the benefit of the tax altogether.

In the same case it was also decided that although income tax might be deducted in arriving at the duty, supertax must not; and the subtle arguments upon which this conclusion was arrived at can be read in the judgment, as they are too long and technical for inclusion in this paper.

A further attempt was made by the Commissioners to include for duty purposes the rental from surface lands connected with a mine. The writer has always resisted this contention, and especially in one case, where the Surveyor of Taxes added to the particulars returned for assessment a considerable amount for surface rents ascertained from the balance-sheet of the colliery company sent to him for income-tax purposes. It was pointed out to Somerset House that this was actually for agricultural and building land held under separate leases, and had no connection with the mines. After much negotiation, the appeal of the trustees of Sir Robert Peel was decided against the Commissioners, and they gave the writer notice that they had determined to abandon claims for duty in respect of surface rents.

Turning now to the Increment Value Duty, this

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[*] A paper read before the Institution of Mining Engineers at Birmingham, on Wednesday, September 11, 1912.

[*] *The Times*, March 7, 1912.

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(a) Where the right to work the minerals is the subject of a mining lease, any sum or sums payable under any Act for the time being in force for any tax, rate, or other statutory payment or outgoing in respect of rent constituting the rental value.

(b) A sum equal to a twentieth part of such rent, as being the estimated expenses incurred by the person entitled thereto in the ascertainment of the amount thereof and otherwise in connection with the survey and management of the property out of which the same arises, and Mineral Rights Duty shall only be charged, levied, and paid for the financial year ended March 31, 1911, and every subsequent year on the rental value as defined by the said section after the deductions mentioned in this section shall have been made therefrom.

2. Where minerals are being worked by the proprietor thereof, a sum or sums equal to the sum or sums which would be deducted in case the right to work the minerals had been the subject of a mining lease.

3. The sum which may be deducted from rent under section 21 of the last-mentioned Act shall be a sum equal to the Mineral Rights Duty on rental value of the same amount as the rent payable after deductions mentioned in this section shall have been made in respect thereof.

These clauses were rejected by the Government.

However, in March 1912, in the case of the Duke of Beaufort *v.* the Commissioners of Income Tax, Mr. Justice Hamilton ruled, with regard to the foregoing Clause 1 (*a*) rejected by the Government, as follows:—

"Then came the question as to the £18 15s. [income tax], it being said that this ought not to be included in the assessment, which ought to include only the amount actually received by the appellant. The tenant was not bound to pay this tax by the lease, but the obligation arose by reason of the provisions of the Income Tax Acts, which also provide for the measure of recoupment. The deduction was made under the ninth rule of No. 4 Schedule A (section 60) of the Income Tax Act, 1842. The whole assumption was that the tenant did not pay the deducted sum to the landlord, as it was argued by the Solicitor-General, but he did in effect. Cumming *v.* Bedborough (15 M. & W., 438); Denby *v.* Moore (1 B. and Ald. 123).

"It was contended for the appellant that having regard to the word 'paid' in section 20 (2) (*a*), and applying it to a case already covered by another taxing statute—namely, the Income Tax Act, 1842, he ought to read it strictly and limit it to the amount which actually reached the landlord. It might be said that the rent was paid when it was discharged, but in cases where there was no item to set against the amount so paid, because there had not been a request to pay the item, but only a payment under statutory obligation, it could not be said that the whole rent had been paid when, in fact, a lesser sum was paid to the landlord. To that extent, therefore, the appeal succeeded."*

On April 2, 1912, the Crown was given leave to appeal, but the appeal has not yet been heard.

In the same case judgment was given upon claims for duty upon arrears of rent; for instance, it is possible that 10 years of arrears might have been paid in the first year of assessment, so that the duty would be for 10 years before the Act was passed. Mr. Justice Hamilton decided that as the duty was upon the "right" to work the minerals under the lease, and not to work them in the last working year or in any year, the arrears were part of the rent paid by the working lessee in the last working year. The argument that probably influenced the judge considerably was the circumstance that in all cases where the rent was constantly paid in arrear, the revenue might lose the benefit of the tax altogether.

In the same case it was also decided that although income tax might be deducted in arriving at the duty, supertax must not; and the subtle arguments upon which this [conclusion was arrived at can be read in the judgment, as they are too long and technical for inclusion in this paper.

A further attempt was made by the Commissioners to include for duty purposes the rental from surface lands connected with a mine. The writer has always resisted this contention, and especially in one case, where the Surveyor of Taxes added to the particulars returned for assessment a considerable amount for surface rents ascertained from the balance-sheet of the colliery company sent to him for income-tax purposes. It was pointed out to Somerset House that this was actually for agricultural and building land held under separate leases, and had no connection with the mines. After much negotiation, the appeal of the trustees of Sir Robert Peel was decided against the Commissioners, and they gave the writer notice that they had determined to abandon claims for duty in respect of surface rents.

Turning now to the Increment Value Duty, this shift on Monday, each of the winding enginemen may be employed for not more than 12 hours both on Saturday and on Sunday in not more than two weeks in any three, provided that notice of this arrangement is affixed by the manager in the winding engine house.

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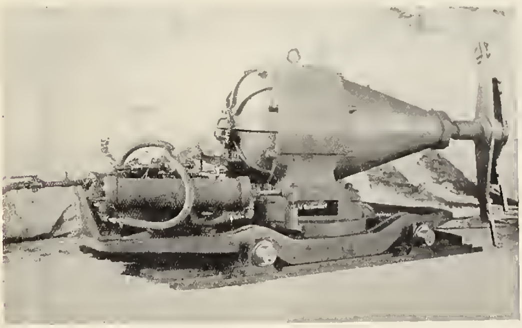
* A paper read before the Institution of Mining Engineers at Birmingham, on Wednesday, September 11, 1912.

* *The Times*, March 7, 1912.

(6) Where at any shaft one shift only of persons descends and ascends the shaft during the day, and mineral is not wound before the descent or after the ascent of that shift, a winding engineman may be employed for not more than 10 hours on any day at that shaft.

(7) In the event of any accident to the winding machinery or other accident interfering with the lowering or raising of workmen, or in the event of any emergency requiring the continuous attendance of a winding engineman at the engine in the interests of the safety of the men below ground, a winding engineman may continue to be employed after the end of his shift unless and until another winding engineman regularly employed at the same shaft is available to take his place.

(8) The manager shall specify in a notice, which shall be kept constantly posted up in the engine room, the hours of employment of the winding engineman at a shaft, or, if the winding is carried on at that shaft in more than one shift during the day, the hours of employment of the winding engineman of each shift.



If a winding engineman is employed for more than eight hours in any one day in pursuance of any of the exemptions in regulations 2, 4, 5 or 6 the notice shall also state under which exemption or exemptions the extended period of employment is claimed.

(9)—(*a*) The manager shall cause a register to be kept in the engine room in the prescribed form, and it shall be the duty of the winding engineman on each day on which he is employed to enter in the book the hour at which he commenced his employment and the hour at which he terminated his employment on that day. The register shall be examined each day by the official, if any, superior to the winding engineman, having the general charge of the machinery, or, if there is no such official, by the manager or under-manager, and shall be initialled by him.

(*b*) Where a winding engineman is employed in pursuance of the exemption contained in regulation 3 or regulation 7, full particulars of the case shall be entered in the register.

Shipment of Bunker Coal.—Last month 1,850,346 tons of coal, &c., were shipped for the use of steamers engaged in the foreign trade, as compared with 1,575,398 tons in August 1911 and 1,722,928 tons in August 1910. During the first eight months of the present year 11,608,744 tons were so shipped, as against 12,665,440 tons and 12,739,619 tons in the corresponding periods respectively of 1911 and 1910.

National Insurance: Notice to Employers.—The National Health Insurance Commission (England) desire to invite the attention of employers to the necessity of cancelling every Health Insurance stamp at the time of affixing it to the contribution card, by dating it either with pen and ink or by a metallic die with indelible ink. In the exceptional conditions prevailing at the commencement of the Act, employers were allowed to use rubber dating stamps until metal stamps could be obtained, but the Commissioners give notice that this concession will be withdrawn on September 30 next, after which date rubber stamps must not be used.

A NEW COAL-CUTTER.

The accompanying photograph illustrates the Hoadley-Knight coal-cutter, a machine embodying some novelties in design that has recently been introduced in the United States.

In the removal of the mineral from the seam the machine cuts and comminutes it, reduces it to a size varying from powdered form to nut, and in doing this the cutters swing from side to side while rotating with great rapidity; at the end of each lateral stroke the machine feeds forward one inch more or less as is desired, whereupon it immediately begins its return lateral swing. The rotating parts of the machine are electrically operated, while the swinging and feeding movements are directed and controlled by hydraulic means, so that while the cutting movements are rapid, the feeding movements are slow and powerful. Lubrication is practically eliminated.

Owing to its combined rotary and swinging motion the machine burrows into the coal, cutting a passage of constant width and height. As an aid to the breaking down of the coal and as a means further of carrying the coal away, a powerful stream of water is made to play upon the coal as it is being cut, and it is found in practice that this stream of water has the further effect of breaking the coal clean to the roof and floor, even though the cutters do not reach that far. The water also prevents dust formation. The coal is carried rapidly away by the stream of water and the mixture of coal and water finally gravitates to a central sump, from whence a powerful electrically-driven centrifugal pump elevates both coal and water to any desired location.

The machine is more particularly designed to mine coking coal in shape ready for the washer or the coke oven.

Rescue Station for South Staffordshire.—The Cannock Chase Colliery Owners' Association has decided to provide a mines rescue station at Hednesford at an estimated cost of nearly £3,000. The suitability of other towns in South Staffordshire as the site of the station was discussed, but Hednesford was finally chosen as being the most central spot in the local coalfields. Forty-nine rescue brigades from the various collieries will receive instruction at the station, which will be under the control of a fully-qualified tutor, who will live on the premises. The chief feature of the station will be a smoke gallery, 30 ft. long and 10 ft. wide, in which demonstrations of rescue work will be given. Parallel with this will be an observation chamber, fitted with airtight windows, through which the students will watch the demonstrations. Three hundred sets of rescue apparatus will be kept ready at the station. The sub-committee has yet to consider further what type of apparatus shall be provided. The initial cost of the station and the maintenance charges will be distributed among the colliery companies in proportion to the number of rescue brigades trained at the station. A powerful motor-car will be kept at the station to despatch rescue apparatus whenever necessary to the collieries, and the station will be in telephonic communication with all the collieries. The new premises are to be ready by the end of the present year. Each colliery in the district will have either two, three or four rescue brigades. Legislation demands that each brigade shall consist of five persons, but it has been suggested by prominent mining authorities that brigades of six would be preferable, and it is probable the Cannock Chase brigades will be so constituted. These brigades will visit the Hednesford Rescue Station at regular intervals to receive instruction, and the instructor will also visit the various collieries to give practical lessons below ground.

TESTING OF SAFETY LAMPS.

The following is the text of the Report of the Departmental Committee on the Testing of Miners' Safety Lamps appointed by the Home Secretary.

To the Right Honourable the Secretary of State for the Home Department.

Sir,—The erection of the safety lamp testing station at Eskmeals, near Barrow-in-Furness, being completed, and certain preliminary tests having been carried out with the apparatus there installed, we are now in a position to state what, in our opinion, should be the nature of the tests which the various types of safety lamps for use in mines should be required to pass in order to be admitted to the list of approved safety lamps in accordance with section 33 of the Coal Mines Act, 1911, and we beg to report as follows:—

THE LAMP TESTING STATION AND APPARATUS.

The lamp testing apparatus is housed in a wood and corrugated iron building erected on the site of the experimental station of the Explosions in Mines Committee at present engaged in enquiring into the question of coaldust explosions in mines. This building is 40 ft. long by 20 ft. wide by 9 ft. 6 in. high to the eaves, the height to the ridge being 18 ft. The interior walls and roof are boarded, the boarding being lined with "fibro-cement" $\frac{3}{16}$ of an inch thick, of hard asbestos grey sheeting, and the building is set on a concrete foundation, the floor being of the same material. The light can be effectually obscured by means of tightly fitting wooden shutters to the windows. The building is fitted with electric lighting and power.

The building contains the following apparatus for testing lamps:—

1. *The lamp-testing gallery* in which lamps are tested in currents of explosive mixtures of gas and air.
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3. *A photometer* for determining the illuminating power of the lamps tested.
4. Devices for submitting the lamps, or portions of them, to tests for mechanical strength.

External to the building is a gasholder of 1,500 cubic feet capacity for supplying gas for the explosive mixture tests. The gasholder allows of any gas being used that may be deemed advisable for testing the lamps. So far we have used only petrol vapour and coal gas—a supply of the latter being procurable from the works of the Coaldust Committee.

A more detailed description of the several pieces of apparatus, and the functions which they have to fulfil is given later on.

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1. Flame Safety Lamps.

We think that the interests of safety will be best served by requiring the lamps to pass a combined test which shall be comprised under the following heads:—

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(*b*.) Photometric tests.
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(*a*) Mechanical Tests.

We attach some importance to these tests, which have been framed with the object of reproducing as far as possible the ordinary conditions of rough usage to which a lamp is likely to be subjected in a mine.

The tests are carried out in the following manner:—

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The height, 6 ft., is measured from the bottom of the lamp, which has been fitted together complete with glass. The arrangement for ensuring uniformity in the conditions under which the dropping is effected consists essentially of an electro-magnet which, when put into action by the passage of an electric current, causes a bar, to which the lamp is suspended, to swing into a vertical position, thus dropping the lamp.

This test to be repeated five times in succession, the lamp being fitted with a different glass each time. Not more than one breakage of the glass in the five tests to constitute a pass. But should the glass be broken in two, but not in more, of the tests, the lamp to be submitted to five more tests when, should the glass break in two of them, the lamp will fail to pass the test.

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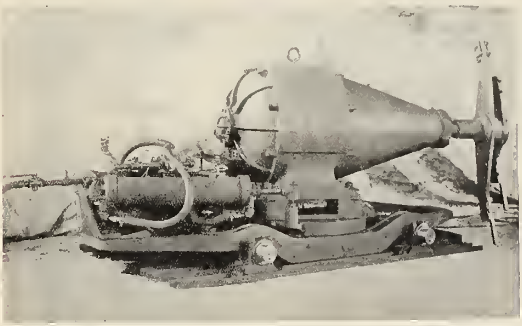

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The height of 6 ft. is measured between the bottom of the weight and the top of the lamp. The weight is a lead disc 3 in. in diameter and 1¾ in. thick, and it is dropped by means of the same arrangement as is used for dropping the lamp.

If a lamp which has passed the test is not taken into practical use within one year of the date of the Order permitting its use, it should be removed from the approved list.

We wish to record our appreciation of the valuable services which Dr. Wheeler, the Chief Chemist to the Coaldust Committee, has rendered to us in carrying out the experimental work on the lamps.

We cannot conclude this Report without expressing our sense of the great loss we have sustained in the death, under tragic and heroic circumstances, of our colleague and friend, Mr. W. H. Pickering. Although Mr. Pickering did not see this Report in its final form, he witnessed the experiments and had discussed in detail with us the matter of the Report, and with the conclusions of the Committee we have no hesitation in saying he was in substantial agreement.

We have the honour to be, Sir,
Your obedient servants,
R. A. S. REDMAYNE.
W. N. ATKINSON.
August 5, 1912. A. P. H. DESBOROUGH, Capt.

CONTINENTAL MINING NOTES.

Belgium.

The production of pig iron in Belgium during August last comprised 6,680 tons of forge pig, 10,330 tons of foundry pig, and 184 040 tons of steel pig—a total of 201,050 tons, as compared with only 183,290 tons in the corresponding month of 1911.

Out of 53 existing blastfurnaces in Belgium, 47 are at present in operation, as against only 44 at this time last year. Of those at work, the production of pig iron per 24 hours is: Two furnaces, 220 tons of forge pig; four, 270 tons of foundry pig; and 41, 6,058 tons of steel pig.

Coal Prices.—Boiler coals: *Menus maigres* 14 50 fr., *quart-gras* 15·50 fr., *demi gras* 16·50 fr. Furnace coals: *Poussiers flénu* 15 fr., *fines* 16 50 fr., *tout-venant flénu* 18·50 fr., *tout-venant gras* 19·50 fr. House coals: *Tout-venant* 22 to 26 francs, *gailleteries et criblés divers* 27 to 37 francs. Coke: Coking coal 15·50 fr., coke (ordinary) 25 fr., ditto *mi-lavé* 28 50 fr., ditto *lavé* 33 fr. Briquettes: Locomotive briquettes I. 22 fr., ditto II. 24 fr., ditto marine type 26 fr.

France.

A new company has recently been formed in Paris, with a capital of £33,600 and the title of La Société des Mines de Fer de la Muance.

The British consul at Rouen states that the importations of coal, which during 1910, on account of the floods in the Seine, showed a decrease of 283,824 tons as against the importations of 1909, easily regained during 1911 the lost ground, showing a total importation of 2,274,739 tons, an increase over 1910 of 342,432 tons. In this total are included 149,728 tons of anthracite as against about 84,116 tons in 1910. The figures of the coal supply for this district for the three years 1909–11, from all sources, were as follows:—

	1909. Tons.	1910. Tons.	1911. Tons.
British coal	2,002,416	1,686,346	2,048,762
German coal......................	205,635	245,961	225,977
French coal	348,298	—	—
French and Belgian coal ...	—	370,510	408,850
Total	2,556,349	2,302,817	2,683,589

During 1911, the quantity of coal imported at Nantes was 552,795 tons, as compared with 478,398 tons in 1910. The Nantes importers form a syndicate, which has the result of considerably increasing the price of coal. Of the above-mentioned quantity of coal imported during the year 1911, German coal may be estimated at 84,000 tons. This coal is used at the Papeteries Gourand and at Blanzy-Ouest. At St. Nazaire, 955,255 tons of coal were imported in 1911, as against 947,650 tons in 1910.

Coal Prices in Paris.—Charleroi extra: *Gailleterie* 66 fr., *gailletins* 67 fr., *têtes de moineaux* 68 fr. Charleroi first quality: *Gailleterie* 64 fr., *gailletins* 65 fr., *têtes de moineaux* 66 fr. Belgian anthracite: *Noisettes* 63 fr., *gailletins* 58 fr. English anthracite: *Noisettes* 76 fr., *gailletins* 67 fr., *grains* 55 fr. *Boulets* 49 fr.

Trade of Bordeaux.—According to Mr. Acting-Consul Patterson, the importation of coal at Bordeaux in 1911 increased by 43,080 tons, there being 1,453,269 tons imported in 1911 as compared with 1,410 189 tons in 1910. Of the total importation in 1911, 1,363,630 tons were from the United Kingdom, an increase of 28,341 tons on 1910. German coal increased by 14,739 tons compared with 1910, the figures being 89,639 tons in 1911 against 74,900 tons in 1910. Imports of coke during 1911 have been of small importance. Only 755 tons were imported against 3,303 tons in 1910, 656 tons being British, and the remainder coming from Germany, a decrease from the latter country of 2,326 tons on the preceding year's figures. The total importation of briquettes in 1911 amounted to 120,074 tons, British briquettes accounting for only 35,072 tons, the rest being from Germany. British trade showed a small decrease, whereas German imports increased from 70,438 tons in 1910 to 85,002 tons in 1911. There are two briquette factories at Bordeaux, and the output of these, combined with successful German competition, accounts for the declining importation from the United Kingdom.

Germany.

Exports and Imports of Fuel.—The following shows the exports and imports of coal, coke, &c., from and to Germany during July and the seven months ending therewith:—

	July.		January-July.	
	1911. Tons.	1912. Tons.	1911 Tons.	1912. Tons.
Exports—				
Coal	2,610,368 ..	2,733,473...	15,225,320 ..	17,833,020
Lignite . .	4,458 .	3,303 ..	32,209 ..	29,110
Coke	421,619	703,283 .	2,524,378 .	3,160,950
Coal briquettes	208,793 ..	231,133. .	1,086,231 ..	1,218,204
Lignite ditto	34,113...	10,655...	264,669 ..	294,630
Imports—				
Coal	779,183 ..	1,212,173 ..	6,021,955 ..	5,401,116
Lignite . . .	52,850 ..	636,849 ..	4,101,261 .	4,220,151
Coke.	53,926 .	60,132 .	350,781 ..	325,802
Coal briquettes	6,785...	2,414 .	62,148 .	28,806
Lignite ditto ..	8,452 .	8,556 ..	63,531...	70,484

The quantity of coal imported from Great Britain in July amounted to 1,090,550 tons, as compared with 668,081 tons in July last year; and the total in the seven months to 4,587,794 tons, against 5,200,097 tons in 1911. The following shows the exports of coal and coke to some of the most important markets during the month:—

To	Coal.		Coke.	
	July 1911. Tons.	July 1912. Tons.	July 1911. Tons.	July 1912. Tons.
Belgium	507,306...	494,249 .	48,430...	92,259
Denmark . .	18,701 .	28,970 .	3,094 .	2,732
France	214,228 .	283,389	112,781	318,902
Great Britain	10..	150 .	449...	6,495
Italy........	48,114 ..	36,205 .	13,502 .	15,374
Netherlands . . .	638,826 ..	580,269 .	17,590...	20,088
Norway . .	302 .	953..	3,315 .	1,660
Austria-Hungary	852,708 .	917,716	72,285...	82,957
European Russia...	129,905...	138,738	59,829 ..	70,163
Sweden	1,891 .	9,748 .	11,523 .	14,618
Switzerland . . .	113,305 ..	132,714	39,098 .	34,503
Spain	5,390 .	11,665	—	3,553
Egypt	30,718 .	11,455 .	13,322 .	7,389
United States . . .	— ...	— .	1,370...	8,093

Coal Market in Upper Silesia.—The traffic returns for August show an increase of about 20 per cent. above the figures for last year. Industrial coals are naturally attracting the most attention, the iron industry being well occupied with orders, and therefore a large buyer of fuel. In house coal, too, business is very active, and difficulty is being experienced in satisfying the demand, whilst gas coal sells well and there is an actual scarcity of coking coal. In the export trade Austria-Hungary is taking large quantities, and the consignments to Russia might be increased if the pits could raise more coal. Both blastfurnace and foundry coke sell as quickly as produced, and stocks are practically *nil*.

Coal Prices at Düsseldorf.—Gas and open-burning coals: Gas coal, summer price 12 to 13 marks, winter price 13 to 14 marks; producer coal, 12·50 to 13·50 marks; open-burning gas coal, 11·50 to 12 50 marks. Bituminous coals: Through-and-through, 11·25 to 12 marks; best mixed, 12 50 to 13 marks; coking coal, 12·25 to 13 marks. Lean coals: Through-and-through, 10·50 to 12 marks; best mixed, 12·75 to 14 25 marks; anthracite nuts II., 21·50 to 25·50 marks. Coke: Foundry coke, 18 to 20 marks; blast-furnace coke, 15·50 to 17·50 marks; broken coke I./II., 20 to 23 marks. Briquettes, 11 to 14·25 marks.

Ruhr Coal Market.—There is no change in the situation, business being very active in both home and export trades. The iron industry is in a very satisfactory state, and other industrial buyers are laying in their supplies before the demands of agriculture lead to a shortage of railway wagons. In Belgium the demand for Ruhr coal is growing, though prices are relatively poor, and Holland is a large buyer; whilst in North Germany the Syndicate has permanently secured a circle of customers who were users of English coals previous to the strike. The favourable state of the river has enabled large shipments to be sent forward to South Germany, though a good deal is being put into stock owing to the slack local demand, except for small nuts and house coal. In the home market gas coal is in better request, but coking coal is comparatively neglected, and the stocks of coke are growing.

Coal Trade of Stettin.—The British consul at Stettin, Mr. Bernal, states that the import of coal and coke by sea showed the large increase of 590,433 metric tons. In 1911 the imports from the United Kingdom for the last six years were as follow in metric tons:—1906, 818,339; 1907, 1,152,829; 1908, 1,007,121; 1909, 962,089; 1910, 809,148; 1911, 1,395,007. The firms engaged in the coal trade derived little benefit from the general improvement of trade. In fact, various circumstances combined to make 1911 a very unprofitable year. Until June lighter freights on the Elbe and Oder remained very low. Upon navigation becoming more difficult in the River Elbe, freights rose, and eventually coal could no longer be shipped *via* Hamburg owing to insufficient water, shipments were then sent *via* Stettin, where, from the month of July, the coal trade showed an extraordinary activity. The accumulation of coal naturally caused a rise in lighter freights from Stettin, which soon reached such a height that coal importers found their transport costs to be under-estimated, and standing contracts could only be carried out at a loss. These conditions were further accentuated by a scarcity of lighters, a large number of which were lying aground in the upper reaches of the Oder on account of low water. The demands in Berlin became at times so pressing that considerable quantities of British coal were forwarded by rail. Towards the end of the year British collieries were executing such large orders that steamers had to wait a long time for their "turn" at loading ports and in consequence steamer freights showed a rising tendency. The following prices were paid at Stettin for British and Silesian coal in 1911.—

	Per metric ton.												
	M.	pf.		M.	pf.		£	s.	d.		£	s.	d.
British—													
Steam, small	10	0	to	13	0	...	0	9	10	to	0	12	0
Large West Hartley coal	14	0		19	0	...	0	13	0		0	18	8
Durham gas and coking coal......	14	0		16	0	...	0	13	11		0	15	9
Large Scotch coal	15	0		17	0	...	0	14	9		0	16	0
„ Welsh coal	22	0		26	0	...	1	1	8		1	5	7
Silesian—													
Large and single nuts	19	50		20	50	...	0	19	2		1	0	2
Double nuts	16	50		17	50	...	0	16	3		0	17	3
Unscreened	17	50		18	50	...	0	17	11		0	18	3

Italy.

Coal Trade of Sicily.—According to the British consul in Sicily the Sicilian imports of coal during the years 1910-11 were as follow:—

Port of entry.	1910. Tons.	1911. Tons.	Carried in British ships, 1911. Tons
Palermo.........	185,795 ...	220,930 ...	163,382
Messina	67,030 ...	111,448 ...	70,741
Catania	142,420 ...	140,000 ...	71,801
Syracuse..............	7,840 ...	14,532 ...	9,870
Licata	23,265 ...	34,078 ...	7,150
Porto Empedocle ...	10,800 ...	33,541 ...	13,161
Marsala	1,100 ...	375 ...	—
Trapani	31,603 ...	29,704 ...	14,570
Milazzo	25,523 ...	21,294 ...	2 300
Augusta	16,361 ...	131,972 ...	48,952
Total............	501,806 ...	740,874 ...	—

At Palermo 4,710 tons were imported from Philadelphia, 1,050 tons from Kiel, and 852 tons from Emden. At Messina 6,500 tons of patent fuel were imported from Emden, and 5,537 tons of coal from Rotterdam. At Catania and Syracuse 7,700 tons and 1,872 tons were imported from Emden respectively. At Licata 2,549 tons were imported from Germany, and 1,448 tons from Austria-Hungary; at Porto Empedocle, 5,487 tons from Germany, and 1,135 tons from Austria-Hungary.

During 1911, 746,281 tons of British coal were imported at Naples, 85,023 tons of German coal, and 50,081 tons of American coal. Imports at Bagnoli amounted to 216,000 tons, and at Torre Annunziata to 195,422 tons.

Netherlands.

The production of the Government coalmines at Ombilian (Java) for the past two years has been as follows:—

	Tons.
1910......	397,522
1911.........	400,508

Spain.

Coalmining in Asturias.—The British vice-consul at Gijon, Mr. Lovelace, reports that the mineowners were busy in 1911 executing orders for the Mediterranean and other Spanish ports, and also for the inland markets, and the total net quantity mined in that year was 2,276,036 tons, of which 979 243 tons were sent coastwise from the following ports:—Gijon-Musel 486,505 tons, Avilés 254,750, San Esteban de Pravia 235,988. The shipment of coal at the Asturian ports is increasing at a far greater rate than the output of the mines, as the following figures demonstrate:—

	Total output. Tons.		Coal shipped. Tons.
1902	1,716,940	...	409,534
1911	2,276,036	...	979,243
Increase	559,096	...	569,709

The above figures show that the mineowners have found a market for their increased output at the various ports outside Asturias. The improved facilities for shipment at the ports of Gijon-Musel and San Esteban de Pravia have contributed considerably to the increased demand for Asturian coal. The loading tips now at work at the port of Musel are capable of dealing with very large quantities of coal per day, and steamers of large tonnage and of any draught, and consequently at lower freights, are being chartered to load for the Mediterranean ports.

Mining Education in the North.—Under the auspices of the Newcastle section of the Society of Chemical Industry and the council of Armstrong College, courses of evening lectures on certain industrial applications of chemistry will be instituted this winter. The courses selected deal with the utilisation of coal in the manufacture of gas and coke and recovery of by-products, and the second course will be concerned with metallography, a branch of science which has grown from researches on the microscopic structure of metals and alloys.

If a lamp which has passed the test is not taken into practical use within one year of the date of the Order permitting its use, it should be removed from the approved list.

We wish to record our appreciation of the valuable services which Dr. Wheeler, the Chief Chemist to the Coaldust Committee, has rendered to us in carrying out the experimental work on the lamps.

We cannot conclude this Report without expressing our sense of the great loss we have sustained in the death, under tragic and heroic circumstances, of our colleague and friend, Mr. W. H. Pickering. Although Mr. Pickering did not see this Report in its final form, he witnessed the experiments and had discussed in detail with us the matter of the Report, and with the conclusions of the Committee we have no hesitation in saying he was in substantial agreement.

We have the honour to be, Sir,
Your obedient servants,
R. A. S. Redmayne.
W. N. Atkinson.
August 5, 1912. A. P. H. Desborough, Capt.

CONTINENTAL MINING NOTES.

Belgium

The production of pig iron in Belgium during August last comprised 6,680 tons of forge pig, 10,330 tons of foundry pig, and 184 040 tons of steel pig—a total of 201,050 tons, as compared with only 183,290 tons in the corresponding month of 1911.

Out of 53 existing blastfurnaces in Belgium, 47 are at present in operation, as against only 44 at this time last year. Of those at work, the production of pig iron per 24 hours is: Two furnaces, 220 tons of forge pig; four, 270 tons of foundry pig; and 41, 6,058 tons of steel pig.

Coal Prices.—Boiler coals: *Menus maigres* 14 50 fr., *quart-gras* 15·50 fr., *demi gras* 16·50 fr. Furnace coals: *Poussiers flénu* 15 fr., *fines* 16 50 fr., *tout-venant flénu* 18·50 fr., *tout-venant gras* 19·50 fr. House coals: *Tout-venant* 22 to 26 francs, *gailleteries et criblés divers* 27 to 37 francs. Coke: Coking coal 15·50 fr., coke (ordinary) 25 fr., ditto *mi-lavé* 28 50 fr., ditto *lavé* 33 fr. Briquettes: Locomotive briquettes I. 22 fr, ditto II. 24 fr., ditto marine type 26 fr.

France.

A new company has recently been formed in Paris, with a capital of £33,600 and the title of La Société des Mines de Fer de la Muance.

The British consul at Rouen states that the importations of coal, which during 1910, on account of the floods in the Seine, showed a decrease of 283,824 tons as against the importations of 1909, easily regained during 1911 the lost ground, showing a total importation of 2,274,739 tons, an increase over 1910 of 342,432 tons. In this total are included 149,728 tons of anthracite as against about 84,116 tons in 1910. The figures of the coal supply for this district for the three years 1909–11, from all sources, were as follows:—

	1909.	1910.	1911.
	Tons.	Tons.	Tons.
British coal	2,002,416	1,686,346	2,048,762
German coal	205,635	245,961	225,977
French coal	348,298	—	—
French and Belgian coal	—	370,510	408,850
Total	2,556,349	2,302,817	2,683,589

During 1911, the quantity of coal imported at Nantes was 552,795 tons, as compared with 478,398 tons in 1910. The Nantes importers form a syndicate, which has the result of considerably increasing the price of coal. Of the above-mentioned quantity of coal imported during the year 1911, German coal may be estimated at 84,000 tons. This coal is used at the Papeteries Gourand and at Blanzy-Ouest. At St. Nazaire, 955,255 tons of coal were imported in 1911, as against 947,650 tons in 1910.

Coal Prices in Paris.—Charleroi extra: *Gailleterie* 66 fr., *gailletins* 67 fr., *têtes de moineaux* 68 fr. Charleroi first quality: *Gailleterie* 64 fr, *gailletins* 65 fr., *têtes de moineaux* 66 fr. Belgian anthracite: *Noisettes* 63 fr., *gailletins* 58 fr. English anthracite: *Noisettes* 76 fr., *gailletins* 67 fr., *grains* 55 fr. *Boulets* 49 fr.

Trade of Bordeaux.—According to Mr. Acting-Consul Patterson, the importation of coal at Bordeaux in 1911 increased by 43,080 tons, there being 1,453,269 tons imported in 1911 as compared with 1,410 189 tons in 1910. Of the total importation in 1911, 1,363,630 tons were from the United Kingdom, an increase of 28,341 tons on 1910. German coal increased by 14,739 tons compared with 1910, the figures being 89,639 tons in 1911 against 74,900 tons in 1910. Imports of coke during 1911 have been of small importance. Only 755 tons were imported against 3,303 tons in 1910, 656 tons being British, and the remainder coming from Germany, a decrease from the latter country of 2,326 tons on the preceding year's figures. The total importation of briquettes in 1911 amounted to 120,074 tons, British briquettes accounting for only 35,072 tons, the rest being from Germany. British trade showed a small decrease, whereas German imports increased from 70,438 tons in 1910 to 85,002 tons in 1911. There are two briquette factories at Bordeaux, and the output of these, combined with successful German competition, accounts for the declining importation from the United Kingdom.

Germany.

Exports and Imports of Fuel.—The following shows the exports and imports of coal, coke, &c., from and to Germany during July and the seven months ending therewith:—

	July.		January-July.	
	1911.	1912.	1911.	1912.
	Tons.	Tons.	Tons.	Tons.
Exports—				
Coal	2,610,368	2,733,473	15,225,320	17,843,020
Lignite	4,458	3,303	32,209	29,110
Coke	421,619	703,283	2,524,378	3,160,950
Coal briquettes	208,793	231,133	1,086,231	1,248,204
Lignite ditto	34,113	10,655	264,669	294,630
Imports—				
Coal	779,183	1,212,173	6,024,955	5,401,116
Lignite	52,850	636,849	4,101,264	4,220,154
Coke	53,926	60,132	350,781	325,802
Coal briquettes	6,785	2,414	62,448	28,806
Lignite ditto	8,452	8,556	63,531	70,484

The quantity of coal imported from Great Britain in July amounted to 1,090,550 tons, as compared with 668,981 tons in July last year; and the total in the seven months to 4,587,794 tons, against 5,200,097 tons in 1911. The following shows the exports of coal and coke to some of the most important markets during the month:—

To	Coal.		Coke.	
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	Tons.	Tons.	Tons.	Tons.
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Austria-Hungary	852,708	947,746	72,285	82,957
European Russia	129,905	138,738	59,829	70,163
Sweden	4,891	9,748	11,523	14,618
Switzerland	113,305	132,714	39,098	34,503
Spain	5,390	11,665	—	2,553
Egypt	30,718	11,455	13,322	7,389
United States	—	—	1,370	8,003

Coal Market in Upper Silesia.—The traffic returns for August show an increase of about 20 per cent. above the figures for last year. Industrial coals are naturally attracting the most attention, the iron industry being well occupied with orders, and therefore a large buyer of fuel. In house coal, too, business is very active, and difficulty is being experienced in satisfying the demand, whilst gas coal sells well and there is an actual scarcity of coking coal. In the export trade Austria-Hungary is taking large quantities, and the consignments to Russia might be increased if the pits could raise more coal. Both blastfurnace and foundry coke sell as quickly as produced, and stocks are practically *nil.*

Coal Prices at Düsseldorf.—Gas and open-burning coals: Gas coal, summer price 12 to 13 marks, winter price 13 to 14 marks; producer coal, 12·50 to 13·50 marks; open-burning gas coal, 11·50 to 12 50 marks. Bituminous coals: Through-and-through, 11·25 to 12 marks; best mixed, 12·50 to 13 marks; coking coal, 12·25 to 13 marks. Lean coals: Through-and-through, 10·50 to 12 marks; best mixed, 12·75 to 14 25 marks; anthracite nuts II., 21·50 to 25·50 marks. Coke: Foundry coke, 18 to 20 marks; blast-furnace coke, 15·50 to 17·50 marks; broken coke I./II., 20 to 23 marks. Briquettes, 11 to 14·25 marks.

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Coal Trade of Stettin.—The British consul at Stettin, Mr. Bernal, states that the import of coal and coke by sea showed the large increase of 590,433 metric tons. In 1911 the imports from the United Kingdom for the last six years were as follow in metric tons:—1906, 818,339; 1907, 1,152,829; 1908, 1,007,121; 1909, 962,089; 1910, 809,148; 1911, 1,395,007. The firms engaged in the coal trade derived little benefit from the general improvement of trade, in fact, various circumstances combined to make 1911 a very unprofitable year. Until June lighter freights on the Elbe and Oder remained very low. Upon navigation becoming more difficult in the River Elbe, freights rose, and eventually coal could no longer be shipped *via* Hamburg owing to insufficient water, shipments were then sent *via* Stettin, where, from the month of July, the coal trade showed an extraordinary activity. The accumulation of coal naturally caused a rise in lighter freights from Stettin, which soon reached such a height that coal importers found their transport costs to be under-estimated, and standing contracts could only be carried out at a loss. These conditions were further accentuated by a scarcity of lighters, a large number of which were lying aground in the upper reaches of the Oder on account of low water. The demands in Berlin became at times so pressing that considerable quantities of British coal were forwarded by rail. Towards the end of the year British collieries were executing such large orders that steamers had to wait a long time for their "turn" at loading ports and in consequence steamer freights showed a rising tendency. The following prices were paid at Stettin for British and Silesian coal in 1911.—

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	M. pf.	M. pf.	£ s. d.	£ s. d.
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Large West Hartley coal	14 0	19 0	0 13 9	0 18 8
Durham gas and coking coal	14 0	16 0	0 13 9	0 15 9
Large Scotch coal	15 0	17 0	0 14 9	0 16 9
,, Welsh coal	22 0	26 0	1 1 8	1 5 7
Silesian—				
Large and single nuts	19 50	20 50	0 19 2	1 0 2
Double nuts	16 50	17 50	0 16 3	0 17 3
Unscreened	17 50	18 50	0 17 3	0 18 3

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Increase	559,096	569,709

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bottoms of most of the shoots appeared to have been blown down, although it is somewhat difficult to accept this evidence in a seam dipping with an inclination of 45 degs. The maximum downward force appeared in the neighbourhood of shoot 76. The evidence of mud thickly plastered on the tubs and timbers appeared clearly indicative of the direction of force. Beyond shoot 100 on the main level there was no disturbance. It appeared quite clear that this explosion originated in the locality of shoot 74. At the top of this shoot, and extending for some distance, a large fall of roof had occurred. At this point it will be noted that there is also every opportunity for an accumulation of gas being present in this open goaf; and, given a source of ignition here, an explosion of firedamp would account for all the phenomena observed.

A public enquiry was held into the cause of this explosion in December 1910 and January 1911, and much evidence was adduced as to the cause of the disaster. For want of a more definite solution, the jury favoured the view of one mining engineer who suggested that the explosion was due to what he termed "his 'percussion' theory," a suggestion which can be dismissed at once, and which will not bear the most slender investigation.

There is no doubt that the explosion was caused by an ignition of firedamp, ignited by sparks emitted from the falling roof.

No. 3 Explosion.—After the explosion of December 9, 1910, a general strike occurred throughout the Crow's Nest Pass district, and the Bellevue Mine was not reopened. Somewhere about January 28, 1911, a further explosion occurred, which did much more damage than on either of the previous occasions. The exact date is somewhat uncertain, as the explosion was not actually observed.

An official inspection was made of part of the workings on January 25, and a new manager was appointed to the mine on January 28, a few days after which the effects of the third explosion were noticed. The fan had been standing since shortly after the explosion of December 9, 1910, but was set running from January 13 to 25, 1911, in order to prepare for the Government inspection. It was, however, stopped again after the inspection.

That a third explosion had occurred was observed first by a fireman going into the mine for some tools on January 30, when he encountered afterdamp. A subsequent examination revealed that the explosion had originated from the neighbourhood of rooms 89 and 90. At this point a heavy fall of roof had occurred, and the area was a very suitable one for gas to have accumulated during the period when the fan had been standing.

The mine remained untouched after this explosion for some months, owing to the strike, and the writers made a careful examination of the workings during August 1911. The magnitude of the explosion within a limited area was very manifest, and although it was difficult to distinguish the evidence of the explosion of December 9, 1910, from that of the later one, by a careful comparison of data and notes it was possible to differentiate between the two.

The No. 3 explosion emanated from about shoot 90, radiating in several directions, and causing considerable damage on the main level at the bottom of shoot 102. At this point 15 tubs, each approximately 2,000 lb. tare, and each carrying over 6,000 lb. of coal, were standing in the shunt. The first four tubs of the set were blown out-bye a distance of 40 ft., one being turned over on its side and another upended. Of the other 11, nearly all were off the rails, one turned upon end, one turned over on its side, and another with the side blown out. The writers instance this example to illustrate the extent of the force, which was certainly greater than in either of the previous explosions.

The writers made a careful examination of the seat of the ignition, and ample evidence of flame was obtained, as also evidence of pitting in the form of globules of cokedust splashed up against timbers was observed radiating from this area. Although the writers do not attach much weight to this, it is worthy of note, particularly as the general evidence of direction clearly pointed to this place as the starting point, and they have observed similar pitting of cokedust around the area of ignition of firedamp in other cases.

Cause of the Explosions.—An experiment was tried in the mine with the hard siliceous roof which Mr. Heathcote had suggested might cause sparks sufficiently intense to ignite firedamp. A large lump of the rock, weighing some 60 or 70 lb., was lifted and dropped into one of the shoots, on the floor of which lay some of the fallen roof. As the lump rolled down the shoot a brilliant display of sparks was observed. Specimens of this roof rock were therefore submitted to a careful examination by one of the writers. When a specimen is struck a glancing blow with a hammer, the surface of percussion glows red hot for the instant, which is probably due to the sparks generated by the friction between the steel and the sand grains igniting the powdered bitumen and the gas liberated, both by the fine pulverisation of the bitumen and by the frictional heat. On a further examination, the rock was found to contain carbonaceous matter, as will be described later. Again, when two small pieces of the stone are struck one against the other, sparks are seen, the intensity of the sparks varying with the energy applied. To obtain a play of sparks, a steel flint-mill was used, and sparks of sufficient intensity were produced to ignite very readily coal gas or methane.

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A thin section of the rock under the microscope shows a fairly even-grained texture, and consists chiefly of colourless grains, which are mixed with a large proportion of grains of various shades of dull yellow and brown to black. The colourless grains are chiefly quartz, which comprises about 50 per cent. of the rock, together with a few felspar granules and abundant grains of micro-crystalline rocks, mostly felsite. The lightest coloured grains are also of micro-crystalline rocks, but the bulk of the brown grains, perhaps a sixth of the rock-mass, seem to be of a carbonaceous material which exert no action upon polarised light. Some of them show traces of organic structure. The blackest grains (brown in reflected light), small and very irregular in shape, forming strings along the bedding planes between the other constituents, are doubtless bitumen, and have clearly yielded under pressure. Besides these definite areas of "bitumen," the grains throughout the rock are defined and separated one from the other by brown lines, which are most probably due to a bituminous cement, filling all interstices, and thus rendering the rock very resistant; and it is not improbable that the marked flame-producing property of the rock may be due in part to this perfect cementation, which limits the frictional heat to the surface.

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The amount of firedamp present in several of the other samples was not sufficient to admit of the presence of other paraffin hydrocarbons being determined.

It is of interest to note the presence of ethane in the above sample. As the ignition temperature of the paraffin hydrocarbons appears to fall slightly as the series ascends, the presence of this higher hydrocarbon in the firedamp would lower the temperature of ignition, and thus render more easy the ignition of gaseous mixtures by sparks from falls of roof.

It is clear, however, that sparks of sufficient intensity can be produced by rubbing together pieces of the roof of No. 1 seam to ignite methane, which has an ignition temperature—according to Dixon and Coward—of from 556 to 700 degrees Centigrade; and as other hydrocarbons have been shown to be present, the temperature of ignition will be less, and an explosive mixture will be more readily ignited.

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To avoid such calamities in the future is a very difficult and serious problem. The present method of working lends itself to irregular falls in open and ill-ventilated goaves. It is impossible, in the present method of working, to prevent falls in the open goaf, and it is further practically impossible to ventilate satisfactorily all the goaf-spaces under the system in operation prior to these explosions. A method is now being adopted of putting shoots through to the surface at frequent intervals for the purpose of freeing the upper goaf areas of inflammable gas. Such a method is applicable only during such time as outcrop workings are in progress, and at the most can only be said to be a temporary expedient. A form of working which permits of the filling of the goaf-space appears the most satisfactory solution of the problem. Although a practical solution of the difficulty, the introduction of such a method is connected with commercial questions which it is not the intention of the writers to discuss.

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Although the presence of coal was thus made known at a very early date in the commercial history of the Hokkaido, nothing was done until about 1874, when a Mr. B. S. Lyman, an American geologist in the service of the Imperial Government, visited the locality and made a report on its resources. About this time he also made a survey of the adjacent Poronai coalfields, discovered by a lumberer in 1868, and while in the locality reported that he had discovered coal in the Yubari district. Unfortunately, owing to the roughness of the Yubari district, Mr. Lyman's discovery of coal in 1876 received no practical attention, and it was not until 1888, when another coalseam was found in the same neighbourhood, that the matter was taken up, and what has proved to be the most valuable and extensive mine seriously exploited.

At that time little or nothing was known of coalfields other than those of the Ishikari district. Even today this district is the only one of any serious importance, and constitutes the centre of the coalmining industry, but investigation has gone to prove that coal also exists along the western slope of the central mountain range which cuts off the eastern from the western Hokkaido. Coal beds again have been found on the south-east coast. The presence of coal on both sides of the central mountain mass at one time was held to be indicative of connecting seams stretching across the island, but subsequent investigations show that the central Hokkaido has been denuded of its coal-bearing strata. This denudation has fortunately not extended very far, and the lateral slopes, particularly on the west, are said to contain considerable quantities of mineral. Estimates of the coal resources of the island have been made from time to time. Already, in a report made in 1891 by the engineer to the Hokkaido Administration, the quantity of coal contained in the fields examined up to date was estimated at 600,000,000 tons. It has since been discovered that that estimate was singularly low.

At present the development of these resources is, as already stated, chiefly confined to the Ishikari prefecture. There are numerous collieries here, both large and small, the most important of which are Sorachi, Poronai, Ikushunbetsu, Yubari No. 1, Yubari No. 2, Shinyubari bottoms of most of the shoots appeared to have been blown down, although it is somewhat difficult to accept this evidence in a seam dipping with an inclination of 45 degs. The maximum downward force appeared in the neighbourhood of shoot 76. The evidence of mud thickly plastered on the tubs and timbers appeared clearly indicative of the direction of force. Beyond shoot 100 on the main level there was no disturbance. It appeared quite clear that this explosion originated in the locality of shoot 74. At the top of this shoot, and extending for some distance, a large fall of roof had occurred. At this point it will be noted that there is also every opportunity for an accumulation of gas being present in this open goaf; and, given a source of ignition here, an explosion of firedamp would account for all the phenomena observed.

A public enquiry was held into the cause of this explosion in December 1910 and January 1911, and much evidence was adduced as to the cause of the disaster. For want of a more definite solution, the jury favoured the view of one mining engineer who suggested that the explosion was due to what he termed "his 'percussion' theory," a suggestion which can be dismissed at once, and which will not bear the most slender investigation.

There is no doubt that the explosion was caused by an ignition of firedamp, ignited by sparks emitted from the falling roof.

No. 3 Explosion.—After the explosion of December 9, 1910, a general strike occurred throughout the Crow's Nest Pass district, and the Bellevue Mine was not reopened. Somewhere about January 28, 1911, a further explosion occurred, which did much more damage than on either of the previous occasions. The exact date is somewhat uncertain, as the explosion was not actually observed.

An official inspection was made of part of the workings on January 25, and a new manager was appointed to the mine on January 28, a few days after which the effects of the third explosion were noticed. The fan had been standing since shortly after the explosion of December 9, 1910, but was set running from January 13 to 25, 1911, in order to prepare for the Government inspection. It was, however, stopped again after the inspection.

That a third explosion had occurred was observed first by a fireman going into the mine for some tools on January 30, when he encountered afterdamp. A subsequent examination revealed that the explosion had originated from the neighbourhood of rooms 89 and 90. At this point a heavy fall of roof had occurred, and the area was a very suitable one for gas to have accumulated during the period when the fan had been standing.

The mine remained untouched after this explosion for some months, owing to the strike, and the writers made a careful examination of the workings during August 1911. The magnitude of the explosion within a limited area was very manifest, and although it was difficult to distinguish the evidence of the explosion of December 9, 1910, from that of the later one, by a careful comparison of data and notes it was possible to differentiate between the two.

The No. 3 explosion emanated from about shoot 90, radiating in several directions, and causing considerable damage on the main level at the bottom of shoot 102. At this point 15 tubs, each approximately 2,000 lb. tare, and each carrying over 6,000 lb. of coal, were standing in the shunt. The first four tubs of the set were blown out-bye a distance of 40 ft., one being turned over on its side and another upended. Of the other 11, nearly all were off the rails, one turned upon end, one turned over on its side, and another with the side blown out. The writers instance this example to illustrate the extent of the force, which was certainly greater than in either of the previous explosions.

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DETAILS OF PUMPS IN USE AT THE SEVEN PRINCIPAL MINES (ISSUED BY THE MINING COMPANIES).

Mine.	Number of Pumps.	Type.	Steam Cylinder Diameter.	Plunger Diameter.	Motive Power.
			In.	In.	
Sorachi	3	Worthington..................	22	7	Steam
	1	"	16	8	"
	2	"	13	5	"
	1	Turbine	—	6	"
Poronai	2	Knowles' special duplex...	16	7	"
	1	Snow	9	4	Compressed air
	1	Dean	10	5	"
	1	Worthington	8	4	"
Yubari No. 1...	4	Evans' Cornish	18	12	"
	3	Knowles' special duplex...	16	7	"
	3	Dean sinking..............	24	10	Steam
	1	Worthington..........	16	8	"
	1	Sinking	10	5	"
	1	Turbine	—	12	"
Yuberi No. 2...	1	Worthington..............	16	8	"
Shinyubari ...	2	Evans'..................	20 - h. p.	5,100 gallons per hour	"

tation is employed in four cases in the Hokkaido, and is found to work very well.

Fortunately water in the mines is comparatively scarce, and as much of the mining is carried on above drainage level wherever possible the water collected is drained naturally out of the mines. Water below drainage level has to be pumped to the surface either by compressed air or steam power. When water is required to be pumped from a great depth the method is to construct receiving chambers at intervals of 200 ft. one above the other and to raise the water by stages to the surface by separate pumps placed at these intervals. The mines are well supplied with pumps in spite of the scarcity of water, but about one-third are spare.

The majority of the mines are exceedingly fiery, and special attention has to be paid to ventilation. The main source of ventilation is produced by large 18 ft. to 20 ft. Guibal fans, but the largest fan in use is a 35 ft. Waddle at Sorachi. These large fans are driven by steam. Auxiliary ventilation is obtained by Champion fans of from 4 to 8 feet in diameter, driven by direct-current motor or induction motor. The Champion ventilators can be used both for exhausting or for blowing without changing the revolutions of the shaft. This device is especially useful for changing the direction of the air current in the mine in case of accident. In addition to these fans there are also provided underground a good number of small Eisen Beis and 4 ft. Champion ventilators ready to be driven by compressed air in case of emergency. In the smaller collieries of the island ventilation is entirely natural.

As already mentioned in another paragraph, ventilation is regulated by partitions erected at intervals across the roadways. By this means the air currents are turned in the direction required, and even the most remote galleries are reached. These partitions, furnished with self-closing doors, also divide the mine into ventilation districts, thereby confining the damage in case of explosion.

Coal-dressing is done either by manual or mechanical labour, the latter being now the more common, and in the largest mines adopted practically throughout. When done by manual labour the coal is classified into two kinds, "lump" and "small"; then from the lump slates and dirts are picked out by women, while the small is usually washed in a primitive trough. However, as mentioned above, the mechanical method is now generally prevalent. On leaving the mine the coal trucks are led along to the screening sheds, where they are dumped directly over bar screens set ½ in. apart and placed at an inclination of 35 to 40 degrees. The coal which is too large to pass these bars is classified as "lump" and slides down to a platform, where the slate and dirt are picked out by women. This sorted coal is loaded direct on to trucks about 7 tons capacity. The coal which passes through the screens is treated in different ways at different mines. At some collieries it is made to fall into another set of screens ¼ in. mesh, and the small coal under this screen is washed in wooden troughs in the method explained above, while the middle-sized coal, over ¼ in. mesh, is washed by jiggers before being sent to the railway wagons. By this means the coal is classified into three sizes, "lump," "medium" (between ½ and ¼ inch mesh) and "small" (below ¼ in. mesh). At other mines the coal passing the ½ in. mesh of the first bar screens is treated by Elliot coal washers at once, without being rescreened by the ¼ in. mesh bar screens.

In some sheds the mine cars are dumped in the first instance over bar screens set 2½ in. apart. The lump is sorted by women, as previously described. The coal passing through the screens is raised by elevators to a trommel which is fitted with two kinds of mesh, 1 and ½ inch. This trommel thus classifies the coal into three kinds, lump, from 2½ to 1 inch; nuts, from 1 to ½ inch; and smalls, below ½ inch. The lumps are hand-picked by women, the nuts are washed in jiggers, and the smalls, which pass under the trommel, are washed either by the Elliot washers or in the wooden troughs.

In other mines Blake's breakers are in use. Coal for treatment by these breakers are inferior lumps selected by women from the lump coal which does not pass through the first bar screens. Such inferior lumps are broken by the breaker, the crushed matter being raised to a trommel, whence the lumps issuing are sorted, the nuts jigged and the smalls washed. These breakers are capable of treating lumps 15 by 9 inches, but are not in general use.

The main source of power is steam, which is generally employed for hauling, pumping, ventilating and screening purposes. In the more important mines it is used to generate electricity, and compress air in cases where these forms of power prove more suitable, namely, for working small pumps and fans, and underground work generally. At Yubari No. 1 compressed air is used to a considerable extent, chiefly for driving the compressed air locomotives employed for hauling, but also for mine drills, coal-cutters and other mining machines which are here used more extensively than elsewhere. Electricity is generally used for light work, such as driving small fans, lighting machinery and small hauling engines; but at Sorachi and Yubari No. 1 this power is used for working a heavy hauling engine, and at Sorachi also supplies electricity to locomotives employed for the same purpose.

Practically all the coal produced in the Hokkaido mines is consumed in Japan, finding its way for the most part to Yokohama, Muroran, Otaru, Aomori and Hakodate, where it is used for coaling purposes. The amount exported does not reach 100,000 tons, and is limited to the Yubari, Sorachi and Poronai mines. The chief ports of destination are Hong-Kong, Singapore, Vladivostok, San Francisco and Australian ports. The mineowners of the Hokkaido cannot congratulate themselves on these figures, for even regarding them in the light of the ratio borne by the export to the net output, the result is considerably below that of the export from the rest of Japan to its total production. For while the production of Japan is about 15,000,000 tons, the export is nearly 3,000,000 tons, or in the ratio of 5 to 1. The production of the Hokkaido is about 1,600,000 tons, and the export at the most 75,000 tons, or in the proportion of 160 to 7, or more than 20 to 1. The companies concerned profess to believe that the quantity exported will increase, and doubtless such will be the case, at least to an extent in proportion to the increasing development of the mineral resources, but whether there will be a marked increase of export as compared with total production it is difficult to foresee.

The price of the Hokkaido coal, of course, varies with the different mines, and also with the demands of the coal market. The companies are, moreover, always open to make special terms to meet different cases, and thus there is no definite rate to quote. Taking, however, the grand total of annual receipts for all sizes and qualities of coals produced and sold at the four leading mines, and comparing it with the gross number of tons sold per year, the following comparative table of average prices in yen per ton can be compiled :—

Year.	Yubari No. 1.	Yubari No. 1.	Sorachi.	Poronai.
	Yen.	Yen.	Yen.	Yen.
1906	6·906 ...	6·726 ..	6·061 ...	6·397
1907	6·348 ..	6·568 .	5·389 ...	5·792
1908	6·045 ...	5·984 ..	4·651 ...	5·174
1909	5·112 ...	4·535 ...	3·484 ...	4·163
1910	4·705 ...	4·651 ...	3·730 ...	4·365
Average ...	5·790* ...	5·480 ...	4·473 ...	5·188

* The average price in sterling works out at about 9s. 6d. to 11s. 6d. per ton.

As is to be expected, in view of the superior quality of Yubari No. 1 coal, the average annual price of that coal is practically always higher than that of the coal produced from the other mines. There is little difference in the price of Yubari No. 1 and Yubari No. 2 coal, but that of Sorachi is much cheaper. It will be seen that the tendency is for the price to decrease. This is accounted for principally by the introduction of mechanical labour-saving improvements, but also owing to the increasing competition in the island.

The position of the miner, his domestic, sanitary, medical and financial arrangements, are not without interest.

The following table shows the number of miners employed in the Hokkaido in 1910 as compared with the preceding year. The figures for 1910 show a very considerable decrease, which is perhaps to be expected, in view of the necessity for curtailing the output in face of the previous year's excessive production, and also because of the gradual adoption of mechanical appliances.

Year.	Men.	Women.	Children.	Total.
1909 ...	10,893 ...	1,574 ..	151 ...	12,618
1910	8,494	1,474 ..	56 ..	10,024

The reduction in the number of children is proportionately the greatest, being for 1910 about one-third of the number employed in 1909.

Women are employed both above and below ground as miscellaneous workers and carriers at three of the mines (Poronai, Ikushunbetsu and Yubari No. 1), and as coal dressers at all of them. The restriction of the female labour to these tasks is in contrast to the system prevailing in Kyushu and other parts of Japan, where women are employed in the usual coal-getting, the management maintaining that the best results are obtained from those galleries where the two sexes work side by side. The absence of the system in the Hokkaido is voluntary and is regarded by some as the forerunner of a general legal prohibition.

The Hokkaido miner seems strikingly cheap compared with rates in other countries, working out at about 1s. 9½d. (0·88 yen) per day. It should be borne in mind, however, that the cost of living in Japan is infinitely cheaper than that of any European country, a Japanese being able to subsist on a few sen per day expended on rice. Indeed, the rate paid in the Hokkaido is high when compared with that which is usually paid in other parts of Japan. The average for Japan is 0·72 yen (1s. 5½d.), or 4d. per day less than that paid in the Hokkaido. In the preceding year (1909) the difference in the wages paid to miners in the Hokkaido and the rest of Japan was even greater, the Hokkaido miner receiving on an average 1·03 yen as against 0·75 yen for the rest of Japan, or as much as 6¼d. per day more than the rate elsewhere. The reason for the present high rate of wages in the Hokkaido is due to the fact that labour is scarce in this newly-developed island, but as immigration and development increase, the supply of labour will become easier and wages correspondingly drop. That this will be the case is already foreshadowed by the decrease in average wages to be noted in 1910 in practically every occupation connected with the mining industry.

The following shows the daily average wages, in yen, of persons employed at the seven principal coalmines in 1910:—Miners, 0·88; timbermen, 1·05. Dressers.—Men, 0·43; women, 0·24; children, 0·19. Carriers.—Men, 0·65; women, 0·35. Carpenters, 0·62. Mechanics.—Men, 0·48; children, 0·15. Others.—Men, 0·45; women, 0·25; children, 0·22.

The usual procedure adopted by persons or companies wishing to commence mining operations is to apply to the authorities for a licence to mine experimentally. Having obtained this permission they can set to work on the area specified in the licence. Licences are charged a fee of 40 sen per 1,000 tsubo (4 sen equal 1d. and 1 tsubo equals 3·593 square yards) and are good for two years from the date of issue, and though they cannot exceed this limit they may be surrendered at any time in the event of unfavourable results. If during this period, however, there are prospects of a successful enterprise the experimental licence can be changed for one of regular mining, the tax for which is 40 sen per 1,000 tsubo. When production has commenced a supertax of 1 per cent. is levied thereon. Armed with a licence either for experimental or regular mining the holder can override all objections to prospecting which the owner of the land may raise, though the latter is entitled to compensation for loss incurred. In 1908 216,227,200 out of a total of 362,071,848 tsubo were prospected for coal alone, a figure which is indicative of the interest taken by prospectors in the coal-yielding possibilities of the island at that time.

The coke plant of Oiwake is of interest as being connected with the coalmines of the island. Oiwake

DETAILS OF PUMPS IN USE AT THE SEVEN PRINCIPAL MINES (ISSUED BY THE MINING COMPANIES).

Mine.	Number of Pumps.	Type.	Steam Cylinder Diameter.	Plunger Diameter.	Motive. Power.
			In.	In.	
Sorachi	3	Worthington	22	7	Steam
	1	"	16	6	"
	2	"	13	5	"
	1	Turbine	—	6	"
Poronai	2	Knowles' special duplex...	16	7	"
	1	Snow	9	4	Compressed air
	1	Dean	10	5	"
	1	Worthington	8	4	"
Yubari No. 1...	4	Evans' Cornish	18	12	"
	3	Knowles' special duplex...	16	7	"
	3	Dean sinking...............	24	10	Steam
	1	Worthington..........	16	8	"
	1	Sinking	10	5	"
	1	Turbine	—	12	"
Yubari No. 2...	1	Worthington...............	16	8	"
Shinyubari ...	2	Evans'..................	20 - h. p., gallons per	5,100 hour	"

tation is employed in four cases in the Hokkaido, and is found to work very well.

Fortunately water in the mines is comparatively scarce, and as much of the mining is carried on above drainage level wherever possible the water collected is drained naturally out of the mines. Water below drainage level has to be pumped to the surface either by compressed air or steam power. When water is required to be pumped from a great depth the method is to construct receiving chambers at intervals of 200 ft. one above the other and to raise the water by stages to the surface by separate pumps placed at these intervals. The mines are well supplied with pumps in spite of the scarcity of water, but about one-third are spare.

The majority of the mines are exceedingly fiery, and special attention has to be paid to ventilation. The main source of ventilation is produced by large 18 ft. to 20 ft. Guibal fans, but the largest fan in use is a 35 ft. Waddle at Sorachi. These large fans are driven by steam. Auxiliary ventilation is obtained by Champion fans of from 4 to 8 feet in diameter, driven by direct-current motor or induction motor. The Champion ventilators can be used both for exhausting or for blowing without changing the revolutions of the shaft. This device is especially useful for changing the direction of the air current in the mine in case of accident. In addition to these fans there are also provided underground a good number of small Eisen Beis and 4 ft. Champion ventilators ready to be driven by compressed air in case of emergency. In the smaller collieries of the island ventilation is entirely natural.

As already mentioned in another paragraph, ventilation is regulated by partitions erected at intervals across the roadways. By this means the air currents are turned in the direction required, and even the most remote galleries are reached. These partitions, furnished with self-closing doors, also divide the mine into ventilation districts, thereby confining the damage in case of explosion.

Coal-dressing is done either by manual or mechanical labour, the latter being now the more common, and in the largest mines adopted practically throughout. When done by manual labour the coal is classified into two kinds, "lump" and "small"; then from the lump slates and dirts are picked out by women, while the small is usually washed in a primitive trough. However, as mentioned above, the mechanical method is now generally prevalent. On leaving the mine the coal trucks are led along to the screening sheds, where they are dumped directly over bar screens set ½ in. apart and placed at an inclination of 35 to 40 degrees. The coal which is too large to pass these bars is classified as "lump" and slides down to a platform, where the slate and dirt are picked out by women. This sorted coal is loaded direct on to trucks about 7 tons capacity. The coal which passes through the screens is treated in different ways at different mines. At some collieries it is made to fall into another set of screens ¼ in. mesh, and the small coal under this screen is washed in wooden troughs in the method explained above, while the middle-sized coal, over ¼ in. mesh, is washed by jiggers before being sent to the railway wagons. By this means the coal is classified into three sizes, "lump," "medium" (between ½ and ¼ inch mesh) and "small" (below ¼ in. mesh). At other mines the coal passing the ½ in. mesh of the first bar screens is treated by Elliot coal washers at once, without being rescreened by the ¼ in. mesh bar screens.

In some sheds the mine cars are dumped in the first instance over bar screens set 2½ in. apart. The lump is sorted by women, as previously described. The coal passing through the screens is raised by elevators to a trommel which is fitted with two kinds of mesh, 1 and ½ inch. This trommel thus classifies the coal into three kinds, lump, from 2½ to 1 inch; nuts, from 1 to ½ inch; and smalls, below ½ inch. The lumps are hand-picked by women, the nuts are washed in jiggers, and the smalls, which pass under the trommel, are washed either by the Elliot washers or in the wooden troughs.

In other mines Blake's breakers are in use. Coal for treatment by these breakers are inferior lumps selected by women from the lump coal which does not pass through the first bar screens. Such inferior lumps are broken by the breaker, the crushed matter being raised to a trommel, whence the lumps issuing are sorted, the nuts jigged and the smalls washed. These breakers are capable of treating lumps 15 by 9 inches, but are not in general use.

The main source of power is steam, which is generally employed for hauling, pumping, ventilating and screening purposes. In the more important mines it is used to generate electricity, and compress air in cases where these forms of power prove more suitable, namely, for working small pumps and fans, and underground work generally. At Yubari No. 1 compressed air is used to a considerable extent, chiefly for driving the compressed air locomotives employed for hauling, but also for mine drills, coal-cutters and other mining machines which are here used more extensively than elsewhere. Electricity is generally used for light work, such as driving small fans, lighting machinery and small hauling engines; but at Sorachi and Yubari No. 1 this power is used for working a heavy hauling engine, and at Sorachi also supplies electricity to locomotives employed for the same purpose.

Practically all the coal produced in the Hokkaido mines is consumed in Japan, finding its way for the most part to Yokohama, Muroran, Otaru, Aomori and Hakodate, where it is used for coaling purposes. The amount exported does not reach 100,000 tons, and is limited to the Yubari, Sorachi and Poronai mines. The chief ports of destination are Hong-Kong, Singapore, Vladivostok, San Francisco and Australian ports. The mineowners of the Hokkaido cannot congratulate themselves on these figures, for even regarding them in the light of the ratio borne by the export to the net output, the result is considerably below that of the export from the rest of Japan to its total production. For while the production of Japan is about 15,000,000 tons, the export is nearly 3,000,000 tons, or in the ratio of 5 to 1. The production of the Hokkaido is about 1,600,000 tons, and the export at the most 75,000 tons, or in the proportion of 160 to 7, or more than 20 to 1. The companies concerned profess to believe that the quantity exported will increase, and doubtless such will be the case, at least to an extent in proportion to the increasing development of the mineral resources, but whether there will be a marked increase of export as compared with total production it is difficult to foresee.

The price of the Hokkaido coal, of course, varies with the different mines, and also with the demands of the coal market. The companies are, moreover, always open to make special terms to meet different cases, and thus there is no definite rate to quote. Taking, however, the grand total of annual receipts for all sizes and qualities of coals produced and sold at the four leading mines, and comparing it with the gross number of tons sold per year, the following comparative table of average prices in yen per ton can be compiled:—

Year.	Yubari No. 1.	Yubari No. 1.	Sorachi.	Poronai.
	Yen.	Yen.	Yen.	Yen.
1906	6·906	6·728	6·064	6·397
1907	6·346	6·568	5·389	5·792
1908	6·045	5·984	4·654	5·174
1909	5·112	4·535	3·484	4·463
1910	4·705	4·654	3·730	4·365
Average ...	5·790*	5·480	4·473	5·188

* The average price in sterling works out at about 9s. 6d. to 11s. 6d. per ton.

As is to be expected, in view of the superior quality of Yubari No. 1 coal, the average annual price of that coal is practically always higher than that of the coal produced from the other mines. There is little difference in the price of Yubari No. 1 and Yubari No. 2 coal, but that of Sorachi is much cheaper. It will be seen that the tendency is for the price to decrease. This is accounted for principally by the introduction of mechanical labour-saving improvements, but also owing to the increasing competition in the island.

The position of the miner, his domestic, sanitary, medical and financial arrangements, are not without interest.

The following table shows the number of miners employed in the Hokkaido in 1910 as compared with the preceding year. The figures for 1910 show a very considerable decrease, which is perhaps to be expected, in view of the necessity for curtailing the output in face of the previous year's excessive production, and also because of the gradual adoption of mechanical appliances.

Year.	Men.	Women.	Children.	Total.
1909 ...	10,893	1,574	161	12,618
1910	8,494	1,474	56	10,024

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THE COAL AND IRON TRADES.

Thursday, September 12.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 126,856 tons of coal and 1,833 tons of coke were despatched from Tyne Dock, a decrease of 9,028 tons of coal and 967 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 72,892 tons of coal and 2,603 tons of coke, an increase of 4,652 tons of coal and a decrease of 473 tons of coke. The Blyth shipments totalled 106,818 tons of coal and coke, an increase of 13,711 tons. Advices from Denmark are to the effect that the Danish State Railways' requirements of 120,000 tons of steam coal over the winter months are likely to be drawn largely from Westphalia. Local tenders of best Blyth steams are stated to have been based on about 19s. 5d. per ton, c.i.f. Korsoer, or about 4½d. per ton more than the German tenders. Derbyshire coal was tendered at about 20s. 5d., c.i.f., and Welsh smokeless at from 23s. 6d. to 24s., c.i.f. Copenhagen. The Syndicate's tenders are said to have been only 5d. or 6d. per ton more for coals and 9d. per ton more for briquettes than the figures of the tender now running. (It is interesting to note that Silesian coal is said to have been offered, for the first time, at the same price as the Westphalian product.) The 90,000 tons of coals required for the locomotive department are, under the circumstances, almost certain to be taken from Westphalia, although it is hoped that Northumberland will get a share of the order for 30,000 tons of steams for the marine department, the balance being likely to go to Derbyshire and Scotland. The following important coal sales are reported this week:—9,000 tons first-class Durham gas coal, for delivery up to next June to the Stavanger gasworks, at about 12s. 9d. per ton, f.o.b.; 100,000 tons good gas seconds, for shipment to Italy over next year, at 11s. 9d., f.o.b.; 15,000 tons best Tyne bunkers, for similar delivery, at 12s. 6d.; 150,000 tons Durham bunkers, for shipment over 1913, at 12s.; 15,000 tons ordinary Durham bunkers, for like delivery, at 12s.; 100,000 tons Durham unscreened coking coal, for the Elba Works Authority, delivery over next year, at from 12s. 9d. to 13s.; a contract secured by a Newcastle-Cardiff firm; contracts aggregating 200,000 tons of good Durham unscreened coking coals and smalls, for similar shipment, at from 12s. to 12s. 6d.; and best Blyth steams, for 1913 delivery, at from 12s. 6d. to 12s. 9d., sold by second-hand holders. The Chilian State Railways order for 30,000 tons of steams is believed to have gone to Australia, as has become customary of recent years. The order to supply the west coast of South America with two cargoes—about 5,000 tons—of coke has gone to Westphalia, owing to the highness of local prices, but another enquiry—this time for 6,000 tons—is now in circulation. A second small consignment of German coke has arrived at Middlesbrough from Rotterdam for blastfurnace use. Several of the large north-country steelworks are stated to be enquiring for large supplies of coal over the ensuing year, evidently believing the present to be an opportune time to make their purchases, in view of the activity of the iron and steel trades. More bunker coal business for next year is stated to be in negotiation at about 12s. 6d. f.o.b. for good ordinary brands. The Swedish State Railways invite immediate offers of 50,000 tons of best Newcastle steams for delivery over the remainder of the year. The Gothenburg Gasworks are inviting prompt offers of 26,000 tons of best Durham gas coal for delivery over 12 months. The prompt coal market has been very much hampered during the past week by lack of tonnage, a position accentuated by strong westerly gales, which have delayed vessels. Nevertheless, the forward market is so good that exceedingly little impression has been made on prompt prices. F.o.b. quotations for prompt shipment are as follow (no change save where otherwise mentioned):—Best steams, Blyths (D.C.B.), 13s. 9d. to 14s. per ton; Tynes (Bowers, &c.), 13s. 3d. to 13s. 6d., easier; seconds, Blyths, 12s. to 12s. 3d.; Tynes (Hastings or West Hartleys), 12s. 6d., firmer; unscreened, 11s. to 11s. 6d.; smalls, Blyths, 9s. 3d., in seller's favour; Tynes, 8s. 6d. to 8s. 9d., 3d. advanced; specials, 10s.; smithies, 12s. 3d. to 12s. 6d.; gas bests (New Pelton or Holmside), 12s. 9d.; seconds (Pelaw Main or similar), 12s. to 12s. 6d.; specials, 13s.; unscreened bunkers, Durhams, 12s. to 12s. 9d., 3d. increased; Northumbrians, 11s. to 11s. 6d.; coking coal, 12s. to 12s. 6d.; smalls, 12s., stronger; households, 14s. 6d.; coke, foundry, 23s. to 24s.; blastfurnace, 21s.; and gas coke, 21s.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 100,330 tons of coal and 160 tons of coke, as compared with 105,235 tons of coal and 215 tons of coke for the corresponding period of 1911, being a decrease of 4,905 tons of coal and 55 tons of coke. The coal trade is steady with a good all-round enquiry, but business is still restricted owing to the tonnage difficulty and the still higher freights. There is an increased demand for gas coals. The bunker coal trade is also rather more active. Coking coal is steady. Household coals are on the quiet side. The coke market is very firm, and a strong enquiry continues for smelting purposes, both for local account and also for delivery inland. General quotations are:—Foundry 23s. to 24s. per ton f.o.b., good Durham furnace coke is from 22s. 6d. to 23s. 6d. per ton at the Teesside furnaces, for export gas coke is in good demand, and the price is well maintained at 21s. 6d. per ton. It is reported that 100,000 tons of Durham unscreened coking coal has been sold for delivery over next year to Porto Ferrajo at prices ranging from 12s. 9d. to 13s. f.o.b.; it is also said that another parcel of ordinary Durham bunker coals has been sold over next year at 12s. per ton f.o.b., the quantity is about 15,000 tons. The Gothenburg Gasworks are inviting tenders for 26,000 tons of Durham gas coal, to be shipped over the next twelve months. Current prices are as follow:—Special Wear gas, 13s. 6d.; best gas, 12s. 9d. to 13s.; seconds, 12s. to 12s. 6d.; coking unscreened, 12s. 6d. to 13s.; smalls, 12s.; smithies, 12s. 6d. to 13s. 6d.; peas and nuts, 14s. to 15s.; household ordinaries, 14s.; bests, 15s. Bunker quotations are:—Morrison's Hartley Marley Hill, 12s. 6d.; Priestman's, Consett, Burnhope, 12s. 3d.; Pease's, South Derwent, Framwellgate, 12s.; South Hetton, 12s. 6d.; Ryhope, 12s. 9d.—all f.o.b. South Dock. The outward freight market continues exceedingly firm, and rates are higher. To the Mediterranean 13s. 6d. has been paid to Genoa, Porto Vecchio 14s., and Port Said 13s.; the Bay has responded by paying 8s. for St. Nazaire, 7s. 3d. Bordeaux, and 12s. 6d. Oporto, and the Baltic is correspondingly strong at 7s. Cronstadt, 7s. 3d. Stockholm, and 8s. Helsingfors. Coasting is also better, with London at 4s. 6d., Hamburg 5s. The Plate has also chartered at 23s. for Buenos Ayres.

Middlesbrough-on-Tees.

COAL.

The fuel trade is steady and firm, with a good business passing. As is usual at this season of the year, demand for gas coal is increasing. Up to 13s. f.o.b. is quoted for best Durham kinds, and second-class gas coal ranges from 12s. 3d. to 12s. 6d. There is more activity in bunker coal, and unscreened Durhams of the usual classes run from 12s. 3d. to 12s. 9d. f.o.b., whilst for special kinds up to as much as 14s. is named. Household coal is very quiet. For ordinary Durham household 14s. is the price, with best kinds at 15s. There is a continued good demand for coking coal. Coking unscreened run from 12s. 3d. to 12s. 9d., and smalls range from 12s. to 13s. A large quantity of coke is being taken up, both for home consumption and for shipment, and prices are advancing. Local requirements are heavy, and as a rule 23s. is now asked for average blastfurnace kinds delivered at Teesside works. Foundry coke for shipment is fully 24s. f.o.b., and some sellers ask up to as much as 25s. Gas coke is in fair demand for export, and the price is well maintained, though the production is now steadily increasing.

IRON.

Excellent accounts are given of all branches of the iron and steel trade. Works are going at full pressure, and notwithstanding this the output is inadequate. Pig iron is very flourishing, and Cleveland pig is selling at higher rates than have been obtained since October 1900. The price of No. 3 g.m.b. Cleveland is now fully 66s. 6d. f.o.b. That figure has been paid rather freely. It is some 16s. above the price of the ruling quality at the beginning of the year, and 17s. above the lowest price of the year. No. 1 is now strong at 71s. 6d.; and the other qualities are very stiff. No. 4 foundry is 66s. 3d.; No. 4 forge 66s. 1½d.; and mottled and white irons each 65s. 9d. All the foregoing quotations are for early delivery, fully 6d. higher being asked on forward account. The anticipated upward movement in east coast hæmatite pig has set in. Very good enquiries are reported, and 77s. is now generally quoted for mixed numbers. Sales have occurred at that price for delivery over a period, commencing with prompt delivery. Spring business is reported to have been done at 78s. There is nothing passing in foreign ore, but sellers take a very firm stand, and will not now base market rates on anything below 23s. ex-ship Tees for rubio of 50 per cent. quality. Freights Bilbao-Middlesbrough were very stiff at 7s. 3d. Many manufactured iron and steel producers are so busily employed and have such large contracts made that they are not seeking further orders at present, especially as prices are likely to rise. Quotations all round tend upward, but the only actual change reported is an advance of 10s. in railway chairs. Principal market quotations stand: Common iron bars, £8 5s.; best bars, £8 12s. 6d.; best best bars, £9; iron ship plates £7 15s. to £8; iron ship angles, £8 5s.; iron ship rivets, £9 10s.; steel bars (basic), £7 15s.; steel bars (Siemens), £8 5s.; steel ship plates, £8; steel ship angles, £7 7s. 6d.; steel strip, £7 12s. 6d.; steel hoops, £7 15s.; steel joists, £7 2s. 6d. to £7 5s.; cast iron railway chairs, £4 7s. 6d.; light iron rails, £6 15s.; heavy steel rails, £6 10s.; steel railway sleepers, £7; and galvanised corrugated sheets, £12 10s.—sheets less 4 per cent. f.o.b., railway material net, and all other descriptions less 2½ per cent. discount.

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South-West Lancashire.

COAL.

There is still a very heavy demand for supplies in the inland household trade, and colliery proprietors are in the position of having a large number of unexecuted orders on their books. In consequence of this there is no shading at all of prices, which are firm at list rates. Forges and manufactories still continue to take full supplies of screened coal. Shipments of bunker coal on contract account are well maintained, though the requirements for excursion steamers are now easing down, and there is not over much outside enquiry. Owing to the good inland demand the available supplies for shipment are somewhat restricted, and there is not much coal to spare. Quotations for screened Lancashire steam coals range from about 11s. 9d. f.o.b. for cheaper grades to 13s. f.o.b. for the best qualities. Shipments for the coastwise and cross-Channel trade are still heavy, although mainly on contract account, but for what is offered outside contract prices are very firm at the following rates:—Best coal, 15s. 6d.; good seconds, 14s. to 14s. 3d. net f.o.b. There is no change to report in slacks, prices still being firm at the rates previously quoted, and which are 9s. 9d. to 10s. for best rough slacks, 9s. to 9s. 3d. for good medium qualities, and 8s. 6d. or thereabouts for the commoner and finer grades, all into wagons at the pit.

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South Lancashire and Cheshire.

COAL.

The Manchester Coal Exchange was well attended on Tuesday, and business generally is brisk. The demand for house coal is heavier than usual at this time of the year, and prices are very firm at late rates; 16s. to 16s. 9d. for best house coal, with good medium qualities 14s. 6d. to 15s. 6d., and kitchen qualities 11s. 9d. to 12s. 9d.—all at the pit. Furnace coal continues to meet with steady enquiry, the price being about 12s. 6d. per ton at the pit, and shipping coal is also brisk at about 12s. to 14s. f.o.b. Partington. Slack moves away actively and prices are strong, at about 9s. to 9s. 9d. for best, with seconds at 8s. to 8s. 6d., into wagons at the pit.

IRON.

The price of pig iron keeps advancing; good No. 3 foundry iron cannot be found under 69s. to 70s., with Middlesbrough brands 74s. 4d. Finished iron makers are absolutely full of work, with iron bars at £8 10s., second quality £8, sheets £9 to £9 5s., hoops £8 12s. 6d. Steelworks are also full of work, and are now asking £6 2s. 6d. for billets, with £8 to £8 5s. for bars, steel hoops £8 7s. 6d. Plate makers are very busy, with boiler plates £9 5s., ordinary plates £8 5s. Foreign bars are still being offered in Manchester at considerably under the English prices. Engineers are busier; in fact, the whole district is now full of work.

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Yorkshire and Derbyshire.

Leeds.

COAL.

Buyers were in the majority on Tuesday's market, and the business done was only limited by the scarcity of prompt supplies. Very few of the local collieries had anything to offer, as all descriptions of coal are sold fairly well forward. The output has been below the average this week, some of the pits suspending work on Wednesday owing to Doncaster races, and others having to work broken time through scarcity of empty wagons. The demand for house coal has kept up very well, some of the collieries being fully sold to the end of September. The tonnage sent to London by rail has again been heavy, although reports indicate some falling off in the retail trade at the depots. It is said that the demand from the eastern and southern counties is exceptionally brisk. All pit prices are firm, and may be averaged as follow:—Haigh Moor selected, 14s. to 14s. 6d.; Wallsend and London best, 13s. to 13s. 6d.; Silkstone best, 13s. to 13s. 6d.; (special qualities, 13s. 6d. to 14s.); Silkstone house, 12s. 6d. to 13s.; house nuts, 11s. 6d. to 12s. The coastwise demand is now very full, the medium-priced Silkstone house coal being chiefly in request. For fairly prompt shipment at Hull the following f.o.b. prices are quoted:—Haigh Moor best, 16s. 6d. to 17s.; Silkstone best, 15s. 6d. to 16s. 3d.; Silkstone house, 14s. 6d. to 15s.; house nuts, 13s. to 13s. 6d. Merchants in Leeds, Bradford, and other West Riding centres are fully employed, the better-class houses buying freely to stock. Best qualities are somewhat scarce, and at some of the depots ground stocks have had to be broken into to meet the demand from the public. For the local markets the following pit prices are firmly quoted:—Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. 6d. to 16s.; Silkstone house, 14s. 6d. to 15s. 6d.; ordinary house coal, 14s. to 15s.; secondary sorts (cobbles, house nuts, &c.), 12s. to 13s. 6d. In manufacturing fuel the position is exceptionally strong. The supply of engine nuts and slacks is barely adequate to meet the needs of the market, and manufacturers are showing increasing willingness to buy forward. For current sales pit prices average as under:—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small engine nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slacks, 8s. to 9s.; small slacks, 7s. to 7s. 6d.; coking smalls, 6s. 9d. to 7s. 3d. Washed furnace coke is scarce and dear, and there is very little offering in the open market. Current quotations range from 16s. to 17s. per ton at the ovens according to quality and promptness of supply. There are no stocks, although the output is rather heavier than it was in July. The gas coal pits are now busy supplying coal under the new

THE COAL AND IRON TRADES.

Thursday, September 12.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 126,856 tons of coal and 1,833 tons of coke were despatched from Tyne Dock, a decrease of 9,028 tons of coal and 967 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 72,802 tons of coal and 2,603 tons of coke, an increase of 4,652 tons of coal and a decrease of 473 tons of coke. The Blyth shipments totalled 106,818 tons of coal and coke, an increase of 13,711 tons. Advices from Denmark are to the effect that the Danish State Railways' requirements of 120,000 tons of steam coal over the winter months are likely to be drawn largely from Westphalia. Local tenders of best Blyth steams are stated to have been based on about 19s. 5d. per ton, c.i.f. Korsoer, or about 4½d. per ton more than the German tenders. Derbyshire coal was tendered at about 20s. 5d., c.i.f., and Welsh smokeless at from 23s. 6d. to 24s., c.i.f. Copenhagen. The Syndicate's tenders are said to have been only 5d. or 6d. per ton more for coals and 9d. per ton more for briquettes than the figures of the tender now running. (It is interesting to note that Silesian coal is said to have been offered, for the first time, at the same price as the Westphalian product.) The 90,000 tons of coals required for the locomotive department are, under the circumstances, almost certain to be taken from Westphalia, although it is hoped that Northumberland will get a share of the order for 30,000 tons of steams for the marine department, the balance being likely to go to Derbyshire and Scotland. The following important coal sales are reported this week:—9,000 tons first-class Durham gas coal, for delivery up to next June to the Stavanger gasworks, at about 12s. 9d. per ton, f.o.b.; 100,000 tons good gas seconds, for shipment to Italy over next year, at 11s. 9d., f.o.b.; 15,000 tons best Tyne bunkers, for similar delivery, at 12s. 6d.; 150,000 tons Durham bunkers, for shipment over 1913, at 12s.; 15,000 tons ordinary Durham bunkers, for like delivery, at 12s.; 100,000 tons Durham unscreened coking coal, for the Elba Works Authority, delivery over next year, at from 12s. 9d. to 13s.; a contract secured by a Newcastle-Cardiff firm; contracts aggregating 200,000 tons of good Durham unscreened coking coals and smalls, for similar shipment, at from 12s. to 12s. 6d.; and best Blyth steams, for 1913 delivery, at from 12s. 6d. to 12s. 9d., sold by second-hand holders. The Chilian State Railways order for 30,000 tons of steams is believed to have gone to Australia, as has become customary of recent years. The order to supply the west coast of South America with two cargoes—about 5,000 tons—of coke has gone to Westphalia, owing to the highness of local prices, but another enquiry—this time for 6,000 tons—is now in circulation. A second small consignment of German coke has arrived at Middlesbrough from Rotterdam for blastfurnace use. Several of the large north-country steelworks are stated to be enquiring for large supplies of coal over the ensuing year, evidently believing the present to be an opportune time to make their purchases, in view of the activity of the iron and steel trades. More bunker coal business for next year is stated to be in negotiation at about 12s. 6d. f.o.b. for good ordinary brands. The Swedish State Railways invite immediate offers of 50,000 tons of best Newcastle steams for delivery over the remainder of the year. The Gothenburg Gasworks are inviting prompt offers of 26,000 tons of best Durham gas coal for delivery over 12 months. The prompt coal market has been very much hampered during the past week by lack of tonnage, a position accentuated by strong westerly gales, which have delayed vessels. Nevertheless, the forward market is so good that exceedingly little impression has been made on prompt prices. F.o.b. quotations for prompt shipment are as follow (no change save where otherwise mentioned):—Best steams, Blyths (D.C.B.), 13s. 9d. to 14s. per ton; Tynes (Bowers, &c.), 13s. 3d. to 13s. 6d., easier; seconds, Blyths, 12s. to 12s. 3d.; Tynes (Hastings or West Hartleys), 12s. 6d., firmer; unscreened, 11s. to 11s. 6d.; smalls, Blyths, 9s. 3d., in seller's favour; Tynes, 8s. 6d. to 8s. 9d., 3d. advanced; specials, 10s.; smithies, 12s. 3d. to 12s. 6d.; gas bests (New Pelton or Holmside), 12s. 9d.; seconds (Pelaw Main or similar), 12s. to 12s. 6d.; specials, 13s.; unscreened bunkers, Durhams, 12s. to 12s. 9d., 3d. increased; Northumbrians, 11s. to 11s. 6d.; coking coal, 12s. to 12s. 6d.; smalls, 12s., stronger; households, 14s. 6d.; coke, foundry, 23s. to 24s.; blastfurnace, 21s.; and gas coke, 21s.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 100,330 tons of coal and 160 tons of coke, as compared with 105,235 tons of coal and 215 tons of coke for the corresponding period of 1911, being a decrease of 4,905 tons of coal and 55 tons of coke. The coal trade is steady with a good all-round enquiry, but business is still restricted, owing to the tonnage difficulty and the still higher freights. There is an increased demand for gas coals. The bunker coal trade is also rather more active. Coking coal is steady. Household coals are on the quiet side. The coke market is very firm, and a strong enquiry continues for smelting purposes, both for local account and also for delivery inland. General quotations are:—Foundry 23s. to 24s. per ton f.o.b., good Durham furnace coke is from 22s. 6d. to 23s. 6d. per ton at the Teesside furnaces, for export gas coke is in good demand, and the price is well maintained at 21s. 6d. per ton. It is reported that 100,000 tons of Durham unscreened coking coal has been sold for delivery over next year to Porto Ferrajo at prices ranging from 12s. 9d. to 13s. f.o.b.; it is also said that another parcel of ordinary Durham bunker coals has been sold over next year at 12s. per ton f.o.b., the quantity is about 15,000 tons. The Gothenberg Gasworks are inviting tenders for 26,000 tons of Durham gas coal, to be shipped over the next twelve months. Current prices are as follow:—Special Wear gas, 13s. 6d.; best gas, 12s. 9d. to 13s.; seconds, 12s. to 12s. 6d.; coking unscreened, 12s. 6d. to 13s.; smalls, 12s.; smithies, 12s. 6d. to 13s. 6d.; peas and nuts, 14s. to 15s.; household ordinaries, 14s.; bests, 15s. Bunker quotations are:—Morrison's Hartley Marley Hill, 12s. 6d.; Priestman's, Consett, Burnhope, 12s. 3d.; Pease's, South Derwent, Framwellgate, 12s.; South Hetton, 12s. 6d.; Ryhope, 12s. 9d.—all f.o.b. South Dock. The outward freight market continues exceedingly firm, and rates are higher. To the Mediterranean 13s. 6d. has been paid to Genoa, Porto Vecchio 14s., and Port Said 13s.; the Bay has responded by paying 8s. for St. Nazaire, 7s. 3d. Bordeaux, and 12s. 6d. Oporto, and the Baltic is correspondingly strong at 7s. Cronstadt, 7s. 3d. Stockholm, and 8s. Helsingfors. Coasting is also better, with London at 4s. 6d., Hamburg 5s. The Plate has also chartered at 23s. for Buenos Ayres.

Middlesbrough-on-Tees.

COAL.

The fuel trade is steady and firm, with a good business passing. As is usual at this season of the year, demand for gas coal is increasing. Up to 13s. f.o.b. is quoted for best Durham kinds, and second-class gas coal ranges from 12s. 3d. to 12s. 6d. There is more activity in bunker coal, and unscreened Durhams of the usual classes run from 12s. 3d. to 12s. 9d. f.o.b., whilst for special kinds up to as much as 14s. is named. Household coal is very quiet. For ordinary Durham household 14s. is the price, with best kinds at 15s. There is a continued good demand for coking coal. Coking unscreened run from 12s. 3d. to 12s. 9d., and smalls range from 12s. to 13s. A large quantity of coke is being taken up, both for home consumption and for shipment, and prices are advancing. Local requirements are heavy, and as a rule 23s. is now asked for average blastfurnace kinds delivered at Teesside works. Foundry coke for shipment is fully 24s. f.o.b., and some sellers ask up to as much as 25s. Gas coke is in fair demand for export, and the price is well maintained, though the production is now steadily increasing.

IRON.

Excellent accounts are given of all branches of the iron and steel trade. Works are going at full pressure, and notwithstanding this the output is inadequate. Pig iron is very flourishing, and Cleveland pig is selling at higher rates than have been obtained since October 1900. The price of No. 3 g.m.b. Cleveland is now fully 66s. 6d. f.o.b. That figure has been paid rather freely. It is some 16s. above the price of the ruling quality at the beginning of the year, and 17s. above the lowest price of the year. No. 1 is now strong at 71s. 6d.; and the other qualities are very stiff. No. 4 foundry is 66s. 3d.; No. 4 forge 66s. 1½d.; and mottled and white irons each 65s. 9d. All the foregoing quotations are for early delivery, fully 6d. higher being asked on forward account. The anticipated upward movement in east coast hæmatite pig has set in. Very good enquiries are reported, and 77s. is now generally quoted for mixed numbers. Sales have occurred at that price for delivery over a period, commencing with prompt delivery. Spring business is reported to have been done at 78s. There is nothing passing in foreign ore, but sellers take a very firm stand, and will not now base market rates on anything below 23s. ex-ship Tees for rubio of 50 per cent. quality. Freights Bilbao-Middlesbrough were very stiff at 7s. 3d. Many manufactured iron and steel producers are so busily employed and have such large contracts made that they are not seeking further orders at present, especially as prices are likely to rise. Quotations all round tend upward, but the only actual change reported is an advance of 10s. in railway chairs. Principal market quotations stand: Common iron bars. £8 5s.; best bars, £8 12s. 6d.; best best bars, £9; iron ship plates £7 15s. to £8; iron ship angles, £8 5s.; iron ship rivets, £9 10s.; steel bars (basic), £7 15s.; steel bars (Siemens), £8 5s.; steel ship plates, £8; steel ship angles, £7 7s. 6d.; steel strip, £7 12s. 6d.; steel hoops, £7 15s.; steel joists, £7 2s. 6d. to £7 5s.; cast iron railway chairs, £4 7s. 6d.; light iron rails, £6 15s.; heavy steel rails, £6 10s.; steel railway sleepers, £7; and galvanised corrugated sheets, £12 10s.—sheets less 4 per cent. f.o.b., railway material net, and all other descriptions less 2½ per cent. discount.

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South-West Lancashire.

COAL.

There is still a very heavy demand for supplies in the inland household trade, and colliery proprietors are in the position of having a large number of unexecuted orders on their books. In consequence of this there is no shading at all of prices, which are firm at list rates. Forges and manufactories still continue to take full supplies of screened coal. Shipments of bunker coal on contract account are well maintained, though the requirements for excursion steamers are now easing down, and there is not over much outside enquiry. Owing to the good inland demand the available supplies for shipment are somewhat restricted, and there is not much coal to spare. Quotations for screened Lancashire steam coals range from about 11s. 9d. f.o.b. for cheaper grades to 13s. f.o.b. for the best qualities. Shipments for the coastwise and cross-Channel trade are still heavy, although mainly on contract account, but for what is offered outside contract prices are very firm at the following rates:—Best coal, 15s. 6d.; good seconds, 14s. to 14s. 3d. net f.o.b. There is no change to report in slacks, prices still being firm at the rates previously quoted, and which are 9s. 9d. to 10s. for best rough slacks, 9s. to 9s. 3d. for good medium qualities, and 8s. 6d. or thereabouts for the commoner and finer grades, all into wagons at the pit.

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South Lancashire and Cheshire.

COAL.

The Manchester Coal Exchange was well attended on Tuesday, and business generally is brisk. The demand for house coal is heavier than usual at this time of the year, and prices are very firm at late rates; 16s. to 16s. 9d. for best house coal, with good medium qualities 14s. 6d. to 15s. 6d., and kitchen qualities 11s. 9d. to 12s. 9d.—all at the pit. Furnace coal continues to meet with steady enquiry, the price being about 12s. 6d. per ton at the pit, and shipping coal is also brisk at about 13s. to 14s. f.o.b. Partington. Slack moves away actively and prices are strong, at about 9s. to 9s. 9d. for best, with seconds at 8s. to 8s. 6d., into wagons at the pit.

IRON.

The price of pig iron keeps advancing; good No. 3 foundry iron cannot be found under 69s. to 70s., with Middlesbrough brands 74s. 4d. Finished iron makers are absolutely full of work, with iron bars at £8 10s., second quality £8, sheets £9 to £9 5s., hoops £8 12s. 6d. Steelworks are also full of work, and are now asking £6 2s. 6d. for billets, with £8 to £8 5s. for bars, steel hoops £8 7s. 6d. Plate makers are very busy, with boiler plates £9 5s., ordinary plates £8 5s. Foreign bars are still being offered in Manchester at considerably under the English prices. Engineers are busier; in fact, the whole district is now full of work.

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Yorkshire and Derbyshire.

Leeds.

COAL.

Buyers were in the majority on Tuesday's market, and the business done was only limited by the scarcity of prompt supplies. Very few of the local collieries had anything to offer, as all descriptions of coal are sold fairly well forward. The output has been below the average this week, some of the pits suspending work on Wednesday owing to Doncaster races, and others having to work broken time through scarcity of empty wagons. The demand for house coal has kept up very well, some of the collieries being fully sold to the end of September. The tonnage sent to London by rail has again been heavy, although reports indicate some falling off in the retail trade at the depots. It is said that the demand from the eastern and southern counties is exceptionally brisk. All pit prices are firm, and may be averaged as follow:—Haigh Moor selected, 14s. to 14s. 6d.; Wallsend and London best, 13s. to 13s. 6d.; Silkstone best, 13s. to 13s. 6d.; (special qualities, 13s. 6d. to 14s.); Silkstone house, 12s. 9d. to 13s.; house nuts, 11s. 6d. to 12s. The coastwise demand is now very full, the medium-priced Silkstone house coal being chiefly in request. For fairly prompt shipment at Hull the following f.o.b. prices are quoted:—Haigh Moor best, 16s. 6d. to 17s.; Silkstone best, 15s. 6d. to 16s. 3d.; Silkstone house, 14s. 6d. to 15s.; house nuts, 13s. to 13s. 6d. Merchants in Leeds, Bradford, and other West Riding centres are fully employed, the better-class houses buying freely to stock. Best qualities are somewhat scarce, and at some of the depots ground stocks have had to be broken into to meet the demand from the public. For the local markets the following pit prices are firmly quoted:—Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. 6d. to 16s.; Silkstone house, 14s. 6d. to 15s. 6d.; ordinary house coal, 14s. to 15s.; secondary sorts (cobbles, house nuts, &c.), 12s. to 13s. 6d. In manufacturing fuel the position is exceptionally strong. The supply of engine nuts and slacks is barely adequate to meet the needs of the market, and manufacturers are showing increasing willingness to buy forward. For current sales pit prices average as under:—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small engine nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slacks, 8s. to 9s.; small slacks, 7s. to 7s. 6d.; coking smalls, 6s. 9d. to 7s. 3d. Washed furnace coke is scarce and dear, and there is very little offering in the open market. Current quotations range from 16s. to 17s. per ton at the ovens according to quality and promptness of supply. There are no stocks, although the output is rather heavier than it was in July. The gas coal pits are now busy supplying coal under the new

THE WELSH COAL AND IRON TRADES.

Thursday, September 12.

Monmouthshire, South Wales, &c.

Newport.

COAL

The position in the steam coal trade has not changed materially during the past week. Sellers continue to quote firm prices for delivery ahead, but the weakness lately perceptible for prompt loading has been accentuated by the continued lack of tonnage, the scarcity of which proves the leading factor in a slack market, and determines easier values for those so fortunate as to be in a position to load forthwith. The reason for the small number of steamers coming along is hard to relate, as both homeward and outward freights are high at the present time, an uncommon synchronism. With increasing stocks, outputs at the collieries are daily becoming lessened, and the difficulty of keeping pits going grows daily greater. This condition of the market always produces a scarcity of smalls, and values of these show a slight improvement. House coal, coke and patent fuel show but little change, while pitwood merchants, hampered by the difficulty of securing wagons, are offering concessions all round. Latest approximate ruling quotations may be taken as follows, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 6d. to 15s. 9d.; western-valleys, ordinaries, 14s. to 14s. 6d.; eastern-valleys, best, 13s. 9d. to 14s.; other sorts, 13s. to 13s. 6d.; colliery smalls, best, 8s. 6d. to 9s.; seconds, 8s. 3d. to 8s. 6d.; inferiors, 8s. to 8s. 3d.; through coals, 10s. 6d. to 11s.; nuts, best washed, 11s. to 11s. 6d.; house coals, best, 18s. to 18s. 6d.; seconds, 17s. to 17s. 6d.; patent fuel, 17s. 8d. to 18s. Coke: Furnace, 22s. to 25s.; foundry, 26s. to 30s. Pitwood: Best French fir, 23s. to 24s. ex-ship.

IRON.

There is no material change to report in the conditions of the local iron and steel trades since last week. The recent healthy briskness is being well maintained in all departments. Rail mills continue busily employed, and the difficulty which manufacturers are experiencing is to keep pace with specifications, which are coming to hand heavily. Meanwhile prices remain firm on a basis of £6 7s. 6d. to £6 10s. for heavy sections, with the usual extras. Tin-plate bar and sheet mills are specially active, and are likely to remain so for some time to come. Few makers can promise prompt delivery of any parcels, but those fortunate enough to be able to do so can obtain practically their own prices. Official figures are £5 12s. 6d. to £5 15s. Bessemer, and £5 15s. to £5 17s. 6d. Siemens, but higher prices are being obtained. The strong tone of local blastfurnaces is being fully upheld, Welsh hæmatite being very firm at 81s. to 82s. delivered in the district. There is little alteration in the tin-plate trade. Most makers are well booked for the present, and with the high cost of raw materials they do not wish to fix further business at to-day's prices, therefore there is little doing. Official quotations remain based upon Bessemer primes IC 20 × 14 15s. to 15s. 1½d., Siemens 15s. 1½d. to 15s. 3d.

Cardiff.

COAL.

The position in this market, so far as tonnage is concerned, is, if anything, worse than last week. It is now a question of not what rate buyers are prepared to pay, but whether they can get tonnage at any price, and the worse feature is that there does not appear to be anyone capable of giving a reliable opinion as to when this state of affairs is likely to end. Homeward freights from all directions are so very tempting that, as already indicated in these columns, numbers of large steamers are being sent out in water ballast in order to take advantage of the high rates ruling rather than wait for a cargo of coal, with the possibility of delay in discharging same at the port of destination. One firm alone, in Cardiff, is stated to have sent out no less than five steamers to Galveston, in ballast, in order to bring back cotton cargoes; and no doubt other shipowners have had a similar experience. In consequence of the lack of tonnage, and the increasing output of coal, there are, at present, an enormous number of wagons standing under load at the dock sidings, and also at the different depôt sidings, and until a very much larger supply of tonnage becomes available, there seems to be but little prospect of enhanced prices being obtainable for coal in the immediate future. On the other hand sellers are as confident as ever with regard to the prospects for next year, provided, of course, tonnage is more plentiful. Next year's trading really depends upon the supply of tonnage, and should this be forthcoming in anything like sufficient volume to meet the requirements of collieries, there is no doubt that prices for 1913 will be considerably higher than they are at present. Some sales agents say they would not be surprised at anything between 18s. and 19s. being obtained for delivery over the year. As regards current business there is great competition for the small amount of tonnage available. This will be readily understood when it is mentioned that the chartering transactions last week only represented a total registered tonnage of 231,370 tons, being a decrease of over 43,000 tons as compared with the previous six days. At the end of last week several more advances took place in freights, as much as 12s. 6d. being paid for Genoa, 14s. for Venice, 13s. for Naples, 12s. 3d. for Port Said, 22s. 6d. for Rio de Janeiro, and proportionately for other ports. No little consternation has been caused by the announcement that it was intended to raise the stevedore rate for discharging vessels at the River Plate from 1s. per ton to 1s. 3d. per ton, and it is probable that concerted action will be taken on the part of shipowners throughout the United Kingdom with the object of resisting the proposed increase. Buyers who are lucky enough to get a boat ready to load are able to fulfil their contracts at very substantial concessions, best steam coal being obtained at something under 17s. and second Admiralties at from 15s. 6d. to 16s. 6d., according to quality. It is reported that about a quarter of a million tons of one of the cheaper classes of Admiralty steams have been sold for delivery over next year at 16s. 6d. per ton, or from 1s. to 1s. 6d. per ton above the prices obtained for running contracts. Best dry coals are 16s. 6d. to 17s., ordinary qualities 14s. to 14s. 3d. So far as the small coal market is concerned the demand has fallen off considerably, owing to so many railway trucks being required for the fruit harvest in Italy, with the result that prices have suffered. Best bunkerings are obtainable at 10s., best ordinaries at 9s. 6d. to 9s. 9d., and cargo qualities at 8s. to 8s. 6d. Best washed nuts are 15s., and best washed peas 13s. per ton. It is reported that the bulk of the Danish State Railways coal contracts, amounting to about 120,000 tons, have again been secured by the Westphalian Syndicate. North-country tenders appear to have been based on about 19s. 5d. c.i.f. Korsoer or fully 4½d. per ton higher than the German tenders. Derbyshire coal was quoted at 20s. 5d. and Welsh smokeless at 23s. 6d. to 24s. c.i.f., Copenhagen. It is expected that the 30,000 tons of steam coal required for ships' use will be divided between best Northumbrian steams and Derbyshire and Scottish coals. Within the past few days contracts are said to have been placed by the French Nord and Midi railway administrators with Welsh coal exporters for about 400,000 tons of through and small coals. Among the firms understood to share the orders are Messrs. J. E. Thomas and Co., Messrs. T. P. Thomas and Co., Messrs. C. L. Clay and Co., and Messrs. Franklin, Thomas and Co. The prices have not been disclosed, but it is believed that, so far as small coal is concerned, they are based on about 17 fr. c.i.f. Bordeaux, and proportionately for other ports of delivery. Quotations for Monmouthshire coals are nominally unchanged, but on account of the scarcity of wagons substantial concessions may be obtained for prompt shipment. Black Veins have been sold at from 15s. 3d. to 15s. 6d., western-valleys 14s. 9d. to 15s., and best eastern-valleys at 14s., with cheaper kinds at 13s. 9d. to 14s., in each case f.o.b. Cardiff. The aggregate shipments of all classes of coal for the week amounted to over 383,000 tons. Sellers of No. 3 Rhondda bituminous coals are still asking 17s. 3d. to 17s. 6d. for large, but some buyers have been able to get on at 16s. 6d. Through-and-through coals are 14s. to 14s. 3d., and small 12s., and in some cases even a shade under that figure. No. 2 large is round about 13s., through-and-through is 10s. 9d., and small 8s. to 8s. 6d. per ton. The Crown Patent Fuel Company have shipped during the week 10 875 tons, whilst Swansea makers have exported 9,050 tons. Prices still remain at from 18s. 8d. to 19s. per ton. Coke is very scarce with a strong demand. Special foundry is 27s. 6d. and ordinary qualities 25s. per ton. Furnace coke is 20s. Pitwood is 23s. 6d. per ton. The *Cardiff Journal of Commerce* gives the following as the average declared prices per ton of coal exported from the chief ports in the Bristol Channel during the month of July:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	16	2	14	10	15	7	14	11
Through-and-through	12	1	11	4	10	9	10	3
Small	8	11	10	5	8	2	8	5
Large anthracite	27	8	—		17	2	17	3
Household	17	3	—		–		—	

In July of last year, the prices were:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	15	6	14	5	14	4	14	0
Through-and-through	14	0	11	6	9	11	9	11
Small	8	8	10	1	7	7	7	7
Large anthracite	21	5	28	5	11	6	16	5
Household	—		—		13	1	—	

IRON.

There is not much change in the tin-plate trade. All the works are in full operation, but owing to the scarcity of tonnage the shipments for the week barely reached 87,000 boxes, whilst the receipts from works amounted to 134,000 boxes, so that stocks have been increased to 225,604 boxes. Heavy orders have been received from Germany, and prices keep very firm. Some works have specifications for oil sizes to last them till the end of the year. Wales has now completely lost the rebate trade, whilst the American makers are also exporting heavily to British and neutral markets. Before last year their exports had never exceeded 13,000 tons per annum, but in 1911 they jumped up to 61,474 tons, whilst for the first six months of the present year they reached the amazing total of 46,845 tons. This means that the Americans are now taking business that had hitherto belonged to Wales to the extent of 150,000 tons a year, or over 3,000,000 boxes, nearly the output of 100 mills. Happily the Welsh makers have been able to develop their trade enormously in other markets. Last month Norway took 2,000 tons more than in the previous month, France 1,000 tons more, Italy nearly 2,000 tons, Roumania 1,700 tons, and the Straits Settlements 2,500 tons. Altogether last month there was an increase of 47 per cent. as compared with the previous month. The demand for steel bars continues very brisk, every available furnace being fully taxed to meet the requirements of the local tin-plate works. The importations of foreign blooms, billets, and tin-bars have been on an unprecedented scale. Last year they amounted to 803,500 tons, of which tin bars accounted for 322,500 tons. So dependent, however, has the tin-plate trade become upon foreign supplies, that the withdrawal of American bars would, it is said, cause a steel famine in Wales. Prices still keep firm at from £5 12s. 6d. to £5 17s. 6d. per ton, according to quantity. The galvanised sheet trade is more buoyant, and the principal works have raised their prices, asking now £12 10s. for 24-gauge. Other makers, however, are still accepting £12 5s. per ton. The Wellfield Galvanising Works at Llanelly are being pushed forward. A number of influential commercial men have joined the company, and it is expected that the whole of the plant will be ready to commence operations at the beginning of next year. The iron and brass foundry workers at Cardiff and Barry, to the number of 140, have struck for an advance of 3s. per week in wages and a curtailment in the hours of labour of three to six hours per week. At present they work 53 hours per week, which the employers say is less than in other districts. Four works have given way, but the rest remain firm. The Aberdare Urban District Council have accepted the tender of Messrs. W. Griffiths and Co., of London, for Sanberg tramway rails, at £11,800. The local engineer said he had been unable to get a single British firm to produce the rails required.

Swansea.

COAL.

There was an average attendance on 'Change, but business was not very brisk on the anthracite coal market, tonnage supplies being very difficult, whilst the undertone was again easier. Swansea Valley large was being freely offered for immediate loading at less than current quotations, but there was practically no enquiry for this commodity. Red Vein large, however, was steady at last figures. Machine-made nuts and cobbles were barely maintaining their position, whilst the rubbly culm enquiry had fallen off considerably. Duff was, however, a very firm market, and supplies were scarce. In the steam coal market there was no material alteration, and the tone of this department closed, if anything, a shade easier. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 17s. to 19s. 6d., less 2½ per cent.; Red Vein large, 13s. 6d. to 14s. 6d., less 2½ per cent.; machine-made cobbles, 22s. to 24s. net; Paris, French, and German nuts, 23s. 6d. to 26s. 6d.; beans, 21s. to 23s. 9d.; machine-made large peas, 13s. to 14s. 6d., all net; rubbly culm, 7s. 3d. to 8s. 9d., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 18s. to 19s.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 9d., all less 2½ per cent. Bituminous; No. 3 Rhondda large, 17s. 6d. to 18s. 6d.; through-and-through, 16s. to 18s. 6d.; small, 12s. 6d. to 13s. 3d.; No. 2 Rhondda large, 14s. to 16s. 6d.; through-and-through, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 6d., all less 2½ per cent. Patent fuel, 17s. 6d. to 18s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

The steel trade in this district for the past week has been very flourishing. The yield of pig iron at Landore Works was quite up to the average, and employment in all branches of the trade was of a more robust character than at any period of the past three months. The demand for tin bars kept pace with the local supply, notwithstanding the heavy imports of foreign material to hand recently. The Mannesmann Tube Works were actively engaged. The shipments of tin-plates last week were 88,709 boxes, and receipts from the works 134,842 boxes, whilst stocks remaining in the warehouses and vans were 225,604 boxes.

Llanelly.

COAL.

This market is in a very firm position and all coals have a very strong demand. The scarcity of tonnage is still a source of great difficulty, and collieries are being much inconvenienced owing to their wagons being kept under load. Stocks of all kinds are heavy, and this, of course, has a deterrent effect on the market. Prices would be much higher if sufficient boats could be got, as order books have never been in such a healthy condition. There is every prospect of the next six months being exceptionally brisk, with good prices. Anthracite of all kinds are going strong. Inland orders are very plentiful; in fact, for some sorts there is quite a scarcity. Steam, bituminous, and gas coals have a better demand than has been the case for a considerable time, with prices at quite a couple of shillings per ton above the corresponding period of last year. The great fall of rain during the past month is now getting into the underground workings and some of the pits have shut down—permanently, it is feared. This week's prices are:—Best malting large, 23s. to 25s.; second malting large, 21s. to 23s.; Big Vein large, 17s. 6d. to 19s. 6d.; Red Vein large, 13s. 6d. to 14s. 6d.; machine-made large cobbles, 21s. to 23s.; German, French and Paris nuts, 23s. to 25s.; machine-made large beans, 22s. to 24s.; ditto, second quality, 20s. to 22s.; machine-made large peas, 14s. to 15s.; rubbly culm, 8s. to 8s. 6d.; duff, 5s. to 5s. 6d.; large steam, 13s. to 14s.; through-and-through, 10s. 9d. to 11s. 3d.; small steam, 8s. 6d. to 9s. 6d.; bituminous small, 10s. 6d. to 11s.—all f.o.b.

THE IRISH COAL TRADE

Thursday, September 12.

Dublin.

Business continues to be active in most branches of the coal trade here, many householders, manufacturers, and other large consumers purchasing their winter supplies before the expected advance in prices take place. There is, so far, no change in quotations for any class of coal in this part, although prices are already higher in other districts. City prices stand as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; "bell" coal, 1s. 6d. per sack; steam coals, from 20s. per ton upwards. Coke supplies are now fairly plentiful, and the price is unaltered at 23s. per ton. The import trade has rarely been so brisk at similar seasons, and quite a procession of steam colliers is daily to be seen entering the Liffey from cross-channel ports. The total quantity of coal landed during the past week was 20,399 tons, the coaling vessels amounting to 47, as compared with 51 the week previously, chiefly from Troon, Campbeltown, Partington, Cardiff, Ardrossan, Whitehaven, Newport, Manchester, Liverpool, Ayr, Garston, Workington, Preston, Point of Aire, Maryport, and Saundersfoot.

Belfast.

In spite of the advances which were made last week in prices of house coal, the volume of trade has increased, and there is at present a large and improving demand for all qualities. There is no change in steam coals, prices being very firm, and as prices are advancing in the Scottish ports, it is probable these classes will again be advanced. City prices stand as follow:—Giant's Hall Arley coal, 28s. 6d. per ton; Hartley, 25s. 6d.; Wigan, 24s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 22s. 6d.; Orrell slack, 22s. 6d. Quotations ex quay:—Arley house coal, 22s. 6d. per ton; Scotch house, 19s. 6d.; Scotch steam coal, 16s. to 17s. per ton; Navigation steam, 16s. to 17s.; Welsh steam coal, 16s. 6d. to 17s. 6d. per ton. From the 18th to the 31st August, 124 coal vessels arrived in this port. Cargoes arriving during the past week were chiefly from Lydney, Point of Aire, Girvan, Maryport, Garston, Troon, Ayr, Ellesmere Port, Irvine, Workington, Whitehaven, Ardrossan, Preston, Glasgow, and Swansea.

THE WELSH COAL AND IRON TRADES.

Thursday, September 12.

Monmouthshire, South Wales, &c.

Newport.

COAL

The position in the steam coal trade has not changed materially during the past week. Sellers continue to quote firm prices for delivery ahead, but the weakness lately perceptible for prompt loading has been accentuated by the continued lack of tonnage, the scarcity of which proves the leading factor in a slack market, and determines easier values for those so fortunate as to be in a position to load forthwith. The reason for the small number of steamers coming along is hard to relate, as both homeward and outward freights are high at the present time, an uncommon synchronism. With increasing stocks, outputs at the collieries are daily becoming lessened, and the difficulty of keeping pits going grows daily greater. This condition of the market always produces a scarcity of smalls, and values of these show a slight improvement. House coal, coke and patent fuel show but little change, while pitwood merchants, hampered by the difficulty of securing wagons, are offering concessions all round. Latest approximate ruling quotations may be taken as follows, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 6d. to 15s. 9d.; western-valleys, ordinaries, 14s. to 14s. 6d.; eastern-valleys, best, 13s. 9d. to 14s.; other sorts, 13s. to 13s. 6d.; colliery smalls, best, 8s. 6d. to 9s.; seconds, 8s. 3d. to 8s. 6d.; inferiors, 8s. to 8s. 3d.; through coals, 10s. 6d. to 11s.; nuts, best washed, 11s. to 11s. 6d.; house coals, best, 18s. to 18s. 6d.; seconds, 17s. to 17s. 6d.; patent fuel, 17s. 6d. to 18s. Coke: Furnace, 22s. to 25s.; foundry, 26s. to 30s. Pitwood: Best French fir, 23s. to 24s. ex-ship.

IRON.

There is no material change to report in the conditions of the local iron and steel trades since last week. The recent healthy briskness is being well maintained in all departments. Rail mills continue busily employed, and the difficulty which manufacturers are experiencing is to keep pace with specifications, which are coming to hand heavily. Meanwhile prices remain firm on a basis of £6 7s. 6d. to £6 10s. for heavy sections, with the usual extras. Tin-plate bar and sheet mills are especially active, and are likely to remain so for some time to come. Few makers can promise prompt delivery of any parcels, but those fortunate enough to be able to do so can obtain practically their own prices. Official figures are £5 12s. 6d. to £5 15s. Bessemer, and £5 15s. to £5 17s. 6d. Siemens, but higher prices are being obtained. The strong tone of local blastfurnaces is being fully upheld, Welsh hæmatite being very firm at 81s. to 82s. delivered in the district. There is little alteration in the tin-plate trade. Most makers are well booked for the present, and with the high cost of raw materials they do not wish to fix further business at to-day's prices, therefore there is little doing. Official quotations remain based upon Bessemer primes I C 20 × 14 15s. to 15s. 1½d., Siemens 15s. 1½d. to 15s. 3d.

Cardiff.

COAL.

The position in this market, so far as tonnage is concerned, is, if anything, worse than last week. It is now a question of not what rate buyers are prepared to pay, but whether they can get tonnage at any price, and the worse feature is that there does not appear to be anyone capable of giving a reliable opinion as to when this state of affairs is likely to end. Homeward freights from all directions are so very tempting that, as already indicated in these columns, numbers of large steamers are being sent out in water ballast in order to take advantage of the high rates ruling rather than wait for a cargo of coal, with the possibility of delay in discharging same at the port of destination. One firm alone, in Cardiff, is stated to have sent out no less than five steamers to Galveston, in ballast, in order to bring back cotton cargoes; and no doubt other shipowners have had a similar experience. In consequence of the lack of tonnage, and the increasing output of coal, there are, at present, an enormous number of wagons standing under load at the dock sidings, and also at the different depôt sidings, and until a very much larger supply of tonnage becomes available, there seems to be but little prospect of enhanced prices being obtainable for coal in the immediate future. On the other hand sellers are as confident as ever with regard to the prospects for next year, provided, of course, tonnage is more plentiful. Next year's trading really depends upon the supply of tonnage, and should this be forthcoming in anything like sufficient volume to meet the requirements of collieries, there is no doubt that prices for 1913 will be considerably higher than they are at present. Some sales agents say they would not be surprised at anything between 18s. and 19s. being obtained for delivery over the year. As regards current business there is great competition for the small amount of tonnage available. This will be readily understood when it is mentioned that the chartering transactions last week only represented a total registered tonnage of 231,370 tons, being a decrease of over 43,000 tons as compared with the previous six days. At the end of last week several more advances took place in freights, as much as 12s. 6d. being paid for Genoa, 14s. for Venice, 13s. for Naples, 12s. 3d. for Port Said, 22s. 6d. for Rio de Janeiro, and proportionately for other ports. No little consternation has been caused by the announcement that it was intended to raise the stevedore rate for discharging vessels at the River Plate from 1s. per ton to 1s. 3d. per ton, and it is probable that concerted action will be taken on the part of shipowners throughout the United Kingdom with the object of resisting the proposed increase. Buyers who are lucky enough to get a boat ready to load are able to fulfil their contracts at very substantial concessions, best steam coal being obtained at something under 17s. and second Admiralties at from 15s. 6d. to 16s. 6d., according to quality. It is reported that about a quarter of a million tons of one of the cheaper classes of Admiralty steams have been sold for delivery over next year at 16s. 6d. per ton, or from 1s. to 1s. 6d. per ton above the prices obtained for running contracts. Best dry coals are 16s. 6d. to 17s., ordinary qualities 14s. to 14s. 3d. So far as the small coal market is concerned the demand has fallen off considerably, owing to so many railway trucks being required for the fruit harvest in Italy, with the result that prices have suffered. Best bunkerings are obtainable at 10s., best ordinaries at 9s. 6d. to 9s. 9d., and cargo qualities at 8s. to 8s. 6d. Best washed nuts are 15s., and best washed peas 13s. per ton. It is reported that the bulk of the Danish State Railways coal contracts, amounting to about 120,000 tons, have again been secured by the Westphalian Syndicate. North-country tenders appear to have been based on about 19s. 5d. c.i.f. Korsoer or fully 4½d. per ton higher than the German tenders. Derbyshire coal was quoted at 20s. 5d. and Welsh smokeless at 23s. 6d. to 24s. c.i.f., Copenhagen. It is expected that the 30,000 tons of steam coal required for ships' use will be divided between best Northumbrian steams and Derbyshire and Scottish coals. Within the past few days contracts are said to have been placed by the French Nord and Midi railway administrators with Welsh coal exporters for about 400,000 tons of through and small coals. Among the firms understood to share the orders are Messrs. J. E. Thomas and Co., Messrs. T. P. Thomas and Co., Messrs. C. L. Clay and Co., and Messrs. Franklin, Thomas and Co. The prices have not been disclosed, but it is believed that, so far as small coal is concerned, they are based on about 17 fr. c.i.f. Bordeaux, and proportionately for other ports of delivery. Quotations for Monmouthshire coals are nominally unchanged, but on account of the scarcity of wagons substantial concessions may be obtained for prompt shipment. Black Veins have been sold at from 15s. 3d. to 15s. 6d., western-valleys 14s. 9d. to 15s., and best eastern-valleys at 14s., with cheaper kinds at 13s. 9d. to 14s., in each case f.o.b. Cardiff. The aggregate shipments of all classes of coal for the week amounted to over 383,000 tons. Sellers of No. 3 Rhondda bituminous coals are still asking 17s. 3d. to 17s. 6d. for large, but some buyers have been able to get on at 16s. 6d. Through-and-through coals are 14s. to 14s. 3d., and small 12s., and in some cases even a shade under that figure. No. 2 large is round about 13s., through-and-through is 10s. 9d., and small 8s. to 8s. 6d. per ton. The Crown Patent Fuel Company have shipped during the week 10,875 tons, whilst Swansea makers have exported 9,050 tons. Prices still remain at from 18s. 6d. to 19s. per ton. Coke is very scarce with a strong demand. Special foundry is 27s. 6d. and ordinary qualities 25s. per ton. Furnace coke is 20s. Pitwood is 23s. 6d. per ton. The *Cardiff Journal of Commerce* gives the following as the average declared prices per ton of coal exported from the chief ports in the Bristol Channel during the month of July:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	16	2	14	10	15	7	14	11
Through-and-through	12	1	11	1	10	9	10	3
Small	8	11	10	5	8	2	8	5
Large anthracite	27	6	—		17	2	17	3
Household	17	3	—		—		—	

In July of last year, the prices were:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	15	6	14	5	14	4	14	0
Through-and-through	14	0	11	6	9	11	9	11
Small	8	8	10	1	7	7	7	7
Large anthracite	21	5	28	5	11	6	16	5
Household	—		—		13	1	—	

IRON.

There is not much change in the tin-plate trade. All the works are in full operation, but owing to the scarcity of tonnage the shipments for the week barely reached 87,000 boxes, whilst the receipts from works amounted to 134,000 boxes, so that stocks have been increased to 225,604 boxes. Heavy orders have been received from Germany, and prices keep very firm. Some works have specifications for oil sizes to last them till the end of the year. Wales has now completely lost the rebate trade, whilst the American makers are also exporting heavily to British and neutral markets. Before last year their exports had never exceeded 13,000 tons per annum, but in 1911 they jumped up to 61,474 tons, whilst for the first six months of the present year they reached the amazing total of 45,845 tons. This means that the Americans are now taking business that had hitherto belonged to Wales to the extent of 150,000 tons a year, or over 3,000,000 boxes, nearly the output of 100 mills. Happily the Welsh makers have been able to develop their trade enormously in other markets. Last month Norway took 2,000 tons more than in the previous month, France 1,000 tons more, Italy nearly 2,000 tons, Roumania 1,700 tons, and the Straits Settlements 2,500 tons. Altogether last month there was an increase of 47 per cent. as compared with the previous month. The demand for steel bars continues very brisk, every available furnace being fully taxed to meet the requirements of the local tin-plate works. The importations of foreign blooms, billets, and tin-bars have been on an unprecedented scale. Last year they amounted to 803,500 tons, of which tin bars accounted for 322,500 tons. So dependent, however, has the tin-plate trade become upon foreign supplies, that the withdrawal of American bars would, it is said, cause a steel famine in Wales. Prices still keep firm at from £5 12s. 6d. to £5 17s. 6d. per ton, according to quantity. The galvanised sheet trade is more buoyant, and the principal works have raised their prices, asking now £12 10s. for 24-gauge. Other makers, however, are still accepting £12 5s. per ton. The Wellfield Galvanising Works at Llanelly are being pushed forward. A number of influential commercial men have joined the company, and it is expected that the whole of the plant will be ready to commence operations at the beginning of next year. The iron and brass foundry workers at Cardiff and Barry, to the number of 110, have struck for an advance of 3s. per week in wages and a curtailment in the hours of labour of three to six hours per week. At present they work 53 hours per week, which the employers say is less than in other districts. Four works have given way, but the rest remain firm. The Aberdare Urban District Council have accepted the tender of Messrs. W. Griffiths and Co., of London, for Sanberg tramway rails, at £14,800. The local engineer said he had been unable to get a single British firm to produce the rails required.

Swansea.

COAL.

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Llanelly.

COAL.

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THE IRISH COAL TRADE

Thursday, September 12.

Dublin.

Business continues to be active in most branches of the coal trade here, many householders, manufacturers, and other large consumers purchasing their winter supplies before the expected advance in prices take place. There is, so far, no change in quotations for any class of coal in this port, although prices are already higher in other districts. City prices stand as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 24s.; Scotch, 20s.; best Orrell slack, 21s.; "ball" coal, 1s. 5d. per sack; steam coals, from 20s. per ton upwards. Coke supplies are now fairly plentiful, and the price is unaltered at 23s. per ton. The import trade has rarely been so brisk at similar seasons, and quite a procession of steam colliers is daily to be seen entering the Liffey from cross-channel ports. The total quantity of coal landed during the past week was 20,399 tons, the coaling vessels amounting to 47, as compared with 54 the week previously, chiefly from Troon, Campbeltown, Partington, Cardiff, Ardrossan, Whitehaven, Newport, Manchester, Liverpool, Ayr, Garston, Workington, Preston, Point of Aire, Maryport, and Saundersfoot.

Belfast.

In spite of the advances which were made last week in prices of house coal, the volume of trade has increased, and there is at present a large and improving demand for all qualities. There is no change in steam coals, prices being very firm, and as prices are advancing in the Scottish ports, it is probable these classes will again be advanced. City prices stand as follow:—Giant's Hall Arley coal, 26s. 6d. per ton; Hartley, 25s. 6d.; Wigan, 24s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 22s. 6d.; Orrell slack, 22s. 6d. Quotations ex quay:—Arley house coal, 22s. 8d. per ton; Scotch house, 19s. 6d.; Scotch steam coal, 16s. to 17s. per ton; Navigation steam, 16s. to 17s.; Welsh steam coal, 16s. 6d. to 17s. 6d. per ton. From the 18th to the 31st August, 124 coal vessels arrived in this port. Cargoes arriving during the past week were chiefly from Lydney, Point of Aire, Girvan, Maryport, Garston, Troon, Ayr, Ellesmere Port, Irvine, Workington, Whitehaven, Ardrossan, Preston, Glasgow, and Swansea.

The Cannock Chase Colliery Owners' Association has decided to erect a mines rescue station at Hednesford.

The autumnal meeting of the Association of Chambers of Commerce was opened on Tuesday at Newcastle, when important discussions took place on the question of Labour unrest.

The executive committee of the Miners' Federation of Great Britain have decided not to proceed with the proposed uniform working policy over the whole British coalfield of five days per week adopted by the last annual conference.

A general meeting will be held at Swansea on Tuesday, September 17, of the South Wales Institute of Engineers.

The exports of coal, coke and manufactured fuel last month aggregated 6,729,653 tons, valued at £4,250,887, as compared with 5,666,296 tons, valued at £3,163,875, in August 1911, and 5,750,783 tons, valued at £3,318,381, in August 1910.

During the first eight months of the year, the exports amounted to 41,246,156 tons, valued at £25,936,337, as against 43,566,117 tons, valued at £24,747,660, and 42,422,482 tons, valued at £25,071,749, in the corresponding periods of 1911 and 1910 respectively.

The average value of coal, coke and manufactured fuel exported from the United Kingdom during August was 12s. 7·5d. per ton, as compared with 11s. 2·008d. in August 1911 and 11s. 6·4d. in August 1910.

The value during the first eight completed months of the present year is 12s. 6·9d. per ton, as compared with 11s. 4·3d. and 11s. 9·3d. respectively in the corresponding periods of 1911 and 1910.

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In this respect, therefore, it is clear that the Act was unsatisfactory both on account of its indefiniteness and defectiveness. It laid down no standard of velocity of the air-current which a lamp should withstand, and, in the use of the term "ordinarily prevailing," failed to provide against air-currents of maximum velocity such as might occasionally be necessary in practical working. As a result of the recommendation of the recent Royal Commission on Mines, as embodied in their second Report, the Government decided to set up a station for testing various types of safety lamp. A Departmental Committee has now reported upon this matter, and in their opinion no safety lamp should be used except of a make which has passed certain specified tests.

It is important to note the significance, in this connection, of the word *make*. It is not proposed to test officially every lamp that is taken into the mine. Such a procedure would be difficult to carry out. It is, however, expected that every lamp will conform to an official specification, based upon official tests carried out upon lamps of the same make. As a safeguard against the use of any lamp which is not up to the proper standard, it is suggested that any lamp in use in a mine may be impounded by the inspector of mines for the purpose of submitting it to the official tests. Should it fall short of the standard requirements, the certificate of approval granted to the maker of the lamp may be cancelled.

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Let us, for example, consider one alone of the many parts of a lamp which may deteriorate in use—*i.e.*, the glass. Glass is, physically speaking, an unstable substance. It may conform perfectly to the mechanical test as well as to the heat test when fresh from the annealing oven. But repeated heatings and coolings of this glass may possibly in time set up internal strains owing to incipient devitrification, inducing brittleness and leading finally to easy fracture. Thus one of the most important elements of the lamp from the point of view of safety in the mine may, and probably will, gradually deteriorate. Doubtless this tendency will vary with the nature of the glass employed. In the elaborate investigations upon lamp-glasses conducted at Frameries, it was found that a special glass, the composition of which is a trade secret, gave strikingly good results as compared with other kinds, but it is not apparent from the description of the tests whether the element of deterioration in use was experimentally examined. Neither is this point of view considered in the tests on lamp glasses adopted in the Report of the Departmental Committee. Certain mechanical and heating tests are there described. Twenty glasses of any one kind are to be tested, and 10 per cent. of failures are to be a cause of rejection. It would be of interest to know how an approved lamp glass would behave under these tests after the lamps have been in daily use for a year.

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To take another instance—viz., the photometric tests—it has been established at Frameries that even a good type of glass may possess the property of rapidly losing transparency. In a tested case there was a loss of 22 per cent. after use in the mine for a few days only. Thus a new lamp which easily conforms to the required illuminating power of 0·30-candle power for 10 hours, as determined by a pentane standard, may fall below this limit after only a few weeks in use. The rapidity of the development of opalescence in glass appears to depend largely upon the degree of humidity of the mine atmosphere. Thus the deterioration of the illumination given by any type of lamp may, to some extent, depend upon local circumstances—that is, upon the kind of mine air to which it is subjected.

While discussing the subject of illumination we may ask, also, upon what logical grounds a higher standard of illumination is *required* in the case of an electric lamp than in the case of a flame lamp. If 0·30-candle power is deemed a reasonable limit of illumination in the latter case, why should 1·5-candle power, or five times as much, be required in the case of the former. It may be admitted that electric lamps can be made to give generally a better light than flame lamps, but it is not quite obvious why an electric lamp should be disqualified because it gives, say, only four times the minimum illumination required in an approved flame lamp. In the case of electric lamps there is a large margin of illumination over and above the capabilities of oil or spirit, and it might reasonably be argued that it would be only fair to allow makers the option of sacrificing any portion of this margin, if by so doing greater efficiency in other directions could be secured. For example, in the recent Home Office competition for the best type of electric lamp, importance was attached to first cost, cost of maintenance and weight, each of which items is governed largely by the candle-power of the lamp. It might surely be left to the maker to determine how far he would endeavour to apportion these factors, having in view a healthy competition on the one hand with

The Cannock Chase Colliery Owners' Association has decided to erect a mines rescue station at Hednesford.

The autumnal meeting of the Association of Chambers of Commerce was opened on Tuesday at Newcastle, when important discussions took place on the question of Labour unrest.

The executive committee of the Miners' Federation of Great Britain have decided not to proceed with the proposed uniform working policy over the whole British coalfield of five days per week adopted by the last annual conference.

A general meeting will be held at Swansea on Tuesday, September 17, of the South Wales Institute of Engineers.

The exports of coal, coke and manufactured fuel last month aggregated 6,729,653 tons, valued at £4,250,887, as compared with 5,666,296 tons, valued at £3,163,875, in August 1911, and 5,750,783 tons, valued at £3,318,381, in August 1910.

During the first eight months of the year, the exports amounted to 41,246,156 tons, valued at £25,936,337, as against 43,566,117 tons, valued at £24,747,660, and 42,422,482 tons, valued at £25,071,749, in the corresponding periods of 1911 and 1910 respectively.

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Federated Area.

At the monthly meeting of Cannock Chase Miners' Association, Mr. Albert Stanley, M.P., reporting upon the Conciliation Board meeting, said there seemed to be a hopeful feeling that employers would agree to give a 5 per cent. increase in wages. The association had been accepted by the Insurance Commissioners as an approved society under the National Health Insurance Act. Mr. Stanley further reported that at the bulk of the collieries they had been able to effect an amicable settlement of the weekly pay question. Friction had, however, arisen at the Cannock and Rugeley and Brereton Collieries, the managers of which had expressed their determination that if they agreed to weekly pay they should "take up" on Tuesday instead of Wednesday, thus keeping a further day's wages of the men in hand. A discussion took place with regard to the position of the association, and it was decided that an entrance fee of 10s. 6d. should be imposed on new members joining on and from the first pay day in October, and in the meantime a new medal be issued and the attention of the workmen called to the matter.

Scotland.

The 800 men employed by the Wemyss Coal Company at Michael pit, East Wemyss, who came out on strike over the "Billy Fairplay" method of weighing their output coal, have now returned to work. The company offered the men a standing reduction of 25 per cent., on condition that the men returned to work pending a settlement of the whole question by the Fife and Clackmannan Coalowners' Association on the one hand, and the Fife and Kinross Miners' Association on the other. The conference between masters and men will take place on an early date.

The monthly meeting of the executive board of the Fife and Kinross Miners' Association was held at Dunfermline lately. The board had under consideration the wages paid to the above-ground workers, the payments being regarded as inadequate. Discussion took place upon the question of a fixed idle day, and it was unanimously agreed to instruct the districts in which the pits are worked on the single shift system that there should be established a stated idle day once a fortnight, and that in double-shifted pits no men be allowed to work more than eleven days per fortnight. The system of men working under contractors has long been regarded with disfavour in the counties, and resolutions condemnatory of it have frequently been passed. The following resolution was agreed to:—"That on and after 31st December, 1912, our members be requested to give up all contracts where the men are paid on the "piece" system, and that after said date no such contracts be entered into by our members."

The Lanarkshire Miners' Union have reported the result of a meeting of the Minimum Wage District Board, presided over by Sheriff Mackenzie, held to discuss the questions of payment of arrears under the Act, and the dismissal of workmen for refusing to sign a document contracting themselves out. The Sheriff intimated that his decision on the points, which were really questions on interpretation of the rules, would be given by him in writing on an early date.

Miners' Federation of Great Britain.

The executive committee of the Miners' Federation of Great Britain, it has been announced, have declined to proceed to take the necessary steps to bring into operation a uniform working policy over the whole British coalfields of five days per week, as decided upon at the last annual conference of the Federation. The executive, it was stated, were not prepared at present to draft a scheme, and they referred it back to the annual conference. In the meantime they requested the districts to fully consider the question, and be prepared to finally decide upon the principal points at the conference upon which a scheme may be drafted.

Instructions have been issued to the districts for a levy of 3d. per member. The ordinary contributions are at the rate of 1d. per quarter per member. The levy will produce over £7,000.

Trades Union Congress

At the resumed meeting of the above on Friday, September 6, a motion to legally enforce industrial agreements was discussed, but was not carried.

A resolution, introduced at the instance of the Miners' Federation, was unanimously carried in favour of the nationalisation of land, minerals, mines, and railways. In the course of the discussion upon it, Mr. Smillie announced that the miners were tired of merely passing resolutions demanding the nationalisation of mines, and that they now proposed to carry out an active propaganda throughout the country, and embody their proposals in a Bill.

Debates on the Insurance Act and on Syndicalism also took place.

The final sitting of the Congress took place on Saturday, when chief among the questions discussed was that of non-unionism. A resolution was passed to the effect that the Congress were of opinion that the time had arrived when trade unionists should refuse to work with non-unionists.

A new Parliamentary Committee was then chosen, which afterwards met and elected Mr. W. J. Davis, of the Amalgamated Brassworkers, as the next president of the Congress.

A special conference is to take place in London on September 18 next to consider a memorandum issued by the Insurance Commissioners on the subject of transferred members and reserve values.

THE SCOTCH COAL AND IRON TRADES.

Thursday, September 12.

Glasgow and Lanarkshire.

COAL.

The coal trade continues very active, but the shipments are not quite so large as might have been expected. This appears to be due, to some extent, to loading berths being occupied by vessels bound coastwise. The aggregate shipments from Scottish ports in the past week amounted to 346,471 tons, being 8,538 less than in the preceding week, and 43,215 tons less than in the corresponding week of last year. The falling off in shipments at Glasgow was considerable, amounting to about 12,000 tons. The foreign clearances were 30,748 tons, while 38,004 tons were despatched coastwise, the total of 68,752 tons comparing with 80,020 in the preceding week, and 100,886 tons in the corresponding week of last year. The shrinkage in the shipments in the last few weeks has occurred almost altogether in the foreign exports. At Glasgow, in three weeks this falling off amounts to about 30,000 tons, and is attributed mainly to the prevailing heavy freights. The rise in the prices of coal has no doubt also, to some extent, adversely affected the export business. It has not been easy to obtain the advanced prices intimated at the beginning of the month. In the household branch of the trade, these rates have only been partly secured notwithstanding that the consumption has materially increased owing to colder weather. There has been a moderate business in steam coal and the better qualities of house coal have been in demand for shipment. Splint coal meets with a very ready market at full prices and there is also an active business in nuts. The quotations f.o.b. at Glasgow are for steam coal 12s. to 13s., ell coal 13s. to 13s. 6d., splint 13s. 6d. to 14s., washed treble nuts 14s. to 14s. 6d., doubles 13s. to 13s. 6d., and singles 12s. to 12s. 6d. per ton. There is a very strong demand for coal for manufacturing purposes.

IRON.

A large business has been done in pig iron on Glasgow Exchange, and still higher prices have been secured. Since last report business has been done in Cleveland warrants from 65s. to 65s. 3d. cash, 65s. 3½d. to 65s. 9½d. one month, and 65s. 11d. to 66s. 2d. three months. Sales have also been noted at 65s. 10d. for delivery in November. There have been occasional slight reactions in price attributed to holders selling for a profit. Merchants report that the outside public is taking an increasing interest in warrant business. The past week's arrivals at Grangemouth of pig iron from Middlesbrough and district amounted to 9,078 tons, being 202 tons more than in the corresponding week of last year. The number of furnaces in blast in Scotland is 88 compared with 83 12 months ago. The market for Scotch pig iron is steady with a large business doing and prices have again been raised in response to the upward movement in warrants. Govan and Monkland are quoted f.a.s. at Glasgow Nos. 1, 71s. 6d., Nos. 3, 70s.; Carnbroe, No. 1, 76s., No. 3, 72s.; Calder, No. 1, 78s. 6d., No. 3, 73s. 6d.; Summerlee, No. 1, 78s., No. 3, 74s.; Clyde and Langloan, Nos. 1, 79s., Nos. 3, 74s.; Gartsherrie, No. 1, 79s. 6d., No. 3, 74s. 6d.; Coltness, No. 1, 95s., No. 3, 77s.; Eglinton at Ardrossan or Troon, No. 1, 72s., No. 3, 71s.; Glengarnock at Ardrossan, No. 1, 80s., No. 3, 75s.; Dalmellington at Ayr, No. 1, 73s., No. 3, 71s.; Shotts at Leith, No. 1, 79s., No. 3, 74s.; Carron at Grangemouth, No. 1, 79s. 6d., No. 3, 74s. 6d. per ton. Cumberland hæmatite has been at 78s. 9d. cash, with business at 79s. 6d. and 79s. 9d. three months, east coast English hæmatite 76s. 6d. f.o.b. and Scotch hæmatite 81s. delivered at the west of Scotland steelworks. The shipments of pig iron at Scottish ports in the past week were 1,922 tons foreign and 4,047 coastwise, the total of 5,969 tons comparing with 6,645 in the corresponding week, thus showing a decrease of 676 tons. The finished iron and steel works are fully employed, but comparatively little fresh business is being fixed.

Renfrew, Ayr and Dumbarton.

COAL.

The foreign shipments of coal from this district in the past week were 2,720 tons, and the quantity sent coastwise and to Irish ports amounted to 29,219 tons. At Bowling 113 tons were shipped, Irvine 1,125, Ardrossan 2,780, Greenock 2,875, Troon 7,628, and Ayr 17,418—total 31,939 tons, compared with 31,801 in the preceding week and 38,115 in the corresponding week of last year. There is a very large inland consumption of coal at iron and steel and other factories, and the household demand has been increasing owing to colder weather. The miners are giving a large and steady output; business is active all round, and prices are firm.

Stirling, the Lothians and Fife.

COAL.

There has been an active demand for coal in this district both for shipment and home consumption. Household coal for home use has been raised 1s. per ton, but there is comparatively little change in the export prices. The shipments are about 13,000 tons larger at the Firth of Forth ports than in the preceding week. At Granton 10,114 tons were cleared, Bo'ness 16,811, Leith 50,433, Grangemouth 52,971—total 130,329 tons, compared with 117,288 in the preceding week and 122,865 in the corresponding week of last year. Best screened steam coal is quoted at Leith 12s. 6d. to 13s., secondary qualities 11s. 6d. to 12s., treble nuts 14s. to 14s. 6d., doubles 12s. 9d. to 13s., and singles 12s. 3d. to 12s. 6d. per ton. Stormy weather around the coasts tended to curtail shipments at Fife ports, but the trade is in a healthy condition. There is a steady demand for lower Baltic ports, and the coastwise business has shown more activity. The shipments have been, at Burntisland 47,380 tons, Methil 62,708, Alloa 2,423, Wemyss 1,271, Dysart 837, Tayport 486, Charleston 346—total 115,451 tons, compared with 125,900 in the preceding week, and 127,820 in the corresponding week of last year. Nuts have been in very strong request. First-class screened navigation coal is quoted at Methil and Burntisland 15s. 6d. to 16s. 6d., unscreened 13s. to 13s. 6d., first class steam coal 13s. 6d., third-class qualities 11s. 6d. to 12s., treble nuts 14s. to 14s. 6d., doubles 13s. 6d. to 14s., and singles 12s. to 12s. 6d. per ton. A good business is being done in house coal for home use.

THE TIN-PLATE TRADE

Liverpool.

The tone of the market is distinctly firmer on the week. Enquiries are numerous, and a steady business has been done at increased prices. Many works are now fully booked for this year, and owing to the high costs ruling for steel bars and tin, are not anxious to sell ahead unless at a good advance on figures ruling to-day. Following are current quotations for coke tins:—I C 14 × 20 (112 sh. 108 lb.), 15s. per box; I C 28 × 20 (112 sh. 216 lb.), 30s. to 30s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 4½d. to 15s. 6d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. 6d. per box; I C 14 × 19½ (120 sh. 110 lb.), 15s. 6d. per box; I C 20 × 10 (225 sh. 156 lb.), 22s. to 22s. 6d. per box; I C squares and odd sizes, 15s. 3d. to 15s. 6d. basis. Ternes are firm at 29s. to 29s. 6d. per box for I C 28 × 20 unassorted. Charcoal tins rule strong at 17s. 6d. to 18s. and upwards according to finish. Blackplate is held at £11 2s. 6d. per ton basis for 30 gauge, finished quality. Coke wasters are in good demand, and quotations are very firm as follow:—C W 14 × 20, 14s. per box; C W 28 × 20, 28s. 6d. per box; C W 14 × 18¾, 14s. 3d. per box; C W 20 × 10, 20s. 3d. per box—all f.o.b. Wales, less 4 per cent.

THE BY-PRODUCTS TRADE.

Tar products.—The market generally is steady, and prices are well maintained. Pitch is rather quiet, but benzols are firm. Naphthas are keeping to the firm side. Crude carbolic is rather quiet on the west coast, and prices wavering. Toluol is on the advance. Creosote steady. Nearest values are:—

Benzols, 90's, 1s. 1d.; ditto 50's, 11½d.; toluol, 11½d.; carbolic acid, crude (60 per cent.), 2s. 6d. to 2s. 7d.; ditto crystals (40 per cent.), 7¼d.; solvent naphtha, 1s. 1½d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 2¼d. for ordinary qualities; pitch, 51s. to 52s. f.o.b. east coast; ditto, 50s. 6d. to 52s. f.a.s. west coast; ditto 55s. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated,* free on rails at *makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—The market is very firm in all positions, and for forward delivery up to next June £14 15s. has been considered a lucky seizure for the purchaser, £15 being required for but little later periods. American advices point to a quiet market at the moment, though there is a tendency to disparage the outlook owing to the operations of cyanamide interests. For prompt closing values are:—

London (ordinary makes), £14; Beckton, £14 2s. 6d.; Liverpool, £14 12s. 6d.; Hull, £14 10s.; Scotch ports, £14 15s. to £14 17s. 6d.; nitrate of soda (ordinary), per cwt., 11s. 4½d.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent.* discount; *24 per cent. ammonia, good grey quality;* allowance *for refraction, nothing for excess.*]

Mining Lessons in School.—The Board of Education has suggested to the Monmouthshire Education Committee that simple instruction should be given in schools in mining districts with regard to the nature, occurrence, and use of the minerals worked in the district, and the general methods of getting the minerals, the dangers which have to be guarded against, and similar topics connected with mining as would interest schoolchildren and create a desire to know more. The committee already have "readers" upon this matter in some schools, and they have decided to extend the field of operation.

Mines Inspection Changes.—The Secretary of State has promoted Mr. T. H. Mottram to the position of divisional inspector of mines in the Yorkshire and North Midlands district in succession to the late Mr. W. H. Pickering, who, it will be remembered, was killed in the Cadeby disaster. Mr. Mottram was appointed H.M. inspector of mines for Lancashire on the retirement of Sir Henry Hall, in June 1910. He will be succeeded by Mr. J. R. R. Wilson, of Leeds, who will take up his headquarters in Liverpool. The Yorkshire district is a very important one, as one-fourth of the men engaged in the coalmining industry in Great Britain are located in that area. Mr. Mottram has been a courteous and painstaking official, and his departure from Lancashire is regretted in mining circles. The vacancy caused by the transfer of Mr. Wilson will be filled by Mr. C. L. Robinson, senior inspector of Scotland. Mr. H. Abbott has been appointed senior inspector in place of Mr. H. R. Hewitt, of Sheffield; and Mr. H. Danby is the new junior inspector in place of the late Mr. G. Y. Tickle, of Doncaster.

Federated Area.

At the monthly meeting of Cannock Chase Miners' Association, Mr. Albert Stanley, M.P., reporting upon the Conciliation Board meeting, said there seemed to be a hopeful feeling that employers would agree to give a 5 per cent. increase in wages. The association had been accepted by the Insurance Commissioners as an approved society under the National Health Insurance Act. Mr. Stanley further reported that at the bulk of the collieries they had been able to effect an amicable settlement of the weekly pay question. Friction had, however, arisen at the Cannock and Rugeley and Brereton Collieries, the managers of which had expressed their determination that if they agreed to weekly pay they should "take up" on Tuesday instead of Wednesday, thus keeping a further day's wages of the men in hand. A discussion took place with regard to the position of the association, and it was decided that an entrance fee of 10s. 6d. should be imposed on new members joining on and from the first pay day in October, and in the meantime a new medal be issued and the attention of the workmen called to the matter.

Scotland.

The 800 men employed by the Wemyss Coal Company at Michael pit, East Wemyss, who came out on strike over the "Billy Fairplay" method of weighing their output coal, have now returned to work. The company offered the men a standing reduction of 25 per cent., on condition that the men returned to work pending a settlement of the whole question by the Fife and Clackmannan Coalowners' Association on the one hand, and the Fife and Kinross Miners' Association on the other. The conference between masters and men will take place on an early date.

The monthly meeting of the executive board of the Fife and Kinross Miners' Association was held at Dunfermline lately. The board had under consideration the wages paid to the above-ground workers, the payments being regarded as inadequate. Discussion took place upon the question of a fixed idle day, and it was unanimously agreed to instruct the districts in which the pits are worked on the single shift system that there should be established a stated idle day once a fortnight, and that in double-shifted pits no men be allowed to work more than eleven days per fortnight. The system of men working under contractors has long been regarded with disfavour in the counties, and resolutions condemnatory of it have frequently been passed. The following resolution was agreed to:—"That on and after 31st December, 1912, our members be requested to give up all contracts where the men are paid on the "piece" system, and that after said date no such contracts be entered into by our members."

The Lanarkshire Miners' Union have reported the result of a meeting of the Minimum Wage District Board, presided over by Sheriff Mackenzie, held to discuss the questions of payment of arrears under the Act, and the dismissal of workmen for refusing to sign a document contracting themselves out. The Sheriff intimated that his decision on the points, which were really questions on interpretation of the rules, would be given by him in writing on an early date.

Miners' Federation of Great Britain.

The executive committee of the Miners' Federation of Great Britain, it has been announced, have declined to proceed to take the necessary steps to bring into operation a uniform working policy over the whole British coalfields of five days per week, as decided upon at the last annual conference of the Federation. The executive, it was stated, were not prepared at present to draft a scheme, and they referred it back to the annual conference. In the meantime they requested the districts to fully consider the question, and be prepared to finally decide upon the principal points at the conference upon which a scheme may be drafted.

Instructions have been issued to the districts for a levy of 3d. per member. The ordinary contributions are at the rate of 1d. per quarter per member. The levy will produce over £7,000.

Trades Union Congress

At the resumed meeting of the above on Friday, September 6, a motion to legally enforce industrial agreements was discussed, but was not carried.

A resolution, introduced at the instance of the Miners' Federation, was unanimously carried in favour of the nationalisation of land, minerals, mines, and railways. In the course of the discussion upon it, Mr. Smillie announced that the miners were tired of merely passing resolutions demanding the nationalisation of mines, and that they now proposed to carry out an active propaganda throughout the country, and embody their proposals in a Bill.

Debates on the Insurance Act and on Syndicalism also took place.

The final sitting of the Congress took place on Saturday, when chief among the questions discussed was that of non-unionism. A resolution was passed to the effect that the Congress were of opinion that the time had arrived when trade unionists should refuse to work with non-unionists.

A new Parliamentary Committee was then chosen, which afterwards met and elected Mr. W. J. Davis, of the Amalgamated Brassworkers, as the next president of the Congress.

A special conference is to take place in London on September 18 next to consider a memorandum issued by the Insurance Commissioners on the subject of transferred members and reserve values.

THE SCOTCH COAL AND IRON TRADES.

Thursday, September 12.

Glasgow and Lanarkshire.

COAL.

The coal trade continues very active, but the shipments are not quite so large as might have been expected. This appears to be due, to some extent, to loading berths being occupied by vessels bound coastwise. The aggregate shipments from Scottish ports in the past week amounted to 346,471 tons, being 8,538 less than in the preceding week, and 43,215 tons less than in the corresponding week of last year. The falling off in shipments at Glasgow was considerable, amounting to about 12,000 tons. The foreign clearances were 30,748 tons, while 38,004 tons were despatched coastwise, the total of 68,752 tons comparing with 80,020 in the preceding week, and 100,886 tons in the corresponding week of last year. The shrinkage in the shipments in the last few weeks has occurred almost altogether in the foreign exports. At Glasgow, in three weeks this falling off amounts to about 30,000 tons, and is attributed mainly to the prevailing heavy freights. The rise in the prices of coal has no doubt also, to some extent, adversely affected the export business. It has not been easy to obtain the advanced prices intimated at the beginning of the month. In the household branch of the trade, these rates have only been partly secured notwithstanding that the consumption has materially increased owing to colder weather. There has been a moderate business in steam coal and the better qualities of house coal have been in demand for shipment. Splint coal meets with a very ready market at full prices and there is also an active business in nuts. The quotations f.o.b. at Glasgow are for steam coal 12s. to 13s., ell coal 13s. to 13s. 6d., splint 13s. 6d. to 14s., washed treble nuts 14s. to 14s. 6d., doubles 13s. to 13s. 6d., and singles 12s. to 12s. 6d. per ton. There is a very strong demand for coal for manufacturing purposes.

IRON.

A large business has been done in pig iron on Glasgow Exchange, and still higher prices have been secured. Since last report business has been done in Cleveland warrants from 65s. to 65s. 3d. cash, 65s. 3½d. to 65s. 9½d. one month, and 65s. 11d. to 66s. 2d. three months. Sales have also been noted at 65s. 10d. for delivery in November. There have been occasional slight reactions in price attributed to holders selling for a profit. Merchants report that the outside public is taking an increasing interest in warrant business. The past week's arrivals at Grangemouth of pig iron from Middlesbrough and district amounted to 9,978 tons, being 202 tons more than in the corresponding week of last year. The number of furnaces in blast in Scotland is 88 compared with 83 12 months ago. The market for Scotch pig iron is steady with a large business doing and prices have again been raised in response to the upward movement in warrants. Govan and Monkland are quoted f.a.s. at Glasgow Nos. 1, 71s. 6d., Nos. 3, 70s.; Carnbroe, No. 1, 76s., No. 3, 72s.; Calder, No. 1, 78s. 6d., No. 3, 73s. 6d.; Summerlee, No. 1, 78s., No. 3, 74s; Clyde and Langloan, Nos. 1, 79s., Nos. 3, 74s.; Gartsherrie, No. 1, 79s. 6d., No. 3, 74s. 6d.; Coltness, No. 1, 95s., No. 3, 77s.; Eglinton at Ardrossan or Troon, No. 1, 72s., No. 3, 71s; Glengarnock at Ardrossan, No. 1, 80s., No. 3, 76s.; Dalmellington at Ayr, No. 1, 73s., No. 3, 71s.; Shotts at Leith, No. 1, 79s., No. 3, 74s.; Carron at Grangemouth, No. 1, 79s. 6d., No. 3, 74s. 6d. per ton. Cumberland hematite has been at 78s. 9d. cash, with business at 79s. 6d. and 79s. 9d. three months, east coast English hematite 76s. 6d. f.o.b. and Scotch hematite 81s. delivered at the west of Scotland steelworks. The shipments of pig iron at Scottish ports in the past week were 1,922 tons foreign and 4,047 coastwise, the total of 5,959 tons comparing with 6,645 in the corresponding week, thus showing a decrease of 676 tons. The finished iron and steel works are fully employed, but comparatively little fresh business is being fixed.

Renfrew, Ayr and Dumbarton.

COAL.

The foreign shipments of coal from this district in the past week were 2,720 tons, and the quantity sent coastwise and to Irish ports amounted to 29,210 tons. At Bowling 113 tons were shipped, Irvine 1,125, Ardrossan 2,780, Greenock 2,875, Troon 7,628, and Ayr 17,418—total 31,939 tons, compared with 31,801 in the preceding week and 38,115 in the corresponding week of last year. There is a very large inland consumption of coal at iron and steel and other factories, and the household demand has been increasing owing to colder weather. The miners are giving a large and steady output; business is active all round, and prices are firm.

Stirling, the Lothians and Fife.

COAL.

There has been an active demand for coal in this district both for shipment and home consumption. Household coal for home use has been raised 1s. per ton, but there is comparatively little change in the export prices. The shipments are about 13,000 tons larger at the Firth of Forth ports than in the preceding week. At Granton 10,114 tons were cleared, Bo'ness 16,811, Leith 50,433, Grangemouth 52,971—total 130,329 tons, compared with 117,288 in the preceding week and 122,865 in the corresponding week of last year. Best screened steam coal is quoted at Leith 12s. 6d. to 13s., secondary qualities 11s. 6d. to 12s., treble nuts 14s. to 14s. 6d., doubles 12s. 9d. to 13s., and singles 12s. 3d. to 12s. 6d. per ton. Stormy weather around the coasts tended to curtail shipments at Fife ports, but the trade is in a healthy condition. There is a steady demand for lower Baltic ports, and the coastwise business has shown more activity. The shipments have been, at Burntisland 47,380 tons, Methil 62,708, Alloa 2,423, Wemyss 1,271, Dysart 837, Tayport 486, Charleston 346—total 115,451 tons, compared with 125,900 in the preceding week, and 127,820 in the corresponding week of last year. Nuts have been in very strong request. First-class screened navigation coal is quoted at Methil and Burntisland 15s. 6d. to 16s. 6d., unscreened 13s. to 13s. 6d., first class steam coal 13s. 6d., third-class qualities 11s. 6d. to 12s., treble nuts 14s. to 14s. 6d., doubles 13s. 6d. to 14s., and singles 12s. to 12s. 6d. per ton. A good business is being done in house coal for home use.

THE TIN-PLATE TRADE

Liverpool.

The tone of the market is distinctly firmer on the week. Enquiries are numerous, and a steady business has been done at increased prices. Many works are now fully booked for this year, and owing to the high costs ruling for steel bars and tin, are not anxious to sell ahead unless at a good advance on figures ruling to-day. Following are current quotations for coke tins:—I C 14 × 20 (112 sh. 108 lb.), 15s. per box; I C 28 × 20 (112 sh. 216 lb.), 30s. to 30s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 4½d. to 15s. 6d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. 6d. per box; I C 14 × 19¾ (120 sh. 110 lb.), 15s. 6d. per box; I C 20 × 10 (225 sh. 156 lb.), 22s. to 22s. 6d. per box; I C squares and odd sizes, 15s. 3d. to 15s. 6d basis. Ternes are firm at 26s. to 26s. 6d. per box for I C 28 × 20 unassorted. Charcoal tins rule strong at 17s. 6d. to 18s. and upwards according to finish. Blackplate is held at £11 2s. 6d. per ton basis for 30 gauge, finished quality. Coke wasters are in good demand, and quotations are very firm as follow:—C W 14 × 20, 14s. per box; C W 28 × 20, 28s. 6d. per box; C W 14 × 18¾, 14s. 3d. per box; C W 20 × 10, 20s. 3d. per box—all f.o.b. Wales, less 4 per cent.

THE BY-PRODUCTS TRADE.

Tar products.—The market generally is steady, and prices are well maintained. Pitch is rather quiet, but benzols are firm. Naphthas are keeping to the firm side. Crude carbolic is rather quiet on the west coast, and prices wavering. Toluol is on the advance. Creosote steady. Nearest values are:

Benzols, 90's, 1s. 1d.; ditto 50's, 11½d.; toluol, 11½d.; carbolic acid, crude (60 per cent.), 2s. 6d. to 2s. 7d.; ditto crystals (40 per cent.), 7¼d.; solvent naphtha, 1s. 1½d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 2¾d. for ordinary qualities; pitch, 51s. to 52s. f.o.b. east coast; ditto, 50s. 6d. to 52s. f.a.s. west coast; ditto 55s. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—The market is very firm in all positions, and for forward delivery up to next June £14 15s. has been considered a lucky seizure for the purchaser, £15 being required for but little later periods. American advices point to a quiet market at the moment, though there is a tendency to disparage the outlook owing to the operations of cyanamide interests. For prompt closing values are:—

London (ordinary makes), £14; Beckton, £14 2s. 6d.; Liverpool, £14 12s. 6d.; Hull, £14 10s.; Scotch ports, £14 15s. to £14 17s. 6d.; nitrate of soda (ordinary), per cwt., 11s. 4½d.

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NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Extraordinary Ballot Vote of Federationists—Wholesale Abstentions—Important Opinion as to New Rules, that some are Ultra Vires—Syndicalist Aims in the Coal Industry—The Forthcoming Conference at Swansea—Struggle Between Old and New Schools of Leaders—High Rates of Freight Hindering Shipment—Swansea: Heavy Increase in Coal Shipments—Coalowners Appeal Against 24-Hours Notice Decision.

Upon the general question of Federation reorganisation, the chief issue being the abolition of the present districts and centralisation of Federation affairs, ballot voting has been in progress during the past few days; and the change is approved of. The figures of the voting are, however, not conclusive as to the mind of the men, the striking feature being the number of abstentions. In one case, where 1,300 men are employed, not 30 went to the poll. The non-unionist difficulty complicates the matter; and in addition to a large number who are not members there are many who are not "in compliance" financially, and therefore were not qualified to vote.

The total number of votes polled was just over 85,000, and the majority for centralisation is 10,340. Roughly, about two-thirds of the members voted, assuming that the defections are not general, but it has to be noted that Mr. John Williams (Merthyr district agent) declared a day or two ago that there had been a "considerable slump" in Federation membership.

The disturbing influence of this voting and of the action to which it leads will be intensified by the decision in the Durham question just given by Mr. J. Sankey, K.C., who has long held a leading position on the South Wales circuit, and thereby ensures more attention locally to his Durham declaration. At the request of the Miners' Federation of Great Britain, Mr. Sankey has considered the new district rules framed for the Durham miners, and these, he now states, are in certain points *ultra vires*. The interest of this lies in the fact that upon at least one point there is similarity between the Durham rules and those of South Wales, so that if one be proved to be illegal the other must be so as well. But the Durham rules were framed by Sir R. Romer, who must be recognised as holding in the legal profession a place by no means inferior to that of the gentleman who now pronounces the rule to be *ultra vires*.

Mr. Sankey condemns the rule that a collier who meets with anything exceptional in his working place has to give notice as early as possible to an official, otherwise become not entitled to have his wages made up to the minimum. This, with certain other rules, he regards as outside the province of the Act, but it is only this rule which has its counterpart in South Wales, and therefore only this is of interest in that locality. The South Wales rule is that the man must "forthwith" give notice to an official; and it is further provided that unless he does so, he "shall forfeit the right to wages at the minimum rate" for that particular "pay."

More importance attaches to Mr. Sankey's opinion because he has, in the interests of the South Wales Federation, frequently acted in mining cases. That Federation has already on other points taken counsel's opinion on some of the rules framed by Lord St. Aldwyn, and it is probable that the rule averaging a workman's wages over a fortnight will be brought to the test of a law action.

It is a coincidence that while the miners were voting there should have been a discussion in the Trades Union Congress, then in session at Newport, upon Syndicalism, and that representatives of the Miners' Federation should have contradicted each other in their remarks to the assembled delegates. Mr. Noah Ablett, prominent as one of the advocates of the proposed changes upon which the Federationists were voting, roused Mr. Brace to declare to the Congress that the views expressed by Mr. Ablett were only his personal opinions, and that he was not, in expressing them, giving voice to the views of the Miners' Federation.

This fact is proved from the voting, wherein the outstanding feature of the returns is the large number of abstentions that have to be deducted from the totals given. As a matter of fact, the Syndicalists, hard as they have worked, have not yet captured the Welsh miner. The votes in favour of change are little more than those of that large body which in every such organisation are always ready for alteration, and therefore vote without due consideration of the real issues involved. Yet the local Syndicalists make no secret of their designs. What is lacking among the rank and file of the men generally is a full appreciation of what the present proposals must lead to, namely, such perpetual unrest as will penalise the men by endless losses through strikes. The ultimate object is not so much the remedy of grievances or improvement of conditions as to make the mining industry unremunerative to investors. It is almost too ridiculous to state, but the idea seems to be that if mining can only be made thus unremunerative, then it would be carried on by class administrators, all profits being absorbed by the "workers," and so the millennium would arrive.

Voting now upon centralisation, the colliers are voting upon what is, by some, intended to be a first step towards this end—at least, this is the idea of a few among the chief advocates of change. The general body of men do not realise this; but the older leaders are not ignorant of the real and ultimate aims, for these have found definite expression privately as well as (in partial form) publicly.

At the first stage, the opposition is upon points of detail, and here the older trade-unionists score. They point out that to centralise all Federation business, making the agents only the mouthpiece of the central committee, and compelling them to bring all questions to the decision of the executive, is to introduce a system which is hopelessly impracticable of operation; that an attempt to deal with local grievances in a central meeting is to intensify greatly the troubles for which remedy is desired, because of the very long delay that would be inevitable. Local negotiation between the district agent and the colliery manager is, as the years go by, negotiation with a trade-union leader who has some knowledge of conditions in the mine; and there is a personal acquaintance and understanding which facilitates agreement. The freedom of the district is valued; and the speedier settlement of grievances is of immense importance to the individual men.

How far all this bears upon the proceedings at the annual conference of the Federation, to assemble in Swansea a few days hence, no one can prophesy. Certain it is that that conference will be a very important one—all the more so because the relative strength of the different sections will be subjected to fresh tests. The lesson of the great strike has, however, been learnt; the altered financial position of the Federation has powerful influence; and the folly of extreme measures has been recognised even by some who have in the past been too ready to resort to them. There is the question of the surfacemen. These in South Wales are members of the Federation, whereas in other parts of the country they are outside the organisation. It is suggested that demand will be initiated for a general higher wage rate, under threat of another general strike; and, probably, some talk of that sort will be indulged in. But the Trades Union Congress of last week, even with a fervid Socialist in the chair, showed that there is a powerful body of opinion and a readiness and vigour of expression on the part of cooler heads—men with long experience—the Miners' Federation being not least among the organisations in possession of men of that type.

With regard to the introduction of Syndicalism among the miners, Mr. George Barker, a member of the South Wales executive, and also of that of the Miners' Federation of Great Britain, has told an interviewer that "in this country, Syndicalism means the workers educated so as to replace the capitalists in directing industry; and the mutual interchange of commodities will replace the present system of production for profit." This is described as entirely different from the objects of the French movement, Syndicalists being there precluded from taking part in politics, whereas in this country Syndicalism leaves the individual freedom to participate in political action if he chooses so to do. According to Mr. Barker, "something more effective than the present strike policy is necessary, and Syndicalism provides it."

Rates of freight are again one great subject of comment, for the increases—amounting in some directions to nearly double the normal figures—are having very deterrent effect upon shipments, as well as compelling colliery people to make concessions in price in order that the wagons may be cleared and returned to the mines. Huge quantities of coal lie in the sidings unshipped; but the prospect of release gets less favourable, for the outlook as to rates of freight seems rather to indicate further advance. With heavy demands from the depots abroad, and other foreign orders awaiting fulfilment, the situation in regard to steamers is extremely unsatisfactory.

Swansea's coal trade for August was very satisfactory. The increase of exports on the month amounted to 60,000 tons. Almost the whole of this had been in coal; but it is noteworthy that the shipments of patent fuel manifest a decline of 14,000 tons, this being mainly due to the lack of tonnage—a circumstance which is having very serious influence upon the South Wales exports at the present time. With regard to the tinplate trade Lord Glantawe pointed out in his review of the business that they had had a "boom" lasting nearly ten years, "the longest on record." His lordship said the prospects encouraged them in carrying out the great additions the manufacturers were making to their works. No less than 12,000 tons of the month's increase is credited to tinplate and galvanised sheets exports, an increase of no less than 47 per cent. over the corresponding month, although this is not to be taken as an accurate representation of the trade, because during August of 1911 there were exceptional circumstances which depressed the shipments. New markets and trade connections are being opened up continually; and the return shows that Norway and Italy each took 2,000 tons more than in the preceding month; France 1,000 tons more; Roumania 1,700 tons more; and the Straits Settlements 2,500 tons more. It has to be noted, in regard to Swansea, that although there are still four months of the present year to run, the shipments generally are within 150,000 tons of those for the preceding year, so that there is every prospect of considerably exceeding the quantity of last year, notwithstanding that strikes during the current 12 months caused the port to lose six or eight weeks of normal trade.

A circular has been issued to the workmen at the Llanbradach Collieries, and a meeting summoned to consider allegations therein contained as to many grievances. One of the allegations is that men are "going home with starvation wages," and that men who "assert their right to the minimum wage" are being stopped or kept idle, or sent to work at night, and that there is delay in getting grievances remedied. Seeing that about 3,000 men are involved, their decision is awaited with something of anxiety.

Elsewhere, protest is being made against methods of operation at the collieries, against the award under the Act, and especially against the new rules that form part of the award. The rules seem to have come in the nature of a very unpleasant surprise, and are provoking widespread antagonism. Coupled with the lessened income occasioned by the Eight Hours Act, the consequences of legislation are regarded as distinctly objectionable.

It is reported that the Llest No. 2 Colliery, Pontycymmer, is to be reopened, men being at work to clear falls and do the necessary preliminary repairs.

It is announced that an appeal will be entered against the decision of the Pontypridd stipendiary in the case of Amos *v.* the Glamorgan Colliery Company, wherein it was decided that the company had no right to dismiss the man at 24 hours' notice, but must give four weeks' notice. The facts of the case were fully set out in last week's issue and showed that the company, when re-engaging men after the strike, made intimation that they did so on terms of 24 hours' notice, pending the fixing of the minimum wage, and that no alteration in this intimation had been made.

The Blaen Hirwain Colliery, Cross Hands, Carmarthenshire, was on Tuesday put up for auction at Swansea by Messrs. Leeder and Co. Freehold farm lands of nearly 50 acres, as well as freehold minerals of 103 acres, with 504 acres leasehold (also plant, machinery, etc., were included. It was stated that upwards of £35,000 had been spent on the property, and that the coal reserves exceeded 15 millions of tons. The property was bought for £10,000 by Mr. Leonard Byass, of Port Talbot.

The Carmarthen Bench on Saturday, after seven hours' hearing of a case against a checkweighman, ordered his removal, and allowed costs to the applicants, the Ammanford Colliery Company. It was alleged that the checkweigher exceeded his duty by interfering with workmen, to the detriment of the management of the mine, the men having stopped work at his instigation. In his behalf it was urged that his words to the men had been misinterpreted, but the Bench held that an offence had been committed.

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Upon the general question of Federation reorgani- ition, the chief issue being the abolition of the present istricts and centralisation of Federation affairs, ballot oting has been in progress during the past few days; ud the change is approved of. The figures of the oting are, however, not conclusive as to the mind of ie men, the striking feature being the number of bstentions. In one case, where 1,300 men are employed, ot 30 went to the poll. The non-unionist difficulty omplicates the matter; and in addition to a large umber who are not members there are many who are ot "in compliance" financially, and therefore were ot qualified to vote.

The total number of votes polled was just over 5,000, and the majority for centralisation is 10,340. oughly, about two-thirds of the members voted. ssuming that the defections are not general, but it has be noted that Mr. John Williams (Merthyr district gent) declared a day or two ago that there had been a considerable slump" in Federation membership.

The disturbing influence of this voting and of the tion to which it leads will be intensified by the ecision in the Durham question just given by Mr. J. ankey, K.C., who has long held a leading position on e South Wales circuit, and thereby ensures more tention locally to his Durham declaration. At the quest of the Miners' Federation of Great Britain, r. Sankey has considered the new district rules framed r the Durham miners, and these, he now states, are in rtain points *ultra vires*. The interest of this lies in e fact that upon at least one point there is similarity etween the Durham rules and those of South Wales, that if one be proved to be illegal the other must be as well. But the Durham rules were framed by r R. Romer, who must be recognised as holding in e legal profession a place by no means inferior to at of the gentleman who now pronounces the rule to *ultra vires*.

Mr. Sankey condemns the rule that a collier who eets with anything exceptional in his working place s to give notice as early as possible to an official, herwise become not entitled to have his wages made to the minimum. This, with certain other rules, he gards as outside the province of the Act, but it is ly this rule which has its counterpart in South Wales, d therefore only this is of interest in that locality. he South Wales rule is that the man must "forthwith" ve notice to an official; and it is further provided that less he does so, he "shall forfeit the right to wages at e minimum rate" for that particular "pay."

More importance attaches to Mr. Sankey's opinion cause he has, in the interests of the South Wales ederation, frequently acted in mining cases. That ederation has already on other points taken counsel's inion on some of the rules framed by Lord St. ldwyn, and it is probable that the rule averaging a orkman's wages over a fortnight will be brought to e test of a law action.

It is a coincidence that while the miners were ting there should have been a discussion in the ades Union Congress, then in session at Newport, on Syndicalism, and that representatives of the iners' Federation should have contradicted each other their remarks to the assembled delegates. Mr. Noah blett, prominent as one of the advocates of the pro- sed changes upon which the Federationists were ting, roused Mr. Brace to declare to the Congress at the views expressed by Mr. Ablett were only his rsonal opinions, and that he was not, in expressing em, giving voice to the views of the Miners' ederation.

This fact is proved from the voting, wherein the tstanding feature of the returns is the large number abstentions that have to be deducted from the totals ven. As a matter of fact, the Syndicalists, hard as ey have worked, have not yet captured the Welsh ner. The votes in favour of change are little more an those of that large body which in every such ganisation are always ready for alteration, and therefore vote without due consideration of the real issues involved. Yet the local Syndicalists make no secret of their designs. What is lacking among the rank and file of the men generally is a full appreciation of what the present proposals must lead to, namely, such perpetual unrest as will penalise the men by endless losses through strikes. The ultimate object is not so much the remedy of grievances or improvement of conditions as to make the mining industry unremunerative to investors. It is almost too ridiculous to state, but the idea seems to be that if mining can only be made thus unremunerative, then it would be carried on by class administrators, all profits being absorbed by the "workers," and so the millennium would arrive.

Voting now upon centralisation, the colliers are voting upon what is, by some, intended to be a first step towards this end—at least, this is the idea of a few among the chief advocates of change. The general body of men do not realise this; but the older leaders are not ignorant of the real and ultimate aims, for these have found definite expression privately as well as (in partial form) publicly.

At the first stage, the opposition is upon points of detail, and here the older trade-unionists score. They point out that to centralise all Federation business, making the agents only the mouthpiece of the central committee, and compelling them to bring all questions to the decision of the executive, is to introduce a system which is hopelessly impracticable of operation; that an attempt to deal with local grievances in a central meeting is to intensify greatly the troubles for which remedy is desired, because of the very long delay that would be inevitable. Local negotiation between the district agent and the colliery manager is, as the years go by, negotiation with a trade-union leader who has some knowledge of conditions in the mine; and there is a personal acquaintance and understanding which facilitates agreement. The freedom of the district is valued; and the speedier settlement of grievances is of immense importance to the individual men.

How far all this bears upon the proceedings at the annual conference of the Federation, to assemble in Swansea a few days hence, no one can prophesy. Certain it is that that conference will be a very important one—all the more so because the relative strength of the different sections will be subjected to fresh tests. The lesson of the great strike has, however, been learnt; the altered financial position of the Federation has powerful influence; and the folly of extreme measures has been recognised even by some who have in the past been too ready to resort to them. There is the question of the surfacemen. These in South Wales are members of the Federation, whereas in other parts of the country they are outside the organisation. It is suggested that demand will be initiated for a general higher wage rate, under threat of another general strike; and, probably, some talk of that sort will be indulged in. But the Trades Union Congress of last week, even with a fervid Socialist in the chair, showed that there is a powerful body of opinion and a readiness and vigour of expression on the part of cooler heads—men with long experience—the Miners' Federation being not least among the organisations in possession of men of that type.

With regard to the introduction of Syndicalism among the miners, Mr. George Barker, a member of the South Wales executive, and also of that of the Miners' Federation of Great Britain, has told an interviewer that "in this country, Syndicalism means the workers educated so as to replace the capitalists in directing industry; and the mutual interchange of commodities will replace the present system of production for profit." This is described as entirely different from the objects of the French movement, Syndicalists being there precluded from taking part in politics, whereas in this country Syndicalism leaves the individual freedom to participate in political action if he chooses so to do. According to Mr. Barker, "something more effective than the present strike policy is necessary, and Syndicalism provides it."

Rates of freight are again one great subject of comment, for the increases—amounting in some directions to nearly double the normal figures—are having very deterrent effect upon shipments, as well as compelling colliery people to make concessions in price in order that the wagons may be cleared and returned to the mines. Huge quantities of coal lie in the sidings unshipped; but the prospect of release gets less favourable, for the outlook as to rates of freight seems rather to indicate further advance. With heavy demands from the depots abroad, and other foreign orders awaiting fulfilment, the situation in regard to steamers is extremely unsatisfactory.

Swansea's coal trade for August was very satisfactory. The increase of exports on the month amounted to 60,000 tons. Almost the whole of this had been in coal; but it is noteworthy that the shipments of patent fuel manifest a decline of 14,000 tons, this being mainly due to the lack of tonnage—a circumstance which is having very serious influence upon the South Wales exports at the present time. With regard to the tinplate trade Lord Glantawe pointed out in his review of the business that they had had a "boom" lasting nearly ten years, "the longest on record." His lordship said the prospects encouraged them in carrying out the great additions the manufacturers were making to their works. No less than 12,000 tons of the month's increase is credited to tinplate and galvanised sheets exports, an increase of no less than 47 per cent. over the corresponding month, although this is not to be taken as an accurate representation of the trade, because during August of 1911 there were exceptional circumstances which depressed the shipments. New markets and trade connections are being opened up continually; and the return shows that Norway and Italy each took 2,000 tons more than in the preceding month; France 1,000 tons more; Roumania 1,700 tons more; and the Straits Settlements 2,500 tons more. It has to be noted, in regard to Swansea, that although there are still four months of the present year to run, the shipments generally are within 150,000 tons of those for the preceding year, so that there is every prospect of considerably exceeding the quantity of last year, notwithstanding that strikes during the current 12 months caused the port to lose six or eight weeks of normal trade.

A circular has been issued to the workmen at the Llanbradach Collieries, and a meeting summoned to consider allegations therein contained as to many grievances. One of the allegations is that men are "going home with starvation wages," and that men who "assert their right to the minimum wage" are being stopped or kept idle, or sent to work at night, and that there is delay in getting grievances remedied. Seeing that about 3,000 men are involved, their decision is awaited with something of anxiety.

Elsewhere, protest is being made against methods of operation at the collieries, against the award under the Act, and especially against the new rules that form part of the award. The rules seem to have come in the nature of a very unpleasant surprise, and are provoking widespread antagonism. Coupled with the lessened income occasioned by the Eight Hours Act, the consequences of legislation are regarded as distinctly objectionable.

It is reported that the Llest No. 2 Colliery, Pontycymmer, is to be reopened, men being at work to clear falls and do the necessary preliminary repairs.

It is announced that an appeal will be entered against the decision of the Pontypridd stipendiary in the case of Amos *v.* the Glamorgan Colliery Company, wherein it was decided that the company had no right to dismiss the man at 24 hours' notice, but must give four weeks' notice. The facts of the case were fully set out in last week's issue and showed that the company, when re-engaging men after the strike, made intimation that they did so on terms of 24 hours' notice, pending the fixing of the minimum wage, and that no alteration in this intimation had been made.

The Blaen Hirwain Colliery, Cross Hands, Carmarthenshire, was on Tuesday put up for auction at Swansea by Messrs. Leeder and Co. Freehold farm lands of nearly 50 acres, as well as freehold minerals of 103 acres, with 504 acres leasehold (also plant, machinery, etc., were included. It was stated that upwards of £35,000 had been spent on the property, and that the coal reserves exceeded 15 millions of tons. The property was bought for £10,000 by Mr. Leonard Bynes, of Port Talbot.

The Carmarthen Bench on Saturday, after seven hours' hearing of a case against a checkweighman, ordered his removal, and allowed costs to the applicants, the Ammanford Colliery Company. It was alleged that the checkweigher exceeded his duty by interfering with workmen, to the detriment of the management of the mine, the men having stopped work at his instigation. In his behalf it was urged that his words to the men had been misinterpreted, but the Bench held that an offence had been committed.

COLLIERY ACCIDENTS.

Cadeby Main.

The located bodies of the remaining victims of the Cadeby disaster are not likely to be brought to the surface for at least a further three weeks, as the work of the rescue parties is necessarily slow. A statement to this effect was made by Mr. Frank Allen, the district coroner, at the adjourned inquest, held at the colliery offices on Monday. In deciding upon a further adjournment till October 7, Mr. Allen said that if any of the bodies were recovered in the meantime he would call the jury together. From a conversation he had had with Mr. Witty (manager of the mine), he understood that since the accident to Burns (the member of the Manvers Main rescue party, who lost his life while helping to recover bodies), it had been necessary to proceed with the work very carefully. He did not propose to take further evidence at length until the whole of the bodies were recovered. During the past week-end a dead pony was taken out of the pit.

Three more bodies were recovered from the Cadeby Colliery at Conisboro, on Tuesday. They were those of J. Beech, dataller, C. Fletcher, dataller, and W. Godsmark, dataller. The remains were in a shocking state, having been lying in the high temperature of the colliery since the disaster on July 9 last. The inquest was formally opened at a late hour the same evening, and adjourned.

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Arthur Jones, a fireman at the pit, stated that he and the deceased drilled a hole, which was charged by the latter, who was told to keep a look-out in a certain direction lest someone might come along. Other workmen were ordered off to guard other parts. Owing to a defect in the cable, however, the shot did not go off at the first attempt. The cable was adjusted, and the shot was fired again by witness, who, to his great surprise, found the deceased on the ground in an unconscious state. The conjecture was that deceased had returned to the scene in the belief that the shot had duly gone off in the first instance.

Witness was closely examined by his Majesty's inspector, Mr. Davies, upon the new rule relative to shot-firing, and according to which an undischarged shot could not be disturbed or put off for a second time until an interval of ten minutes had elapsed. Witness replied that he was not aware that such a rule applied to the case under review.

The rule in question was produced, and the coroner pointed out that there existed some doubt in face of the fact that the subsequent rule enacted that "shots should be fired as soon as practicable."

The jury returned a verdict of "Accidental death," with the addendum that no blame could be attached to anyone.

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Mr. H. Milligan, the Wigan Borough Coroner, held the inquest on the following day.

Thomas Walford said he along with Sherrington and Warren was working in the Arley Mine, within about a yard of each other. They were jack-legging a bar, when there was a heavy fall of roof, five stones coming down, and catching Warren and Sherrington. He jumped out of the way, but was caught on the neck and leg. He ran down towards the shunt, and sent for a man named Talbot, who assisted in rescuing the men. Sherrington was unconscious, and was bleeding from a large wound on the neck and throat. He died in about a quarter of an hour. The fall would weigh about 28 cwt. One stone would be about 5 ft 6 in. long, a yard wide, and a yard thick; it brought about four "legs" and two bars down. Witness said when he first went into the place he found there had been a fall of two tubs of dirt, which had "canted" two props. He spoke to Talbot, who sent for the datallers, Warren and Sherrington, and it was whilst they were engaged in strengthening the timber that the accident happened.

James Hill, day fireman, said he examined the roof on the previous day, and he thought it was in very good condition. One of the bars was slightly canted through weight, but he did not consider it dangerous. The place was between two steps, and they were preparing for a side road to get in. It was timbered very well. Witness agreed that in the future it would be better to take immediate precautions where there was the slightest indication of weight. He also agreed that if the bars were flat where the legs were, it would minimise the risk of props "canting."

The jury returned a verdict of "Accidental death," and recommended that when bars were used they should be left flat where the caps fitted.

Horden.

Deputy-Coroner Pearce held an inquest at Horden, lately, on the body of Charles Brown, stoneman, who was killed by a fall of stone in Horden Colliery, on the 29th ult.

Peter Yore, stoneman, who was working with deceased, said they were engaged in drawing timber. Deceased was getting out a prop, and had cut away the top of the prop with his axe to ease it. He then tried to get it out with a plank, but it was too hard in, and he went back to ease it with his axe, intending then to retire into safety and knock it out with a plank, when a heavy stone came away, carrying all before it, and killed him. In answer to Mr. E. Hay, H.M. inspector of mines, witness said he knew it was the rule to use a "pout," or long-handled instrument in drawing timber, and there was one not far away, but in this case it was not necessary to use one, as the timber was so close together, and there appeared to be no danger.

Mr. Hay said that, according to law, the men were bound to use the safety appliances provided for timber drawing, and not to use their own judgment. This was in accordance with the new Mines Act.

The Coroner said it seemed that the men were in the habit of picking up a plank or the first thing handy in order to push on with their work. It was very unfortunate that they would not take more care. He hoped that this case would be a warning, and that men would carry out the rules made for their own safety.

The jury returned a verdict that deceased was accidentally killed while following his employment.

MINING AND OTHER NOTES.

It is expected that before very long the pit sinkers at the new colliery at Askern Spa will have succeeded in reaching the Barnsley bed. Reticence is observed in official quarters concerning this interesting event, but it seems to be no secret that coal is expected to be reached very shortly.

The Admiralty are reported to have placed a further order for oil fuel, aggregating some 200,000 tons, among the principal refining companies in Scotland, in proportion to their production.

Mr. Arthur Lawrence, mining engineer, Cardiff, has been elected a director of the Oakdale Navigation Collieries Limited in the place of the late Mr. Walter McLaren, M.P.

Mr. Henry Holliday, of Gildersome, near Leeds, colliery proprietor, of Messrs. Robert Holliday and Sons, of the East Ardsley Collieries, who died on May 18, aged 62, left estate valued at £54,916 gross, with net personalty £49,513.

For some time past boring operations have been conducted in the vicinity of Oakley, on behalf of Oakley Collieries Limited, of whom the principal is Sir James Sivewright, of Tulliallan Castle. It is learned that the Dunfermline splint coal, which is the most valuable seam in the Fife measures, and is the deepest, has been pierced at the short distance from the surface of 30 fathoms.

Mr. Alexander Hinshelwood has been appointed manager at Knowehead Mine, Dennyloanhead, Stirlingshire. Mr. Hinshelwood, who was formerly a mine surveyor, was for a long time in the employment of the Coltness Iron Company.

A new manager has been appointed at William Pit, Whitehaven, in place of the late Mr. Whitfield. Mr. Whitfield's successor is Mr. George Emmerson, for the time being under-manager for the Burradon and Coxlodge Coal Company, Burradon, Northumberland.

Working places are now being opened out in the Trencherbone Mines (reached at a depth of about 800 yards) at the Pilkington Colliery Company's Astley Green collieries, in South Lancashire.

Mr. George Steele Byers, of Darlington, colliery proprietor, left estate of the gross value of £10,206 4s. 3d., of which the net personalty has been sworn at £6,663 14s. 1d.

Mr. John Clark, who for the past five years has been colliery manager for the Niddrie and Benhar Coal Company Limited, has been appointed manager for the Glencraig Colliery Limited, of Wilsons and Clyde Limited, near Lochgelly.

Mr. Enoch Edwards, of Burslem, Staffs, president of the Miners' Federation, Labour M.P., who died on June 28, aged 60, left estate of the gross value of £3,192, of which the net personalty has been sworn at £2,861.

Mr. A. Storey, of the New Monckton Collieries, Barnsley, has obtained the under-manager's position at the Cadeby Colliery of the Denaby and Cadeby Collieries Limited.

The Carriden Coal Company are opening two new pits to the rear of Bo'ness Dock for the purpose of working the coal under the sea. Sinking operations for the main shaft are already well advanced at a point below low water mark, to which point a pier has been thrown out.

At Ystradgynlais Police Court recently, the Abercrave Colliery Company were summoned for keeping explosives in unauthorised places on July 22, and also for not having a sufficient lightning conductor to a store where explosives were kept. The chairman considered the offence as regards the explosives a serious one, and fined the defendants 20 guineas and costs in the first case, £5 and costs in the second, and a fine of 10s. was imposed in the case of the lightning conductor.

Cases arising out of a fatality at the Cwm Colliery, a small house coal colliery, on May 10 last, were heard at Ebbw Vale last week, when Richard Stanfield, colliery proprietor, Malpas, was summoned, at the instance of Dr. W. N. Atkinson, chief inspector of mines, for not exercising daily personal supervision of the mine, either by himself as manager, or by an under-manager appointed by him. Defendant was fined £20, and five guineas costs. Other summonses for offences under the Mines Act were dismissed upon payment of court fees.

It has been arranged that the new science laboratories of George Heriot's school will be formally opened by the Right Hon. T. McKinnon Wood, Secretary for Scotland, on Friday, October 4. These laboratories have been erected at a cost of £16,000.

There is now an increasing output from various seams at the Bryn Hall Colliery Company's Countess-lane Colliery, Radcliffe, near Manchester, the latest started coalpit in that neighbourhood, and additional working places are being opened out.

The Earl of Ellesmere, Clifton and Kersley Coal Company and other leading coalowners in Manchester and Bolton districts are now adopting electricity on a more ambitious scale for various purposes in connection with their extensive collieries in those areas.

The miners and officials at Cadzow Colliery, Hamilton, have presented Mr. James Jobson, their under-manager, with various tokens of goodwill to his wife and himself, in view of his departure to fill an appointment as manager of Meadowhead Colliery, Airdrie.

Mr. G. J. German, who has just retired from the management of Hall's Collieries, has been presented with a handsome silver rose bowl by the officials.

Mr. Jabez Hall, who until recently represented Wigan and Bolton on the executive of the Associated Iron and Steel Workers of Great Britain, was recently presented with an oak roll top desk and chair on his appointment to the presidency of the Association.

The *London Gazette* announces the appointment of the Right Hon. Arnold Morley to be a Commissioner to enquire into the natural resources, trade and legislation of certain portions of his Majesty's dominions, in the place of Lord Inchcape, who has resigned.

It is announced that one of the largest steelworks in South Staffordshire are about to lay down new plant aiming at superior economies in connection with the heating furnaces serving the steel rolling mills. The new plant will obtain valuable residues from the raw coal used for firing the heating furnaces, and also provide additional gas power for rolling the mill products. Hitherto these economies have been mostly confined to blast-furnace working, but the Staffordshire works in question believe they can attach them to steel manufacture.

In regard to the inrush of water which recently occurred at Hartford Pit, it is fully anticipated by the management of the mine that the whole of the men and lads, who have been temporarily employed at the other pits of the company, will be transferred and reinstated at their own pit in the course of a very few days.

On the question of whether or not the coal under Kirkcaldy foreshore belongs to the burgh, an opinion has been prepared by Mr. W. L. Macindoe, town clerk. That the coal under the foreshore belongs to Mr. Oswald of Dunnikier for the following reasons.—(1) That the burgh charter does not expressly include the foreshore, and the burgh has not had possession either of the foreshore or the coal under it; (2) Mr. Oswald has a valid title to the coal under the foreshore apart from possession; and (3) Mr. Oswald has a prescriptive title followed by possession.

A meeting of the governors of the Northumberland Aged Mine Workers' Homes Association was held recently at Burt Hall, Newcastle, when arrangements were considered in connection with the laying of the foundation stones of ten cottages at Annitsford on Saturday, October 12. These cottages will constitute the seventeenth group, or a total of 178 cottages, which the Association has built in 12 years for the benefit of old miners and their wives. The site at Annitsford has been kindly provided by Major Clayton.

On the 2nd inst. Richard Harris, miner, was summoned at Rotherham for doing an act likely to endanger the safety of persons at work in the Silverwood Pit on August 27. The defendant was dissatisfied because empty trucks were not reaching his working place as he expected, and it was alleged he had wrongfully started full tubs, as a result of which there was a collision with the empty tubs, and three men narrowly escaped injury. When seen by the manager, defendant said he set off one of the tubs, but he did not think any harm would be done. Defendant was fined 20s. and costs.

Mr D. R. Morgan, manager, Ben Evans and T. R. Evans, underground timbermen, Lettyshenkin Colliery, Cwmbach, Aberdare, Glamorganshire, on February 1, 1912, succeeded in rescuing a man who was buried under a large fall of roof at the above colliery. Mr. Morgan is to receive an honorary certificate, and Ben Evans and T. R. Evans the sum of £5 each, from the Carnegie Hero Fund trustees.

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Peter Yore, stoneman, who was working with deceased, said they were engaged in drawing timber. Deceased was getting out a prop, and had cut away the top of the prop with his axe to ease it. He then tried to get it out with a plank, but it was too hard in, and he went back to ease it with his axe, intending then to retire into safety and knock it out with a plank, when a heavy stone came away, carrying all before it, and killed him. In answer to Mr E. Hay, H.M. inspector of mines, witness said he knew it was the rule to use a "pout," or long-handled instrument in drawing timber, and there was one not far away, but in this case it was not necessary to use one, as the timber was so close together, and there appeared to be no danger.

Mr. Hay said that, according to law, the men were bound to use the safety appliances provided for timber drawing, and not to use their own judgment. This was in accordance with the new Mines Act

The Coroner said it seemed that the men were in the habit of picking up a plank or the first thing handy in order to push on with their work. It was very unfortunate that they would not take more care. He hoped that this case would be a warning, and that men would carry out the rules made for their own safety.

The jury returned a verdict that deceased was accidentally killed while following his employment.

MINING AND OTHER NOTES.

It is expected that before very long the pit sinkers at the new colliery at Askern Spa will have succeeded in reaching the Barnsley bed. Reticence is observed in official quarters concerning this interesting event, but it seems to be no secret that coal is expected to be reached very shortly.

The Admiralty are reported to have placed a further order for oil fuel, aggregating some 200,000 tons, among the principal refining companies in Scotland, in proportion to their production.

Mr. Arthur Lawrence, mining engineer, Cardiff, has been elected a director of the Oakdale Navigation Collieries Limited in the place of the late Mr. Walter McLaren, M.P.

Mr. Henry Holliday, of Gildersome, near Leeds, colliery proprietor, of Messrs Robert Holliday and Sons, of the East Ardsley Collieries, who died on May 18, aged 62, left estate valued at £54,916 gross, with net personalty £49,513.

For some time past boring operations have been conducted in the vicinity of Oakley, on behalf of Oakley Collieries Limited, of whom the principal is Sir James Sivewright, of Tulliallan Castle. It is learned that the Dunfermline splint coal, which is the most valuable seam in the Fife measures, and is the deepest, has been pierced at the short distance from the surface of 30 fathoms.

Mr. Alexander Hinshelwood has been appointed manager at Knowehead Mine, Dennyloanhead, Stirlingshire. Mr. Hinshelwood, who was formerly a mine surveyor, was for a long time in the employment of the Coltness Iron Company.

A new manager has been appointed at William Pit, Whitehaven, in place of the late Mr. Whitfield. Mr. Whitfield's successor is Mr. George Emmerson, for the time being under-manager for the Burradon and Coxlodge Coal Company, Burradon, Northumberland.

Working places are now being opened out in the Trencherbone Mines (reached at a depth of about 800 yards) at the Pilkington Colliery Company's Astley Green collieries, in South Lancashire.

Mr. George Steele Byers, of Darlington, colliery proprietor, left estate of the gross value of £10,206 4s. 8d., of which the net personalty has been sworn at £6,663 14s. 1d.

Mr. John Clark, who for the past five years has been colliery manager for the Niddrie and Benhar Coal Company Limited, has been appointed manager for the Glencraig Colliery Limited, of Wilsons and Clyde Limited, near Lochgelly.

Mr. Enoch Edwards, of Burslem, Staffs, president of the Miners' Federation, Labour M.P., who died on June 28, aged 60, left estate of the gross value of £3,192, of which the net personalty has been sworn at £2,861.

Mr. A. Storey, of the New Monckton Collieries, Barnsley, has obtained the under-manager's position at the Cadeby Colliery of the Denaby and Cadeby Collieries Limited.

The Carriden Coal Company are opening two new pits to the rear of Bo'ness Dock for the purpose of working the coal under the sea. Sinking operations for the main shaft are already well advanced at a point below low water mark, to which point a pier has been thrown out.

At Ystradgynlais Police Court recently, the Abercrave Colliery Company were summoned for keeping explosives in unauthorised places on July 22, and also for not having a sufficient lightning conductor to a store where explosives were kept. The chairman considered the offence as regards the explosives a serious one, and fined the defendants 20 guineas and costs in the first case, £5 and costs in the second, and a fine of 10s. was imposed in the case of the lightning conductor.

Cases arising out of a fatality at the Cwm Colliery, a small house coal colliery, on May 10 last, were heard at Ebbw Vale last week, when Richard Stanfield, colliery proprietor, Malpas, was summoned, at the instance of Dr. W. N. Atkinson, chief inspector of mines, for not exercising daily personal supervision of the mine, either by himself as manager, or by an under-manager appointed by him. Defendant was fined £20, and five guineas costs. Other summonses for offences under the Mines Act were dismissed upon payment of court fees.

It has been arranged that the new science laboratories of George Heriot's school will be formally opened by the Right Hon. T. McKinnon Wood, Secretary for Scotland, on Friday, October 4. These laboratories have been erected at a cost of £16,000.

There is now an increasing output from various seams at the Bryn Hall Colliery Company's Countess-lane Colliery, Radcliffe, near Manchester, the latest started coalpit in that neighbourhood, and additional working places are being opened out.

The Earl of Ellesmere, Clifton and Kersley Coal Company and other leading coalowners in Manchester and Bolton districts are now adopting electricity on a more ambitious scale for various purposes in connection with their extensive collieries in those areas.

The miners and officials at Cadzow Colliery, Hamilton, have presented Mr. James Jobson, their under-manager, with various tokens of goodwill to his wife and himself, in view of his departure to fill an appointment as manager of Meadowhead Colliery, Airdrie.

Mr. O. J. Oorman, who has just retired from the management of Hall's Collieries, has been presented with a handsome silver rose bowl by the officials.

Mr. Jabez Hall, who until recently represented Wigan and Bolton on the executive of the Associated Iron and Steel Workers of Great Britain, was recently presented with an oak roll top desk and chair on his appointment to the presidency of the Association.

The *London Gazette* announces the appointment of the Right Hon. Arnold Morley to be a Commissioner to enquire into the natural resources, trade and legislation of certain portions of his Majesty's dominions, in the place of Lord Inchcape, who has resigned.

It is announced that one of the largest steelworks in South Staffordshire are about to lay down new plant aiming at superior economies in connection with the heating furnaces serving the steel rolling mills The new plant will obtain valuable residues from the raw coal used for firing the heating furnaces, and also provide additional gas power for rolling the mill products. Hitherto these economies have been mostly confined to blast-furnace working, but the Staffordshire works in question believe they can attach them to steel manufacturers.

In regard to the inrush of water which recently occurred at Hartford Pit, it is fully anticipated by the management of the mine that the whole of the men and lads, who have been temporarily employed at the other pits of the company, will be transferred and reinstated at their own pit in the course of a very few days.

On the question of whether or not the coal under Kirkcaldy foreshore belongs to the burgh, an opinion has been prepared by Mr. W. L. Macindoe, town clerk. That the coal under the foreshore belongs to Mr. Oswald of Dunnikier for the following reasons:—(1) That the burgh charter does not expressly include the foreshore, and the burgh has not had possession either of the foreshore or the coal under it; (2) Mr. Oswald has a valid title to the coal under the foreshore apart from possession; and (3) Mr. Oswald has a prescriptive title followed by possession.

A meeting of the governors of the Northumberland Aged Mine Workers' Homes Association was held recently at Burt Hall, Newcastle, when arrangements were considered in connection with the laying of the foundation stones of ten cottages at Annitsford on Saturday, October 12. These cottages will constitute the seventeenth group, or a total of 178 cottages, which the Association has built in 12 years for the benefit of old miners and their wives. The site at Annitsford has been kindly provided by Major Clayton.

On the 2nd inst. Richard Harris, miner, was summoned at Rotherham for doing an act likely to endanger the safety of persons at work in the Silverwood Pit on August 27. The defendant was dissatisfied because empty trucks were not reaching his working place as he expected, and it was alleged he had wrongfully started full tubs, as a result of which there was a collision with the empty tubs, and three men narrowly escaped injury. When seen by the manager, defendant said he set off one of the tubs, but he did not think any harm would be done. Defendant was fined 20s. and costs.

Mr. D. R. Morgan, manager, Ben Evans and T. B. Evans, underground timberman, Lettyshenkin Colliery, Cwmbach, Aberdare, Glamorganshire, on February 1, 1912, succeeded in rescuing a man who was buried under a large fall of roof at the above colliery. Mr. Morgan is to receive an honorary certificate, and Ben Evans and T. R. Evans the sum of £5 each, from the Carnegie Hero Fund trustees.

share (free of income tax) for the half-year ended June 30 last, making 10 per cent. for the year, be paid on September 30 next, and the balance of £19,115 be carried forward.

Lambert Brothers Limited.—The report for the year ended June 30 last states that the profit, including the amount brought forward, is £64,917 7s. 8d., and after providing for the managing director's remuneration, directors' fees, and the preference dividend for the year there remains a balance of £46,567 7s. 8d., out of which the directors have placed to reserve account the sum of £10,000, and propose to pay a dividend at the rate of 10 per cent. on the ordinary shares, carrying forward an amount of £6,567 7s. 6d. to the next account.

Lothian Coal Company Limited.—The report by the directors for the year ending May 31 last states that the profit and loss account for the year, after providing for the maintenance of works and all current charges, shows a credit balance of £7,685 7s. 10d.; the balance from last year was £5,918 16s. 2d.—total, £13,604 6s. There falls to be deducted £2,000 in respect of debenture interest and directors' fees, leaving a balance of £11,604 6s., out of which there were paid on August 15, 1912, the arrears of preference dividends for the two half-years ending Martinmas 1911 and Whitsunday 1912, £7 300. The amount to be carried to the year now current is, therefore, £4,304 6s. The directors state that the demand for coal was artificially inflated in the beginning of 1912 by the expectation of a national strike of miners, which actually took place on March 1, and continued till April 8. This prolonged stoppage of work reduced the output for the year by about 12 per cent., and materially raised the average annual cost per ton of producing the coal. Frequent interruptions to the output, causing *in cumulo* the loss of a considerable tonnage, occurred during the year, owing to defective railway service, and with the view of securing a satisfactory service the directors joined with others in promoting the Lothian Railways Bill. Success has not attended the promotion of the measure on this occasion, but whether it will eventually pass or not, good has been done by public attention having been called to the manner in which the natural development of the important coal industry of the Lothians is checked by inadequate railway facilities.

McAndrew (John) and Co. Limited.—This private company has been registered in Edinburgh, with a capital of £35,000 in £1 shares, to carry on business as coalmasters, &c. First directors, Wm. Wallace and A. W. Waddell. Registered office, 112, Wellington-street, Glasgow.

N. U. Syndicate Limited.—This private company has been registered, with a capital of £10,500 (8,000 ordinary shares of £1 each and 50,000 deferred shares of 1s. each), to carry on the business of coal and iron masters, &c. Provisional directors, R. O. Mann and H. J. Smith. Registered office, 1-2, George-street, Mansion House, E.C.

Pearson and Knowles Coal and Iron Company Limited—The directors have decided to recommend the payment of the usual half-year's dividend at the rate of 6 per cent. per annum on both the preference and second preference shares, and a half-year's dividend at the rate of 7 per cent. per annum on the ordinary shares. They also recommend that the capital expenditure for the year be written off out of profits, that £12,393 be added to the reserve fund, and the balance carried forward to the next account.

Powell Duffryn Steam Coal Company Limited.—The directors have declared the usual interim dividends for the half-year ending June 30 last at the rate of 10 per cent. per annum on the ordinary shares, free of income tax, and at the rate of 6 per cent. per annum on the preference shares, less income tax.

Stooke and Sparke Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of brass-founders, mechanical engineers, toolmakers, &c., and to take over the business carried on at Forest Gate as Stooke and Sparks, and to adopt an agreement with S. A. Stooke and C. H. Sparks. First directors, S. A. Stooke and C. H. Sparke (managing directors), J. J. Bassett, W. T. Clapton, D. Steedman, and W. Wilkinson. Qualification, 500 shares. Registered office, Stratford Iron-works, Woodgrange-road, Forest Gate, Essex.

Turbine Gears Limited.—This private company has been registered, with a capital of £5,000 in £1 shares, to carry on the business of manufacturers of gear-cutting machines, founders, mechanical engineers, toolmakers, &c., and to adopt an agreement with J. Ogden. Qualification of first directors, who are to be appointed, £50. Registered office, Daisyfield House, Newton Moor, Hyde, Cheshire.

Vickermann (R E.) Limited.—This private company has been registered, with a capital of £6,000 in £1 shares (3,500 preference), to take over the business of a colliery agent, coal merchant, &c., now carried on by R. E. Vickermann at Harrogate, Yorks, as R. E. Vickermann. First directors: R. E. Vickermann (chairman and managing director), G. W. Fletcher, and G. Wilkinson. Qualification, £100.

Vryheid (Natal) Railway Coal and Iron Company Limited.—The report for the year ended January 31, 1912, states that, after allowing for depreciation and providing for interest on debenture issue and loan, the result of the year's trading is a profit of £1,368, which, deducted from the debit balance of £6,200 brought forward, leaves a sum of £4,800 to be dealt with hereafter. The output from the mine for the year was 228,106 tons, as against 119,730 tons for 1910-11. The quality of the coal has undoubtedly improved, and it is being supplied regularly to the South African railway liners, &c.

Windsor Steam Coal Company (1910) Limited.—The directors, in submitting the accounts to June 30, 1912, state that after charging all expenses, including interest on debentures, there is a loss on the year's trading of £14,385 8s. 2d. Practically the whole of the above loss was incurred prior to December 31 last, and was due in a large measure to the reduced output and increased cost of working brought about by strikes and labour troubles. Considerable delay has been experienced in the erection of the north pit winding-engine, and this pit has been on stop during the whole of the financial year. The work has now been practically completed, and the winding of coal should be commenced during the current month. It is anticipated that when work is resumed at the north pit the output will be increased and the cost of working materially reduced. A duplicate air-compressing plant and additional hauling engines are on order.

COAL AND COKE EXPORTED FROM PORTS IN ENGLAND, SCOTLAND AND WALES

During the month of August 1912, compared with the corresponding month of 1911.*

Port.	August 1912.		August 1911.		Coals.		Coke.	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons	Tons.	Tons	Tons.
Newcastle	935,705	28,927	794,626	13,598	141,079	—	15,329	—
North Shields	103,317	711	120,198	2,945	—	16,881	—	2,234
South Shields	131,137	17	173,640	3,131	—	42,503	—	3,384
Sunderland	317,298	5,987	282,891	4,641	34,307	—	1,346	—
West Hartlepool	142,737	2,153	109,015	1,625	33,722	—	528	—
Goole	107,649	2,307	114,893	2,317	—	7,244	—	10
Blyth	373,381	230	302,168	2,217	71,213	—	—	1,987
Newport	330,297	979	396,255	1,143	—	65,958	—	164
Liverpool	45,718	1,414	31,051	488	14,667	—	926	—
Methil	241,680	—	254,830	201	—	13,150	—	201
Glasgow	218,001	3,068	209,315	2,500	8,686	—	568	—
Kirkcaldy	9,732	—	9,504	—	228	—	—	—
Burntisland	201,775	370	179,731	151	22,044	—	119	—
Cardiff	1,580,926	8,090	1,150,921	3,913	430,005	—	4,177	—
Borrowstoness	69,429	227	55,720	389	13,729	—	—	162
Llanelly	9,253	—	13,273	—	—	4,020	—	—
Middlesbrough	1,570	1,343	12,933	2,099	—	11,363	—	750
Seaham	86,405	—	67,661	69	18,744	—	—	69
Swansea	306,722	567	223,994	549	82,728	—	18	—
Granton	10,270	1,003	13,602	1,735	—	3,320	—	732
Port Talbot	141,278	347	129,758	879	11,520	—	—	532
Alloa	14,305	—	18,601	—	—	4,296	—	—
Grangemouth	160,013	12,779	71,525	3,601	88,488	—	9,178	—
Neath	9,751	—	1,681	—	8,070	—	—	—
Hull	522,901	2,319	354,251	2,590	168,647	—	—	271
Amble	38,060	—	41,514	—	—	3,451	—	—
Troon	10,599	—	5,522	—	5,077	—	—	—
Grimsby	118,507	203	140,611	146	—	22,104	57	—
Ayr	4,654	—	4,972	—	—	318	—	—
Greenock	447	—	—	—	447	—	—	—
Leith	151,786	—	160,425	—	—	8,639	—	—
Ardrossan	2,939	—	2,245	—	694	—	—	—
Stockton	—	—	—	—	—	—	—	—

COAL AND COKE SHIPPED FOR LONDON AND OTHER PORTS IN THE UNITED KINGDOM.*

Port.	August 1911.		August 1912.		Port.	August 1911.		August 1912.	
	Coals.	Coke.	Coals.	Coke.		Coals.	Coke.	Coals.	Coke.
	Tons.	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.	Tons.
Newcastle	348,120	305	400,360	705	Ayr	70,630	—	68,499	10
North Shields	—	—	—	—	Irvine	7,469	—	3,881	—
South Shields	5,120	—	2,820	—	Alloa	3,440	—	5,139	—
Blyth	5,755	—	18,155	—	Whitehaven	17,025	—	21,015	—
Amble	9,213	—	7,344	—	Liverpool	103,072	2	106,651	—
Sunderland	97,443	—	118,053	—	Grimsby	3,847	—	4,005	—
Seaham	81,195	—	109,933	—	Granton	23,273	—	8,957	—
Hartlepool	18,715	—	37,615	—	Borrowstoness	10,812	—	11,113	0
Stockton	—	—	—	—	Burntisland	48,800	—	11,759	—
Middlesbro'	450	135	—	250	Kirkcaldy	5,725	—	2,391	—
Hull	61,685	—	85,414	—	Methil	18,760	—	23,894	—
Goole	118,406	—	110,085	—	Port Talbot	18,516	267 o 300 pf	13,144	50 pf
Swansea	16,533	50 o 1810 pf	29,939	350	Glasgow	58,431	775	41,874	805
Cardiff	179,453	120	245,519	60	Grangemouth	7,785	500	17,387	650
Llanelly	3,753	—	4,312	—	Greenock	1,335	—	1,380	4
Newport	53,699	560	53,929	--	Neath	17,907	—	9,774	—
Troon	25,941	—	22,193	—	Leith	11,591	—	7,802	17
Ardrossan	5,503	—	5,038	—					

* From *Browne's Export List.*

Yorkshire Electric Power Company Limited.—The report states that the gross profit on the revenue account is £5,605; and the net profit, after payment of mortgage interest, amounted to £3,349. The balance available, including £330 brought forward, is £3,679, and the directors recommend a dividend (less income-tax) for the half-year ended June 30, 1912, at the rate of 6 per cent. per annum on the amount paid up on the cumulative preference shares, carrying forward £1,356. The reduction in profits is due to the coal strike, to extra cost of fuel during the continuance of the strike and immediately thereafter, when it was necessary to replenish the coal stock, and to the reduced consumption and unsatisfactory conditions of working produced by the disturbance of trade throughout the district. The whole of the preference capital (£100,000) authorised in September 1910 has been applied for, and a quotation of these shares has been obtained on the Leeds Stock Exchange. The rapid development of the company's business and the increasing demands for electrical energy will necessitate a further issue of cumulative preference shares. Shareholders will be asked to consider the authorisation of an issue of 10,000 shares of £5 each.

THE FREIGHT MARKET.

The outward freight market on the north-east coast has been very quiet this week, there being a serious shortage of tonnage and, in consequence of strong gales, considerable irregularity in the arrival of vessels. The acute position is reflected in the scanty list of Tyne fixtures and the exceedingly high figures, rates which, for the most part, have not been approached for a very long time. For example, London has been done at from 4s. 3d. to 4s. 6d., Antwerp at 5s. 3d., Cronstadt at 7s., and Genoa at from 12s. 9d. to 13s. 6d. At South Wales chartering has been much more active, but rates are very high indeed, and owners appear to be holding back their vessels in order to force the market up still more. At the Humber, the market is firm and tonnage is scarce. At the Clyde, business is quiet and rates are well maintained. Homewards, business has been brisk. At the Black Sea tonnage is rather more plentiful, but rates on all berths are steadily advancing. The Azof and Danube are similarly situated. The Mediterranean, ore and Baltic trades are steady. The Eastern demand and tone are good. The River Plate is active and firm. America is fairly busy and steady.

Tyne to Arendal, 2,000, 7s.; Antwerp, 1,700, 5s. 3d.; Algiers, 3,000, 10s. 10½d.; Cronstadt, 2,800, 7s.; Genoa, 4,400, 13s.; 5,000, 13s.; 5,000, 12s. 9d., 750; 3,300, 13s. 6d., spot; 4,200, 13s. 3d.; London, 1,800, 4s. 3d; 1,800, 4s. 6d.; 2 600, 4s. 4½d.; Lubeck, 2,200, 6s. 9d.; Mariager, from Dunston, 700, 6s. 3d.; 1,000, 6s. 1½d.; 1,000, 6s. 6d.; Naples, 3,200, 13s., 800, 10d.; 4,400, 13s., 500; Oporto, 1,500, 12s. 6d.; Port Said, 4,500, 12s. 3d.; Porto Vecchio, 5,000, 14s.; Rotterdam, 1,700, 4s. 9d.; Randers, 1,100, 8s.; Savona, 4,400, 13s.; Seville, 1,300, 11s.; 2,300, 11s.; St. Nazaire, 2,100, 8s., Trignec terms.

Cardiff to Barcelona, 3,000, 13s., ppt.; Bayonne, 1,400, 9¾ fr., September 16; Buenos Ayres, 23s., September 20, 4,400, 23s., September; Brest, 1,200, 7s.; Caen, 1,700, 6s. 9d.; September 10; Constantinople, 5,400, 13s., September 14, Carthagena, 2,300, 12s. 6d., September 15; Cork, 400, 4s. 9d.; Cronstadt, 1,700, 10s.; Dundee, 550, 7s., Admiralty; Devonport, p t; Dieppe, 2,300, 7s., ppt.; Fortrose, 950, 5s. 7½d., Admiralty terms; Genoa, 4,200, 12s. 10½d., September 12; 4,000, 12s. 6d., end September; 5,000, ditto; 2,050, 12s. 9d., ppt.; 4,000, 12s. 10½d., 50 hours, ppt.; Gibraltar, 5,200, 9s. 6d., ppt.; Granville, 700, 6s. 9d.; Haida Pasha, 4,800, 13s., September 11; Havre, 1,600, 6s. 6d.; 2,000, 6s. 6d.; Hamburg, 2,000, 6s.; Islands, 5,800, 11s. 6d., September 21; Lisbon, 1,900, 9s. 0d., 350; 1,550, 9s. 9d.; Leghorn, 5,800, 13s.; 1,600, 13s., 700, ppt.; 4,200, 12s. 10½d., September 12; 4,000, 12s. 10½d., 50 hours, Genoa terms, ppt.; Liverpool, 750, 4s. 6d.; Las Palmas, 5,800, 11s. 6d.; Malta, 4,000, 10s. 6d., ppt; 3,500-3,700, 10s. 3d., Admiralty, September 14; Marseilles, 0,500, 16 fr., ppt.; 4,600, 16 fr.; Morlaix, 900, 6s.; Malaga, 2,200, 13s.; Naples, 5,800, 13s., 800, September 14; 4,500, 13s., 800, ppt.; 4,600, 13s., 700, ppt; 5,800, 13s.; 4,500, 13s. 3d.; Nantes, 2,000, 9 fr., ppt.; Newry, 550, 4s. 9d.; Piræus, 12s. 6d., September 12; Port Said, 6,400, 12s. 3d., September 20; 7 000, 12s. 3d., September 18; Porto Empedocle, 2,800, 14s. 3d., 250; Philippeville, 1,000, 16 and 17 francs; River Plate, 23s., September; Rio de Janeiro, 5,000, 23s., ppt.; Syra, 12s. 6d., September 12; Savona, 4,000, 12s. 10½d., 50 hours, Genoa terms, ppt.; 4,200, 12s. 10½d., September 12; Spezzia, 4,200, 12s. 10½d., September 12; Santos, 5,000, 23s., ppt.; Teneriffe, 5,800, 11s. 6d.; Trieste, 3,800, 13s. 6d., September 18; Venice, 5,500, 14s., 500, ppt.

Wear to Buenos Ayres, 23s., October; Bordeaux, 2,800, 7s. 3d.; Helsingfors, 2,300, 8s.; Cronstadt, 3,200, 7s.

Burntisland to Venice, 6,500, 14s.; Horsens, 1,600, 7s. 6d., 300 tons coke 6s.

Newport to Naples, 5,800, 13s., 800, September 14; Caen, 1,700, 6s. 9d.; Nantes, 3,200, 8·60¼ fr.; Cork, 600, 4s. 9d.; Bilbao, 950, 7s. 6d.; Buenos Ayres-La Plata, 5 000, 23s 9d., September 13-23; Seville, 1,350, 11s 9d., ppt.; Dieppe, 1,700, 7s.; La Rochelle, 9 fr.; direct nitrate port, sail, 2,009 reg., 20s., fuel, October-November; Marseilles, 6,300, 16 fr.

Swansea to Bizerta, 1,700, 18 fr., ppt.; 1,800, 18 fr. coal, 19 fr. fuel; Port Nolloth, sail, 20s., coke; St. Nazaire, 2,250, 9 fr.; Rouen, 1,200, 7s 4½d.; Dieppe, 1,250, 6s. 9d., ppt; Marseilles, 2,200, 16·80 fr.; Hamburg, 1,100, 6s.; Bona, 1,000, 17 fr., 400, 1s., September 20; Honfleur, 920, 7s.; 1,150, 6s. 9d.; Boulogne, 700, 7s; Spezzia, 1,400, 13s.; La Rochelle, 1,250, 9 fr.; Cherbourg, 560, 7s. and 7s. 6d.; Caen, 750, 7s.

Glasgow to Algiers, 2,500, 11s. 1½d.; Savona, 12s. 6d.;

share (free of income tax) for the half-year ended June 30 last, making 10 per cent. for the year, be paid on September 30 next, and the balance of £19,115 be carried forward.

Lambert Brothers Limited.—The report for the year ended June 30 last states that the profit, including the amount brought forward, is £64,917 7s. 8d., and after providing for the managing director's remuneration, directors' fees, and the preference dividend for the year there remains a balance of £46,567 7s. 8d., out of which the directors have placed to reserve account the sum of £10,000, and propose to pay a dividend at the rate of 10 per cent. on the ordinary shares, carrying forward an amount of £6,567 7s. 8d. to the next account.

Lothian Coal Company Limited.—The report by the directors for the year ending May 31 last states that the profit and loss account for the year, after providing for the maintenance of works and all current charges, shows a credit balance of £7,685 7s. 10d.; the balance from last year was £5,918 18s. 2d.—total, £13,604 6s. There falls to be deducted £2,000 in respect of debenture interest and directors' fees, leaving a balance of £11,604 6s., out of which there were paid on August 15, 1912, the arrears of preference dividends for the two half-years ending Martinmas 1911 and Whitsunday 1912, £7 300. The amount to be carried to the year now current is, therefore, £4,304 6s. The directors state that the demand for coal was artificially inflated in the beginning of 1912 by the expectation of a national strike of miners, which actually took place on March 1, and continued till April 8. This prolonged stoppage of work reduced the output for the year by about 12 per cent., and materially raised the average annual cost per ton of producing the coal. Frequent interruptions to the output, causing *in cumulo* the loss of a considerable tonnage, occurred during the year, owing to defective railway service, and with the view of securing a satisfactory service the directors joined with others in promoting the Lothian Railways Bill. Success has not attended the promotion of the measure on this occasion, but whether it will eventually pass or not, good has been done by public attention having been called to the manner in which the natural development of the important coal industry of the Lothians is checked by inadequate railway facilities.

McAndrew (John) and Co. Limited.—This private company has been registered in Edinburgh, with a capital of £35,000 in £1 shares, to carry on business as coalmasters, &c. First directors, Wm. Wallace and A. W. Waddell. Registered office, 112, Wellington-street, Glasgow.

N. U. Syndicate Limited.—This private company has been registered, with a capital of £10,500 (8,000 ordinary shares of £1 each and 50,000 deferred shares of 1s. each), to carry on the business of coal and iron masters, &c. Provisional directors, R. O. Mann and H. J. Smith. Registered office, 1–2, George-street, Mansion House, E.C.

Pearson and Knowles Coal and Iron Company Limited—The directors have decided to recommend the payment of the usual half-year's dividend at the rate of 6 per cent. per annum on both the preference and second preference shares, and a half-year's dividend at the rate of 7 per cent. per annum on the ordinary shares. They also recommend that the capital expenditure for the year be written off out of profits, that £12,393 be added to the reserve fund, and the balance carried forward to the next account.

Powell Duffryn Steam Coal Company Limited.—The directors have declared the usual interim dividends for the half-year ending June 30 last at the rate of 10 per cent. per annum on the ordinary shares, free of income tax, and at the rate of 6 per cent. per annum on the preference shares, less income tax.

Stocke and Sparks Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of brass-founders, mechanical engineers, toolmakers, &c., and to take over the business carried on at Forest Gate as Stocke and Sparks, and to adopt an agreement with S. A. Stocke and C. H. Sparks. First directors, S. A. Stocke and C. H. Sparks (managing directors), J. J. Hassett, W. T Clapton, D. Steedman, and W. Wilkinson. Qualification, 500 shares. Registered office, Stratford Ironworks, Woodgrange-road, Forest Gate, Essex.

Turbine Gears Limited.—This private company has been registered, with a capital of £5,000 in £1 shares, to carry on the business of manufacturers of gear-cutting machines, founders, mechanical engineers, toolmakers, &c., and to adopt an agreement with J. Ogden. Qualification of first directors, who are to be appointed, £50. Registered office, Daisyfield House, Newton Moor, Hyde, Cheshire.

Vickermann (R E.) Limited.—This private company has been registered, with a capital of £6,000 in £1 shares (3,500 preference), to take over the business of a colliery agent, coal merchant, &c., now carried on by R. E. Vickermann at Harrogate, Yorks, as R E. Vickermann. First directors: R. E. Vickermann (chairman and managing director), G. W. Fletcher, and G. Wilkinson. Qualification, £100.

Vryheid (Natal) Railway Coal and Iron Company Limited.—The report for the year ended January 31, 1912, states that, after allowing for depreciation and providing for interest on debenture issue and loan, the result of the year's trading is a profit of £1,368, which, deducted from the debit balance of £6,200 brought forward, leaves a sum of £4,800 to be dealt with hereafter. The output from the mine for the year was 228,106 tons, as against 119,730 tons for 1910-11. The quality of the coal has undoubtedly improved, and it is being supplied regularly to the South African railway liners, &c.

Windsor Steam Coal Company (1910) Limited.—The directors, in submitting the accounts to June 30, 1912, state that after charging all expenses, including interest on debentures, there is a loss on the year's trading of £14,385 8s. 2d. Practically the whole of the above loss was incurred prior to December 31 last, and was due in a large measure to the reduced output and increased cost of working brought about by strikes and labour troubles. Considerable delay has been experienced in the erection of the north pit winding-engine, and this pit has been on stop during the whole of the financial year. The work has now been practically completed, and the winding of coal should be commenced during the current month. It is anticipated that when work is resumed at the north pit the output will be increased and the cost of working materially reduced. A duplicate air-compressing plant and additional hauling engines are on order.

COAL AND COKE EXPORTED FROM PORTS IN ENGLAND, SCOTLAND AND WALES

During the month of August 1912, compared with the corresponding month of 1911.*

Port.	August 1912.		August 1911.		Coals.		Coke.	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons	Tons.	Tons.
Newcastle	935,705	28,927	791,626	13,598	144,079	—	15,329	—
North Shields	103,317	711	120,198	2,945	—	16,881	—	2,234
South Shields	131,137	47	173,640	3,431	—	42,503	—	3,384
Sunderland	317,298	5,987	282,991	4,641	34,307	—	1,346	
West Hartlepool	142,737	2,153	109,015	1,625	33,722	—	528	—
Goole	107,649	2,307	114,893	2,317	—	7,244	—	10
Blyth	373,381	230	302,168	2,217	71,213	—	—	1,987
Newport	330,297	979	396,255	1,443	—	65,958	—	464
Liverpool	45,718	1,414	31,051	488	14,667	—	926	—
Methil	241,680	—	254,830	201	—	13,150	—	201
Glasgow	218,001	3,068	209,315	2,500	8,686	—	568	—
Kirkcaldy	9,732	—	9,504	—	228	—	—	—
Burntisland	201,775	370	179,731	151	22,044	—	119	—
Cardiff	1,580,926	8,090	1,450,921	3,913	130,005	—	4,177	—
Borrowstoness	69,449	227	55,720	389	13,729	—	—	162
Llanelly	9,253	—	13,273	—	—	4,020	—	—
Middlesbrough	1,570	1,343	12,933	2,099	—	11,363	—	756
Seaham	86,405	—	67,661	69	18,744		—	69
Swansea	306,722	567	223,994	549	82,728	—	18	—
Granton	10,276	1,003	13,602	1,735	—	3,326	—	732
Port Talbot	141,278	347	129,758	879	11,520	—	—	532
Alloa	14,365	—	18,661	—	—	4,296	—	—
Grangemouth	160,013	12,779	71,525	3,601	88,488	—	9,178	—
Neath	9,751	—	1,681	—	8,070	—	—	—
Hull	522,901	2,319	354,254	2,590	168,647	—	—	271
Amble	38,060	—	41,514	—	—	3,454	—	—
Troon	10,599	—	5,522	—	5,077	—	—	—
Grimsby	118,507	203	140,611	146	—	22,104	57	
Ayr	4,654	—	4,972	—	—	318	—	—
Greenock	417	—	—	—	417	—	—	—
Leith	151,786	—	160,425	—	—	8,639	—	—
Ardrossan	2,939	—	2,245	—	694	—	—	—
Stockton	—	—	—	—	—	—	—	—

COAL AND COKE SHIPPED FOR LONDON AND OTHER PORTS IN THE UNITED KINGDOM.*

Port.	August 1911.		August 1912.		Port.	August 1911		August 1912.	
	Coals.	Coke.	Coals.	Coke.		Coals.	Coke.	Coals.	Coke.
	Tons.	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.	Tons.
Newcastle	348,120	305	400,360	705	Ayr	76,030	—	68,180	10
North Shields	—	—	—	—	Irvine	7,169	—	3,881	—
South Shields	5,120	—	2,820	—	Alloa	3,149	—	5,139	—
Blyth	5,755	—	18,155	—	Whitehaven	17,025	—	21,615	—
Amble	9,213	—	7,344	—	Liverpool	103,072	9	100,654	—
Sunderland	97,443	—	118,053	—	Grimsby	3,847	—	4,065	—
Seaham	81,195	—	109,933	—	Granton	23,273	—	8,657	—
Hartlepool	18,715	—	37,615	—	Borrowstoness	10,812	—	14,143	6
Stockton	—	—	—	—	Burntisland	18,890	—	14,759	—
Middlesbro'	450	135	—	250	Kirkcaldy	5,725	—	2,391	—
Hull	61,685	—	85,414	—	Methil	18,760	—	23,854	—
Goole	118,406	—	110,085	—	Port Talbot	18,546	267 c 300 pf	13,464	56 pf
Swansea	16,533	50 c 1810 pf	29,939	350	Glasgow	58,431	775	41,874	805
Cardiff	179,453	120	245,549	60	Grangemouth	7,785	590	17,387	650
Llanelly	3,753	—	4,312	—	Greenock	1,335	—	1,386	4
Newport	53,690	560	53,920	—	Neath	17,907		9,771	
Troon	25,941	—	22,193	—	Leith	11,591	—	7,802	17
Ardrossan	5,503	—	5,038	—					

* From *Browne's Export List.*

Yorkshire Electric Power Company Limited.—The report states that the gross profit on the revenue account is £5,805; and the net profit, after payment of mortgage interest, amounted to £3,349. The balance available, including £330 brought forward, is £3,679, and the directors recommend a dividend (less income-tax) for the half-year ended June 30, 1912, at the rate of 6 per cent. per annum on the amount paid up on the cumulative preference shares, carrying forward £1,356. The reduction in profits is due to the coal strike, to extra cost of fuel during the continuance of the strike and immediately thereafter, when it was necessary to replenish the coal stock, and to the reduced consumption and unsatisfactory conditions of working produced by the disturbance of trade throughout the district. The whole of the preference capital (£100,000) authorised in September 1910 has been applied for, and a quotation of these shares has been obtained on the Leeds Stock Exchange. The rapid development of the company's business and the increasing demands for electrical energy will necessitate a further issue of cumulative preference shares. Shareholders will be asked to consider the authorisation of an issue of 10,000 shares of £5 each.

THE FREIGHT MARKET.

The outward freight market on the north-east coast has been very quiet this week, there being a serious shortage of tonnage and, in consequence of strong gales, considerable irregularity in the arrival of vessels. The acute position is reflected in the scanty list of Tyne fixtures and the exceedingly high figures, rates which, for the most part, have not been approached for a very long time. For example, London has been done at from 4s. 3d. to 4s. 6d., Antwerp at 5s. 3d., Cronstadt at 7s., and Genoa at from 12s. 9d. to 13s. 6d. At South Wales chartering has been much more active, but rates are very high indeed, and owners appear to be holding back their vessels in order to force the market up still more. At the Humber, the market is firm and tonnage is scarce. At the Clyde, business is quiet and rates are well maintained. Homewards, business has been brisk. At the Black Sea tonnage is rather more plentiful, but rates on all berths are steadily advancing. The Azof and Danube are similarly situated. The Mediterranean, ore and Baltic trades are steady. The Eastern demand and tone are good. The River Plate is active and firm. America is fairly busy and steady.

Tyne to Arendal, 2,000, 7s.; Antwerp, 1,700, 5s. 3d.; Algiers, 3,000, 10s. 10½d.; Cronstadt, 2,800, 7s.; Genoa, 4,400, 13s.; 5,000, 13s.; 5,000, 12s. 9d., 750; 3,300, 13s. 6d., spot; 4,200, 13s. 3d.; London, 1,800, 4s. 3d; 1,800, 4s. 6d.; 2 600, 4s. 4½d.; Lubeck, 2,200, 8s. 9d.; Mariager, from Dunston, 700, 8s. 3d.; 1,000, 8s. 1½d.; 1,000, 8s. 6d.; Naples, 3,200, 13s., 800, 10d.; 4,400, 13s., 800; Oporto, 1,500, 12s. 6d.; Port Said, 4,500, 12s. 3d.; Porto Vecchio, 5,000, 14s.; Rotterdam, 1,700, 4s. 9d.; Randers, 1,100, 8s.; Savona, 4,400, 13s.; Seville, 1,800, 11s.; 2,300, 11s.; St. Nazaire, 2,100, 8s., Trignac terms.

Cardiff to Barcelona, 3,900, 18s., ppt.; Bayonne, 1,400, 9¾ fr., September 10; Buenos Ayres, 23s., September 20, 4,400, 23s., September; Brest, 1,200, 7s.; Caen, 1,700, 6s. 9d.; September 10; Constantinople, 5,400, 13s., September 14, Carthagena, 2,300, 12s. 6d., September 15; Cork, 400, 4s. 9d.; Cronstadt, 1,700, 10s.; Dundee, 550, 7s., Admiralty; Devonport, p.t.; Dieppe, 2,300, 7s., ppt.; Fortrose, 950, 5s. 7½d., Admiralty terms; Genoa, 4,200, 12s. 10½d., September 12; 4,000, 12s. 6d., end September; 5,000, ditto; 2,650, 12s. 9d., ppt.; 4,000, 12s. 10½d., 50 hours, ppt.; Gibraltar, 5,200, 9s. 6d., ppt.; Granville, 700, 6s. 9d.; Haida Pasha, 4,800, 13s., September 11; Havre, 1,600, 6s. 6d.; 2,600, 6s. 6d.; Hamburg, 2,000, 6s.; Islands, 5,800, 11s. 6d., September 21; Lisbon, 1,900, 9s. 6d., 350; 1,550, 9s. 9d.; Leghorn, 5,800, 13s.; 4,600, 13s., 700, ppt.; 4,200, 12s. 10½d., September 12; 4,000, 12s. 10½d., 50 hours, Genoa terms, ppt.; Liverpool, 750, 4s. 6d.; Las Palmas, 5,800, 11s. 6d.; Malta, 4,000, 10s. 9d., ppt; 3,500-3,700, 10s. 3d, Admiralty, September 14; Marseilles, 6,500, 16 fr., ppt.; 4,000, 16 fr.; Morlaix, 600, 8s.; Malaga, 2,200, 13s.; Naples, 5,800, 13s., 800, September 14; 4,500, 13s., 800, ppt.; 4,000, 13s., 700, ppt; 5,800, 13s.; 4,500, 13s. 3d.; Nantes, 2,900, 9 fr., ppt.; Newry, 550, 4s. 9d.; Piræus, 12s. 6d., September 12; Port Said, 6,400, 12s. 3d., September 20; 7 000, 12s. 3d, September 18; Porto Empedocle, 2,800, 14s. 3d., 250; Philippeville, 4,000, 16 and 17 francs; River Plate, 23s., September; Rio de Janeiro, 5,000, 23s., ppt.; Syra, 12s. 6d., September 12; Savona, 4,000, 12s. 10½d., 50 hours, Genoa terms, ppt.; 4,200, 12s. 10½d, September 12; Spezzia, 4,200, 12s. 10½d, September 12; Santos, 5,000, 23s., ppt.; Teneriffe, 5,800, 11s. 6d.; Trieste, 3,800, 13s. 6d, September 18; Venice, 5,500, 14s., 500, ppt.

Wear to Buenos Ayres, 23s., October; Bordeaux, 2,800, 7s. 3d.; Helsingfors, 2,300, 8s.; Cronstadt, 3,200, 7s.

Burntisland to Venice, 6,500, 14s.; Horsens, 1,600, 7s. 6d., 300 tons coke 9s.

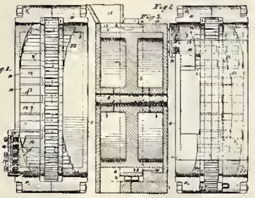
Newport to Naples, 5,800, 13s., 800, September 14; Caen, 1,700, 6s. 9d; Nantes, 3,200, 8·60½ fr.; Cork, 600, 4s. 9d.; Bilbao, 950, 7s. 6d.; Buenos Ayres-La Plata, 5 000, 23s 6d., September 13-23; Seville, 1,350, 11s 9d., ppt.; Dieppe, 1,700, 7s.; La Rochelle, 9 fr.; direct nitrate port, sail, 2,699 reg., 20s, fuel, October-November; Marseilles, 6,300, 16 fr.

Swansea to Bizerta, 1,700, 18 fr., ppt.; 1,800, 18 fr. coal, 19 fr. fuel; Port Nolloth, sail, 29s., coke; St. Nazaire, 2,250, 9 fr.; Rouen, 1,200, 7s. 4½d.; Dieppe, 1,250, 6s. 9d., ppt; Marseilles, 2,200, 16·80 fr.; Hamburg, 1,100, 6s.; Bona, 1,000, 17 fr., 400, 1s., September 20; Honfleur, 920, 7s.; 1,150, 6s. 9d.; Boulogne, 700, 7s; Spezzia, 1,400, 13s.; La Rochelle, 1,250, 9 fr.; Cherbourg, 560, 7s. and 7s. 6d.; Caen, 760, 7s.

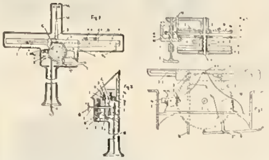
Glasgow to Algiers, 2,500, 11s. 1½d.; Savona, 12s. 6d.;

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

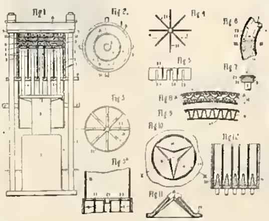
333 (1912). *A New or Improved Briquetting Press.* J. T. Davis, San Francisco, San Francisco County, California, U.S.A.—The object of the present invention is to provide a briquetting press in which various sizes of briquette can be made at the same time. In the accompanying drawings fig. 1 is a top plan view of the press; fig. 2 is a bottom plan view thereof and fig. 3 is a vertical section thereof taken longitudinally of the shaft. In these, 1 indicates a base upon which are erected standards 2 having bearings 3 for a shaft 4. Secured to said shaft is a wheel 5, the central portion 6 of the periphery of which is raised from the marginal portion thereof, and on said raised central portion are formed gear teeth 7 which mesh with the teeth of a pinion 29, rotated by an electric motor or any other suitable source of power. Transversely through said raised central portion 6 of the periphery extend apertures or slideways 8, through which can move mould walls 9, sliding on the periphery of said wheel; 10 indicates a sectional housing surrounding the wheel, the sections being secured together by bolts 11, and secured to the top of said housing is a hopper 12 from which the material to be briquetted falls in succession into moulds 13. The bottom of each mould is formed by a portion 14 of the periphery of the wheel on one side of the raised portion 6, the sides thereof by the adjacent mould walls 9, one end by the side of said raised portion 6 of the wheel, and the other end by a stationary wall 15 secured to the housing 10. As the wheel revolves, these mould walls 9 pass in succession under, and closely adjacent to a cylindrical portion 16 of the housing which thus forms the tops of the moulds. Extending beneath said cylindrical portion of the housing, is a cam 17, the inner surface of which gradually approaches the geared portion of the wheel. Consequently the mould walls, abutting against said cam 17, are gradually pressed inwards thereby, and the mould is gradually reduced in length. The material in said mould is thus compressed, the degree of compression being determined by the degree to which the cam 17 approaches the other end of the moulds—that is, the side of said raised portion 6 of the periphery. The cam is arranged to terminate at a point slightly behind the lowest portion of the wheel, in order that the briquettes may readily drop by gravity from the wheel. But in order to ensure that said briquettes so drop, means are provided for entirely removing the movable mould walls from said briquettes, which means consist of a cam-shaped lip 21 secured to the stationary housing, engaging grooves 22 in said mould walls, so that in the motion of the wheel said lip 21 gradually causes the mould walls to move still farther in the same direction as before, so that, by the time that the briquette arrives at the lowest portion of the wheel, said mould walls are entirely withdrawn from contact with the briquette. The return of the mould walls to their original position, ready to receive a further charge of loose material from the hopper 12, is effected in the remaining portion of the revolution of the wheel by means of a stationary cam 23, which engages the ends of said mould walls and causes them to move reversely to their former movement, so that, by the time they arrive at a position beneath the hopper, they are moved completely across the wheel, and assume a position ready to receive the material. (Two claims.)



22484 (1911). *Improvements in Weight-recording Devices for Weighing Machines.* S. Denison, Hunslet Foundry, Leeds, director of Saml. Denison and Son Limited.—This invention relates to the type of weighing machine which, by the manipulation of poise-weights, arranges type for the purpose of printing a permanent record of the weighings upon a ticket and tape separately or simultaneously. It has for its object to provide means to prevent such records being made, except when the steelyard is in equilibrium. In carrying out the invention, any interference tending to influence the weighing is prevented by entirely enclosing the steelyard and its weighing equipment in a casing, and providing means for manipulating the poise-weights separately from without. Fig. 1 shows the general arrangement of the parts, in front elevation, the casing being in section; fig. 2 an end elevation of same; fig. 4 is a plan view showing in detail the method of controlling the poise-weights; and fig. 5 is an elevation of same. The steelyard A is preferably of double section, and prepared to carry the major poise-weight B, which is fitted with rollers 1, 2, 3, 4, to permit of being moved along the steelyard easily. The rack C is attached to, and forms part of the major poise-weight. The steelyard is equipped with two fulcrum knife-edges at D and E, which are fulcrummed on the pedestal F, and a back knife-edge G, to which is shackled the connecting rod H, communicating with the under levers of the weighing machine. The positioning sliding peg O, attached to the carrier N, which is guided in the pedestal F, is shaped on its inner end in the form of a tooth to exactly fit into the teeth of the wheels Q and Q¹. This tooth, when caused to enter a particular pair of teeth in the said wheels by the lateral movement of the spindle L, serves to lock them from further revolution. This action also exactly fixes the rack and major poise-weight to coincide with one or other of the major divisions of the steelyard, and this without the use of notches thereon. The action further causes the corresponding type upon the type wheel to be arranged in line for printing. (Eight claims.)



24819 (1911). *Process and Apparatus for Pressing Materials containing Liquid, for example, Peat and the like.* T. Franke, of Wartburgstrasse 24, Schöneberg, Berlin, Germany.—This invention relates in particular to machines of the well-known type comprising a compressing chamber provided with strainers for enabling the liquid to escape from the material while being compressed in the chamber. The invention consists in certain improvements the objects of which are to render such machines more efficient than hitherto in the expulsion of the liquid and to improve their construction. One improvement consists in the provision of the strainers with teeth, the purpose of which is to tear up and open the smooth outer surfaces of the material while it is being compressed so as to facilitate the flow of the liquid through the outer layer of the material, which, when the well-known wire gauze strainers are used, offers great resistance to the outward flow of the liquid on account of the said outer layer being of a mud-like or pulp-like nature caused by the deposition of fine particles carried by the liquid expelled at the commencement of the compressing operation. Another improvement consists in the provision of piston packing-rings in the form of elastic metallic wires for the purpose of satisfactorily packing the pistons in compression chambers fitted with strainers provided with the above-mentioned teeth. Another improvement consists in the provision of combustible partitions in the material to be pressed for the purpose of deflecting the liquid to the exterior of the material without it being necessary to remove said partitions if the material is to be used for fuel. Other improvements consist in the concentric arrangement of the pistons in the compressing chamber; in the provision of double-acting strainers with unperforated cores preventing liquid from flowing through the strainers from one side to the other; in the provision of an improved hopper adapted to hold the strainers in position during the charging operation, and in other improvements hereinafter described and claimed. Fig 1 is a part sectional elevation of the machine; fig. 2 a plan of the compression chamber with concentric strainers; fig. 3 an under side view of a charging hopper; fig. 3*a* a vertical section of the same, the upper portion being broken off; fig. 4 a plan of a set of knives; fig. 5 a section on the line V—V fig. 4; fig. 6 a plan of a portion of an annular piston with its strainer partially removed; fig. 7 a section on the line VII—VII, fig. 6; fig. 8 a section of a portion of one form of vertical double-acting strainer; fig. 9 a section of a portion of a second form of vertical double-acting strainer; fig. 10 a plan, and fig. 11 a vertical section on the line XI—XI, fig. 10, of a group of teeth on a horizontal strainer, and fig. 12 a part sectional elevation of a compression chamber with vertical concentric strainers and with pistons provided with conical strainers. (Nine claims.)



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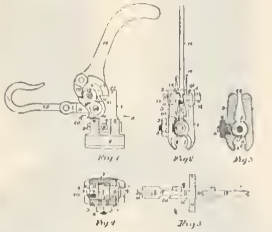

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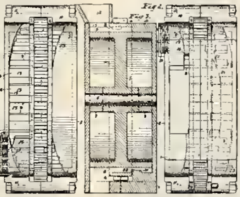
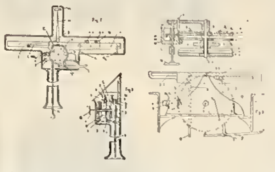
(*Continued on page 556.*)

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

333 (1912). *A New or Improved Briquetting Press.* J. T. Davis, San Francisco, San Francisco County, California, U.S.A.—The object of the present invention is to provide a briquetting press in which various sizes of briquette can be made at the same time. In the accompanying drawings fig. 1 is a top plan view of the press; fig. 2 is a bottom plan view thereof and fig. 3 is a vertical section thereof taken longitudinally of the shaft. In these, 1 indicates a base upon which are erected standards 2 having bearings 3 for a shaft 4. Secured to said shaft is a wheel 5, the central portion 6 of the periphery of which is raised from the marginal portion thereof, and on said raised central portion are formed gear teeth 7 which mesh with the teeth of a pinion 29, rotated by an electric motor or any other suitable source of power. Transversely through said raised central portion 6 of the periphery extend apertures or slideways 8, through which can move mould walls 9, sliding on the periphery of said wheel; 10 indicates a sectional housing surrounding the wheel, the sections being secured together by bolts 11, and secured to the top of said housing is a hopper 12 from which the material to be briquetted falls in succession into moulds 13. The bottom of each mould is formed by a portion 14 of the periphery of the wheel on one side of the raised portion 6, the sides thereof by the adjacent mould walls 9, one end by the side of said raised portion 6 of the wheel, and the other end by a stationary wall 15 secured to the housing 10. As the wheel revolves, these mould walls 9 pass in succession under, and closely adjacent to a cylindrical portion 16 of the housing which thus forms the tops of the moulds. Extending beneath said cylindrical portion of the housing, is a cam 17, the inner surface of which gradually approaches the geared portion of the wheel. Consequently the mould walls, abutting against said cam 17, are gradually pressed inwards thereby, and the mould is gradually reduced in length. The material in said mould is thus compressed, the degree of compression being determined by the degree to which the cam 17 approaches the other end of the moulds—that is, the side of said raised portion 6 of the periphery. The cam is arranged to terminate at a point slightly behind the lowest portion of the wheel, in order that the briquettes may readily drop by gravity from the wheel. But in order to ensure that said briquettes so drop, means are provided for entirely removing the movable mould walls from said briquettes, which means consist of a cam-shaped lip 21 secured to the stationary housing, engaging grooves 22 in said mould walls, so that in the motion of the wheel said lip 21 gradually causes the mould walls to move still farther in the same direction as before, so that, by the time that the briquette arrives at the lowest portion of the wheel, said mould walls are entirely withdrawn from contact with the briquette. The return of the mould walls to their original position, ready to receive a further charge of loose material from the hopper 12, is effected in the remaining portion of the revolution of the wheel by means of a stationary cam 23, which engages the ends of said mould walls and causes them to move reversely to their former movement, so that, by the time they arrive at a position beneath the hopper, they are moved completely across the wheel, and assume a position ready to receive the material. (Two claims.)



22484 (1911). *Improvements in Weight-recording Devices for Weighing Machines.* S. Denison, Hunslet Foundry, Leeds, director of Saml. Denison and Son Limited.—This invention relates to the type of weighing machine which, by the manipulation of poise-weights, arranges type for the purpose of printing a permanent record of the weighings upon a ticket and tape separately or simultaneously. It has for its object to provide means to prevent such records being made, except when the steelyard is in equilibrium. In carrying out the invention, any interference tending to influence the weighing is prevented by entirely enclosing the steelyard and its weighing equipment in a casing, and providing means for manipulating the poise-weights separately from without. Fig. 1 shows the general arrangement of the parts, in front elevation, the casing being in section; fig. 2 an end elevation of same; fig. 4 is a plan view showing in detail the method of controlling the poise-weights; and fig. 5 is an elevation of same. The steelyard A is preferably of double section, and prepared to carry the major poise-weight B, which is fitted with rollers 1, 2, 3, 4, to permit of being moved along the steelyard easily. The rack C is attached to, and forms part of the major poise-weight. The steelyard is equipped with two fulcrum knife-edges at D and E, which are fulcrummed on the pedestal F, and a back knife-edge G, to which is shackled the connecting rod H, communicating with the under levers of the weighing machine. The positioning sliding peg O, attached to the carrier N, which is guided in the pedestal F, is shaped on its inner end in the form of a tooth to exactly fit into the teeth of the wheels Q and Q^1. This tooth, when caused to enter a particular pair of teeth in the said wheels by the lateral movement of the spindle L, serves to lock them from further revolution. This action also exactly fixes the rack and major poise-weight to coincide with one or other of the major divisions of the steelyard and this without the use of notches thereon. The action further causes the corresponding type upon the type wheel to be arranged in line for printing. (Eight claims.)



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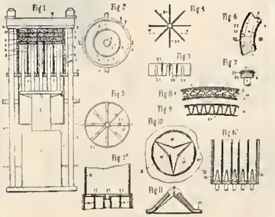

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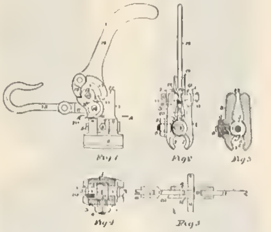

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(*Continued on page 560.*)

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NOTICE is hereby given, that in an action for Infringement of Blackett's Patent No. 14,053, of 1904, raised in the Court of Session, Edinburgh, at the instance of the Patentee, William Cuthbert Blackett, Mining Engineer, of Acorn Close, Sacriston, in the County of Durham, Complainer, against Dickson & Mann Limited, Engineers and Steel Founders, incorporated under the Companies' Acts, and having their registered office at Bathville Steel Works, Armadale, in the County of Linlithgow, Respondents, the Lord Ordinary (Lord Guthrie) by his Interlocutor or Order dated 17th November, 1908 (*inter alia*) certified the validity of the said Patent, in terms of section 35 of the Patents and Designs Act, 1907.

The Patentee hereby WARNS the trade and the public generally against making, selling, buying, dealing in or using Conveyors made in infringement of the said patent, which it is his intention to support and vindicate by all necessary means including legal proceedings. And further CAUTIONS infringers that they render themselves liable to an injunction or interdict with costs or expenses as well as to damages and delivery up of all infringing apparatus.

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Plowright Bros. Ld., Chesterfield
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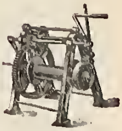

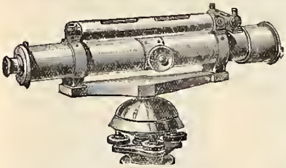

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Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Exhaust Turbine Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanell
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Files
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

Fire Appliances
Fell, C. A., Dronfield, near Sheffield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Beddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Purchasers' Guide to Advertisers' Specialities.—(continued).

Firelighter Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Fishplates
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

Fittings (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

Forced Draught
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

Forges
Hardy Patent Pick Co. Ld., Sheffield

Forgings
Bagnall, W. G., Ld., Stafford
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld., Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Fuel Economisers
Pell, C. A., Dronfield, near Sheffield
Pillatt and Co., Stapleford, Nottingham
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld., Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Hammerton-st., Burnley
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall

Fuses (Safety)
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Bricks

Gas Engines
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Glover, M., and Co., Holbeck-lane, Leeds
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Gas Exhausters
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Gas Plant
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Tipton

Gas Valves
Haslam and Schontheil Ld., Bristol

Gauge Glasses
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Jacobson, Richard, 70, Shoe-lane, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gear (Special for Motor Lorries Cars &c.)
Brown, David, & Sons (Hudd.) Ld., Huddersfield

Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroën, Andre, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Nuneaton Engineering Co. Ld., Nuneaton.
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Rods Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, H., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Hoists
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Hooks or Links (Safety)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Loampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Hydraulic Jacks
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Ryland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hydrometers
Davis, John, and Son (Derby) Ld., Derby

Incline Rollers
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Reddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

Jointing Cement
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

Jointing (Sheet)
Thomas and Bishop 119 125, Finsbury Pav., E.C.

Joists (Rolled Steel)
Heenan and Froude Ld., Worcester
Benton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Keps (for Winding Cages)
Bentham, D., 45, Bank-street, Sheffield
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Lamp Cleaning Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Gauze Brushes
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Glasses
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Oil Filling Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Re-Lighting Apparatus (Underground)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Arc)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Lamps (Electric)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

Lamps (Electric Safety)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Rd., Ld., Belvedere Works, Belvedere, Kent
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Miners' Safety)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Outdoor)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

Lathes
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

Leather Appliances

Lessons by Post
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

Lifting and Hoisting Tackle
Benton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

Lightning Conductors
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Shaw, John, Ld., Sheffield
Theedam, E. C., Ld., Dudley

Locknut Washers
Benton, B. M., and Co., Sheffield

Loose Collars
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster S.W.

Lubricators
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon street, E.C.

Machinery (Second-hand)
Bute Works Supply Co. Ld., Cardiff
Foot, R. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Benton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

Machine Tools
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

Mathematical Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mechanical Stokers
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

Metal Perforators
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

Metallic Packing
United States Metallic Packing Co. Ld., Soho Works, Bradford

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Norton's (Tividale) Ld., Tipton
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Screening Plant
Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Screwing Machines
Frost, Albert, and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Screws (Stretching)
Youngs, Ryland-street Works, Birmingham

Sewage Treatment Plant
Mather and Platt Ld., Manchester

Shafting
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Hardy Patent Pick Co. Ld., Sheffield
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Phillips, C. D., Newport, Mon.
Spencer and Co. Ld., Melksham, Wilts
Tickle Bros., Vulcan Ironworks, Wigan
Uskside Eng. Co. Ld., Newport Mon.
Wright, Joseph, and Co., Tipton

Shaft Sinkers
Trefor Boring and Mining Co. Ld., 41, rue Royale, Brussels

Sheet Iron
Firth, Wm., Ld., Water-lane, Leeds
Harvey, G. A., & Co., Leampit Vale, Lewisham, S.E.
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

Sheet Metal Works (for Cylinder Casings)
Baker, John, and Son, Bilston
Kenyon, Wm., & Sons, Ld., Dukinfield
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Shot-Firing Batteries and Cables
British Explosives Syndicate Ld., Glasgow
British Insulated and Helsby Cables Ld., Lancs.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Haslam and Schontheil Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

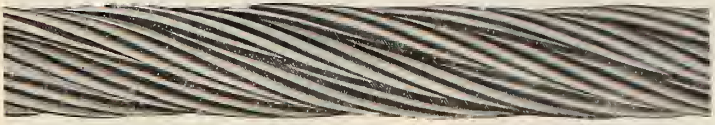
Shovels and Shovel Trees
Baker, John, and Son, Bilston, Staffs
Fell, C. A., Dronfield, near Sheffield
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

Shovels (Sprinkling)
Fell, C. A., Dronfield, near Sheffield

Sidings
Bagnall, W. G., Ld., Stafford
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, & Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

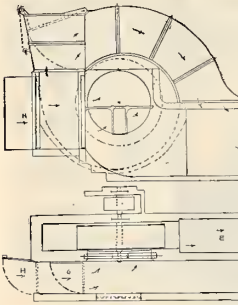
Sleepers (Iron and Steel)
Allen, W. G., & Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
Baird, J. W., and Co., West Hartlepool
Bute Works Supply Co. Ld., Cardiff
Firth, Wm., Ld., Water-lane, Leeds
Renton, B. M., and Co., Midland Works, Sheffield

JOHN SHAW LTD.,
Yorkshire Wire Rope Works, SHEFFIELD, ENGLAND.



STEEL WIRE ROPES OF EVERY DESCRIPTION.

JOHN SHAW (AUSTRALIA) LD., 445, Kent Street, Sydney.



The Capell Patent Reversing Fan
Single or Double Inlet.

CAPELL PATENT FANS (1906-1907).

REVERSING FANS ARE REQUIRED BY NEW MINES ACT.

These give larger Volumes and higher Manometric Effects. The Result is a Smaller Fan is now used for all duties. Fans—Rope or Belt or Direct Driven.

SOME RESULTS OF THESE NEW FANS ARE NOW GIVEN.

1. IN ENGLAND.
Fan, 12 ft. 6 in. × 7 ft. 0 in.
Date, Oct. 5th, 1907.
Revols. 265
W.G. ... ... 8 inches
Cubic ft. per min. 376,000
H.P. in av. .. . 472
H.P. indicated .. 579
Useful Effect 81·5 %

2. IN PENNSYLVANIA.
Fan, 16 ft. 0 in. × 8 ft. 0 in.
Direct Driven.
Date, October 6th, 1907.
Revols. 158
Cubic ft. ... 431,700
W.G. ... ... 4·3 inches
Useful Effect 80 %

3. IN ENGLAND.
Single Inlet Fan,
16 ft. 0 in. × 5 ft. 6 in.
Revols. 170
Cubic ft. ... 298,000
W.G. ... ... 5½ inches
Useful Effect 74 %

INDUCED DRAUGHT. IN-BYE FANS, CUPOLA FANS, FORCE FANS, HAND MINING FANS, AND DUPLICATE MINE FANS.

Sole Makers—
THE CAPELL FAN CO., 13, Mosley Street, NEWCASTLE-ON-TYNE.

Purchasers' Guide to Advertisers' Specialities—(*continued*).

Smiths' Tools
Hardy Patent Pick Co. Ld., Sheffield

Smith Work
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Wright, Joseph, and Co., Tipton

Smoke Helmets
Siebe, Gorman and Co. Ld., Westminster, S.E.

Speed-Reducing Gears
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Sphincter Grip Armoured Hose
Reddaway, F., & Co. Ld., Pendleton, Manchester

Springs
British Wagon Co. Ld., Rotherham
Lancaster and Tonge Ld., Pendleton, Manchester
Skinner, J. P. and Co. Ld., Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Stampings
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Steam Experts
Fell, C. A., Dronfield, near Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan

Steam Fittings
British Mannesmann Tube Co. Ld., London Wall
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Russell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staffs.

Steam Mains and Pipe Installations
Stewarts and Lloyds Ld., Birmingham & Glasgow
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

Steam-Saving Appliances
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Burnley
Yorkshire Boiler Co. Ld., Bradford

Steam Traps
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster & Tonge Ld., Pendleton, Manchester
Stewarts & Lloyds Ld., Birmingham and Glasgow
United States Metallic Packing Co. Ld., Soho Works, Bradford
Wright, Joseph, and Co., Tipton

Steam Winches
Bridge, David, & Co. Ld., Castleton, Manchester
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Phillips, C. D., Newport, Mon.
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Steel
Cooke, William, and Co. Ld., Tinsley, Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Hatch and Batchelor Ld., Hay Mills, nr. B'ham
Mining Engineering Co. Ld. (The), Sheffield
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Stewarts & Lloyds Ld., Birmingham and Glasgow
Thompson and Co., Wigan
Waterfall, H. & H., & Barber, Bridge-st., Sheffield

Steel Blooms Billets
Benton, B. M., and Co., Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Flats and Rounds
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Timbers
Scott, Walter, Ld., Leeds Steel Works, Leeds

Stone Breakers
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln

Structural Steel Work
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Wright, Joseph, and Co., Tipton

Sulphate of Ammonia Plant
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Sulphur Recovery Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Superheaters
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
Pulsometer Engineering Co. Ld., Reading
Stringer, John, and Son, Dept. 11, Blackburn

Surgical Appliances
White & Wright, 93, Renshaw Street, Liverpool

Surplus Steam Valves (Full Bore)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Hopkinson, J., and Co. Ld., Huddersfield

Surveying (Books on)
Thomas, Wm., Cambrian Mining School, Porth

Surveying (Instruction)
Thomas, Wm., Cambrian Mining School, Porth

Surveying Instrument Makers
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavement, London
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Switch Boards
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Switch Gear
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Swivels (Ball-Bearing)
Bridge, David & Co., Ld., Castleton, Manchester
Youngs, Ryland-street Works, Birmingham

Tamping Plugs

Tanks
Bagnall, W. G., Ld., Stafford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Harvey, G. A., and Co. Loampit Vale, Lewisham
Isca Foundry & Engineering Co., Newport, Mon.
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Valor Co. Ld., Rocky-lane, Aston Cross, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

Tanks (Ferro-Concrete)

Tar Distilling Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Technical Education
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Telephones
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Timber (Colliery)
Baird, J. W., and Co., West Hartlepool
Osbeck and Co., Newcastle-on-Tyne

Tipplers.
Bagnall, W. G., Ld., Stafford
Cantrell, W. E., and Co. Ld., Beeston, Notts
Heenan and Froude Ld., Worcester
Spencer and Co. Ld., Melksham, Wilts
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

Tools
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Tram and Wagon Corner Plates
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Theedam, E. C., Ld., Dudley

Transformers (Electrical)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Transport Plant
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Trommels
Borns, W., and Son, Globe Works, Holloway
Heenan & Froude Ld., Worcester and Manchester
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts

Truck Shunting Plants
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Tubbing and Well Cylinders
Head, Wrightson and Co. Ld., Stockton-on-Tees
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Tub Drawbars
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Ormerod, Edward, Atherton, near Manchester
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

Tube Expanders
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

Tube Fittings
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Wednesbury
Stewarts & Lloyds Ld., Birmingham and Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tubes (Iron and Steel)
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Lewis, William, and Son, Bilston
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tub Greasers and Controllers
Theedam, E. C., Ld., Dudley

Tugs (Colliery)
Allen, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Humble, Stephen, 9, Victoria-st., London, S.W.
Longbotham, R. H., and Co. Ld., Wakefield
Theedam, E. C., Ld., Dudley
Wigan Wagon Co. Ld., Springs Branch, Wigan
Wright, Joseph, and Co., Tipton

Tunnel Segments
Railway and General Engineering Co. Ld., Notts
Tickle Brothers, Vulcan Ironworks, Wigan

Turbines
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester

Turbines (Exhaust)
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Turbo Compressors
Tickle Brothers, Vulcan Ironworks, Wigan

Turntables
Heenan and Froude Ld., Worcester
Isca Foundry & Engineering Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Tuyeres
Baker, John, and Son, Bilston, Staffs
Railway and General Engineering Co. Ld., Notts
Russell, John, and Co. Ld., Walsall
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C. Ld. Dudley

Valuers
Radford, R. H., Son, and Squire, Sheffield
Stringer, John, and Son, Blackburn

Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Green and Boulding Ld., 28, New Bridge-st., E.C.
Haslam and Schontheil Ld., Cardiff
Hopkinson, J., and Co. Ld., Huddersfield
Mather and Platt Ld., Manchester
Russell, John, & Co. Ld., Alma Tube Works, Walsall

Vices
Frost, Albert, and Co., Sheffield
Glover, M., and Co., Holbeck-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

Vulcanised Fibre
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Washers
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Jardine, John, Deering-street, Nottingham
Benton, B. M., and Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Water Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Purchasers' Guide to Advertisers' Specialities.—(continued).

Water Filters
Pulsometer Engineering Co. Ld., Reading
Wright, Joseph, and Co., Tipton

Water Softening and Purifying
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Wright, Joseph, and Co., Tipton

Water Tube Boilers
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.

Water Wheels

Welding Apparatus

Well Tubes
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Bussell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Wellington, Staffs.

Weighing Machinery
Thompson and Co., Wigan

Wheelbarrows
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Son, Thompson-street, Bilston
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Haslam and Schontheil Ld., Cardiff
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

Wheels Axles and Tyres
Bagnall, W. G., Ld., Stafford
Baker, John, and Co. (Rotherham) Ld., Kilnhurst, Rotherham
British Wagon Co. Ld., Rotherham
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lancashire & Yorkshire Wagon Co. Ld., Heywood
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn and Cubitt, Ld., Pentre, Glam.
Moy, Thomas, Ld., Railway Works, Peterborough
Nuneaton Engineering Co. Ld., Nuneaton
Railway and General Engineering Co. Ld., Notts
Benton, B. M., & Co., Midland Works, Sheffield
Thompson and Southwick, Ld., Tamworth
Wigan Wagon Co. Ld., Springs Branch, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Winches
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Bros., Vulcan Ironworks, Wigan
Youngs, Ryland-street Works, Birmingham

Winding Engine Indicators
Daglish, H., and Co., St. Helens, Lancashire
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Wire
British Insulated and Helsby Cables Ld., Prescot
Cooke, Wm., and Co. Ld., Tinsley, Sheffield
Elliot, George, & Co. Ld., 16, Gt. George-st., S.W
Glover, Wm. Jas., and Co., St. Helens, Lancs.
Latch and Batchelor Ld., Hay Mills, Birmingham
Benton, B. M., and Co., Sheffield
Shaw, John, Ld., Sheffield

Wire Mesh and Gauze
Ackroyd & Best Ld., Morley, near Leeds
Barns, W., and Son, Holloway, London, N.
Copeland, Alex., and Son, 3, Mitchell-st., Glasgow

Wire Mesh and Gauze—continued.
Davis, John, and Son (Derby) Ld., Derby
Harvey, G. A., and Co., Lewisham, London,
Theedam, E. C., Ld., Dudley

Wire Rope Greaser
Mining Engineering Co. Ld. (The), Sheffield
Theedam, E.C., Ld., High-street, Dudley
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Wire Rope Pulley Blocks
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Wire Work
Barns, W., and Son, Globe Works, Holloway, N.
Copeland, Alex., and Son, 3, Mitchell-st., Glasgow
Harvey, G. A., and Co., Lewisham, London, S.E
Shaw, John, Ld., Sheffield

Wood-working Machinery
Glover, M., and Co., Holbeck-lane, Leeds
Stringer, John, and Son, Dept. 11, Blackburn

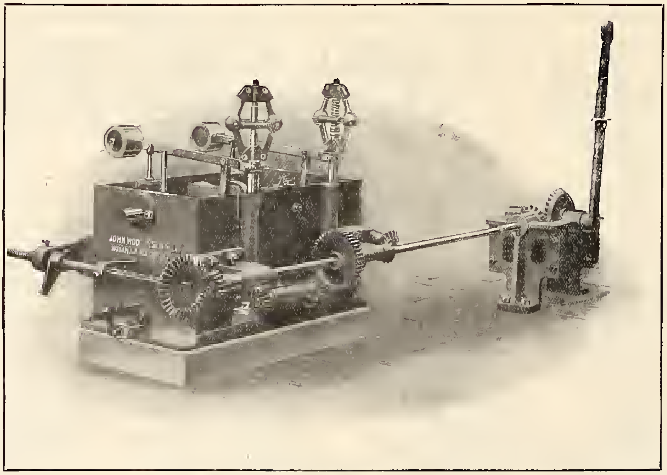
Worm Gearing
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan

NO MORE PIT CAGE ACCIDENTS!

Ascending and Descending Cages Safeguarded.

No Interference with Winding.

Starting in the Wrong Direction Prevented.



Safety assured with 'THE VISOR.

The most Effective Machine on the Market.

160 at work.

Write for particulars to **JOHN WOOD & SONS Ltd.,**

Telephone: 55 Wigan. Engineers, WIGAN. Telegrams: "Haulage, Wigan."

BEVER'S PATENT ATTACHMENT

TO PREVENT

OVERWINDING,

EXCESSIVE SPEED,

OR STARTING IN WRONG DIRECTION.

ABSOLUTE AUTOMATIC CONTROL

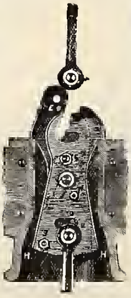
DURING FULL PERIOD OF WIND.

CAN BE FITTED TO ANY ENGINE.

BEVER, DORLING & CO. LTD

Telegrams—"Foundry, Bradford." Bowling Ironworks, BRADFORD. *Telephone*—1644 Bradford.

Makers of all kinds of COLLIERY PLANT.



ORMEROD'S
IMPROVED
PATENT SAFETY LINKS

For the effectual prevention of Accidents from Overwinding.

THE BEST AND MOST RELIABLE SAFETY DETACHING HOOK YET INVENTED.

Advantages and full particulars on application.

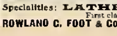
Sizes up to 10 Tons working load in Stock or Progress.

DIPLOMAS OF HONOUR AWARDED TORONTO, LONDON & OTTAWA, CANADA, August, September and October, 1898.

PATENTEE & SOLE MANUFACTURER—

EDWARD ORMEROD,

Atherton, nr. Manchester.



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Specialities: **LATHES & SAW BENCHES.**
First class at competitive prices
ROWLAND C. FOOT & CO. 11, QUEEN VICTORIA ST., LONDON, E.C.

Marcus Screen. Capacity, 90 tons per hour.

Marcus Screens. Each, 100 tons per hour into 4 grades.

INFRINGEMENT OF MARCUS PATENTS

ALL WHO ARE CONSIDERING THE ADOPTION OF

Horizontal Screens

are earnestly requested to compare **"MARCUS" PATENT No 14412/1900** and to **JUDGE** for themselves how far the Adoption of Propulsion Screens other than those manufactured by **HEAD, WRIGHTSON & CO. LTD.,** will render **THE USER LIABLE TO LEGAL ACTION.**

Head, Wrightson & Co. Ltd., Stockton-on-Tees,

will be pleased to forward copy of the **"MARCUS" PATENT** on application.

Marcus Screen. Capacity, 75 tons per hour.

Marcus Coke Screens. Each, 30 tons per hour capacity.

COLLIERY REPORT BOOKS & FORMS.

New Forms, &c., recently issued under the Coal Mines Acts.

This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c., as issued.

☞ ISSUED SINCE THE LAST APPEARANCE OF THIS LIST.

Registered No. Please quote when ordering.	NEW FORMS, &c., RECENTLY ISSUED.		
	Statutory Rules and Orders, &c.		
H.O., 511	Explosives in Coal Mines Order of 21st May, 1912 (revoking all previous "Explosives" Orders). Pamphlet Form	4d. each.	By post 5d.
C.G., 69.	The same (without Schedules). Pamphlet Form	4d. each.	By post 5d.
H.O., 34	The same (without Schedules). In Sheet Form for posting	1d. each.	By post 1½d.
H.O., 1149	Mining Examinations. Order Fixing Times and Places	1d. each.	By post 1½d.
☞ H.O., 1150	Rules for the Conduct of Examinations	1d. each.	By post 1½d.
☞ H.O., 1151	Rules as to the Qualifications of Applicants for First and Second-class Certificates of Competency	1d. each.	By post 1½d.
C.G., E.	Special Rules for the Installation and Use of Electricity in Mines. Sheet Form (H.O., 12)	3d. each.	By post 3½d.
C.G., K.	Pamphlet Form (H.O., 11)	2d. each.	By post 3d.
C.G., L.	Coal Mines Act, 1911. Pamphlet Form	9d.	By post 11d.
C.G., L. (Abs.)	Coal Mines Act, 1911, Abstract. Sheet (26 in. by 34 in.) (H.O., 2)	3d. each.	By post 4d.
C.G., M.	Coal Mines (Minimum Wage) Act, 1912. Pamphlet Form	1½d.	By post 2d.
Cd. 6340.	Mines and Quarries: General Reports, &c. Part I. District Statistics	6½d.	By post 8d.
☞ Cd. 6387	Testing of Miners' Safety Lamps. Report of Departmental Committee, August 5, 1912	5½d.	By post 7d.
	List of Mines in the United Kingdom for 1911	4s. each.	By post 4s. 4d.
C.G., F.	Directions as to the Restoration of Persons suffering from Electric Shock (Silvester or Schafer). Sheets (20 in. by 30 in., and 10 in. by 15 in.)	4d. each.	3s. per doz.
	Mounted on Cardboard	6d. each,	carriage extra.
	Do. and Varnished	1s. each,	do.
	On Enamelled Iron Plates (10 in. by 15 in.)	3s. 2d. each	do. Reduction on a quantity.

	PRESCRIBED FORMS.		
H.O., 11A	Electricity Rules: Daily Log Sheet	1s. 6d. per 100	
H.O., 11B	Do. Do. Book	4s. each.	By post 4s. 8d.
H.O., 11C	Do. Notice to Inspector of the District under Rule 2 (ii.)	1d. each.	By post 1½d.
H.O., 11D	Do. Notice to Inspector of the District under Rule 2 (iii.)	1d. each.	By post 1½d.
H.O., 20	Form of Register of Boys, Girls and Women Employed—Section 94	4d. each,	postage extra
H.O., 36	Form of Report Book for Inspection on behalf of Workmen—Section 16	9d. each	do.
H.O., 37	Form of Book for Record of Measurements of Air Currents—Section 29 (2)	7d. each,	do.
H.O., 38	Form of Book for Daily Record of Damage to Safety Lamps—Section 34 (1) (ii)	1s. 6d. each	do.
H.O., 39	Form of Report of Thorough Examination of Steam Boiler—Section 56	1d. each	do.
H.O., 40	Form of Book for Report on Quarterly Internal Examination of Steam Boilers—Section 56 (1) (*c*) and (3)	6d. each	do.
H.O., 41	Form of Book for Daily Report on Condition of Roads as to Coal Dust—Section 62 (5)	1s. 3d. each	do.
H.O., 42	Form of Report Book for Firemen, Examiners or Deputies—Sections 64 and 65	1s. each	do.
H.O., 43	Form of Book for Daily Report of Examination of External Parts of Winding Machinery, Guides, &c.—Section 66 (*a*)	1s. 6d. each	do.
H.O., 44	Form of Book for Weekly Report of Machinery, Gear and other Appliances (other than Winding Machinery, Gear, &c.)—Section 66 (*b*)	1s. 3d. each	do.
H.O., 45	Form of Book for Weekly Report on State of Shafts in which Persons are Lowered or Raised—Section 66 (*c*)	1s. 3d. each	do.
H.O., 46	Form of Book for Weekly Report on State of Airways—Section 66 (*d*)	1s. 3d. each	do.
H.O., 47	Form of Book for Reports on Places from which Workmen have been Withdrawn Section 67	9d. each	do.
H.O., 48	Form of Notice of Accident Causing Loss of Life or Serious Personal Injury to be sent to Representative of Persons Employed—Section 80 (1)	1d. each	do.
H.O., 49	Form of Notice Specifying the Period of Employment and Times Allowed for Meals of Boys, Girls and Women—Section 93	1d. each,	postage extra
H.O., 50	Form of Book for Horsekeeper's Record and Daily Report of Horses under his care—Schedule III. (13)	2s. 6d. each,	do.
H.O., 51	Form of Annual Return of Horses Used Underground in the Mine—Schedule III. (16)	1d. each	do.
H.O., 52	Form of Book for Daily Record of Shots Fired—Explosives in Coal Mines Order	9d. each	do.

Continued on Page 567.

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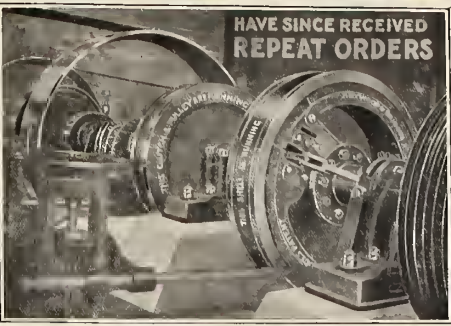

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Continued from Page 566.

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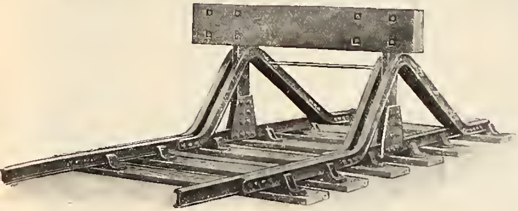

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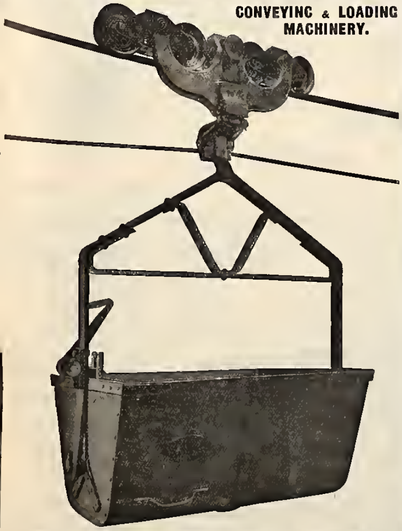

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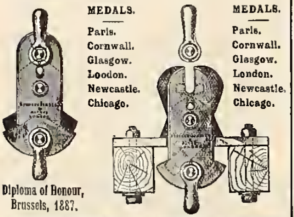

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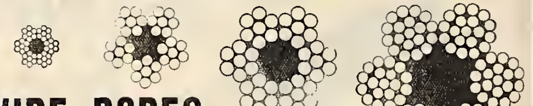

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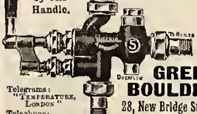

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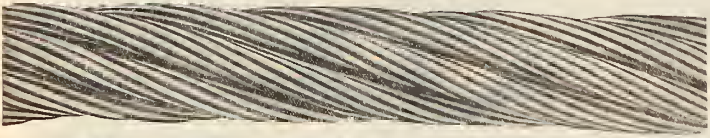

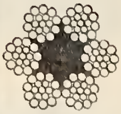

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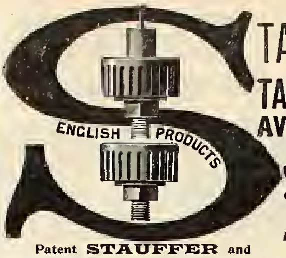

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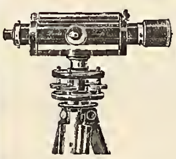

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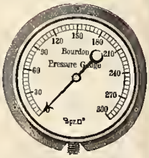

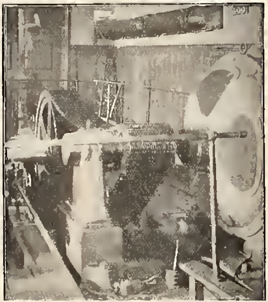
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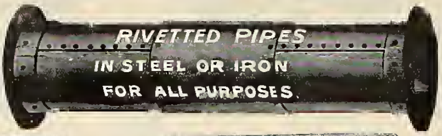

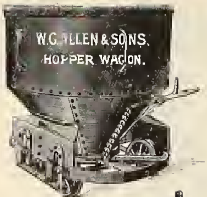

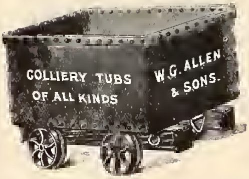

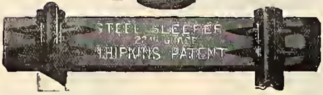

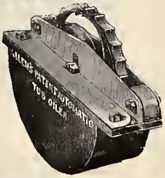

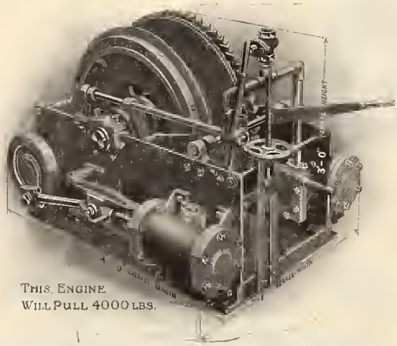

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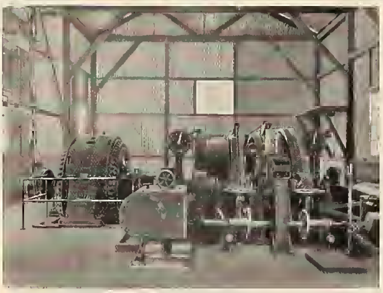

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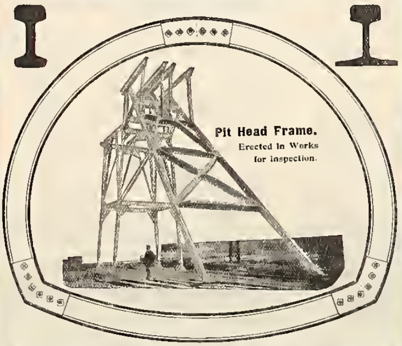

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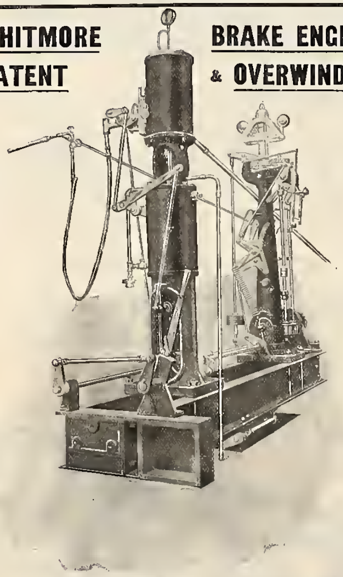

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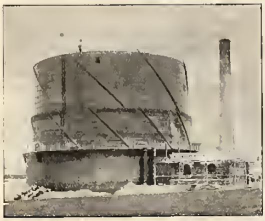

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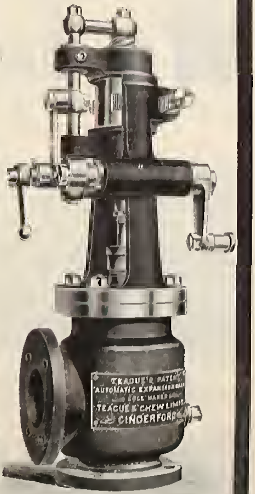

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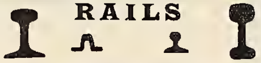

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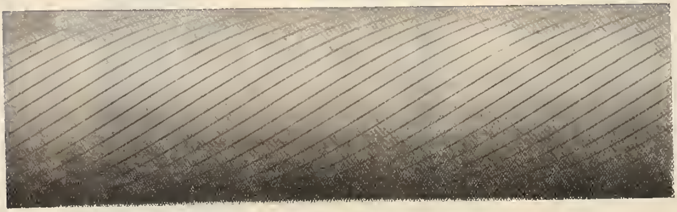

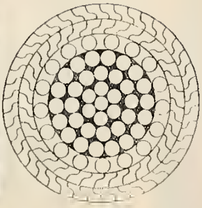

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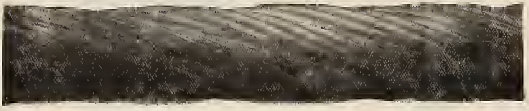

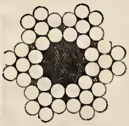

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THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CIV. FRIDAY, SEPTEMBER 20, 1912 No. 2699.

THE INSTITUTION OF MINING ENGINEERS.

Annual General Meeting.

The twenty-third annual general meeting of the Institution of Mining Engineers was held at Birmingham on September 11, under the presidency of Dr. WILLIAM EDWARD GARFORTH, LL.D., M.Inst.C.E. The meeting took place in the Lecture Theatre, Edmund-street, forming part of the original buildings which, known as the Mason College, were opened in 1880, and which have afforded scientific and literary training to the youth of the Midlands ever since. Now that the Mason College has obtained the greater influence and power of a university, it is a tribute to the mining profession that, in its twelfth year of exaltation, it should have conferred the honorary degree of LL.D. upon Mr. Garforth, the president of the Institution of Mining Engineers for two successive years. The LORD MAYOR (Alderman W. H. Bowater), in welcoming the institution, said that the Birmingham University was delighted at the opportunity of conferring that honour, and Dr. GARFORTH, in reply, expressed his great appreciation of it, in which the profession as a whole shares. Mr. ALEXANDER SMITH, who read the first paper, referred to the fact that the president had done perhaps more than any other man living for the advancement of the science of life-saving, and that Birmingham University had been the first to recognise it publicly. The second paper was read by Prof. JOHN CADMAN, D.Sc., who now controls the mining department of the University, the chair of mining having been founded in 1902, with Mr. R. A. S. Redmayne (now H.M. Chief Inspector of Mines) as its first professor.

The attendance was large and influential, as will be seen by the following list:—Prof. W. Hardwick, Prof. J. H. Merivale, Prof. J. Cadman (Birmingham University), Messrs. R. W. Dron, Arthur Hassam, G. H. Hollingworth, W. C. Mountain, J. M. Gregory, W. Smith, J. Nisbet, W. Williamson, Douglas Jackson, T. H. Wordsworth, J. Balfour Sneddon, F. R. Atkinson, W. McCreath, O. Latham, W. B. Wilson, James Hamilton, Alexander Smith, A. Stanley Atherton, Dr. W. N. Atkinson (H.M. inspector of mines), Dr. R. T. Moore, Messrs. Hugh Johnstone (H.M. inspector of mines), W. Hepplewhite (H.M. inspector of mines), W. Cochrane Carr, L. Austin, W. F. Clark, R. H. S. Hepplewhite, G. Douglas Smith, Arthur Sopwith, R. McLaren (H.M. inspector of mines), W. G. Phillips, G. A. Lewis, J. Turnbull, J. C. Forrest, M. J. Foggo, S. L. Thacker, Arthur Hall, D. E. Parry, Langford Ridsdale, Harry Mitcheson, J. James Turnbull, J. Jeffry, Alexander Clubb, W. Price Abell, W. Smith, D. N. Turner, T. H. Bailey, W. T. Anderson, W. H. Patchell, John Simpson, G. Turner, G. A. Lewis, H. P. W. Gifford, J. Burns, J. Lomax, W. Saint (H.M. inspector of mines), J. R. Felton (H.M. inspector of mines), J. Greenwood, J. MacLeod Carey (H.M. inspector of mines), J. W. Gregory, F. H. Wynne, G. P. Hyslop, J. Brindley, N. Forrest, C. H. Bailey, R. Wood, W. Halder, G. W. Greenwood, G. Forster, J. W. McTrusty, J. Hunter, W. Charlton, Walcot Gibson, H. Bradshaw, Roslyn Holiday, T. G. Fisher, G. Hailstone, F. Bernard Clark, J. Campbell Foster, H. Jenkins, E. G. Sutherland, A. M. Henshaw, L. T. O'Shea (secretary), and P. Strzelecki (assistant secretary).

The LORD MAYOR OF BIRMINGHAM (Alderman W. H. Bowater), who said he preferred to address the president as "Dr. Garforth," because he had obtained his title and degree of Doctor of Laws at that University, welcomed the members of the institution to Birmingham. Its record in the past was such as to prove that it deserved to be held in the highest esteem, and he congratulated the members on having as president such a distinguished scientist as Dr. Garforth, who had made such practical experiments, to mention one phase of a very active and useful life, on a practical scale on coal-dust as to have convinced everyone whose opinion was worth having that explosions could occur from coaldust without any admixture of gases; and what was more, he had proved that such explosions were preventable, although, as he understood, a further series of experiments on the same lines was going to be made. The fact of having a man like that at its head proved that the institution was a practical one, and the Birmingham University was delighted to have the opportunity of conferring upon Dr. Garforth the degree which he had received a month or two back. He had had a letter from Sir Oliver Lodge, who was attending the British Association meeting at Dundee, expressing his very deep regret at his inability to be present at their deliberations and to welcome Dr. Garforth to Birmingham. The membership of the institution being well over 3,000, it was certainly numerically strong. During the 23 years of its federated existence he observed that 43 volumes of *Transactions* had been issued. He was speaking almost as a mere man in the street, but he was struck by the fact, on seeing the titles of many of the papers which had been read and published, that they certainly showed a practical tendency. That locality was a fitting one for the Institution of Mining Engineers to meet in, for although, large as the city was, it had not any real mines, yet it was the centre of a ring of mines in East Worcestershire, Staffordshire and Warwickshire. He thought, too, that the junior members had learnt a good deal from the model mine at the University. Apart from the point of view of local pride, he hoped the members would agree with him that the mining department of the University was one of the best equipped in the country. The University was not only teaching, and prepared to teach, mining engineers, or those who wished to become such. Under the new Act the Government had shown its determination of improving the qualifications of those in any position of authority in mines. The members of the institution knew better than he did that under the new Act the deputies would have to be men of proved capacity; they would have to obtain a certificate, and the Birmingham University had the duty placed upon it by the Home Office of examining some 1,600 deputies, and those who passed that examination would receive a certificate from that University, showing that it was not only a teaching, but in a way an administrative body. Birmingham was dependent in a very great measure upon the successful carrying on of the coal and iron mining in its immediate district. It was a centre which attracted a large number of very able professional men in most departments, and there were in and near Birmingham a great many very competent mining engineers. He was pleased to see many of them were present, and to know that they took an interest in the doings of the institution, realising as they did the great advantage of inter-communication not only by papers but by a conference like the present, which enabled them to come into personal contact one with another.

The PRESIDENT, on behalf of the Institution of Mining Engineers, thanked the Lord Mayor most sincerely for the very generous welcome that he had extended to them on their visit to that renowned city. He would not attempt to take up the various points which the Lord Mayor had mentioned, but he thought it would be a satisfaction to him to know that they not only had in that Birmingham district some of the most experienced engineers, who had been working thick mines in a way that had been the admiration of other members of the institution, but they had to thank them for many appliances for the production of iron and steel, which had helped not only that district, but other parts of the country, in carrying out the work of the mining engineer and colliery official; because, without the help of mechanical and electrical engineers, and the producer of iron and steel, they could not possibly have accomplished what had been done in the last few years; and Birmingham had all those trades in its midst. The Lord Mayor had referred to what had been done in finding a preventative for the coaldust trouble, which had occupied the attention of mining engineers, and been a matter of controversy for the last 30 years. He thought they would have to call upon that district to give them the benefit of their experience with regard to spontaneous combustion, which might be looked upon as one of the coming dangers. The coaldust question had, in his opinion and in the opinion of a great many others, been practically settled. At the present moment he felt more free from anxiety than he had done during the 40 years that he had been connected with mining, both from the practical experience one had had in recovering a mine after an explosion, and also from the experiments which many of the members had seen at Altofts some two or three years ago. If they adopted the suggested preventative—namely, stonedust distributed in proper quantities along the various roadways of the mine—then the coal-mine became to all intents and purposes a metalliferous mine; and he believed that when the stonedust was raised at the same moment as the coaldust, and there was a cloud in air, then those dreadful disasters which had resulted in so much loss of life would be things of the past. But the question of spontaneous combustion or goaf fires was one which he hoped the mining engineers of that district, when called upon by the Government or by the proper authority, would deal with. The committee, which he supposed would be formed shortly, would be increased by-and-bye by other names, but they did look to that district to help them in overcoming that great danger, which was becoming more acute year by year as the mines increased in depth. He would also like to congratulate the people of Birmingham on having that magnificent University, which he thought stood foremost in teaching science and technology, and he hoped that the forethought and the enterprise which had been shown would in due time meet its reward.

Mr. J. C. FORREST (Essington) said that as president of the local institute (the South Staffordshire and Warwickshire) he would like to second Dr. Garforth's proposal. He thought, after the Lord Mayor's kindness to the mining world not only in regard to that meeting, but in relation to the University of the City of Birmingham, that they had a great deal to thank him for. Although the Black Country had had a past in the thickness of its seams in the large areas, there were other districts and other coalfields adjoining them which were now only being proved, which would make Birmingham one of the most important centres for the iron trade. He was glad to say that the iron trade was reviving, and was now on the wing. At one time it had been thought that steel would sweep it out, but it was just the reverse; iron was coming back, and coal would be found in the district to smelt the iron, which made it so rich. The only thing wanted was means to take it away; and they would be glad to hear that the Lord Mayor of Birmingham had taken the lead in trying to secure that that means should be found by national canals, which would provide facilities and make Birmingham a seaport.

The resolution was carried by acclamation.

Annual Report.

The HON. SECRETARY (Mr. L. T. O'Shea) read the 23rd annual report of the council.

The PRESIDENT moved the adoption of the report.

Mr. J. C. FORREST seconded the motion, which was unanimously carried.

The PRESIDENT then moved: "That the council and members of the Institution of Mining Engineers tender their condolence to the relatives of those who lost their lives in the Cadeby Colliery explosion, and their sympathy with Mr. W. H. Chambers and the colliery company." He asked the members to stand in token of their sympathy with the resolution.

Mr. T. H. BAILEY (Birmingham) suggested that the workmen—the employees at the colliery—should be added to the resolution.

The resolution was carried in silence, all standing.

Officers for 1912-1913.

The PRESIDENT called upon the hon. secretary to announce the names of the officers for the ensuing year.

The HON. SECRETARY read the list as follows:—President: Dr. W. E. Garforth, Snydale Hall, Pontefract. Vice-presidents (nominated by the various federated institutes): Mr. John Gerrard and Mr. Sydney

A. Smith (Manchester Geological and Mining Society); Mr. J. P. Houfton and Mr. W. H. Hepplewhite (Midland Counties Institution of Engineers); Mr. M. H. Habershon and Prof. F. W. Hardwick (Midland Institute of Mining, Civil, and Mechanical Engineers); Mr. James Hamilton, Mr. Robert McLaren, and Mr. J. B. Sneddon (Mining Institute of Scotland); Mr. W. C. Blackett, Mr. C. G. Leach, Mr. J. H. Merivale, Mr. F. R. Simpson, and Mr. J. C. Weeks (North of England Institute of Mining and Mechanical Engineers); Mr. Hugh Johnstone (North Staffordshire Institute of Mining and Mechanical Engineers); Mr. Alexander Smith (South Staffordshire and Warwickshire Institute of Mining Engineers).

Recent Mining Legislation.

Mr. **Alexander Smith** (Birmingham) then read his paper entitled "Recent Legislation in Relation to Land and Mines," which appeared in last week's *Colliery Guardian*.

In opening the discussion, the **President** said that they had had a most instructive and interesting paper from Mr. Smith, who had presented that important matter in a very clear and attractive way.

Mr. D. N. **Turner** (Chesterfield) said the author had dealt principally with the two duties on mines—namely, the Mineral Rights Duty and the Increment Duty. With regard to the first of those, the author's suggested amending clauses seemed so very reasonable that it was difficult to see why anybody should object. To the ordinary lay mind they appeared to be incapable of contradiction. He noticed that in the example referred to with regard to the mineral rights duty, the author had omitted to include super-tax as a tax upon which duty had to be paid. At 6d. in the £ that would amount to £250, and the mineral rights duty upon it would come to £12 10s. The total sum, therefore, which the owner would have to pay in mineral rights duty on sums which he would not receive was £91 13s. 4d. If the decision of Mr. Justice Hamilton in the Duke of Beaufort's case was upheld in the Appeal Court, and mineral rights duty was not to be assessed on the amount paid in income-tax, then that total amount would be reduced by £29 3s. With regard to increment duty, the name, in his opinion, was entirely misleading, because the amount on which duty was assessed was in the majority of cases not increment at all; it was merely the accumulations of interest, which any investor or speculator would naturally look forward to. Let them take, for instance, the example quoted in the paper; the author carried it to the point where a purchaser gave £42,655 for what was originally valued at £10,941. The difference, as the author rightly pointed out, was entirely made up of accumulated interest. If the author had carried the example one step further, and supposed that the purchaser immediately leased the coal and began to receive the income of £5,000, the £42,655 then became the original capital value. It had presumably been agreed to by the Government mineral valuer on the basis that the owner was going to receive £5,000 per annum for 20 years. If, therefore, he only received £5,000 per annum, anyone who had not read the Finance Act would think that he was not getting any increment at all, and would say that there was no increment. But that was not the case. Under section 22 (3) of the Act an owner who leased his mines would only be allowed to receive, without paying increment value duty, in any one year a sum equal to $\frac{2}{25}$ths of the original capital value. He would, therefore, only be allowed to receive £3,412 without paying increment duty. He would have to pay increment duty on £1,588, which amounted to £317. Under another section of the Act, however (section 22 (6)), the owner was entitled to be relieved from the payment of mineral rights duty up to the amount paid by him in respect of increment value duty. The mineral rights duty would in the ordinary course have amounted to £250. He therefore had in that case, over and above the mineral rights duty, to pay £67.

There was a point in connection with that section of the Act which he wished to bring to the notice of the members of the institution, showing what a handicap it might prove to colliery lessees. It sometimes happened that, having taken a lease of coal, unforeseen difficulties were met with, or serious accidents, such as fires or explosions, occurred. In such cases the lessee sometimes approached his lessor and asked him, in order to assist him during such time of stress, to allow his minimum rent to stand over until the following year, in order to give him time to pay and get over his difficulties, when he would be willing to pay it, in addition to the current year's rent. In that case the lessor would be receiving two years' rent in one. He had himself been approached by lessees, and where there were reasonable grounds for doing so he had always advised his clients, as far as possible, to accede to the request. In the future, however, he thought it would be difficult for lessors to meet their lessees as they had done in the past, because by so doing the lessors would be heavily mulcted in increment duty. Let them take, for instance, the example already quoted, and suppose the minimum rent to be the £5,000 per annum referred to. The lessees would ask that they should be let off paying their rent in a particular year, and next year they would pay £10,000 instead of £5,000. Under the Act the lessor would only be allowed to receive $\frac{2}{25}$ths of the original capital value—namely, £3,412—without paying increment duty in that year; therefore, if he received £10,000, increment duty would be due on £6,588, and the amount of it would be £1,317. He would again escape paying mineral rights duty, which would have amounted to £500, but he would have to pay £683 more than if he had compelled the lessee to pay the rents when due. In addition to that extra sum in duty, he would of course have lost a year's interest on £5,000—namely, £250—and the State would have benefited by his generosity by £933.

Increment duty was a direct handicap on the vigorous development of mineral properties, because the more an owner received in excess of the original capital value the more increment duty he had to pay. It was originally intended to put a tax on owners who did not develop their mines, in order to give encouragement to have them worked; but under the present Act they were taxed if they were worked beyond a certain rate. Increment value duty also fell very much heavier on the owners of small estates than on the owners of large estates. It might have been possible for the owner of a large estate, which would take many years to work out, to have got such a value accepted by the Inland Revenue authorities as would nearly represent the annual income which he would receive, spread over a considerable number of years. If, however, his coal was worked in less than 12½ years he automatically became liable to increment duty if his coal was leased, because he was only allowed to receive in any one year, free of duty, $\frac{2}{25}$ths of its original capital value. Taking an extreme case, if a small owner leased his coal to a colliery company, and the coal was all worked out and paid for during one year of the term, he could only escape increment duty on $\frac{2}{25}$ths, and therefore he would have to pay increment duty on $\frac{23}{25}$ths. Of course, if that small owner knew that his coal was going to be worked in one year it would pay him better to sell it rather than lease it, because he would then only be liable to increment duty on the excess received over and above the total capital value returned. It seemed unreasonable that an owner should be heavily mulcted, because the title which he had given to a colliery company to work his coal was by way of lease instead of by way of conveyance.

If the Act were to be amended, he would propose to Mr. Smith that he should suggest to members of Parliament, such as Mr. Newdegate, who took an interest in colliery matters, that clauses should be inserted providing that before the amount upon which increment value duty was due was arrived at, the owner should be allowed to add to his original capital value a sum equal to 4 per cent. compound interest for the period during which his mines had remained unworked, and therefore during which his capital had remained idle.

Increment on surface land was quite a different thing from increment on minerals. A man might own some fields which eventually increased in value. During the interval he was receiving rents which perhaps brought him in interest at the rate of 4 per cent. In the case of minerals, however, he was receiving nothing at all until the minerals came into working. He thought that that point must have been overlooked when the Act was passed.

There was another suggestion which he would venture to make—namely, that instead of the annual equivalent of $\frac{2}{25}$ths of the original capital value being applicable to each separate year, as provided by the Act, the annual equivalent should be the average, say, for five or 10 years. That would prevent such unfair cases as those referred to, where, through the nature and geographical position of a particular property, coal might be worked, say, during the first two or three years, to an amount about equal annually to the annual equivalent value; then there might be a few years when the workings were advancing across another owner's property before they again got into the first owner's property. When they again reached the first owner's property, and were perhaps working coal to the value of double the annual equivalent, the unremunerative years would be included in the average, and a much fairer assessment would be arrived at. The whole question of the mineral taxes in the Finance Act, 1910, seemed to have received very little public attention—principally, he believed, because the Act was so complicated that many people had not attempted to understand it. He felt sure that if some of the points to which he had referred were fully understood, mineral owners would receive much more sympathy than they did at present.

Prof. J. H. **Merivale** (Newcastle) said that his official position made the paper very interesting to him. He noted that the author pointed out that the main object of the Acts was identical with that of the Institution of Mining Engineers—namely, the safe working of mines, and one naturally inferred from that that the author at any rate was under the impression that there were certain subsidiary objects in the Acts which personally he (Prof. Merivale) would not like to hint at in a meeting of that kind. But he was quite convinced that so long as they did not consider those subsidiary objects, but confined themselves to the main object—namely, the safe working of mines—they were quite justified in discussing legislation. It was a little too soon at present, but he could not help thinking that it would be a very excellent thing if some gentleman would give them a paper upon recent legislation in relation to mines, how far it had promoted safety in working, and how far future legislation might further ensure that object. He would suggest that the hint thrown out that morning with regard to some little further help from the president might possibly take that direction. There was no subject on which the president was a greater authority, and his views would be of immense interest and value to the institution.

Mr. W. **Price Abell** differed from the previous speaker because he thought it good for a body of experts like the present to discuss the effects of legislation on their particular industry. Where the members of an industry like the mining industry of this country felt that the legislation under discussion cramped the work and development of mining, it was good that the outside public should know the facts and opinions of bodies such as that.

Mr. J. C. **Forrest** (Essington) said that if the author would go a little further later on and give a paper containing an abstract case or two and calculate the amount he would put down per acre, and work it out, they would be surprised to see how the figures came out in making the returns which some of them had had to make. It would be seen at the end of the problem that although the man who owned the estate appeared to have escaped in one way, yet when he came to die he would be caught in another way. In putting the value to an estate of 3,000 to 5,000 acres, which had already been referred to by Mr. Turner, one would be surprised to see the amount per annum one escaped payment on, judged by the amount per acre which was put down as the value of the estate to start with; and then, keeping that in mind, one finished up, taking the age of the owner at the time they came for the death duties, with another set of problems. The proposition was, in fact, a most difficult one. Although he had had a good deal of it to do lately, he believed that there were very few men indeed who could be found to do it properly, because it was half a lawyer's job and half a mining engineer's job to get to the bottom of it; and when one got to the bottom of it one was not at all satisfied with what had been done. He supposed that the Government *were* satisfied.

It had been suggested that someone should write a paper on the benefits or otherwise of past legislation, and of proposed new legislation. He hoped emphatically that there would be no more new legislation for a time, but such a paper written by a writer of Mr. Smith's experience would be a most important and valuable one. If it started with the valuation of an estate and carried it right through, so that one saw exactly how it turned out, the information so derived would be most instructive and helpful to the members of the institution.

Mr. **Roslyn Holiday** thought that the advantage of the paper was that it brought practical points before them. The position they were in was like that of a man who had some complicated disease, and who knew he had got it, but did not know what it was. The doctor came along and told him, and he found out he had a great many complications, and that if he took one pill it would do one part good but would injure another. That was really the position they were in. Whether it was the duty of the institution to take up the matter strongly as regards legislation, he did not feel prepared to say.

Mr. **Alexander Smith**, in reply, thanked Mr. Turner for his remarks and suggestions. It was true he had not included super-tax, and the reason for that was a very unfortunate one. He had rather dealt with facts; and the facts were that, although £10,000 a year was obtained from royalties, the owner of those royalties was not paying super-tax, because there were other drawbacks that robbed him of the opportunity of doing so.

With reference to Prof. Merivale's remarks, and those from other gentlemen, he thought if they discussed Acts of Parliament dealing with the workings of mines as Acts of Parliament, they would be treading on very dangerous ground. He remarked that they had the Government inspectors as their prominent members. He did not say they could influence them, because they were beyond suspicion, but when things were in embryo they could discuss matters with them; and if they were taken into consultation at the Home Office, as they ought to be, he thought they were to a great extent in safe hands.

The Bellevue Explosions.

Prof. JOHN CADMAN, D.Sc., then read the paper by himself and JOHN T. STIRLING, H.M. inspector of mines, Alberta, Canada, entitled "The Bellevue Explosions, Alberta, Canada: an Account of, and subsequent Investigation concerning, Three Explosions produced by Sparks from Falls of Roof." This was also given in last week's *Colliery Guardian*.

Prof. JOHN CADMAN afterwards demonstrated by experiment how the friction of two rocks produced sparks which ignited the gas.

In the discussion that followed, Mr. A. M. HENSHAW (Talk-o'-th'-Hill Colliery) thought there could be no doubt, after what they had heard and the experiments they had seen, that the Alberta explosion was caused by sparks from the falling rock. The peculiar and fortunately rare character of the rock as to its sparking property had been demonstrated, and in the absence of any person or other means of ignition in the pit at the time of the explosion, they were enabled, he thought, to agree thoroughly with the authors in their conclusions. He feared that unexplained explosions might be due to the same cause in some other instances, and a closer examination into the nature of the roof rocks demanded attention when considering the cause and prevention of such accidents. It was fortunate that similar conditions to those of the Alberta mine were rare, but he was reminded of the explosion at the Orrell Colliery, Wigan, in 1902, which he considered was caused by the spark from a shovel striking the roof. The verdict in the Alberta case was incredible. The jury, influenced by evidence given by their old friend Mr. Ashworth, found that the explosion was caused by percussion of air due to the caving in of the roof. Such a theory need not be seriously discussed, but Mr. Ashworth, in order to support his theory, made much capital of the explosion in 1901 at the Talk-o'-th'-Hill Colliery, with which he said he was familiar. He was not aware that Mr. Ashworth had ever visited the colliery during the past 25 years, and he certainly did not do so at the time of the explosion. Mr. Ashworth said that explossion was also caused by a fall of roof and percussion of air, and gave particulars which were altogether erroneous. It was proved beyond question that the Talk-o'-th'-Hill explosion was caused by gob-fire. However mysterious the cause of certain explosions might be, the air percussion theory might be totally disregarded, and the Alberta explosion in particular, notwithstanding the finding of the jury, might, without further question, be attributed to sparks from a fall of roof, as advanced by the authors of the excellent paper. They were particularly indebted to Dr. Cadman for his active interest in questions of that kind, and for the valuable scientific and experimental work the University authorities were always so willing to undertake to promote the study of difficult problems exercising the minds of mining engineers.

Dr. W. N. ATKINSON (H.M. chief inspector of mines, South Wales) expressed his appreciation of the work Dr. Cadman had done in connection with those explosions, and of the paper. There was abundant evidence that sparks of all sorts would ignite gas. The explosion which Dr. Cadman had referred to in South Wales appeared to be quite as well substantiated as being caused by sparks from a falling rock as the Alberta explosions. That explosion had been investigated by one of his colleagues. He had discussed the matter with him, and there appeared to be no doubt as to the cause of that explosion; and it could be demonstrated in a similar way to that in which Dr. Cadman had shown them that the stone which fell in that case produced the sparks which ignited the gas. Explosions had also been caused by sparks from miners' picks. In two or three cases of such ignitions which had come under his personal notice he could not be positively certain as to the cause, because there were other possible means of ignition; in one case, for instance, they were working with naked lights. There had been cases of ignition of gas in the cutting of bar machines, where there was a possibility of electricity coming into play. But taking all cases that were known, there appeared to be no possible doubt that an explosion might be started by a fall of roof. It had also been abundantly proved that electric sparks would ignite gas. The recent explosion in South Wales was without doubt caused by the sparks from signalling wires. There were 11½ volts. Afterwards, experimentally, gas was ignited by 4 volts. What could be done to prevent those explosions was, as Dr. Cadman said, a very difficult problem. It appeared impossible to prevent the production of those sparks, and the only means available appeared to be to prevent gas being present where the sparks might be produced. There was also another view of the matter which occurred to him; although it was absolutely proved that explosions might be caused in that way, in investigating an explosion such a cause ought to be the very last that was thought of. Only after having exhausted all other possible causes of ignition should sparking be considered. Otherwise, it would be very easy to say, "Oh, there has been a fall of roof, and there must have been a spark and it must have fired the gas," which would distract attention from other much more likely causes which were generelly present.

Mr. F. H. WYNNE (Newcastle, Staffs) wished to add a word or two to what Mr. Henshaw had said with reference to the paper. The theory of serious explosions arising from the clashing of rocks as far as he knew had not been previously considered seriously. After what they had seen they could have no further doubt about it. It appeared to him that there was only one method of preventing such accidents, and that was by complete packing of the seam either with dry stones or with hydraulic methods. At the same time, by that process he thought they could do away largely with the danger of gob fires in those thick seams, which had become such a serious question.

Mr. W. SAINT (H.M. inspector of mines, Stafford) mentioned the circumstances of a case which had come under his observation in South Wales. Two men were set to enlarge a roadway in a coalmine. They had drawn a collar of a setting of timber and let down about 20 to 30 tons of rubbish. While drawing the second collar a further fall took place on the top of the first one, and both those men who were standing facing their work observed a flash immediately the second fall touched the first. One of the witnesses described that flash as like that which occurred when benzoline was thrown on a fire. In that cavity there were two small bands of hard siliceous rock, one 8 in. thick and the other 2 in. They were separated by about 2 in. On the lower side of the heading there was a break in the roof, which two days after the occurrence was giving off firedamp. Strange to say, after the men had reported that to the officials, on examining the cavity the officials did not find any gas, and it was only on putting a lamp into the break that gas was discovered. The volume of air passing was considerable; it was said to be 12,000 to 15,000 feet a minute. He had himself seen an abundance of sparks produced by vigorously rubbing together two rocks which had been obtained from the roof of a coal-seam in one of the steam coal pits of South Wales.

Mr. R. McLAREN (H.M. inspector of mines, Airdrie) remarked that it was no uncommon thing in some collieries to have sparks from hard rock, as mentioned by Dr. Cadman. In the first instance which came to his mind, the men had bored a shot-hole in what they called Scotch kinnel, a stone not unlike that which had been produced by Dr. Cadman. The men only bored a short distance and put in their gunpowder, when, in order to stem the hole, one of the men put in a hard piece of gingle rock, and while stemming it up an explosion occurred. It had occurred to himself and the manager that probably it was due to sparks caused by the two portions of stone in the hole rubbing against each other. They had made experiments, and in every case, by rubbing those two hard gingle stones together they got sparks, showing that it was quite possible that in a fall such as that described by Dr. Cadman sparks would occur, and if gas was present there must be an explosion. There were many sources from which sparks were obtained, and that was another added to the list; but he thought it would be well, before coming to hasty conclusions on any matter, to exhaust all enquiries. Not only should they consider the question of sparking by electricity or by electrical plant of various descriptions, but also they should keep in mind the fact which had been before them, and which had been proved conclusively by himself on many occasions, that another source of danger came in—namely, sparks caused by the rubbing of one stone against another. How that was to be avoided in a goaf was a very difficult problem. Many years ago a case was enquired into in Scotland where gas was in the goaf, and it was said then that gas should not be in the goaf, which was true enough; but the question was how they were to get it out. The goaf was left behind coming towards the shaft bottom. They had a hard rocky substance, and huge falls took place, and gas collected there in spite of anybody. When one had an outcrop and a seam of 45 degrees, it was not difficult to put that up to the surface and let the gas get off; but when one had fathoms of very hard rock there was only one of two ways in which it could be done. One was by packing them off entirely tight. In that way, by packing them as had been done in some parts of Scotland, one would do away with gas explosions and also with gob fires, which were very dangerous things.

Mr. W. COCHRANE CARR (Newcastle-on-Tyne) said he was afraid that if the authorities got to know anything about it, they might be ordered to use copper picks. He had always been under the impression that sparks were not likely to cause an explosion. In the old days they had the flint mill, and had not found any danger. The new discovery that sparks were dangerous in coalmining seemed to be very serious indeed. He had himself been rather surprised that Dr. Cadman had got a light at all from the sparks from the stone in his experiment, but after examining the stone he saw that it was quite an unusual one. He hoped that no people in England had any stone of that dangerous character. He would like an opinion from the author with regard to the difference between the sparks he had produced in his experiment and the sparks produced by the old flint mill.

Prof. JOHN CADMAN, in reply, said that with reference to the sparks from the flint mill, he rather imagined the reason why the flint mill was abandoned was because it ignited gas. One could get very brilliant sparks with a flint mill with that particular stone—in fact, exceptionally brilliant. One had to remember that when stone rubbed against steel one naturally got a better opportunity of producing bright sparks. The sparks produced in his experiment that morning, although they had apparently taken a long time to appear, were ignited quite readily. After the meeting he would start the experiment again, and it would be seen that it was possible to light the gas at every spark. The temperature of the spark was quite hot enough to ignite it. The difficulty in the experiment was to get the mixture right for ignition.

The Birmingham University was more than an educational body; they were endeavouring to make the mining department a large laboratory which was at the disposal of the coalowners and managers of the locality, and in any problem which had to be investigated, which naturally a mine manager might have some difficulty in tackling himself, they were always ready and willing to throw the whole of their equipment open to him, either for him to do it himself, or to assist him, or to tackle it for him. He thanked Mr. Henshaw for his reference to the work they were doing, and which they would always continue. It was their ambition always to place their equipment at the disposal of managers and coalowners.

The PRESIDENT moved a vote of thanks to the authors which was carried by acclamation.

Votes of Thanks.

Prof. J. H. MERIVALE (Newcastle) moved a vote of thanks to the president and council of the South Staffordshire and Warwickshire Institute of Mining Engineers for making the arrangements in connection with the meeting. He said they were enjoying themselves, and were also getting a great deal of interesting information, and everything worked so smoothly that he did not suppose one in a dozen really imagined the immense amount of hard work—underground work, so to speak—which had been going on, probably for several weeks, in making provision for the meeting. Their thanks were due to Mr. Forrest and the council for their very kind reception of the members of the institution and for the very hard work they had undertaken for their entertainment.

Mr. ARTHUR HASSAM (Newcastle, Staffs) seconded the resolution, which was carried by acclamation.

Mr. W. H. PATCHELL said that they had a personal invitation from the Lord Mayor of Birmingham to meet himself and the Lady Mayoress at the Council House that evening, and he had great pleasure in proposing a vote of thanks to the Lord Mayor for his personal hospitality. It was very good of the Lord Mayor to go out of his way to help to entertain them on their visit to Birmingham.

Mr. JOHN SIMPSON seconded the vote of thanks, which was carried unanimously.

Mr. W. C. MOUNTAIN (Newcastle-on-Tyne) had great pleasure in moving a vote of thanks to the Chancellor and Council of the University of Birmingham for their courtesy in permitting the use of their rooms for the meeting.

Mr. JAMES HAMILTON (Glasgow) seconded the motion, which was carried by acclamation.

Mr. W. B. WILSON proposed and Mr. T. H. WORDSWORTH (Ashton-under-Lyne) seconded a vote of thanks to the owners of collieries and works to be visited during the meeting. Mr. Wilson said it was very gratifying to find that people were so willing to throw their works open, and their best thanks were due to them.

The vote of thanks was unanimously carried.

Mr. W. F. Clark (Aldridge) moved a vote of thanks to the president for his services in the chair.

Mr. W. G. Phillips (Atherstone) seconded, and the vote was enthusiastically carried.

The President briefly replied.

This terminated the annual general meeting. In the afternoon an inspection of the Mining Department of the Birmingham University at Bournbrook was made, Dr. Rowland Hill receiving the members and their lady friends on behalf of the University. In the evening there was a well-attended reception at the Council House by the Lord Mayor and Lady Mayoress. On Thursday there were alternative excursions to the Earl of Dudley's Round Oak Iron and Steel Works and Baggeridge Colliery, or to Messrs. Cadbury's Cocoa and Chocolate Works and Model Village, Bournville, and in the evening the dinner took place at the Grand Hotel. On Friday a number of members took part in an excursion to Stratford-on-Avon, and thence to Warwick Castle and Leamington.

Dinner.

A dinner was held at the Grand Hotel, Birmingham, on the evening of September 12, Mr. J. C. Forrest, president of the South Staffordshire and Warwickshire Institute, being in the chair. Amongst a company of nearly 200, including many ladies, were the following:—Lord Norton, Lord Mayor and Lady Mayoress of Birmingham, Sir Gilbert Claughton, Dr. W. E. Garforth, Col. Hollingworth, Col. Harrison, Dr. R. T. Moore, Dr. Rowland Hill (Birmingham University), Profs. J. Cadman, Alfred Hughes, W. J. Ashley, Stephen Dixon, and L. T. O'Shea (hon. sec. of the institution), Mr. H. C. Peake (past president of the institution), Mr. W. C. Blackett (president of the North of England Institute), Mr. Alexander Smith (vice-president of the institution), Mr. W. F. Clark and Mr. Hugh Johnstone (H.M. inspector of mines).

The toast of "The Institution of Mining Engineers" was proposed by the Rt. Hon. Lord Norton in a speech in which he touched upon many subjects.

Dr. W. E. Garforth, who replied, said that they used to be told that in having a very cheap supply of coal, and also iron, this country would have power to undersell the rest of the world. That power we did not possess at the present time, and he thought mining engineers, and colliery owners and officials, had for many years felt that a great responsibility rested upon them to supply the coal at such a rate as would enable Britain to compete with foreign countries, and at the same time safeguard their workmen. With regard to the abundant supply, he might remind them that the pits did not work full time throughout the year, yet the last return showed that we were able to raise 271 million tons annually. With regard to safeguarding the workman, they would recollect that six years ago a Royal Commission was appointed in order to get from different districts the most capable men to advise the Home Office as to the best way of preserving the lives and limbs of the workmen. In consequence of the information obtained from these experts, the Government had passed an Act which some of them thought rather stringent; but he would remind them that Acts of Parliament were not brought in very often. When they were brought in they were stringent, but in regard to past Acts, in the course of a few years many of them had had to admit that the regulations laid down were very essential. As to the price of coal, that concerned not only the owners but also the workpeople; the latter thought they were entitled to a larger share than the owners thought was due to them, and consequently they had occasional stoppages—but that was a delicate subject, and he would not pursue it farther. At any rate, it was a satisfaction to them to know that our annual output of coal was 271 million tons, as compared with 68 million tons 50 years ago; but the most satisfactory thing was that the loss of life was now only one as compared with three 50 years ago. That was indeed something they should all be proud of, having regard to the increased depth at which coal was now worked, and that the difficulties increased more than *pro rata* with the depth. Looking at the *Transactions* of their institute, it would be seen that they dealt with subjects of the most varied character. They dealt, he might almost say, with the infinitely great and the infinitely small. A Royal Commission appointed some years ago estimated the coal in the United Kingdom at 1,914,668,000 tons. This quantity was estimated on a basis of 79 per cent. of coal exceeding 2 ft. in thickness and 21 per cent. of coal 18 in. in thickness. With a consumption of 260 million tons per annum, or 10 millions less than it was on the last return, this quantity would last the country 388 years; and whilst they were dealing thus with millions of tons they were also dealing with matters so small that in recent experiments they were able to say that they had got the size and shape of particles of coal not more than $\frac{1}{10000}$ in. in size. They also dealt with questions of cost to $\frac{1}{20}$d. They dealt with millions of cubic feet of air which they had to circulate in the mine, and at the same time with ventilation so stagnant that it was difficult to estimate what was passing. Therefore they were entitled to say that they dealt with the infinitely great and the infinitely small, something in the same way as scientists. The mining engineer was dealing not with speculations, but with questions of fact. Dealing, as they would have to deal in the future, with coal which would have to be mined at great depths, they would need all the skill and scientific knowledge they had been gaining for years past, and which would be so much more necessary in the future, if they were to win these deep seams of coal of small thickness, and which should be won, since they had been Divinely placed there for our use. Therefore, the advantages to be derived from such an institution as that to which they belonged would prove of inestimable value in years to come; and he appealed to young men to miss no opportunity of learning all they could from the *Transactions*, by attendance at the meetings, and by association with the older men, just as the older men were only too pleased to accept from the younger men the modern ideas which the latter were able to give them.

The toast of "The City" was given in a humorous speech by Dr. R. T. Moore, and the Lord Mayor, in his response, mentioned that the Mining Department at the Birmingham University had received the fullest support financially and practically from the South Midland coalowners. The teaching at the University was of a practical nature and thoroughly fitted them for any work they might be called upon to do not only in England but also abroad, and to further this they had just started a course for teaching oilmining.

The toast of "Our Guests" was proposed by Mr. Alexander Smith, who said he had to couple with that toast the name of Dr. Rowland Hill, who represented the University during the present visit. Dr. Hill was of the family of Holcrofts, a very honoured name in connection with the iron and coal trades of Staffordshire. Dr. Hill's uncle, Sir Charles Holcroft, Bart., had presented over £100,000 to the funds of the University. He (Mr. Smith) would like to record the very cordial relations that existed between the Mining Department of the University and the local institute. They did all that was possible to help each other, and the mining industry of the Midlands looked upon that department as one of their most valuable assets.

This was responded to by Dr. Rowland Hill, who thanked Mr. Smith for what he had said, and the members for their support.

Sir Gilbert Claughton, who proposed "The Chairman," said that Mr. Forrest was one of those who had taken part in the work of proving the coal on the western boundary of that district. No one knew better what that meant than did Mr. H. W. Hughes, who had spent his life on that great undertaking Baggeridge Colliery, which many of them had seen that day. They were grateful to Mr. Forrest for the object-lesson he had given them in proving how they could overcome the water difficulty at Holly Bank. They had to thank men like their chairman, who had risked their all in trying to prove what was on the other side of that western fault, and he thought that such pioneers as Mr. Forrest and Lord Dudley deserved all the benefits they would reap, and he thoroughly believed they would be held in honour hereafter as men who had done so much to increase the area, which, though to some it might appear a small area, to those in that district meant the difference between life and death. He was much gratified to have had the opportunity of showing the members of that institution what could be done by modern engineering in extending the boundary of the great coalfield of that district.

The Chairman, in reply, congratulated the Earl of Dudley, Sir Gilbert Claughton, and those who had worked with them, not only on having a fine property, but also upon having done so much for the property of the district, for in future they would have to live by the coal which could be got from such seams as Baggeridge. In Nottinghamshire, Yorkshire and Lancashire, when they got down to their coal they could drive out freely all round; but Lord Dudley dare not do that at Baggeridge because of the dangers of working the thick seams at that depth. Proving the coal was one thing, but getting it was another great problem. He thought Sir Gilbert was probably right in saying that the extension of the coalfield on the western side was a larger one than had yet been defined, and, in his opinion, whatever they had proved on the west would also be proved to the east of the district. Mr. Forrest then referred to the great kindness shown by the Lord Mayor in receiving the institution.

Mr. W. C. Mountain proposed the health of Mr. G. Douglas Smith, the local secretary (who had had charge of the arrangements), which was drunk. Mr. Smith briefly replied.

Songs were sung during the evening by Mr. W. Gardener and Miss M. Hoskins.

Grimsby Coal Exports.—The following are the official returns as to the amount of coal exported from Grimsby for the week ending September 13, 1912:—Foreign destinations, 28,274; coastwise, 940. The exports were distributed as follow:—Randers, 268; Rotterdam, 612; Kuldeborg, 656; Hamburg, 201; Sodertelje Ulhalmn, 345; Drammen, 771; Merbylauge, 630; Malmo, 2,625; Carlshamn, 1,284; Gefle, 3,284; Cimbria, 1,106; Cronstadt, 4,693; Westervik, 838; Horsens, 1,272; Rostwick Town, 631; Dieppe, 737; Antwerp, 733; Lengesund, 433; Hernes, 1,709; Stockholm, 1,993; Gothenburg, 826; Esbjerg, 480; Christiania, 105; Trelleborg, 2,062; Yarmouth, 700; King's Lynn, 240.

TESTING OF SAFETY LAMPS.

Official Memorandum.

The Home Secretary announces that the Home Office station at Eskmeals, Cumberland, for the testing of safety lamps for use in mines under the Coal Mines Act, 1911, is now open for the reception and testing of lamps. Under section 33 of the Act, no safety lamp must after January 1, 1913, be used by any person employed in a mine unless it is of a type for the time being approved by the Secretary of State.

A memorandum has been issued describing the nature of the test to which safety lamps will be subjected, and containing instructions as to the submission of lamps to the official test, copies of which may be obtained on application to the Under-Secretary of State, Home Office, Whitehall, S.W.

The memorandum is in the following terms:—

1. *Nature of Test.*—A safety lamp will be required to pass the official test described in the Appendix to this Memorandum before it is approved by the Secretary of State for the purposes of the Coal Mines Act, 1911.

2. *Application for Test.*—When it is desired to submit a safety lamp to the official test, an application form should be obtained from the Home Office, and this, when filled in, should be forwarded together with the prescribed fee of £20 to the Under Secretary of State, Home Office, Whitehall, S.W. On receipt of the necessary authority from the Home Office ten specimens of the lamp to be tested and forty specimens of the glass to be used in the lamp together with a statement showing the nature of the fuel and wick to be used in the lamp should be forwarded, carriage paid, to—

Home Office Lamp Testing Station,
Eskmeals, Cumberland.

3. *Approved List.*—An official description of every type of safety lamp which passes the official test and is approved by the Secretary of State will be published by the Home Office. Every lamp of a type so approved which is supplied for use in mines to which the Act applies will be required to conform in all particulars with the official description. The description will specify in the case of each type of lamp by what manufacturer and in what factory or factories it is to be made.

4. *Revocation of Approval and Retest.*—The approval of the Secretary of State will only be given subject to revocation at any time by the Secretary of State at his discretion. The approval of a lamp which is not being supplied for use within one year from the date of approval will, except on special grounds to be allowed by the Secretary of State, be revoked. He also reserves the right to direct that lamps in actual use in mines shall be submitted to the official test with a view to determining whether they conform in all respects to the official description and are otherwise safe for use in mines.

5. *Manufacturers at Testing Station.*—Manufacturers and their representatives can attend at the Testing Station when their lamps are being officially tested or retested.

Home Office,
September, 1912.

Appendix.

1. The test will be carried out by an officer of the Home Office with the testing apparatus at the Home Office Lamp Testing Station at Eskmeals, Cumberland.

2. The lamp will be examined in respect of its general design, strength of material, and general character of construction.

It must be provided with double gauzes. (This requirement will not come into force until the 1st January, 1914.) Every gauze must be of steel or best charcoal-annealed iron wire (or in the case of a lamp used for surveying purposes, copper wire) of 28 B.W.G. (·014 inch in diameter) with 28 meshes to the lineal inch (784 to the square inch).

If lamp pillars are used the pillars must be so arranged that a straight line touching the exterior part of the consecutive pillars will not touch the glass.

The lamp will be required to have marked upon it in a distinct manner the name of the maker and the name by which it is to be designated in the List of Approved Lamps.

In the case of an electric safety lamp no liquid must escape from the battery when the lamp is turned upside down. Regard will also be had in the case of electric lamps to the distribution of the light outside the lamp and to the quality and colour of the light, and the lamp should be provided with a movable reflector to enable the light to be concentrated or shielded at will.

3. Tests for Flame Safety Lamps.

Flame safety lamps will be tested in the following manner:—

(*a.*) *Mechanical Tests.*

I.—General.

Test 1.—The lamp is dropped from a height of 6 feet on to a wooden floor.

The height of 6 feet is measured from the bottom of the lamp which has been fitted together complete with glass, and the lamp is dropped by means of a mechanical arrangement.

This test is repeated five times in succession, the lamp being fitted with a different glass each time. The lamp passes the test if the glass is broken in not more than one of the five tests. Should the glass be broken in two, but not in more, of the tests, the lamp is submitted to five more tests with fresh glasses when, should the glass break in two of them, the lamp will fail to pass the test.

Test 2.—A weight of 5 pounds is dropped from a height of 6 feet on to the lamp standing vertically on a wooden platform beneath the weight.

The height of 6 feet is measured between the bottom of the weight and the top of the lamp. The weight is a lead disc, 3 inches in diameter and 1¾ inches thick, and is dropped mechanically.

Should the glass of the lamp be broken, the test is repeated twice with a different glass each time, when one failure of the glass causes the lamp to fail.

Test 3.—A weight of 10 pounds, attached to a cord, the other end of which is secured to the bottom of the lamp, is dropped from a height of 6 feet, the lamp being suspended at a height of 7 feet from the ground.

The lamp is gripped by means of brass claws or slung by means of wire rope straps round its upper part, above the standards protecting the glass. A brass platform is fastened to the bottom of the lamp and to the centre of this platform the cord is attached. The weight is a lead disc, 4¾ inches in diameter and 1½ inches thick; it is dropped mechanically.

This test is repeated three times. If, as the result of any one of these three trials, the security of attachment is found to be defective in any way the lamp will fail to pass the test.

Tests 1, 2 and 3 are to be made in succession on one lamp. Cracking of the glass will be regarded as a breakage.

II.—Tests of Glass.

1. A weight of 1 pound is dropped by means of a mechanical arrangement from a height of 4 feet on to the lamp glass placed on a wooden floor, the glass being in a vertical position.

The weight is a lead disc, 2½ inches in diameter and ½ inch thick.

Twenty glasses of any one kind to be tested; two failures in the twenty will cause the lamp to fail.

2. The glasses are heated in an air bath in batches of ten, to a temperature of 212° Fah., and when at that temperature removed from the bath and plunged into water at a temperature of 60° to 65° Fah.

The air bath consists of a double walled copper box heated electrically. The external dimensions are 1 foot 5 inches by 9 inches by 8¼ inches high. The internal dimensions are 1 foot 3 inches by 6½ inches by 6 inches high, the space between the walls being packed with asbestos fibre. The tray upon which the lamp glasses are supported is 1 foot 2½ inches long and 5¾ inches wide, and it is pierced with holes ¼ inch in diameter.

Of the ten glasses heated in each batch five are placed horizontally on the tray and five vertically. After heating, the tray and glasses together are plunged into water contained in a copper bath, 1 foot 3 inches long, 7 inches wide and 3 inches in depth, the water standing at a level of 2¼ inches.

Twenty glasses of any one kind to be tested, two failures in the twenty will cause the lamp to fail.

In the case of lamps having two glasses the outer glass will be tested mechanically only and the inner glass by heating only.

(*b*) *Photometric Test.*—The lamp is required to give a minimum candle-power of 0·30, as determined by a pentane standard, during a period of 10 hours.

(*c*) *Tests in an Explosive Mixture.*—(1.) In a still atmosphere. A lamp which has passed the mechanical test is placed, with a fresh glass if necessary, in an inflammable atmosphere (the composition of which shall be such as the officer carrying out the test may select) in a gas chamber. An ignition exterior to the lamp will cause the lamp to fail.

(2) In a gallery. A lamp which has passed the mechanical tests, but fitted with a fresh glass if necessary, is tested in horizontal and inclined currents in an explosive mixture at a maximum velocity of about 1,200 feet per minute.

The duration of each test is two minutes and the mixture will be, within reasonable limits, the most explosive mixture obtainable with the particular combustible gas or vapour used.

In addition to the above, five other lamps of the same construction, which have not been subjected to the mechanical or other tests, are submitted to the gallery test.

An ignition exterior to the lamp will cause the lamp to fail.

4. Tests for Electric Safety Lamps.

Electric safety lamps will be tested in the following manner:—

(*a*) *Mechanical Tests.*—The lamp is submitted to the first of the mechanical tests specified in the case of the flame safety lamp. The complete lamp will not be required to be submitted to the test, but, at the option of the manufacturer, the battery may be removed and a dummy one of the same weight, provided by the manufacturer, may be substituted.

(*b*) *Photometric Test.*—The lamp is required to give a minimum candle-power of 1½, as determined by a pentane standard, during a period of 10 hours.

(*c*) *Tests in an Explosive Mixture.*—A lamp which has passed the mechanical test is submitted to a test in which the light is switched on and off while the lamp is in an explosive mixture.

ELECTRIC WINDING ENGINES.*

A Comparison of Systems and the Influence of Drum Profile on the Performance Obtained.

By A. E. du Pasquier.

The scope of this paper is not to discuss at length the relative advantages of using steam or electricity for winding purposes, but rather to consider some of the more important principles underlying the selection and design of the most suitable type of winder for any particular conditions, with special reference to the influence of drum profile on the performance to be obtained.

The progress made in electric winding has been so marked that the author thinks that many people will agree that as time goes on the steam winder will eventually become rather the exception than the rule as in the past. From published details of the winding engine contracts of the principal electric manufacturers in this country and on the Continent, there would appear to be at the present time some 500,000-horse power of electrical winding engines at work or under construction, and as this figure cannot for obvious reasons include work in hand, other than that for which the author is responsible, it is reasonable to believe that this figure would, if anything, fall short of the actual total to date. There is one interesting feature about this diagram (No. 1)—viz., that the rate of increase appears to be anywhere slightly greater than the tangent to the curve at any point, shewing, in other words, that the rate of increase is still an increasing one.

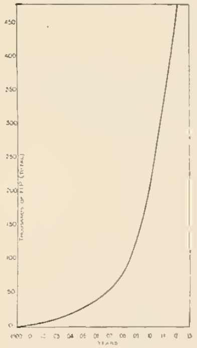

Diagram 1.—Curve showing Increase in Total Number of Electric Winding Engines Installed from Year to Year

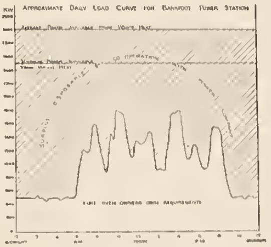

Diagram 2.

It is interesting to note that the makers of steam winders are with one accord adapting their designs to be more suitable for electrical operation. Many of them have gone to the length of developing safety devices of various kinds, such as overwinding, excess speed, automatic accelerating and retarding devices, to be specially applicable to electrical operation, and are now perhaps looking as much to this class of work to keep their shops full as to the steam winder which was once their staple business.

One of the determining factors in this general trend towards electric winding is unquestionably the continued growth of the large power companies. The author suggests the following points are worth more consideration than they usually obtain from the advocates of independent generating plants:

That the general economic trend is towards the larger supplier. The fact is indisputable that better use can be made of a given capital outlay on generating plant in a large power company's generating station than if spent in equipping independent generating stations; or, put another way, that the same consumers' requirements can be met with a smaller capital expenditure.

That the business of generating power is not the main business of the colliery company, and, therefore, if reasonably possible, they are better without it.

That the capital outlay on generating plant will frequently prevent the would-be consumer reaping the advantages of electric driving which would be otherwise profitable to him.

That where the difficulty of capital outlay can be met, it might very well be expended in other directions, giving a greater return than the possibly somewhat problematical saving on the price per unit generated over a guaranteed flat rate for supply from a power company. This question of possible returns on outlay if expended in other directions is very often not sufficiently considered when estimating the capital charges entering into the generating cost.

With a large power company's supply available, very often electric winding engines of simple type and considerable size can be put down with a smaller initial outlay than for a correspondingly efficient steam winder, efficient being used in the sense of high-class rather than as applied to consumption.

Perhaps it is hardly necessary to lay emphasis on the great importance, in schemes of this nature, of a close and accurate estimation of the load factor. Naturally, the smaller the load factor the less favourable is the case for local generating plant.

In concluding this section of the paper, the author would like to say there is one case where not only is local generating plant desirable, but that anything else is wasteful to a degree that in a few years' time would probably not be tolerated, and that is where waste heat can be utilised from coke ovens. He would emphasise the fact, however, that the full benefit of the combination cannot be realised without the conjunction of a power company, owing to the colliery's demand for power varying so over the 24 hours. By kind permission of Messrs. Merz and McLellan he is able to reproduce diagram No. 2 showing the daily output and load curve of the waste-heat station of Messrs. Pease and Partners at Crook. This station consists of five boilers evaporating 17,000 lb. each per hour at 200 lb. pressure and 180 degs. Fahr. superheat, and two small boilers situated at a distance of about 1,000 ft. from the larger ones generating 8,000 lb. each at 235 lb. pressure and 200 degs. Fahr. superheat, with turbo-generating plant aggregating 5,000 kw., the boilers being fired with waste heat and spare gas from 176 coke ovens of the Otto-Hilgenstock type. From the diagram, assuming that the curve represents approximately the working conditions throughout the year, it will be seen that the colliery company utilise 7½ million units per annum for their own requirements and have a surplus of 18½ million units disposable by co-operation with the supply company. Under such circumstances the generating plant is operating under the most favourable conditions all the time. From the colliery company's point of view no spare plant is needed, there being a complete stand-by service from the supply company, and consequently the colliery company are not embarrassed by any shortage of power if for any reasons they are unable to work the ovens to their full capacity at any time.

Other examples of similar installations are:—Messrs. Priestmans' collieries at Blaydon, 80 Otto-Hilgenstock ovens, 3,700-horse power generating plant; Weardale Steel Coal and Coke Company, Tudhoe, Koppers regenerative ovens, 7,330-horse power generating plant; Messrs. Pease and Partners, Bowden Close, 6,400-horse power generating plant. There are also examples of stations utilising the waste gases from blastfurnaces, which are outside the scope of this paper. There is no need here to go into the question of mutual charges. These can be arranged in several different ways to the advantage of both parties.

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* From a paper read before the South Wales Institute of Engineers, and published in the *Proceedings*.

All the waste-heat stations mentioned are in connection with the very extensive system of power supply on the north-east coast, and undoubtedly are directly due to the enterprise and initiative of Messrs. Merz and McLellan, who were probably the first to fully realise the great possibilities of such a co-operative system.

It may not be out of place to point out here how extremely valuable a joint system of this nature or a supply from a power company may prove in industrial crises, as recently experienced, and how important it may be to be able to wind, ventilate and pump without having to get up steam.

In the second section of this paper it is proposed, assuming an *à priori* case has been made out for an electric winder, to consider the various factors which will determine the type of winder to be adopted.

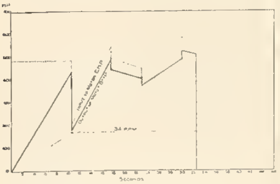


Diagram 3.—Winding, 61 cwt. from 710 ft.; Winding, 39·5 Secs.; Banking, 12·0 Secs.; Output, 224 Tons per Hour. Cylindro Conical Drum, 9 ft. to 16 ft. (Geared 234/34 r.p.m.)

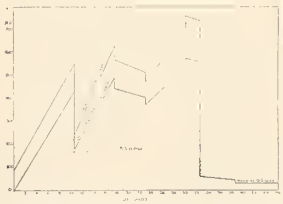


Diagram 4.—Winding, 61 cwt. from 710 ft.: Winding, 38·5 Secs.; Banking, 12·0 Secs.; Output, 224 Tons per Hour; Ward-Leonard Control. Cylindro-Conical Drum, 9 ft. to 16 ft. (Geared 170/34 r.p.m.).

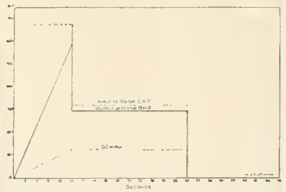


Diagram 5.—Winding, 44 cwt. from 780 ft.: Winding, 40 Secs.; Banking, 15 Secs.; Output, 144 Tons per Hour; Plain Cylindrical Drum, 10 ft. Diam. (With Tail Rope) (Geared 200/50 r.p.m.).

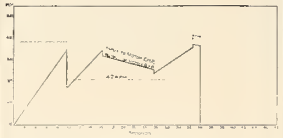


Diagram 6.—Winding, 44 cwt. from 780 ft.: Winding, 40 secs.: Banking, 15 secs.; Output, 144 Tons per Hour; Cylindro-Conical Drum, 8 ft. to 12 ft. Diam. (Geared 200/12 r.p.m.).

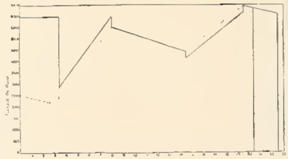


Diagram 7.—Winding, 44 cwt. from 780 ft.: Torque-turn Diagram.

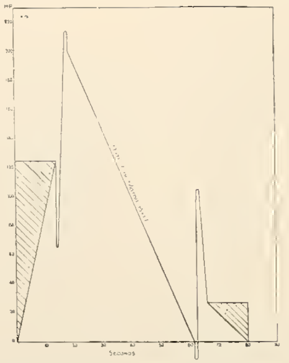


Diagram 8.—Winding, 12 Men from 458 yds.; 2-Deck Cage; Cylindro-Conical Drum, 5 ft. 6 in. to 10 ft. diam. (Geared 240/43 r.p.m.).

There are, broadly speaking, two systems which can be adopted, using in the one case an alternating-current motor either geared or direct-coupled to the drum shaft, and in the other a direct-current motor, hereafter referred to as A.C. and D.C. respectively. Diagrams 3 and 4 are illustrative of the two systems as calculated for the same duty. Actually in this case the energy consumption for the wind is 3·7 units and 3·49, showing an advantage in favour of the Ward-Leonard system, but the A.C. winder would have an advantage of nearly 20 per cent. in the initial outlay, and if the periods of rest were at all prolonged the extra energy consumption per wind would be more than wiped out. It might here be pointed out that the actual peak load on the system is always higher with a Ward-Leonard system owing to the added conversion losses, though, of course, not of such long duration. The Ward-Leonard system has the inherent advantage that braking towards the end of the wind can be done regeneratively. Too much importance can be attached to this. While no doubt a desirable feature, unless the winding cycle cannot be met without a considerable amount of braking in the retarding period, and with an equalised winder, the return is seldom of sufficient amount to affect the consumption per ton, and it may only mean that the mechanical brakes are utilised to a little less degree.

With an A.C. winder one endeavours to so lay out the cycle that power can be shut off at a definite distance from bank, where the stored energy in the masses will be sufficient to bring the cage to bank with a certain margin in hand to cover varying loads. An excellent example of this is shown in diagrams 5 and 6, calculated for a winding engine in the north-east coast district. Both the cylindrical drum with tail-rope and the cylindro-conical drum are entirely satisfactory from the point of view of brake losses, but the equalising effect of the 8·12' drum is very marked. The torque turn curve is shown in diagram No. 7, and as there were no local conditions prejudicial to a drum of this type, it was finally selected.

It will be seen, and the diagrams also show this, that with the Ward-Leonard system there is also the advantage that one has electrical control of the winder right up to bank, which is not usually the case with an A.C. winder, as power is shut off some few revolutions from bank; but with the excellent mechanical brakes available and the numerous overspeed and overwind devices on the market, there is actually not much real advantage in this from the purely safety point of view.

It may be noted that occasionally, in spite of the introduction of rheostatic losses towards the end of the drive, entailed by running to bank with power, the consumption per wind may be no greater, or even improved, this being due to the greater losses during the accelerating period, if it was desired to arrange the winding cycle for coasting to bank. This is a condition that is not likely to arise very often, and diagram 8 is given as an instance in point. It was a condition of the service that the maximum demand should be limited to 200 kw. Actually on the diagram it will be approximately 176 kw. The winder is for an emergency outlet under the new Coal Mines Bill.

The recent introduction of highly efficient and durable machine-cut double helical gearing has greatly extended the field of the A.C. winder, as it enables the motor to run at speeds at which good efficiencies and power factors can be commercially secured.

(*To be continued.*)

JUNIOR INSPECTORS OF MINES.

Results of June Examination.

The results of the competition held in June of this year for the situation of Junior Inspector of Mines and Quarries under the Home Office have been made public.

The candidates were examined in 10 subjects, viz.: (1) English, (2) elementary mathematics, (3) elementary geology, (4) coal mining, (5) ore and stone mining, (6) electricity in mines, (7) law relating to mines and quarries, (8) oral examination, (9) chemistry, and (10) physics, and were required to qualify in each of the subjects numbered 1, 4, 5 and 6. Subjects 9 and 10 were optional, and only one of them might be offered.

As a result the following candidates proved successful, the figures in parentheses showing the marks obtained by each out of the maximum obtainable of 3,400:—

Douglas Hay (2,771).
Herbert John Humphrys (2,484).
John Anthony Sydney Ritson (2,468).
Frank Noel Siddall (2,461).
Herbert Danby (2,425).
Harold Taylor Foster (2,395).
Edward Sims Rees (2,369).
Paul Salthouse Lea (2,355).

In addition, 12 other candidates obtained pass marks in all subjects, and 17 failed in one or more subjects.

At Brodsworth, on Saturday, a handsome new sports pavilion was opened by Mrs. Thellusson, wife of the High Sheriff of Yorks. It has cost £1,000, and will be used by the colliery football and cricket teams, ambulance brigade, band, &c. At the Danum Hotel, Doncaster, the same evening, the first annual dinner of the Brodsworth Main Sports and Pastimes Club was held. Mr. B. Cook, in proposing "The Brodsworth Main Colliery," referred in terms of regret to his departure from Brodsworth for the Yorkshire Main at Edlington. Difficulties, he said, had been met with at the latter place, but he now thought there was a bright future for it. As for Brodsworth Colliery there was a great future for that. Up to now, the speaker said, it had been an up-hill fight, and some people might be astonished to learn that the shareholders did not receive a penny in the £ till the year ending December 31, 1911. Since then the corner had been turned by the company, and it was now on the high road to success. It was a difficult matter at first to get the coal on to the market, because there was a certain amount of prejudice against a new thing. He had been talking with the London agent for the Brodsworth and Hickleton coals, who told him he had the utmost difficulty in getting the coal introduced into London. The London market was the largest, but they did not get the best price—in fact, they got the worst. The London private householder seemed to be wedded to one class of coal, the same sort that their fathers, and probably grandfathers, used, and so in order to be successful they must put the coal on the market in the best possible condition.

THE BRITISH ASSOCIATION.

At the meetings of the British Association, held last week in Dundee, several papers on subjects of high economic and technical interest were contributed. We give below abstracts of some of these:—

Colliery Explosions.

In the Engineering Section Prof. H. B. Dixon gave a brief account of the Home Office Experimental Station for research on explosions in coalmines. He said that they had carried out experiments with pure ethane mixed with air. The main object of the work was to try the effect of different dusts in the explosion. They had adopted the plan of employing a fan to stir up the dust, and had worked with 4·6 per cent. and 3·3 per cent. mixtures. In the experiments with the stronger mixture and with the fan running at 6,000 revolutions per minute, the time between the firing of the spark and the first indication of pressure rise was 0·3 second, and without the fan 0·7 second. With the 3·3 per cent. mixture it was 0·15 second, with the fan working and without the fan 0·2 second, and the pressure curve ran up very slowly. If the fan was run very hard with the low-percentage mixture there was no explosion.

Mr. W. McLaren (McGill University) enquired of Prof. Dixon as to the methods of extinction which had been adopted in the coaldust explosion experiments. In the French testing station at Liévin (Pas-de-Calais) he had been present at some experiments, in which cross overhead planks carrying uninflammable dust and *débris* were placed at intervals.

Prof. Dixon, in reply, said he did not think that the remedy referred to by Mr. McLaren was the best one, and, indeed, it had been suggested that it might have the effect of making the explosion more intense. It would seem that the employment of uninflammable dust in large quantities might prevent the ignition of coaldust, but what it was desired to test at the Home Office station was what would be the effect of uninflammable dust when an explosion had been started. If, however, the use of the dust would prevent the explosion, then clearly a good deal had been accomplished.

A paper on "The Ignition of Gaseous Mixtures by Momentary Electric Arcs" was contributed by Prof. W. M. Thornton. He stated that as a result of an investigation of the least currents, direct and alternating, which were required to ignite gaseous mixtures at different voltages and frequencies, the lower and upper limits of mixture within which ignition was possible were found to be 4·25 and 14 per cent. for firedamp in air, and 6 and 40 per cent. for coal gas. There was a well-defined maximum of sensitiveness to ignition at 7 per cent. in the former, 8·5 per cent. in the latter. With direct voltage the least igniting current was approximately proportional to the reciprocal of the voltage; with alternating voltage the frequency was of more importance, and the current remained constant over a long range of voltage, being higher for methane than for coal gas. The energy of spark which would just ignite the most sensitive mixtures was about 0·10 joule, corresponding to the combustion of 37 c.c. of an 11 per cent. mixture of coal gas. Single sparks, therefore, gave relatively poor ignition. It would appear from the results that when alternating current was used for signalling, or where there was no continuous sparking at a contact, the risk from electrical signalling in coalmines was extremely small. Where there was sparking, as at a vibrating contact, the bells must be enclosed in flame-proof cases, or be situated in places which could not be reached by firedamp in mixtures approaching 4 per cent.

Mr. Dugald Clerk said it would be very interesting if the research could be continued and if Prof. Thornton would use a stream of sparks instead of a single arc.

Mr. F. Reid (Dundee) brought forward a new suggestion for saving life in coalmines. Pointing out the cumbrousness of the present rescue apparatus, the danger of exhausting its oxygen and the necessity of training men to use it, he proposed to substitute a permanent provision of pure air in pipes at high pressure through the pit to the face. From locks in these the workers could draw air through flexible tubes to their helmets. He reminded the meeting that compressed air was already carried to the face to drive coal-cutting machinery, and thought if two men using the pipe supply worked together they would be able to move freely, the second man changing the supply pluge from point to point on the high-pressure main. As the first advanced the pipe line could in an emergency be extended into the pit off the main roadway by using flexible steel tubing. His apparatus, he contended, could be used not only by trained men, but by anybody in the mine. He suggested that there should also be provided compressed-air bottles at the pit mouth, which could be used to enable the rescue party to go down into the mine until they could connect themselves with the permanent pipes.

Prof. Galloway said that Mr. Reid's proposal would have to be tried in practice before judgment could be passed. It was difficult to maintain air pipes in a mine; indeed, it was difficult enough to maintain electric cables in mines worked on the longwall system, where the face was always advancing and the roof always falling. To drag 30 yards of hose pipe would impede a rescuer quite as much as to carry an ordinary rescue apparatus. At present approved rescue apparatus had by law to be provided at each mine, and, for every 100 men employed, a corps of five had to be trained in rescue work. Whether they would keep up the training in pits normally free from accident remained to be seen, but the law did make these provisions.

Sir William White referred to the chance of a system of pipes being itself broken down during an accident.

Mr. Reid said he intended his apparatus to be a refuge for men who might be cut off in a mine, and not merely for use by rescuers from outside. Its maintenance would prove easy.

The problem of colliery explosions and the effect of still or turbulent air on them was also referred to by Mr. Leonard Hill, in his presidential address to the Physiological Section. His general topic was that sunlight and moderate temperature were more important to human health than artificial ventilation, which concentrated itself on attaining a very low proportion of carbonic acid. From this he went on to condemn the high standard of oxygen demanded by law in coalmines. "There is," he said, "little doubt that the great mine explosions have been caused by the enforcement of a high degree of chemical purity in the air. In the old days, when ventilation was bad, there were no great dust explosions. Mr. W. N. Chambers, general manager of the Cadeby Mine, where the recent disastrous explosion occurred, with the authority of his great and practical experience of fiery mines, told me that the spontaneous combustion of the coal and the danger of explosion can be wholly met by an adequate diminution in ventilation. The fires can be choked out, while the miners can still breathe and work." Mr. Hill concluded that if the mines were ventilated with air containing only 17 per cent. of oxygen, but in sufficient volume to keep the mines cool and fresh, then explosions would be prevented, and the mines would be safety worked and lighted with electricity.

Prices and Wages.

In Section F (Economic Science and Statistics) Sir Henry Cunynghame, the president, sought in his address to establish the claim of economics to be considered as an exact science by showing that it was capable of being demonstrated by means of geometry and mathematics, the surest test which could be applied to it. He pointed out all the social sciences were for the most part still in the metaphysical stage. The "right to work," the "right to live," "the right to a living wage," "the right to the vote" were all metaphysical propositions assumed as axiomatic by various energetic writers and speakers, which were usually advanced with a dogmatism proportioned to the uncertainty of their foundation. Most economists would agree that—provided suitable meanings were given to the words—"wages in a free market depend upon the demand and supply of labour." A Legislature, wishing to remedy social inequalities and evils, might resolve to render the market no longer free—to impose a minimum wage, or to put a tax upon wages, or in other ways to regulate them by statute. And legislation might go so far as to render wages wholly dependent on scales fixed by authority or by custom. Or, again, a powerful combination, either of employers or of workmen, might unite to fix rates of wages and render it impossible in practice for any other rates to be paid. Systems established by these means might be wise or foolish, beneficial or injurious; but could it be said that the authors of them had succeeded in sending political economy to Saturn? Certainly not. They might have rendered inapplicable that chapter of political economy which dealt with price as fixed by exchange in a free market, but only to bring the case under the next chapter, entitled, "Price as fixed under conditions of monopoly." The political economy would be there surely enough, with its laws, and with their consequences for those who ignored its teachings. Sir Henry Cunynghame proceeded to demonstrate certain economic theories by the use of graphs, his principal illustration being concerned with the factors which govern the price of a commodity.

Mr. A. A. Mitchell read a paper entitled "Do Trade Unions Raise Wages?" He assumed that it was a good thing that trade unions aimed not at increasing the total product, but at obtaining a larger share for labour at the expense of other factors of production. The trade union argument took various forms. It was argued that combination was necessary to put the workman on an equal footing in bargaining. But the question was whether combination was in fact a help or a hindrance. Moreover, the inequality was denied. In a trial of endurance, no doubt, the employer might be able to hold out longer by converting his capital into a fund for his own subsistence, but in employing it as capital he was as dependent on his workmen as they on him. The alleged inequality therefore existed only in a *régime* of strikes and lock-outs. Besides, if both parties were combined their relative strengths would not be altered. Again, it was argued that under competition there was no downward limit to wages, save the least that would keep the workman and his family in life. But this was untrue historically. Wage rates had differed and did differ enormously, and on the whole tended enormously upwards. In particular it was argued that the subsistence level of the lowest workman fixed the wage rate. This was fundamentally untrue. The economically strongest workman required fixed the rate for the rest. It was also argued that trade unions might raise wages as capitalistic combinations raised prices. But was there any reason to suppose that capitalistic combinations benefited capitalists as a whole? The Steel Trust gained at the expense of steel users. Moreover, while capitalistic combinations could control the output, trade unions could not limit the supply of men. The true analogue of labour was a given quantity of perishable goods, and there was no way in which such could be disposed of for so large a total price as by competition of both buyers and sellers. Any attempt to exact more than a competitive price necessarily meant that some remained unsold. In the sphere of labour, the demand—*i.e.*, the capital—was taken to some other country, and the unemployed workmen, besides the injury to themselves, were a standing menace, as potential blacklegs, to the rest. By lessening the demand for labour trade unionism lessened employment, produced sweating, and in addition to general it intensified periodic or cyclical unemployment. The proper remedy for lessened demand was, as in the sale of stocks or commodities, an all-round diminution of price, not a suspension of transactions. Other evils were restriction of output, limitation of apprentices, and opposition to labour co-partnership or any scheme, however beneficent, which was believed to impair the efficiency of the strike weapon.

The President thought there could be no doubt that the trade unions did raise wages. They were doing it every day by creating a monopoly, or, in other words, limiting the supply of labour.

In a paper on "Dumping as it affects the Steel and Tin-plate Industries of South Wales" Mr. J. H. Jones said that local steel manufacturers, having lost the monopoly which they had long enjoyed, were compelled to pay greater attention to the needs of their customers. This constituted the main advantage to tin-plate manufacturers, for, thanks to the success with which the merchants "beared" the tin-plate market, they benefited but little from the fall in the price of steel.

Prof. Chapman, of Manchester, read a paper on the methods of industrial peace. In the course of this he said that it must always be very difficult, if not impossible, to enforce any course of action upon groups of people associated in large numbers for a common economic purpose. The consent of the parties interested was essential. Arbitration was likely to prove, in an industrialised country like England, a very defective plan; in the first place, because the award might be unsatisfying to one or both parties, and, secondly, because the arbitrator would find it exceedingly awkward to get the kind of evidence from which he could deduce the right result. Nevertheless, it was better that small disputes should be settled in this way than that cessation of work should supervene; and it was better also that one or both parties should suffer slight dissatisfaction than that an industry should be convulsed by industrial warfare for a long period. The most hopeful method for English conditions would seem to be that of conciliation, the obligation to intervene whenever there were prospects of success being imposed upon some public office, panel, or official. Recent events had shown that in special cases a more drastic handling of disputes might be requisite. In connection with the problem of industrial peace, above everything it was important to realise that action at the present time must be tentative and undoctrinaire.

Mr. Ramsay MacDonald, M.P., who spoke on the minimum wage in reference to the general question of labour disputes, and more particularly with respect to labour unrest, said that the minimum wage, when considered from a scientific point of view, was a very vague and indefinite expression. Compulsory arbitration was spoken of by many people as something which was going to secure the two very desirable ends of industrial peace and the fixing of wages. But how was it going to be imposed? There was, first, the problem of whether it could be imposed without the consent of both parties, and then how it was to be imposed on parties not represented in the original agreement. Again, if compulsory arbitration was to be imposed, substantial guarantee deposits would have to be required, and this would cripple both employers and employed. Then there was the difficulty in compulsory arbitration of getting a judge acceptable to both sides. He believed that they must have a minimum wage, but he did not think it ought to be regarded as something fixed all round for every trade and district. Speaking as a Socialist, he said that the reward of labour must have some relation to the mechanism and system of the industry under which the wage operated. Men must not make demands for wages or for a share which would paralyse existing society. Whatever system was adopted, it must not be too stereotyped. The best means for establishing a series of minima to express the national minimum was a voluntary arrangement. Under a voluntary arrangement deposits would be possible.

Mr. Arnold Lupton said that arbitration wages awards often injuriously affected workmen.

The President disagreed with a suggestion that employers should go to school to the professors. On the contrary, the professors and also public officials concerned with administration of trade and labour affairs should go to school to the employers. It was by going to the employers and seeing their difficulties that he himself had learned everything of value to him as a Home Office official. He also held that no man was fit to be a professor of economics who had not had practical experience of the application of the problems with which he was concerned, either in business, as a worker, or as a trade union official.

In the section of Economics and Statistical Science, Miss A. Ashley read a paper on "A Comparison of British and German Insurance Legislation."

The Caloric Theory.

In his address as president of the Mathematical and Physical Section, Prof. H. L. Callendar considered some fundamental ideas as to the nature of heat, and suggested the advantage of importing into the modern theory some of the ideas of the old caloric or material theory which has been for so long forgotten and discredited. He remarked that he might appear to be taking a retrograde step, because the caloric theory was generally represented as being fundamentally opposed to the kinetic theory and to the law of the conservation of energy; but they should rather be regarded as different ways of describing the same phenomena The greatest contribution of the caloric theory to thermodynamics was the production of Carnot's immortal *Reflections on the Motive Power of Heat.* In calculating the value of his function for air, Carnot made use of the known value of the difference of the specific heats at constant pressure and volume. He showed that this difference must be the same for equal volumes of all gases measured under the same temperature and pressure, whereas it had always previously been assumed that the ratio (not the difference) of the specific heats was the same for different gases. He also gave a general expression for the heat absorbed by a gas in expanding at constant temperature, and showed that it must bear a constant ratio to the work of expansion. These results were verified experimentally some years later, in part by Dulong, and more completely by Joule, but Carnot's theoretical prediction was generally overlooked, although it was of the greatest interest and importance. The reason of this neglect was probably to be found in the fact that his expressions contained the unknown function $F't$ of the temperature, the form of which could not be deduced without making some assumptions with regard to the nature of heat and the scale on which temperature should be measured. It was the speaker's privilege to discover a few years ago that Carnot himself had actually given the correct solution of this fundamental problem in one of his most important footnotes, where it had lain buried and unnoticed for more than 80 years. He showed by a most direct application of the caloric theory that if temperature was measured on the scale of a perfect gas (now universally adopted), the value of his function $F't$ on the caloric theory would be the same at all temperatures, and might be represented simply by a numerical constant (our "mechanical equivalent") depending on the units adopted for work and heat. It was obvious that this solution, so far from being inconsistent with the mechanical theory of heat, was a direct statement of the law of conservation of energy as applied to the Carnot cycle.

The experimental fact underlying the statement that "heat is a form of energy and not a material fluid" was that ordinary methods of measuring quantities of heat in reality measured quantities of thermal energy. Heat was a form of energy merely because the thing measured and called heat was really a quantity of energy. Apart from considerations of practical convenience, a quantity of heat might equally well be measured in accordance with Carnot's principle, by the external work done in a cycle per degree fall. Heat would then not be a form of energy, but would possess all the properties postulated for caloric. The caloric measure of heat followed directly from Carnot's principle just as the energy measure followed from the law of conservation of energy. But the term heat had become so closely associated with the energy measure that it was necessary to employ a different term, caloric, to denote the simple measure of a quantity of heat as opposed to a quantity of heat energy. The processes by which caloric was generated in mixing substances at different temperatures, or in other cases where available motive power was allowed to run to waste, were generally of so turbulent a character that the steps of the process could not be followed, although the final result could be predicted under given conditions from the energy principle. The familiar process of conduction of heat through a body, the parts of which were at different temperatures, afforded better promise of elucidating the nature of caloric, owing to the comparative simplicity and regularity of the phenomena, which permitted closer experimental study. On the hypothesis that the carriers were the same for electricity and heat, and that the kinetic energy of each carrier was the same as that of a gas molecule at the same temperature, it became possible, on the analogy of the kinetic theory of gases, to calculate the actual value of the ratio of the conductivities. The value thus found agreed closely in magnitude with that given by experiment, and might be regarded as confirming the view that the carriers were the same, although the hypotheses and analogies invoked were somewhat speculative. It might be asserted with some confidence that the corpuscles of caloric which constituted a current of heat in a metal were very closely related to the corpuscles of electricity, and had an equal right to be regarded as constituting a material fluid possessing an objective physical existence. For himself, if he might be allowed to speculate a little on his own account, he would prefer to regard the molecules of caloric, not as being identical with the corpuscles of negative electricity, but as being neutral doublets formed by the union of a positive and negative corpuscle, in much the same way as a molecule of hydrogen was formed by the union of two atoms. The assumption of a molecular constitution for caloric followed almost of necessity from the molecular theories of matter and electricity, and was not inconsistent with many well-established experimental facts. On the contrary, the many relations which were known to exist between the specific heats of similar substances, and also between the latent heats, would appear to lead naturally to a molecular theory of caloric.

Without venturing too far into the regions of metaphysical speculation, or reasoning in vicious circles about the nature of an electric charge, it might at least be asserted with some degree of plausibility that material bodies under ordinary conditions probably contained a number of discrete physical entities, similar in kind to X-rays or neutral corpuscles, which were capable of acting as carriers of energy, and of preserving the statistical equilibrium between matter and radiation at any temperature in virtue of their interchanges with electrons. To go a step further and identify these corpuscles with the molecules of caloric would certainly entail conflict with some of the fundamental dogmas of the kinetic theory, which tried to express everything in terms of energy, but the change involved was mainly one of standpoint or expression.

Other Papers.

In his presidential address to the Geology Section, Dr. B. N. Peach recapitulated the leading features of cambrian life in Scotland and North America.

In his presidential address to the Engineering Section Prof. Archibald Barr upheld the thesis that the engineer fails in the fulfilment of his duty in so far as his works are detrimental to the health or destructive to the property of the community, or in so far as they are unnecessarily offensive to any of the senses of those who are compelled to live with them. He pointed out that the combustion of fuel did little harm to any one; it was the imperfection of the combustion that was the main cause, almost the sole cause, of injury to health, to property, and to the amenity of populous centres. Of course smokeless combustion was not necessarily, nor always, the most economical, but that was only because we had not yet learned how to use fuel in anything like a perfect manner. But all the tendencies at the present time were towards improvement, and the more attention was paid to the elimination of the smoke nuisance the more rapid would be our progress in the economical use of one of the most valuable of our inheritances. It was therefore clearly the duty of every engineer who had to do with power or heat production—for the credit of his profession and even in the interests of his immediate clients—to consider the use and convenience of all who could be affected by the work for which he was responsible. If all engineers concerned with the design and application of plants in which coal was used had a due sense of their responsibilities to the community, progress would have been, and would to-day be, much more rapid; and economies would be effected that would, in themselves, amply justify the application of more scientific methods of utilising the constituents of a very complex material, which we were too apt to look upon as merely a convenient source of heat—plentiful enough and cheap enough, as yet, to be used in a most wasteful manner. It would not be to the credit of the engineering profession if it should require restrictive legislation not only to prevent a gross interference with the health and comfort of the community and the amenities of our centres of industry or of population, but to effect economies in the utilisation of the chief of the sources of power which it was their function to direct to the best advantage of all concerned.

Mr. A. Newlands, in a paper on "Water-power in Scotland," said the economic waste represented by the non-utilisation of the water-power possibilities of the Scottish Highlands was at last beginning to receive the somewhat belated attention of their industrial life. Their water-power possibilities were as yet undeveloped, and by means of high-tension electrical transmission hydro-electric energy could now be sold in favourable localities at probably about one-half the expense of power from coal. It was manifest, therefore, that where cheap hydro-electric power could be generated, where raw material could be got or could be imported—as much of it now was—where sea and rail facilities were available, where labour could be got or could be attracted by reason of healthy and economical conditions of living, industrial development was eminently practicable, and nowhere in Great Britain did these conditions exist to such a marked extent as on the seaboard of the Highlands of Scotland. That locality had hydro-electric possibilities estimated at a million-horse power, it had an indented and sheltered coast-line for shipping and ample rail and road facilities, an equable climate, and a healthy sturdy population unfortunately being attracted overseas by our competitors there.—The President (Sir Henry Cunynghame) said the subject was of tremendous importance, because it brought us face to face with the provision for the people of Scotland of a new coalfield without the smoke. It was by such natural agencies rather than by legislation that industry with happiness would be brought to the people.—Mr. W. F. Reid said it was difficult to make such electrical schemes profitable unless they were worked on a large scale.

Orders have recently been received for Mirrlees-Leblanc multi-jet plant for Lewis Merthyr Colliery (two sets), the Tower Colliery, South Wales, East Hetton Colliery (two sets), Kirkby Colliery, and Sutton Heath Colliery. A Mirrlees low-level jet condensing plant has been ordered by the Wath Main Colliery.

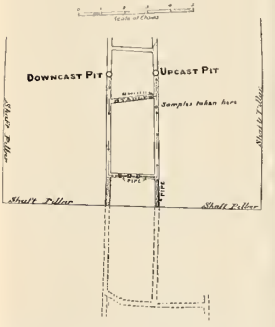
Firemen's Certificates in Cleveland.—A matter of considerable interest to the miners of Cleveland was referred to in the minutes of the North Riding Education Committee before the members at a meeting at Northallerton recently. By one of the sections of the Coal Mines Act of last year, a person acting as a fireman, examiner or deputy in a mine which comes under the Act must obtain a certificate from a mining school or institution approved by the Home Secretary. Dr. Newman, the educational adviser, has drawn up a report, and according to this the examinations held by any institution for the purposes of the section must be open to any candidate who presents himself, and the examination must be strictly limited to the matters specified by the Act. Dr. Newman states that at the present time there are between 400 and 500 deputies in Cleveland who will require the certificate before January 1, 1913, and after that there are likely to be about 100 applications for examination every year. It is competent for the committee to apply for recognition as an approved authority, but whether they are the proper body to undertake such work is a question on which there may be much difference of opinion; in the absence of any mining school or technical college, the governing body of which might be regarded as the proper authority to conduct such an examination, the only alternative would be for the University of Leeds to undertake the work. After considering the educational adviser's report, the Higher Education Sub-Committee have advised that in the opinion of the committee the University of Leeds are the proper body to become an approved authority for the granting of the certificates; but in the event of the University being unwilling or unable to undertake the work the Education Committee would be prepared to consider the matter further.

FURTHER NOTES ON THE ANALYSES OF MINE AIR CONDUCTED AT THE LEWIS MERTHYR CONSOLIDATED COLLIERIES LIMITED, TREHAFOD.[*]

By J. W. Hutchinson, M.I.M.E., and Edgar G. Evans, B.Sc., A.I.C.

When the previous paper was read and discussed, the authors stated that further work was being performed in order to ascertain what effect a slowly rising or falling barometer had on the quantity of methane issuing from cavities or old workings, and also what effect the varying speed or stoppages of the fan had on the quantity of methane in the air-currents. An attempt was made, in the first place, to find out whether, in the case of firedamp issuing from old workings, an increased evolution of methane preceded a fall in the barometric pressure, and *vice versâ*, or whether the percentage of gas varied concomitantly with the barometer.

It was decided for the purpose of this investigation to choose a place for taking the samples which would be untouched by any air from the working places of the colliery, and where the quantity of air would be fairly constant. (The accompanying plan shows the position.) The place chosen was at the outbye end of an old main return airway, which was of considerable length, with a large area of goaf and old workings on each side. The out bye end of this return had been stowed up some years previously, as methane was always more or less present, and the quantity varied considerably, according to the rise or fall of the barometric pressure. A pipe, 12 in. diameter, passes through the stopping and rubbish in order to carry off the methane from the inside, and the officials have on many occasions found an increase in the quantity of gas issuing from the pipe before any change was visible on the barometer. When the barometric pressure was very low a large quantity of gas was issuing, and it had been found necessary to have a current of at least 25,000 cubic feet of air per minute always circulating in order to keep the roadway leading to the upcast from the stopping in a safe condition. The bulk of this air-current is carried directly past the end of the pipe, in order to dilute the gas as it issues from the pipe. The samples were taken 75 yards from the end of the pipe.



Samples of the air were taken hourly, the barometer being read simultaneously by the person taking the samples. The procedure in this case differed somewhat from the previous ones, inasmuch as the barometer was taken underground and read directly at the place where the samples were taken. The instrument used for the first few days was a sensitive aneroid barometer, but was later substituted by a mercury barometer, which had been standardised in comparison with the first. Owing to pressure of other work, the experiments could only be continued for a few days; but even so the results obtained were of decided interest, and are given in Table 1. The influence of barometric variation is exceedingly marked. Very few discrepancies are noticeable, and it seems exceedingly significant that these discrepancies take place at the maxima and minima of the curve representing barometric variation. Thus, on July 31, the maximum percentage of methane was attained at 3.15 p.m., *i.e.*, 2·98. The barometer had then been dropping for 15 hours, the rate of fall averaging, from 11 a.m. to 2 p.m., 0·05 in. per hour. After 2 p.m., the rate of fall decreased considerably, averaging a little over 0·01 in. per hour. It will be noted that the maximum quantity of methane corresponded with the point at which the rate of fall commenced to diminish. The percentage of methane fluctuated considerably for the next few hours up to 10 o'clock when a rapid barometric rise took place, accompanied by an equally rapid fall in the percentage of methane. Again, on August 2, it will be noticed that a barometric rise has taken place, extending from 10 p.m. on July 31 until 11.15 p.m. on August 2, when the maximum of 30·39 in. of mercury is reached, yet the minimum percentage of methane is reached at 5 p.m.—six hours previously.

TABLE No. 1.
Observations made Week ending August 3rd.

Time	Barometer in inches	Percentage of Methane	Time	Barometer in inches	Percentage of Methane
July 30th			11.0 a.m.	29·98	0·41
7.30 a.m.	30·07	0·46	12 noon	30·00	0·28
8.0 a.m.	30·07	0·38	1.0 p.m.	30·00	0·15
9.0 a.m.	30·06	0·28	2.0 p.m.	30·02	0·21
10.0 a.m.	30·04	0·22	3.15 p.m.	30·0[illegible]	0·25
11.0 a.m.	30·10	0·12	4.0 p.m.	30·05	0·23
12.30 p.m.	30·10	0·10	5.0 p.m.	30·05	0·20
1.30 p.m.	30·12	0·11	6.0 p.m.	30·01	0·20
3.0 p.m.	30·16	0·10	7.0 p.m.	30·08	0·16
4.0 p.m.	30·17	0·05	8.0 p.m.	30·09	0·11
5.0 p.m.	30·20	0·03	9.0 p.m.	30·10	0·15
6.0 p.m.	30·20	0·05	10.0 p.m.	30·10	0·14
7.0 p.m.	30·22	0·03	11.5 p.m.	30·12	0·15
8.0 p.m.	30·24	0·045	*August 2nd*		
9.0 p.m.	30·20	0·05	12.15 a.m.	30·14	0·08
10.0 p.m.	30·20	0·06	1.0 a.m.	30·15	0·05
11.15 p.m.	30·26	0·01	1.45 a.m.	30·15	0·01
July 31st			2.40 a.m.	30·15	0·01
12.15 a.m.	30·28	0·015	3.40 a.m.	30·16	0·01
1.0 a.m.	30·27	0·010	4.45 a.m.	30·17	0·01
1.45 a.m.	30·26	0·05	5.50 a.m.	30·18	0·01
2.45 a.m.	30·21	0·03	7.15 a.m.	30·18	0·0
3.45 a.m.	30·23	0·10	8.0 a.m.	30·18	0·0
4.45 a.m.	30·23	0·22	9.45 a.m.	30·18	0·01
5.45 a.m.	30·20	0·29	10.35 a.m.	30·18	0·01
7.0 a.m.	30·15	0·32	11.50 a.m.	30·18	0·01
8.10 a.m.	30·11	0·72	12.50 p.m.	30·18	0·01
9.10 a.m.	30·08	0·90	1.30 p.m.	30·23	0·01
10.5 a.m.	30·06	1·15	2.30 p.m.	30·23	0·01
11.0 a.m.	30·03	1·83	3.15 p.m.	30·23	0·0
12 noon	29·95	2·45	4.0 p.m.	30·23	0·0
1.0 p.m.	29·92	2·50	5.0 p.m.	30·25	0·0
2.0 p.m.	29·88	2·90	6.0 p.m.	30·28	0·01
3.15 p.m.	29·86	2·98	7.0 p.m.	30·28	0·01
4.0 p.m.	29·84	2·08	8.0 p.m.	30·31	0·15
5.0 p.m.	29·82	2·78	9.0 p.m.	30·31	0·18
6.0 p.m.	29·82	2·85	11.15 p.m.	30·39	0·05
7.0 p.m.	29·81	2·56	*August 3rd*		
8.0 p.m.	29·80	[illegible]	12.15 a.m.	30·37	0·05
9.0 p.m.	29·79	[illegible]	1.0 a.m.	30·36	0·10
10.0 p.m.	29·78	2·77	1.40 a.m.	30·35	0·08
11.15 p.m.	29·86	1·42	2.30 a.m.	30·34	0·00
August 1st			3.20 a.m.	30·35	0·10
12.15 a.m.	29·88	1·22	4.10 a.m.	30·35	0·00
1.0 a.m.	29·80	1·21	4.45 a.m.	30·36	0·00
1.50 a.m.	29·93	0·71	6.0 a.m.	30·38	0·00
2.45 a.m.	29·94	0·67	7.0 a.m.	30·37	0·02
3.45 a.m.	29·93	0·55	8.0 a.m.	30·37	0·05
4.35 a.m.	29·94	0·47	9.0 a.m.	30·37	0·05
5.35 a.m.	29·94	0·50	10.0 a.m.	30·35	0·12
7.0 a.m.	29·97	0·20	11.0 a.m.	30·35	0·10
8.0 a.m.	29·97	0·37	12 noon	30·33	0·11
9.0 a.m.	[illegible]	0·38	1.0 p.m.	30·31	0·26
10.0 a.m.	30·0	0·27			

These results seem to confirm those obtained by Koehler at the mines of Karwin. He definitely states that "after a rapid period of barometric depression a further small depression is accompanied by a small decrease in the percentage of methane; on the other hand, after a rapid barometric rise a further small rise is accompanied by a small increase in the amount of methane evolved." The Lewis Merthyr experiments, however, are not extended enough to do much more than generalise on this point; but as far as they go they certainly seem to point to the fact that under certain conditions a variation in the methane content precedes a barometric variation.

The Effect of the Fan on the Percentage of Methane in Returns.

At first sight the influence of the speed of the fan on the percentage of methane in mine airways seems quite obvious. One would naturally expect that, other factors remaining constant, a diminution in the speed of the fan would effect an increase in the percentage of methane in the airway, and *vice versâ*. Some discrepancies in their earlier work had already turned the authors' minds in this direction, whilst, in view of Dr. Haldane's instructive communication, it was felt that some detailed work in this connection would prove of value. A preliminary experiment was therefore made at Colliery B—[*] Plan B, in this direction.

An observer was stationed at the place marked 1 on the plan, and it was arranged that the speed of the fan should be altered at a certain time, observations being made underground three-quarters of an hour afterwards. The barometric pressure, speed of the fan, water-gauge, and temperature were noted at the surface, whilst underground the barometric pressure and the velocity of the air were observed at the time the samples were taken. The results are given in Table 2. It will be noted that the immediate effect of reducing the speed of the fan is to cause a small increase in the barometric pressure in the return. The percentage of methane in the return air is very slightly increased, but if the quantity of methane evolved is considered, it will be found that there is an enormous decrease when the speed of the fan has been reduced from 45 to 37, and then to 29 revolutions per minute. When, however, the speed of the fan is increased the percentage of methane in the return air is increased considerably, and the actual quantity passing along the roadway per minute assumes considerable proportions. Further experiments were made at the same place on Sunday and Monday, August 4 and 5, as shown in Table 3. In this case the fan was stopped on Sunday for seven hours.

It will be observed here that the percentage of methane in the returns increases continuously throughout the period of stoppage. There is also a further increase shown in the sample taken a quarter of an hour after the fan was restarted. Probably, however, this sample was taken rather too soon to obtain the full effect, and from the results given in the other tables, it is quite probable that the percentage of 3·37 obtained at 4.15 p.m. was not the maximum, but would have increased still further within the next three-quarters of an hour. There is, however, a considerable increase in the quantity of methane passing per minute. It is evident from the analysis made at 6 o'clock that the airways,

JULY 20th COLLIERY B. PLAN B TABLE No. 2.

Samples.	Time tests are taken.	Quantity of air passing in cub. ft. per minute	Barometer Surface	Barometer Underground	Fan engine revs. per minute	Water-gauge in inches	Percentage of Methane.	Quantity of Methane in c. ft. per minute.	Remarks.
No. 1	4.0 p.m.	57600	29·63	30·30	45	3·6	1·54	887	The speed of the fan was reduced at 4.15 p.m. and the barometer gradually rose to 30·32 in 2 to 3 minutes.
No. 2	5.0 p.m.	38800	29·63	30·32	37	2·4	1·55	601	
No. 3	6.0 p.m.	30960	29·63	30·39	29	1·6	1·50	492	
No. 4	7.0 p.m.	41400	29·63	30·37	37	2·4	1·70	704	Fan put on full speed at 7.15 p.m. and the barometer gradually dropped to 30·30.
No. 5	8.0 p.m.	55800	29·63	30·30	45	3·0	1·78	993	

SUNDAY, AUGUST 4. TABLE No. 3.

Samples.	Time tests were taken.	Quantity of air passing in cub. ft. per minute.	Barometer Surface	Barometer Undergrnd	Fan engine revs. per minute	Water gauge in inches	Percentage of Methane.	Quantity of Methane in c. ft. per minute	Remarks.
No. 1	9.0 a.m.	46475	29·12	29·93	45	3·6	1·35	627	The fan was stopped at 9.0 a.m. and the barometer rose underground gradually to 30·12 in 2 or 3 minutes.
No. 2	9.45 a.m.	14520		30·12	Nil	—	1·48	215	
No. 3	12 noon	13200	29·16	30·09	Nil	—	2·27	300	
No. 4	3.30 p.m.	19645	—	30·11	Nil	—	3·30	648	The fan was restarted at 4.0 p.m. and the barometer underground dropped to 30·05 in 2 or 3 minutes.
No. 5	4.15 p.m.	46255	29·17	30·05	45	3·5	3·37	1559	
No. 6	6.0 p.m.	48675	—	30·09	45	3·5	1·37	667	
				Monday, August 5th.					
No. 1	8.45 a.m.	53350	29·41	30·17	46	3·4	1·38	736·2	The fan was stopped at 9.0 a.m. and the barometer rose from 30·17 to 30·33 in 2 to 3 minutes.
No. 2	9.25 a.m.	13365	29·42	30·33	Nil	—	1·25	167	
No. 3	12.35 p.m.	14080	29·44	30·39	Nil	—	1·95	274·5	The fan was restarted at 2.10 p.m. and the barometer dropped to 30·20 in 2 to 3 minutes.
No. 4	2.30 p.m.	45650	29·42	30·29	44	3·1	2·5	1141	

TABLE No. 4.

Sample.	Time tests taken.	Quantity of air passing in cub. ft. per minute.	Barometer Surface.	Barometer Underground.	Fan engine revs. per minute.	Water gauge in inches.	Percentage of Methane.	Quantity of Methane in c. ft. per minute.	Remarks.
No. 1	10.5 a.m.	47250	29·8	31·18	60	3·10	1·02	481·9	The fan was reduced to half speed at 10.15 and the barometer underground rose gradually to 31·31 in 2 to 3 minutes.
No. 2	10.35 a.m.	27000	29·87	31·31	30	1·0	1·0	275	
No. 3	10.50 a.m.	27000	29·90	31·32	30	0·9	1·01	272·7	The fan was stopped at 11.0 a.m. and the barometer rose to 31·37 in 2 minutes after the stoppage.
No. 4	11.15 a.m.	15000	29·90	31·37	Nil	0·5	1·03	154·5	There was a gradual rise in the barometer underground to 31·40.
No. 5	11.40 a.m.	13000	29·92	31·39	Nil	—	1·00	130	At 11.45 the barometer dropped to 31·37 when the fan started full speed.
No. 6	11.50 a.m.	—	—		30	0·9	1·03		
No. 7	12 noon	27000	29·90	31·37	30	0·9	0·97	261·9	
No. 8	12.15 p.m.		—		30	0·9	1·09		
No. 9	12.25 p.m.	27500	29·90	31·37	30	0·9	1·16	321·5	The fan commenced to run at full speed at 12.30, the barometer gradually dropped to 31·32 3 minutes after.
No. 10	12.45 p.m.	47000	29·90	31·32	60	3·10	1·25	587·5	
No. 11	1.0 p.m.	46500	29·90	31·32	60	3·10	1·25	581·2	
No. 12	1.15 p.m.	[illegible]	29·90	31·32	60	3·10	1·29	503·1	

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[*] A paper read before the South Wales Institute of Engineers, and published in the *Proceedings*. See *Colliery Guardian*, July 19, 1912, p. 117.

[*] See *Colliery Guardian*, July 19, 1912, p. 118.

although clearing, had not even then acquired their normal condition, as the barometer was a rising one. On Sunday, August 11, the authors themselves made experiments at Colliery A, Plan A.* in the main return (Table 4). The same thing occurred in this case as in Table 2. Here the speed of the fan was gradually reduced, kept at a standstill for some time, and then again increased gradually to its maximum. The surface barometer was rising slightly throughout the first portion of the observations, but its effect in comparison with the effect of the fan can be disregarded. Here again a decreasing speed of the fan is accompanied by an increased barometric pressure. This increase is certainly not of great magnitude, but it must be remembered that it takes place with considerable rapidity. Thus, at 11 a.m., the barometric pressure rose 0·05 in. in the course of two or three minutes after the fan was stopped. This undoubtedly has the effect of forcing the methane back into the crevices and fissures from which it emanates, as is shown by the considerably diminished quantity of methane passing along the roadway. On the other hand, when the fan was again started, a fall of barometric pressure took place, which was accompanied immediately by an increased quantity of methane passing along the roadway, and after about a quarter of an hour the same thing was made evident by an actual increase in the percentage of methane.

It will be seen from these results that the effect of variation in the speed of the fan on the composition of the air underground is a complicated one. There are two factors acting—one, a statical effect—of pressure—in retarding temporarily, at any rate, the evolution of methane; and, secondly, a dynamical effect, in sweeping out the gas evolved in the mine, these two factors working in opposition to one another. When we consider the question of reversing the ventilation, it seems probable that, so far as the returns are concerned, the first effect of the increased pressure would be (as Dr. Haldane thinks) to temporarily check the issue of firedamp. As to how long this would last the authors cannot say, and the effect of the intake airway, then converted to a return, in a fiery mine would be difficult to conjecture. It will be noted that the observations have been limited to the return airways, and the time at their disposal has also been so limited as to make it impossible for the authors to carry out such experiments as would definitely show the actual quantity of methane evolved from stated areas of working faces when the coal was being won and when work was suspended.

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* *See Colliery Guardian*, July 19, 1912, p. 118.

The Law of Support in Scotland.—The Lord Advocate for Scotland (the Right Hon. Alexander Ure, K.C., M.P.) visited Motherwell on the 12th inst. in connection with the question of securing compensation for damage created by mineral workings. Mr. J. Duncan Millar, the representative in Parliament of the division of which Motherwell is the centre, has introduced a Bill dealing with the matter, and it was on his invitation that the Lord Advocate visited the district. The Bill which Mr. Millar has presented to the House of Commons is "to amend the law relating to feus and leases for building in Scotland and to secure compensation for injury caused by mineral workings." The object in view is to give effect to the Common Law obligation which binds a superior or a landlord to maintain the surface or to pay compensation for damage done. In the present feu contracts and building leases the landlord inserts a condition that he is not to be liable in the event of any damage, whether by subsidence or otherwise, being caused to the ground feued or to the buildings erected thereon, or in any manner or way by or through the past or future workings of the reserved minerals under or near the ground feued. Present feu charters also contain a provision that the feuar shall be bound to erect and maintain in all time coming buildings sufficient to secure the feu duty. The extent of the damage to buildings by mineral workings in the Motherwell district has attracted much notice, and pressure has been put upon the Scotch Office to deal with the matter at an early date. In the course of the tour of inspection special attention was directed to the damage done to industrial works, public buildings, and dwelling-houses. With one or two exceptions, most parts of Motherwell have suffered more or less severely from ground subsidences. The levels of a large number of feus have sunk from 2 ft. to 4 ft. in comparatively short periods. The Lord Advocate said the question was urgent. Something ought to be done. What that something was it was not for him to say at present. It would engross the attention not only of Mr. Millar but of himself as a member of the Government, and they would certainly consider carefully whether some remedy could be found for what appeared to them to be so manifestly an injustice. Mr. Millar said they knew that this question affected a much wider area than that of Motherwell. He agreed that it was not from one point of view only that the question had to be looked at. Means might have to be taken to look at it from the wider aspect as regarded the securing of adequate support for the surface as well as from the specific aspect of amending the present law relating to buildings feus and buildings leases in Scotland.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

New District Rules Still Causing Trouble: Lord St. Aldwyn Called In to Decide—Litigation upon Term of Notice Required—Mining Certificates: Difficulty with Home Office—Swansea Conference of Miners' Federation of Great Britain: Several Important Proposals—New Ballot Vote Suggested upon Centralisation—Peculiar Cases in the Courts—Mr. Gilbertson's Important Speech on Tin-Plate Trade.

One or two points which have been in dispute as to interpretation of new rules under the minimum wage award, have been arranged at a joint meeting representing the coalowners and colliers. It has been agreed, as to Rule 5—which deals with the giving of notice by a workman who finds himself unable to earn the minimum owing to causes beyond his own control—that the notice to the employer need not be in writing; also, that the employer may give only verbal notice to a man charged with offences that extinguish his right to the minimum; further, where medical examination takes place on the employer's behalf, the workman is to have the right of securing the attendance of his own medical man.

It is understood, however, that the agreement made in these respects does not avert the probability that appeal will be made to the law courts to determine the validity of certain of the rules which are challenged. Both the rule as to giving notice (24 hours or one month), and that as to "averaging the wages," will, it is anticipated, come before the judges.

The Conciliation Board met at Cardiff on Monday and received the report of the sub-committee upon the points mentioned, a discussion following as to those in regard to which they had failed to agree. Piecework colliers are entitled to a minimum of 4s. 7d. per day, whereas day-wagemen have a minimum of 4s. 3d. (unless the customary rate of the colliery be higher). It was suggested by the employers that where the management are dissatisfied with the amount of work, in cases where the place is abnormal and the man cannot earn the minimum, they shall be at liberty, after notice, to put the man upon day wage at 4s. 3d., or the customary higher rate—any man objecting to be at liberty to leave without notice. But inasmuch as this proposal conceded liberty for employers to transfer a man from one scale to another, the men's representatives objected, and no agreement could be reached. Other matters dealt with were the pooling of earnings, certain points in classification of men, and that night and day hauliers should have the same minimum. Agreement proved impracticable in certain cases; and as to those and other matters, reference will have to be made to Lord St. Aldwyn.

The subject of length of notice was introduced by Mr. Brace, M.P., arising out of the decision given last week by the Rhondda stipendiary, when he determined that 24 hours' notice was not sufficient. Mr. Brace suggested that the Joint Board might discuss the matter with a view to endeavouring to arrive at a settlement and so prevent further litigation. Although some little discussion followed this suggestion, it was found impracticable to agree, and in all probability therefore the employers will carry the case to appeal, judgment having gone against them in respect of the giving of 24 hours' notice, instead of a month.

To-day (Friday) the District Board meets in order that Lord St. Aldwyn may attend and deal with the questions already referred to, and it is expected that he will also give his decision as to the applications from certain districts for special treatment under the Minimum Wage Act.

Complaint is made that the Home Office, in the new instructions as to candidates for mining certificates, is imposing serious hardship upon those who have to sit for examination on November 25. Both a fireman's certificate and an ambulance certificate will be required, and therefore candidates who do not already possess these would be debarred, seeing that they have not now sufficient time in which to acquire them. It is suggested that exemption should be conceded for this occasion.

Keen interest has been aroused by the forthcoming conference at Swansea of the Miners' Federation of Great Britain, because of the subjects having direct relation to South Wales, especially that of the surfacemen. It will be remembered that these are members of the Federation in this district, whereas in parts of England they are not members, and it was a matter of great complaint locally that whilst the Minimum Wage Act would remedy grievances of underground workers, the surfacemen (who also were on strike, and, besides, were subscribers to the Federation) would get no advantage from the new law. This question comes up at Swansea. The executive committee submit a resolution that surface workers shall be brought into direct operation not only of the Minimum Wage Act, but also of the Eight Hours law. From delegates individually a motion will be submitted that all the surface workers shall have a minimum wage of at least 5s. per day.

Legislative action in several directions is to be proposed, the Workmen's Compensation Act, the Insurance Act and the Coal Mines Act being dealt with. But the most noteworthy is the proposal coming from the north of England that the Eight Hours Act shall be extinguished so far as regards its application to Northumberland and Durham. From the Midlands comes a proposal that the national organisation should at once take steps towards securing a general increase of 20 per cent. in the present wage rate; and it is noteworthy that just at the time when the Syndicalists have been trying to separate the Parliamentary and industrial work of the Federation, a proposal should come before the conference at Swansea making more close than ever the connection between the Miners' Federation and Parliamentary candidature. It is part of the policy of the advocates of the new system in South Wales that members of Parliament should have no share in the industrial work; but the proposition to be brought before the conference will be that miners' candidates need not henceforth be restricted to their own localities.

How far the new centralisation scheme for South Wales will be approved at their separate conference is even yet a question. For example: During a meeting at Ebbw Vale on Saturday, the chairman (Councillor Evan Davies) commented upon the fact that only two-thirds of the men had voted during the ballot; and upon his stating that, notwithstanding this, the ballot must be regarded as final, a long discussion arose. In the end a resolution was passed that, at the South Wales conference shortly to be held, application should be made for another ballot to be taken; and that the votes should be counted at Cardiff under scrutineers. Part of the argument which led to this was that, by centralisation of affairs, the present foundation of the organisation would be swept away; the district would cease to exist as such; and that the whole area would revert to the former system of lodges and the workmen would lose the local efforts of committee men at the collieries, which had hitherto done so much to maintain their wage rate and improve their conditions of labour.

One of the reasons assigned for the smallness of the vote upon federation re-organisation is that there was a change in the system of voting. Instead of the ballot being conducted at the pit-top, the men had to go to the lodge room to record their votes; and therefore an unusally large proportion did not take the trouble to vote at all. (This matter of the method of voting must of necessity come into greater prominence as time goes on, for the determination of important questions by a minority of the employees is unsatisfactory in every respect.) Further consideration of the new centralisation scheme will take place to-morrow, when a special meeting of the drafting committee, with the executive, takes place in Cardiff.

As there has been a failure of agreement, Lord St. Aldwyn will be asked to settle a panel of umpires for deciding local disputes in the different parts of the district. Mr. W. Stewart, chairman of the Coalowners' Association, and Mr. W. Brace, president of the Federation, had been charged with the task of arranging this panel, but it proved incapable of adjustment.

An interesting and important question was decided by Judge Bryn Roberts at the Merthyr County Court. A collier claimed compensation, and the dispute arose as to the basis upon which this should be calculated. The man had been unable to work every day because of stoppages due to strikes, breakages and other causes; and for the employers, it was contended that the compensation should be paid in respect of the difference in earnings on the assumption that he had worked every day. But the judge held that the whole period must be taken into account in order to ascertain the average weekly earnings while in light employment, and therefore increased the amount of compensation.

Another judgment had direct relation to the strike. A man in receipt of compensation was engaged in light employment at the time the strike was declared, but he did not give notice with the rest of the men, and he therefore claimed full compensation for the strike period, the company having refused to provide him with light employment during that period. His Honour held that the company's refusal was entirely due to the abnormal state of the labour market, as a result of the strike; and he therefore dismissed the claim with costs.

Mr. Gilbertson, who addressed the annual meeting of the Swansea Metal Exchange, is honourably distinguished in the great undertaking with which he is connected; and his utterances on the tinplate trade come with weight and influence. He showed how the American trade during 1911 had sustained a reduction of 16,000 tons, so that whilst the exports from Wales had exceeded those of 1910 by nearly 2,000 tons, the comparative rate of increase (which had been 10 per cent. in preceding years) was particularly disquieting. It was evident, he said, that an industry able to stand this loss of trade, and to balance it with increased sales in other directions, must possess wonderful vitality; but he was afraid there were signs which would prevent them being too optimistic in view of the future. American exports to British or neutral markets, which had never exceeded about 1,200 tons, jumped in 1911 to 61,474 tons, and during the first six months of this year they had reached the amazing total of 45,845. Combining these two points of competition, the United States were now taking the business that had hitherto belonged to Wales to the extent of 150,000 tons a year, or over 3,000,000 boxes, nearly the output of 100 mills. He did not wish to be misunderstood, for he was not pretending that manufacturers here were short of orders, or that they could have executed orders which went to American mills, neither did he suggest that the extension of the world's markets was not going to give sufficient employment for all; but the extent to which Wales could meet the requirements of the world would continue to be limited by the course of events in America.

One further point of great importance was made by Mr. Gilbertson—namely, that (upon an assumption that the last two mining Acts of Parliament increased the cost of coal by one shilling a ton) the expense to his firm arising from coal advance, Workmen's Compensation Act, and the Insurance Act amounted together to £7,000 a year.

The tinplate trade in South Wales, it should be noted, gives employment to about 30,000 persons; and during August the total increase of exports, notwithstanding American competition, was 14,000 tons, spread over a wide area, Europe, Australia, East Indies, &c. More mills are now in operation than ever before in the history of the trade, and these mills have 25 per cent. greater output than before the American tariff was instituted. In addition to this, the tinplaters have established their own sheet mills, of which there are now 74 in existence. American success as against Wales in the Canadian market has been largely due to the abnormally low prices that prevailed for the raw material, and to the idleness of their mills, whilst South Wales was fully employed at high prices. How far (under their improved conditions as to prices) the Americans can maintain their power in Canada remains to be seen.

The "Ceag" Electric Miner's Lamp.—Messrs. A. Baird and Son Limited, colliery furnishers, steelfounders, &c., of Hamilton, have been successful in securing the sole agency for Scotland for the sale of the "Ceag" miner's electric lamp. This is the lamp to which the judges appointed by the Home Secretary in the international competition for the best electric miner's lamp awarded the first prize of £600 out of nearly 200 competitors, while eight other competitors received £50 each.

Municipal Coal Supply.—As a result of an agitation for a municipal coal supply among the councils of the Bradford Corporation, which has existed for a matter of 10 years or so, a special committee was appointed a little while ago to enquire into the feasibility of the proposal. This committee had now presented a report entirely hostile to the idea. The committee has taken expert evidence from the local tramways manager and gas engineer, several leading coal merchants, the secretary of the local co-operative society, and the secretary of a working men's coal supply association. The result of the evidence is stated to be that the Bradford Coal Consumers' Association, upon a turnover of £600,000 last year, made a profit of only 3½d. per ton, and the general conclusion arrived at on profits is that the public impression of exorbitant profits in the trade is quite unfounded, and that the profit on all the coal sold in the city does not average 1s. per ton.

INDIAN AND COLONIAL NOTES.

Africa.

Included in the new South African mail contract which has been concluded between the South African Government and the Union Castle Line, are clauses, according to which, among other conditions, in order to assist in the development of the South African coal export trade, the contractors undertake to purchase for export, in addition to what they may require for their steamers, not less than 50,000 tons of South African coal, provided it can be supplied at not less than 1s. 6d. below the average for similar coals in July 1912.

Transvaal Coal Export Trade.—An important report has recently been made to the Railway Board by Mr. Gordon Sandilands, Special Commissioner in the East, on the prospects of developing our export trade *viâ* Delagoa Bay. Mr. Sandilands' investigations covered the following localities: (1) East Coast of Africa including Aden. (2) Bombay and the North-Western Provinces of India. (3) Madras and Southern India. (4) Ceylon. (5) Mauritius and Reunion. (6) Madagascar. He considers that at present the East Coast section offers but a poor market for coal, owing to the entire absence of industrial centres, or important bunkering ports. Although probably 225,000 tons of coal are disposed of annually along the coast, between Lourenco Marques and Port Sudan, the market is an illusory one; the major portion is disposed of under European bunkering contracts at the coaling ports of Aden, Perim and Jibuti, and the trade at these ports is in the hands of the steamship companies and of the large European coaling firms, and until these companies can be induced to accept the South African product in lieu of Welsh, little hope can be entertained of finding a large permanent outlet for Transvaal coal. The most potent factor against the introduction of Transvaal coal is the geographical situation of Aden and Perim; these bunkering depots are on the main trade route between Europe and the East, while the Transvaal lies in a backwater so far as the great trade currents are concerned. In order to establish Transvaal coal in the East Coast bunkering market, a strenuous and persistent campaign of advertisement should be undertaken among the shipping companies and amongst coaling contractors. Such tactics could best be effected in London by an agent who is thoroughly conversant with Transvaal coal and also with shipping interests. Of the six sections which, for convenience sake, form subdivisions of this report, that comprising the north-western districts of India and the province of Bombay is by far the most important. The consumption of coal in this locality is an increasing one, and may be assessed at: In the north-western districts, 1,300,000 tons per annum; in the province of Bombay, 1,500,000 tons per annum; total, 2,800,000 tons per annum. The actual volume of trade open to foreign (extra-Indo) competition falls far below this figure (2,800,000 tons), because a large proportion of the railway requirements have necessarily to be supplied to the inland termini of the three great railway systems. The North-Western State Railway, the Bombay, Baroda and Central Indian Railway, and the Grand Indian Peninsula Railway, procure probably 40 per cent. of their annual requirements by rail from the Bengal fields. Thus only the seaborne coal requirements of this section are open to foreign competition. The ratio of seaborne to railborne varies slightly according to the prices of seaborne coal at the ports, which again are dependent upon ruling freight rates. Mr. Sandilands estimates the annual seaborne tonnage as follows:—At Karachi, between 600,000 and 700,000 tons; at Bombay, about 1,300,000 tons. The Indian coalfields easily hold the market against all comers, notwithstanding the fact that of recent years the demand for coal in Western India has kept ahead of the supply from Indian sources. In this, the Indian fields are enormously assisted by the low rates at which coal is carried upon Indian railways. The home freight charged to Indian railways is 0·09 pies per maund per mile, equivalent to 0·2d. per ton per mile. Only a limited number of practical tests of Transvaal coal have been made in India, and though of an encouraging nature, the relative commercial values of Bengal and Transvaal coal are as yet undetermined. Sample cargoes are, however, now *en route* to three Indian railway systems, and it is to be hoped that the superiority of Transvaal coal may be clearly established. Indian consumers are over-cautious about placing large contracts with distant foreign collieries; they constantly have had had experiences in connection with maintenance of grade and regularity of delivery, even with their own collieries, and therefore they fear to take on greater risks. Mr. Sandilands is of opinion that their objections could be overcome if satisfactory guarantees were forthcoming, *i.e.*, such as could only be given by the united collieries of the Transvaal, or indeed of any State, where organisation and unity of action existed among coalmasters. The practical problem before Transvaal colliery owners is: How to place a moderate quality coal upon a market which is now held by an inferior indigenous product? The situation of the Hyderabad coalfields and the proximity of Calcutta to the port of Madras, places Indian coal almost beyond foreign competition in the Madras Presidency. The best chance of selling Transvaal coal in Madras is by securing a railway contract, and by supplying *viâ* the port of Marmagoa, though possibly a few thousand tons might be sold through the instrumentality of an energetic local agent in Madras City. Although the Ceylon market is large, it is somewhat difficult to approach, because four-fifths of the annual imports are disposed of under bunkering contracts, which are determined in Europe, and therefore a permanent outlet for Transvaal coal cannot be expected until the colony's steam coal has established a reputation in the London market. For some time to come the annual Government railway contract is likely to be the chief matter of interest to colliery owners in the Transvaal. The market, however, is worth striving for, because of its permanency when once a good footing is secured. The quantitative value of the Mauritius market may be taken at 45,000 tons annually. Approximately half of this quantity is consumed by the Government Railway, whose requirements are arranged for by public tender, while the other half goes into the planters' market, which is an open one throughout the year. Notwithstanding the relative proximity of Mauritius to South Africa, it is remarkable that more than half of its coal requirements until now have been drawn from the United Kingdom. It is instructive to note that after one year's trial of Natal coal, the Railway Administration was prepared to wholly condemn all South African coals, and to do so, not because of poor quality, but because certain two collieries in Natal were unable to maintain a uniform grade of coal. No stronger proof could be adduced of the necessity for concerted action among Transvaal colliery owners in regard to the export trade than this fact. In the planter's market both Natal and Transvaal coal have been favourably received. The shares to be secured by the rival colonial coals will depend almost wholly upon the relative shipping facilities between Port Louis and the two coaling ports of Durban and Lourenco Marques. At present the advantages seem to lie with Natal. The island of Reunion, although almost equal to Mauritius in size, offers fewer attractions to the coal salesman. The prospects of opening up a coal trade with Madagascar are at present somewhat remote. The island has recently emerged from a state of semi-barbarism, and has not developed any industries which require the use of power. The only likely clients for Transvaal coal will be found among the shipping companies. With the exception of the railway, which, from motives of policy, buys about 2,000 tons of Natal coal annually, there is no demand whatever in Madagascar. Notwithstanding this state of affairs, the colony of Natal is able to find an outlet in Madagascar for about a thousand tons a month. To summarise:—The immediate prospects are fair and the future possibilities even more encouraging. An export trade to the East of from 100,000 to 240,000 tons annually, might be established. The growing industrial development in Western India warrants the assumption that the above estimate may be ultimately exceeded. A standard quality of round coal, guaranteed either by Government or by a recognised public institution of world-wide repute, is essential. Distant consumers will not contract with individual concerns, but will always demand guarantees for quality and regular supplies. The present Bombay market prices necessitate an approximate price of 18s. per long ton c.i.f. ports of entry. Until Transvaal coal has secured a sound footing in the Eastern markets, colliery owners should not expect more than a bare margin of profit per ton.

Australia.

At Altona, eight miles from Melbourne, an extensive area of brown coal has been mined for some time by a local company. This company, it is stated, has now been bought out by a body of English and American capitalists who have been responsible for the erection of large electrical undertakings in Canada and South America. A power house is to be constructed, and it is stated that up to £3,000,000 for development will be provided if the industrial development warrants it.

Report on the Killingworth Colliery Explosion.—The full text of the report of Mr. A. J. R. Watt, Royal Commissioner, appointed to enquire into the cause of the Killingworth Colliery explosion in 1911, has been issued. The report is an exhaustive one. In Mr. Watt's opinion, either of two things happened—first, that a dormant fire in the goaf was freshened, and forced into such activity that it developed flame in a very short time, or secondly, that when it decomposed, and partly oxidised materials, constituted in favourable proportions in the goaf, it developed into a gob fire, that, favoured by its surroundings, heated and leapt into flame in the space of a few hours. The explanation of the absence of smoke and smell is that fires in the goaf are so peculiar in their action that it cannot be accepted as an axiom that there will be either smoke or smell from a dormant gob fire. It is, in Mr. Watt's opinion, therefore, by no means an unreasonable assumption that the return airway from the goaf, as far as the regulator in the return behind the stables, and all or some of the bords on the right-hand side of the return, as well as the goaf itself, were heavily charged with highly inflammable gases. On the afternoon of the day before the explosion timber was being "snigged" to some deputies. The district was dusty, and the effect of the operation would be to carry the combustible dust in suspension along the return, and if not held in suspension, would be lightly deposited on the timber and coal ribs in

THE COAL AND IRON TRADES.

Thursday, September 19

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 144,098 tons of coal and 1,122 tons of coke were despatched from Tyne Dock, a decrease of 17,658 tons of coal and an increase of 614 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 68,643 tons of coal and 2,610 tons of coke, an increase of 2,365 tons of coal and a decrease of 548 tons of coke. The Blyth shipments aggregated 94,306 tons of coal and coke, an increase of 15,640 tons. A Swedish contract for a moderate amount of steam coal—hitherto invariably ordered in this district—is stated to have been diverted to Silesia, the determining factor being the cost of freight. The report as to the contract to supply the Chilian State Railways with 220,000 tons of steam coal would appear to be somewhat premature, to say the least, inasmuch as the contract is not yet allotted. However, in view of the highness of freights from this country, and the keen competition of Australia, South Africa, America and Japan, it is very unlikely that any British coal will be taken, although local collieries have tendered. The Copenhagen Electricity Works want tenders by September 20 of 24,000 tons of steam coal for delivery from October to the end of March. Tenders of 26,000 tons of gas bests have been submitted to the Gothenburg Gasworks. The following large sales of fuel have been reported during the week:—About 80,000 tons of best Blyth large steams and 20,000 tons of Blyth smalls for shipment to Hamburg over next year at 12s. 9d. and 8s. 3d. per ton, f.o.b., respectively, in renewal of a regular contract; and 30,000 tons of good Durham coke for delivery at Workington over next year at 27s. per ton, delivered. Bunker coals have been in active demand and the following sales are recorded:—Good unscreened Durham sorts: 12,000 tons for shipment over next year at 12s.; 10,000 tons for similar delivery at 12s. 1½d.; 5,000 tons for October shipment at 12s. 6d.; 6,000 tons for delivery over the first half of next year at 12s. 7½d. Superior South Durham sorts: A considerable quantity partly screened for delivery over next year as required at 13s. 6d., f.o.b. Tees. The Danish State Railways are reported to have placed the order for 30,000 tons of steam coals for the marine department, delivery over the next six months, for Aitken and Bannockburn (Scotland) coal. As regards the contract for 90,000 tons of steams for the mechanical department, delivery over the same period, this is stated to have gone—excepting for a small quantity to be taken from Yorkshire—to Germany, thus confirming merchants' previous apprehensions. Further details are not yet to hand. The contract to supply the Swedish State Railways with 17,000 tons of steams for the upper ports has come to this district, but details are still lacking. Some 15,000 tons of South Durham gas coal are stated to have been sold for shipment over next year at 12s. 9d. per ton, f.o.b. West Hartlepool. Coal tonnage supplies have been better this week, although they are still far from satisfactory. On the whole, prices for prompt shipment have been well maintained, although buyers with ready vessels are occasionally able to command substantial discounts on current figures. The forward position is, generally, good. The demand for coke is steadily improving, and more beehive ovens are being set going to increase the supply. It is reported from Genoa that best Durham gas coal has been sold for September shipment at 25s. 6d. per ton, c.i.f. For October, 26s. 6d. is asked; for October-December, 26s.; and for next year's delivery, 23s. In each instance, buyers' notions are from 6d. to 1s. below these figures, as is not unreasonable. Quotations for prompt shipment are as follow (steady where not otherwise stated):—Best steams, Blyths (D.C.B.), 13s. 6d. to 13s. 9d. per ton f.o.b., a decline of 3d. on the week; Tynes (Bowers, &c.), 13s., from 3d. to 6d. cheaper; seconds, Blyths, 12s. to 12s. 3d.; Tynes (Hastings or West Hartleys), 12s. to 12s. 3d., from 3d. to 6d. cheaper; unscreened, 11s. to 11s. 6d.; smalls, Blyths, 9s. 3d.; Tynes, 8s. 9d. to 9s. 3d., advanced; specials, 10s.; smithies, 12s. to 12s. 6d., easier; gas bests (New Pelton or Holmside), 12s. 6d. to 12s. 9d., weaker; seconds (Pelaw Main or similar), 12s., 6d. reduced; specials, 13s.; unscreened bunkers, Durhams, 12s. to 12s. 9d.; Northumbrians, 11s. 3d. to 11s. 9d., an advance of 3d.; coking coal, 12s. to 12s. 6d.; smalls, 12s.; households, 14s. 6d.; coke, foundry, 23s. to 25s., an increase of 1s.; blastfurnace, 21s.; and gas coke, 21s. Some weakness in steams, smithies and gas coals will be noted.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 110,075 tons of coal and 315 tons of coke, as compared with 103,520 tons of coal and 1,400 tons of coke for the corresponding period of 1911, being an increase of 6,555 tons of coal and a decrease of 1,055 tons of coke. The coal market is still checked by the continued scarcity of tonnage, the undertone is good, and prices are steady, especially for forward business, but buyers who can take prompt delivery are able to get concessions. Merchants are still adopting the hand-to-mouth policy, owing to the very high range of freights. The bunker coal market keeps strong, and the enquiry is still good both for prompt and forward delivery; the sale is reported of 20,000 tons unscreened at 12s. to 12s. 1½d. over next year, 5,000 tons at 12s. 6d. for delivery in October, and 6,000 tons better-class unscreened at 12s. 6d. delivery January to June next year. A further contract for 30,000 tons good Durham furnace coke has been made at 27s. delivered at Workington. Both blastfurnace and foundry coke are in strong demand. Generally, quotations are as follow:—Special Wear gas, 13s. 6d. to 14s.; best gas, 12s. 9d. to 13s.; seconds, 12s. 6d.; coking unscreened, 12s. 6d. to 13s. 6d.; smalls, 12s. to 13s.; smithies, 13s.; peas and nuts, 14s. to 15s.; household ordinaries, 14s.; bests, 15s. Bunker quotations are:—Ordinary kinds, 12s. 3d. to 12s. 6d.; bests, 13s.; specials, 13s. 6d. Best foundry coke is 23s. to 24s., blastfurnace coke 23s., and gashouse coke 21s. The outward freight market retains its strength, with a lack of business passing, owing to the difficulty in securing tonnage. Fixtures reported are:—Coasting: London 4s. 6d., Antwerp 6s., Havre 6s. 6d., Hamburg 5s. Bay: Bordeaux 7s. 3d., St. Nazaire 8s., Lisbon 11s. 3d. Baltic: Cronstadt 7s., Gefle 7s. 4½d., Hango 7s. 9d. Mediterranean: Genoa 13s. 9d., Civita Vecchia 14s. 7½d., Malta 11s., and Port Said 12s. 9d.

Middlesbrough-on-Tees.

COAL.

The fuel trade is steady and firm, with a considerable business passing. Deliveries are good, and would be much heavier but for scarcity of steamers. Shippers on the north-eastern rivers are much concerned at the high rates of freights. Consumption of gas coal is increasing, as is usual at this season of the year, and best Durhams run from 12s. 9d. to 13s., with seconds at 12s. 6d. Bunker coal is in very good request, and ordinary kinds realise 12s. 3d. to 12s. 6d., whilst bests are 13s. and specials 13s. 6d. Improvement is noticeable in household coal, and best sorts are up to 15s. There is continued large demand for coking coal. Smalls range from 12s. to 13s., and unscreened coking 12s. 6d. to 13s. 6d. All descriptions of coke are in very good request, and prices are strong. Up to 23s. is named for medium blastfurnace qualities delivered at Teesside works, and in one case at least as much as 24s. has been paid for best furnace coke. Foundry coke for shipment ranges from 23s. 6d. to 24s. 6d. f.o.b. Gas coke is in the neighbourhood of 21s.

IRON.

The pig iron market is active. This week, business has been done in Cleveland iron at higher rates than have ruled for the past 12 years. No. 3 g.m.b. has been sold at as much as 68s. 4½d. f.o.b., but there are now second hands prepared to accept 67s. 10½d. Other qualities of Cleveland pig have fluctuated somewhat, and No. 1 is now 72s. 10½d., No. 4 foundry and No. 4 forge each 67s. 6d., and mottled and white iron each 67s. East coast hæmatite pig is in fairly good request, and is moving upward. Nothing below 80s. is now named for Nos. 1, 2 and 3 for prompt business and for delivery to the end of the year, whilst, for spring delivery, 82s. 6d. is named. There is little or nothing doing in foreign ore, but sellers take a very firm stand and market rates are on the basis of fully 23s. ex-ship Tees for rubio of 50 per cent. quality. Freights are high, as much as 7s. 6d. having been paid Bilbao-Middlesbrough. In the manufactured iron and steel industries there is great activity, and some producers have orders sufficient to keep them fully employed for nearly two years. All manufacturers are well booked up, and are not keen to enter into further contracts at present, as they look for higher quotations ruling in the near future. Steel strip and steel hoops have been advanced by 7s. 6d. per ton, the former now standing at £8 and the latter at £8 2s. 6d.

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South-West Lancashire.

COAL.

The inland household trade, notwithstanding the mild weather, continues brisk, and orders are considerably in arrear. Prices are unchanged at the moment, but there is every probability of an early alteration. For the present 15s. 6d. or thereabouts rules for the best grades, with 14s. and 11s. 6d. respectively for good medium sorts and kitchen coals. Forges and users of screened coal for manufacturing purposes continue to take full supplies, with prices ranging up to 12s. per ton into wagons. As regards shipping, the strong demand for bunker coals does not show signs of easing off. Contractors all round are asking for maximum quantities, and although there is no very unusual outside enquiry, supplies are little more than sufficient for current requirements. Prices of screened Lancashire steam coals are firmly held, and range from 11s. 9d. to 12s. f.o.b. for cheaper qualities to 13s. or 13s. 3d. f.o.b. for the best descriptions. Pressure continues to be exercised for household fuel for the coastwise and cross-Channel trade, but mostly on account of contracts already booked. Open sale prices for best coal rule at about 15s. 6d., with good seconds grades at 14s. to 14s. 3d., both net f.o.b. Garston. Work at the manufacturing towns has resumed its full swing, and this will now have the effect of clearing away the little quantity of slack that accumulated during the holidays. Prices are firm at about 9s. 9d. to 10s. for the best rough grades, with 9s. to 9s. 3d. for good medium qualities, and 8s. 6d. or thereabouts for the commoner and finer qualities, all into wagons at the pit. The gas coal purchasing season may now be considered to be over, the last of the places having made settlements. The sales may be said to be at 2s. per ton advance upon last year.

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South Lancashire and Cheshire.

COAL.

The demand for house coal is good, but perhaps not quite so brisk as during the last week or two. Prices are firm and there seems every probability of an advance in the immediate future, especially in view of the decision of the Conciliation Board. At present the list rates are 16s. to 16s. 9d. for best house coals, with good medium qualities 14s. 6d. to 15s. 6d., and kitchen qualities 11s. 9d. to 12s. 9d.—all at the pit. Furnace coal still continues to meet with steady enquiry, the price being about 12s. 6d. per ton at the pit, and there is an improvement in shipping coal, the price being firm at about 12s. to 14s. f.o.b. Partington. Slack maintains its strong position, the prices being about 9s. to 9s. 9d. for best, with seconds at 8s. to 8s. 6d., into wagons at the pit.

IRON.

There was a good attendance on 'Change in Manchester on Tuesday last, and pig iron prices remain firm. Forges are extremely busy on Crown iron bars at £8 10s., second quality £8, sheets £9 to £9 5s., hoops £8 12s. 6d., and deliveries are still hard to get hold of. Steelworks are fully occupied, with billets at £6 2s. 6d. net and bars at £8 5s.—less 2½ per cent., hoops £8 7s. 6d. Heavy engineers and ironfounders are fairly well employed. Wagon works very busy.

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Yorkshire and Derbyshire.

Leeds.

COAL.

The floor of the Yorkshire Coal Exchange was crowded on Tuesday afternoon. Traders were present from a wide area, and the attendance included a large number of exporters and West Riding merchants. Colliery salesmen generally had very little to offer for prompt delivery, and prices all round were firmly held. The bulk of the enquiries concerned steam coal and nuts, the latter being in very good demand for Bradford and Huddersfield districts. No official announcement was made concerning house coal prices for West Riding depots, but sales are being generally made with an early advance in view. The pits have worked about full time this week, and the output has been cleared without difficulty. Empty wagons are somewhat scarce. The warmer weather has checked the consumption of house coal, but the effects have scarcely been felt at the pits, as merchants are selling a good deal into stock. Business with London and the eastern and southern counties continues satisfactory, and pit prices show an increase of about 6d. per ton since last week. The advance in London public prices of 1s. per ton on last Friday's market has caused this advance, as a good many of the contracts this year are on a sliding-scale basis. For prompt delivery representative collieries quote about as follow:—Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. 6d. to 14s.; Silkstone best, 13s. 6d. to 14s. (special qualities, 14s. to 14s. 6d.); Silkstone house, 12s. 6d. to 13s.; house nuts, 11s. 6d. to 12s. There is a fair amount of business passing in the coastwise trade, the demand running mostly on the cheaper sorts. Freights rule very high, and there is a marked scarcity of small tonnage. Current f.o.b. Hull quotation:—Haigh Moor best, 16s. 6d. to 17s. 3d.; Silkstone best, 15s. 6d. to 16s. 6d.; Silkstone house, 14s. 6d. to 15s. 3d.; house nuts, 13s. 6d. to 14s. Merchants in Leeds, Bradford, Huddersfield, Halifax, and the heavy woollen district are well employed, as the public are buying heavily in view of a probable advance in prices. Current quotations are very firm, and average about as follow:—Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. 6d. to 16s.; ordinary house coal, 14s. to 15s.; other sorts, 12s. to 13s. 6d. The market for manufacturing fuel shows very little change. There is a full demand, and pit prices are about as quoted last week. Washed furnace coke is decidedly stronger on the week, and sales have been made during the past few days at 18s. per ton at the ovens. Coking smalls are dearer, good average qualities realising 7s. to 7s. 6d. per ton at the pits. The gas coal pits are working full time, contract deliveries covering nearly the whole of the output. New business is quiet. Current pit prices:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal 9s. to 10s. For export at Hull the following f.o.b. figures are quoted:—Screened gas coal, 12s. 9d. to 13s. 6d.; gas nuts, 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d. to 12s. 6d.

Barnsley.

COAL.

The shortage of the output during the past week has no doubt greatly increased the activity which is apparent for all classes of steam fuel. The generally vigorous demand for large fuel on export account is far from met as yet, and consequently shippers are seeking to make up arrears as speedily as possible before the market assumes a further degree of strength than now prevails. The coalowners are so well placed that they can almost name the price required

THE COAL AND IRON TRADES.

Thursday, September 19

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 144,098 tons of coal and 1,122 tons of coke were despatched from Tyne Dock, a decrease of 17,658 tons of coal and an increase of 614 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 68,643 tons of coal and 2,610 tons of coke, an increase of 2,365 tons of coal and a decrease of 548 tons of coke. The Blyth shipments aggregated 94,306 tons of coal and coke, an increase of 15,640 tons. A Swedish contract for a moderate amount of steam coal—hitherto invariably ordered in this district—is stated to have been diverted to Silesia, the determining factor being the cost of freight. The report as to the contract to supply the Chilian State Railways with 220,000 tons of steam coal would appear to be somewhat premature, to say the least, inasmuch as the contract is not yet allotted. However, in view of the highness of freights from this country, and the keen competition of Australia, South Africa, America and Japan, it is very unlikely that any British coal will be taken, although local collieries have tendered. The Copenhagen Electricity Works want tenders by September 20 of 24,000 tons of steam coal for delivery from October to the end of March. Tenders of 26,000 tons of gas bests have been submitted to the Gothenburg Gasworks. The following large sales of fuel have been reported during the week:—About 80,000 tons of best Blyth large steams and 20,000 tons of Blyth smalls for shipment to Hamburg over next year at 12s. 9d. and 8s. 3d. per ton, f.o.b., respectively, in renewal of a regular contract; and 30,000 tons of good Durham coke for delivery at Workington over next year at 27s. per ton, delivered. Bunker coals have been in active demand and the following sales are recorded:—Good unscreened Durham sorts: 12,000 tons for shipment over next year at 12s.; 10,000 tons for similar delivery at 12s. 1½d.; 5,000 tons for October shipment at 12s. 6d.; 6,000 tons for delivery over the first half of next year at 12s. 7½d. Superior South Durham sorts: A considerable quantity partly screened for delivery over next year as required at 13s. 6d., f.o.b. Tees. The Danish State Railways are reported to have placed the order for 30,000 tons of steam coals for the marine department, delivery over the next six months, for Aitken and Bannockburn (Scotland) coal. As regards the contract for 90,000 tons of steams for the mechanical department, delivery over the same period, this is stated to have gone—excepting for a small quantity to be taken from Yorkshire—to Germany, thus confirming merchants' previous apprehensions. Further details are not yet to hand. The contract to supply the Swedish State Railways with 17,000 tons of steams for the upper ports has come to this district, but details are still lacking. Some 15,000 tons of South Durham gas coal are stated to have been sold for shipment over next year at 12s. 9d. per ton, f.o.b. West Hartlepool. Coal tonnage supplies have been better this week, although they are still far from satisfactory. On the whole, prices for prompt shipment have been well maintained, although buyers with ready vessels are occasionally able to command substantial discounts on current figures. The forward position is, generally, good. The demand for coke is steadily improving, and more beehive ovens are being set going to increase the supply. It is reported from Genoa that best Durham gas coal has been sold for September shipment at 25s. 6d. per ton, c.i.f. For October, 26s. 6d. is asked; for October-December, 26s.; and for next year's delivery, 23s. In each instance, buyers' notions are from 6d. to 1s. below these figures, as is not unreasonable. Quotations for prompt shipment are as follow (steady where not otherwise stated):—Best steams, Blyths (D.C.B.), 13s. 6d. to 13s. 9d. per ton f.o.b., a decline of 3d. on the week; Tynes (Bowers, &c.), 13s., from 3d. to 6d. cheaper; seconds, Blyths, 12s. to 12s. 3d.; Tynes (Hastings or West Hartleys), 12s. to 12s. 3d., from 3d. to 6d. cheaper; unscreened, 11s. to 11s. 6d.; smalls, Blyths, 9s. 3d.; Tynes, 8s. 9d. to 9s. 3d., advanced; specials, 10s.; smithies, 12s. to 12s. 6d., easier; gas bests (New Pelton or Holmside), 12s. 6d. to 12s. 9d., weaker; seconds (Pelaw Main or similar), 12s., 6d. reduced; specials, 13s.; unscreened bunkers, Durhams, 12s. to 12s. 9d.; Northumbrians, 11s. 3d. to 11s. 9d., an advance of 3d.; coking coal, 12s. to 12s. 6d.; smalls, 12s.; households, 14s. 6d.; coke, foundry, 23s. to 25s., an increase of 1s.; blastfurnace, 21s.; and gas coke, 21s. Some weakness in steams, smithies and gas coals will be noted.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 110,075 tons of coal and 345 tons of coke, as compared with 103,520 tons of coal and 1,400 tons of coke for the corresponding period of 1911, being an increase of 6,555 tons of coal and a decrease of 1,055 tons of coke. The coal market is still checked by the continued scarcity of tonnage, the undertone is good, and prices are steady, especially for forward business, but buyers who can take prompt delivery are able to get concessions. Merchants are still adopting the hand-to-mouth policy, owing to the very high range of freights. The bunker coal market keeps strong, and the enquiry is still good both for prompt and forward delivery; the sale is reported of 20,000 tons unscreened at 12s. to 12s. 1½d. over next year, 5,000 tons at 12s. 6d. for delivery in October, and 6,000 tons better-class unscreened at 12s. 6d. delivery January to June next year. A further contract for 30,000 tons good Durham furnace coke has been made at 27s. delivered at Workington. Both blastfurnace and foundry coke are in strong demand. Generally, quotations are as follow:—Special Wear gas, 13s. 6d. to 14s.; best gas, 12s. 9d. to 13s.; seconds, 12s. 6d.; coking unscreened, 12s. 6d. to 13s. 6d.; smalls, 12s. to 13s.; smithies, 13s.; peas and nuts, 14s. to 15s.; household ordinaries, 14s.; bests, 15s. Bunker quotations are:—Ordinary kinds, 12s. 3d. to 12s. 6d.; bests, 13s.; specials, 13s. 6d. Best foundry coke is 23s. to 24s., blastfurnace coke 23s., and gashouse coke 21s. The outward freight market retains its strength, with a lack of business passing, owing to the difficulty in securing tonnage. Fixtures reported are:—Coasting: London 4s. 6d., Antwerp 6s., Havre 6s. 6d., Hamburg 5s. Bay: Bordeaux 7s. 3d., St. Nazaire 8s., Lisbon 11s. 3d. Baltic: Cronstadt 7s., Gefle 7s. 4½d., Hango 7s. 9d. Mediterranean: Genoa 13s. 9d., Civita Vecchia 14s. 7½d., Malta 11s., and Port Said 12s. 9d.

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The fuel trade is steady and firm, with a considerable business passing. Deliveries are good, and would be much heavier but for scarcity of steamers. Shippers on the north-eastern rivers are much concerned at the high rates of freights. Consumption of gas coal is increasing, as is usual at this season of the year, and best Durhams run from 12s. 9d. to 13s., with seconds at 12s. 6d. Bunker coal is in very good request, and ordinary kinds realise 12s. 3d. to 12s. 6d., whilst bests are 13s. and specials 13s. 6d. Improvement is noticeable in household coal, and best sorts are up to 15s. There is continued large demand for coking coal. Smalls range from 12s. to 13s., and unscreened coking 12s. 6d. to 13s. 6d. All descriptions of coke are in very good request, and prices are strong. Up to 23s. is named for medium blastfurnace qualities delivered at Teesside works, and in one case at least as much as 24s. has been paid for best furnace coke. Foundry coke for shipment ranges from 23s. 6d. to 24s. 6d. f.o.b. Gas coke is in the neighbourhood of 21s.

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The demand for house coal is good, but perhaps not quite so brisk as during the last week or two. Prices are firm and there seems every probability of an advance in the immediate future, especially in view of the decision of the Conciliation Board. At present the list rates are 16s. to 16s. 9d. for best house coals, with good medium qualities 14s. 6d. to 15s. 6d., and kitchen qualities 11s. 9d. to 12s. 9d.—all at the pit. Furnace coal still continues to meet with steady enquiry, the price being about 12s. 6d. per ton at the pit, and there is an improvement in shipping coal, the price being firm at about 12s. to 14s. f.o.b. Partington. Slack maintains its strong position, the prices being about 9s. to 9s. 9d. for best, with seconds at 8s. to 8s. 6d., into wagons at the pit.

IRON.

There was a good attendance on 'Change in Manchester on Tuesday last, and pig iron prices remain firm. Forges are extremely busy on Crown iron bars at £8 10s., second quality £8, sheets £9 to £9 5s., hoops £8 12s. 6d., and deliveries are still hard to get hold of. Steelworks are fully occupied, with billets at £6 2s. 6d. net and bars at £8 5s.—less 2½ per cent., hoops £8 7s. 6d. Heavy engineers and ironfounders are fairly well employed. Wagon works very busy.

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The floor of the Yorkshire Coal Exchange was crowded on Tuesday afternoon. Traders were present from a wide area, and the attendance included a large number of exporters and West Riding merchants. Colliery salesmen generally had very little to offer for prompt delivery, and prices all round were firmly held. The bulk of the enquiries concerned steam coal and nuts, the latter being in very good demand for Bradford and Huddersfield districts. No official announcement was made concerning house coal prices for West Riding depots, but sales are being generally made with an early advance in view. The pits have worked about full time this week, and the output has been cleared without difficulty. Empty wagons are somewhat scarce. The warmer weather has checked the consumption of house coal, but the effects have scarcely been felt at the pits, as merchants are selling a good deal into stock. Business with London and the eastern and southern counties continues satisfactory, and pit prices show an increase of about 6d. per ton since last week. The advance in London public prices of 1s. per ton on last Friday's market has caused this advance, as a good many of the contracts this year are on a sliding-scale basis. For prompt delivery representative collieries quote about as follow:—Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. 6d. to 14s.; Silkstone best, 13s. 6d. to 14s. (special qualities, 14s. to 14s. 6d.); Silkstone house, 12s. 6d. to 13s.; house nuts, 11s. 6d. to 12s. There is a fair amount of business passing in the coastwise trade, the demand running mostly on the cheaper sorts. Freights rule very high, and there is a marked scarcity of small tonnage. Current f.o.b. Hull quotation:—Haigh Moor best, 16s. 6d. to 17s. 3d.; Silkstone best, 15s. 6d. to 16s. 6d.; Silkstone house, 14s. 6d. to 15s. 9d.; house nuts, 13s. 6d. to 14s. Merchants in Leeds, Bradford, Huddersfield, Halifax, and the heavy woollen district are well employed, as the public are buying heavily in view of a probable advance in prices. Current quotations are very firm, and average about as follow:—Haigh Moor selected, 17s. to 18s.; Wallsend and London best, 16s. to 17s.; Silkstone best, 15s. 6d. to 16s.; ordinary house coal, 14s. to 15s.; other sorts, 12s. to 13s. 6d. The market for manufacturing fuel shows very little change. There is a full demand, and pit prices are about as quoted last week. Washed furnace coke is decidedly stronger on the week, and sales have been made during the past few days at 18s. per ton at the ovens. Coking smalls are dearer, good average qualities realising 7s. to 7s. 6d. per ton at the pits. The gas coal pits are working full time, contract deliveries covering nearly the whole of the output. New business is quiet. Current pit prices:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal 9s. to 10s. For export at Hull the following f.o.b. figures are quoted:—Screened gas coal, 12s. 9d. to 13s. 6d.; gas nuts, 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d. to 12s. 6d.

Barnsley.

COAL.

The shortage of the output during the past week has no doubt greatly increased the activity which is apparent for all classes of steam fuel. The generally vigorous demand for large fuel on export account is far from met as yet, and consequently shippers are seeking to make up arrears as speedily as possible before the market assumes a further degree of strength than now prevails. The coalowners are so well placed that they can almost name the price required for the surplus fuel they have to deal with, and the application for an increase of wages by the men is regarded as likely to be merely another reason, which would come to the aid of sellers in making prices still higher. This is particularly the case with respect to the finer quality of large steams, though not a great deal of this grade of fuel is leaving for abroad, and the greater demand for good hard coal by the various industries in the Midlands serves to sustain the higher quotations which were quoted last week of from 12s. 9d. to 13s. per ton. A good many arrears in regard to secondary descriptions of large steams have quickly accumulated, and the rush for delivery at Hull has given values in this respect marked stability. Rather higher figures than a week ago are offered to obtain prompt delivery, but generally business is done at about 11s. 6d. per ton, though forward enquiries are not entertained at this figure. The demand on account of railway contracts is particularly large, and extra purchases are necessary in some cases when the advanced rate had to be paid. The business in regard to the small classes of steam fuel could hardly be of a more active character, and in this respect a shortage of tonnage is felt owing to the cause already spoken of. Best washed nuts are good to sell, even at the exceptionally high figure 11s. 6d. per ton which is now quoted, whilst secondary qualities are stronger also on the week, and are only from 9d. to 1s. per ton lower than the best brand of nuts. A very firm market is also met with in regard to pea slacks and rougher fuel, and though buyers regarded the recent advance of 1s. per ton which was imposed for best sorts, the experience is in favour of sellers. The best brand of washed slacks are making fully 8s. per ton, and secondary kinds, which are most largely utilised for coke manufacture, are from 6s. 6d. to 7s. per ton, and some hold the opinion that values will show a still greater degree of advance. The position of the house coal trade has little altered on the week, though merchants find the public are holding off buying somewhat with the warmer weather prevailing. However, the position at the collieries is little affected, for during the last week supplies were difficult to obtain and orders are so extensively placed that the easier enquiry will not be unwelcome. The producers of the best quality fuel are adhering to their recently advanced price list, though there is still a good deal of variety in the character of business transacted. Best Silkstones make from 14s. to 14s. 6d. per ton, best Barnsley softs 12s. 6d. to 13s. 6d. per ton, seconds 10s. 6d. to 11s. 6d. per ton, house nuts best about 11s. 6d. per ton. The contracts placed for gas coal in the district are stated to be of about an average character and the pits are making good time, though the export trade is probably of a more remunerative character than at home. Coke keeps in excellent demand, the delivery being well cleared and values are of a strong description, the ordinary washed sorts making fully 16s. per ton at the ovens.

Hull.

COAL.

The market was largely attended to-day; business, however, was slow and rather easier in tone, favouring buyers. So far as the export business was concerned, the shortage of suitable tonnage was the main factor in respect to the volume of actual business. For the moment, the demand for house coal is slightly easier. As to forward business, the tone is good, the feeling being in favour of higher prices later. Shipments continue good, and the railway companies are meeting all demands with promptness. Approximate prices for prompt shipment f.o.b. Hull:—South Yorkshire: Best steam hards, 15s. 3d. to 15s. 6d.; washed double-screened nuts, 13s. 6d. to 13s. 9d.; unwashed double-screened nuts, 12s. 6d. to 12s. 9d.; unwashed single-screened nuts, 11s. 6d. to 11s. 9d.; washed smalls, 11s. 9d.; unwashed smalls, 10s. 6d.; Parkgate, 13s. 3d. West Yorkshire: Hartleys, 12s. 9d. to 13s.; rough slack, 10s. 3d. to 10s. 6d.; pea slack, 8s. 6d. to 8s. 9d.; best Silkstone screened gas coal, 13s. 9d. to 14s.; best Silkstone unscreened gas coal, 12s. to 12s. 6d. Derbyshire: Best steam hards at Hull, 14s. 9d. to 15s.; best steam hards at Grimsby, 14s. 6d.; Derbyshire large nuts at Hull, 14s.; Derbyshire large nuts at Grimsby, 13s. 9d.; Nottinghamshire hards at Hull, 14s. 6d. to 14s. 9d.; Nottinghamshire hards at Grimsby, 14s. 3d.

Chesterfield.

COAL.

There is a distinct improvement in the demand for house coal, orders for which are coming to hand in sufficiently large numbers to enable the pits of the district to work full time—an unusual condition of things at this time of the year. Prices are very firm, and will be advanced on October 1. There are no stocks of any appreciable size at any colliery. The demand for fuel for manufacturing purposes is now greater than at any period since the present revival in trade set in, and customers are clamouring for deliveries. There is a great run on cobbles and nuts for gas producers in connection with the steel trade, but the supply is not by any means equal to the requirements of the market. Consumers are eager to increase the tonnage of these qualities already bought under contract, but sellers are unable to meet their wishes in this respect owing to the heavy commitments into which they have already entered. Prices keep steadily advancing. With the conclusion of the holidays in connection with the cotton industry a further strengthening of the demand for slack for Lancashire is most pronounced, with a corresponding firmness of prices. The tonnage going forward daily from this district is the heaviest on record. An active demand is experienced for steam coal for locomotive use, and railway companies find it almost impossible to obtain as much coal as they would like. One or two of the railways are now inviting tenders for a renewal of the contracts which expire with the close of the present month. It is not known yet what the new prices will be, but it is certain that the collieries will insist on a minimum advance of 2s. 6d. per ton. The consumption of locomotive coal is just now on an extensive scale, and it will no doubt be exceptionally heavy for many months to come. There is a brisk business being done in the export branch of the trade, which will continue to the close of the shipping season. With a fuller supply of vessels it may be that a rush for coal will be experienced very shortly and will continue to the closing of the Baltic ports. Prices of Derbyshire Top Hards are strong, as the available supply of this coal is extremely limited. To-day's figure is 14s. 6d. per ton delivered free alongside steamer at Grimsby. Cobbles and nuts for near Continental ports continue in good demand. Orders for washed nuts and washed slack are plentiful, but the supply of this class of fuel is now comparatively scarce. Prices remain very firm. The condition of the coke market is as strong as ever, and 18s. to 18s. 6d. per ton at the ovens is readily paid for good brands. Coking fuel remains dear and scarce. Prices are as follow:—Best 13s. 6d., seconds 12s., cobbles 11s. 6d., nuts 10s., slack 8s.

IRON.

An active market in pig iron and manufactured kinds. There is a full demand at the advanced figures recently quoted. Enquiries coming to hand for forward delivery are numerous and of an encouraging kind. All the industries of the district are equally well employed.

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Nottingham.

COAL.

No marked change has been noticeable in the state of the coal trade in Nottinghamshire during the past week, but the outlook is improving. In the house coal section, although business is keeping steady at present, there is an indication of an early improvement. A fair tonnage is being sent to London, and this factor is assisting to maintain values, whilst business at local landsale machines is good. Hand-picked brights are quoted from 12s. to 13s. per ton, good households 10s. 6d. to 11s. 6d., nuts 9s. to 10s. 6d., cheap kitchens 7s. 6d. to 8s. 6d. The demand in the steam coal branch continues to be active. Most of the pits are making practically full time and stocks are low. Industrials are in particularly good request in the home markets; and the tonnage sent away on export account is considerable. Values are firm, best hards selling at from 11s. to 12s. per ton, and seconds 9s. 6d. to 10s. Slacks are in a favourable position, best qualities making much better prices than a year ago. Gas coal and coke are both in satisfactory request.

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Leicestershire.

COAL.

In the past week there has not been any variation in the amount of business, except for the better. At the present time there is a quite satisfactory total of business on hand and the collieries are all busily employed. As a rule a full week is being worked. The output is delivered promptly, and stocks are quite absent. The demand is for all descriptions of coal, both household and steam sorts. There is no doubt that the present active state of business will be maintained for some time, as the majority of collieries have sold well forward, and a brisk time is anticipated. Local merchants are quite busy, and last week was the busiest for a very considerable period. They are likely to continue busy for some little time. The market prices are fully sustained, and the present full rates will rule for some time at least. The prospects of business are better than they have been for a long time and give much cause for satisfaction on the part of coalowners.

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South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL

The satisfactory condition of the coal trade experienced during the past few weeks throughout the Cannock Chase district is well maintained. There is very little coal in stock and enquiries are numerous. The collieries throughout the district are working full time. Owing to the activity in the iron trade the demand for works fuel continues brisk and there is a very good demand for house coal. Railway and canal sales are satisfactory and a good business is being done at the landsale depôts.

Birmingham.

COAL.

The coal trade is very busy, and the pits are making full time. No difficulty is experienced in getting the enhanced prices—indeed, it is not so much a matter of price as of delivery. Values are expected to go higher next month. The enormous demand for all kinds of manufacturing fuel helps the household side in so far as it swallows up all the common fuel.

IRON.

Business on a strong, active market was more of a prospective character than for present requirements, which are fairly fully met. We are approaching the end of the quarter, and naturally consumers are looking ahead. There was no weakening during the afternoon in any department. On the contrary, prices in some branches were stiffer. Representatives of the galvanised corrugated sheet industry, for instance, came with instructions to quote £12 15s. for the home trade, and a minimum of £12 10s. for export orders; while for the lighter gauges, 28 to 30, the basis was £13, all f.o.b. Liverpool. In South Wales, selling figures are proportionately improving. Makers have plenty of business. The bar trade continues in a state of unabated activity. Some makers of merchant qualities are getting £8 10s. for their products, but for the middle qualities the general price ranges from £8 5s. to £8 7s. 6d. delivered Birmingham. North Staffordshire and Lancashire producers of crown bars report that they have no difficulty in securing the recently fixed basis price of £8 10s. Puddled bars are none too plentiful, and the price of £6, though high compared with £4 5s. obtained a couple of years ago, is quite reasonable when the enhanced price of pigs is considered and the fact that puddlers' wages have gone up 9d. a ton. Some difficulty is experienced in obtaining adequate supplies of men. In the gas-strip department business maintains its recent volume, and makers report a steady stream of specifications. The association has not altered prices, which are £8 5s. to £8 7s. 6d., but an early advance is not improbable to bring them into line with bars. The market for raw material keeps up well at recent quotations. Makers are offered contracts for more than they can entertain, and as prices are expected to go higher before any backward movement commences, they are naturally avoiding selling forward at current rates. Derbyshire forge has touched 65s. net, but other brands are not quotably altered. The whole of the iron that can be made during the next three months has been sold. There is no relief to the pressure in the steel trade, and most makers are booked six months ahead. In all directions there are complaints of difficulty in getting deliveries. Ferro-manganese has gone up 10s. to £10 10s. per ton. Copper sheets at £95 a ton are too high for much business, but consumers' stocks are getting short, and they must soon be on the market.

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Forest of Dean.

Lydney.

COAL.

As anticipated in our last week's report, prices of house coals in this district were advanced 1s. per ton from Monday the 16th, making present values as follow:—Block 16s. 6d., rubbles 15s. 9d., nuts 14s. per ton at pit, and 1s. 9d. per ton extra f.o.b. Lydney or Sharpness. This advance in coal prices carries with it an increase of 5 per cent. in the miners' wages, in accordance with agreement now existing between masters and men. Customers evidently expected this advance in prices, and orders continue to come in steadily, good business being done both in the inland and shipping branches of the trade. The steam coal trade continues to show considerable activity, and full time is the rule at all the pits. Good prices are being obtained, and higher rates are quoted for new business. Buyers who have delayed contracting until now have to pay the price for holding back.

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Gloucestershire, Somersetshire and Wilts.

Plymouth.

COAL.

Messrs. W. Wade and Son report that prices and freights are firm at all the coal ports, but wholesale buyers are reluctant to respond to the recent advances, as they appear to think the season is too early to justify their doing so. Consequently the wholesale business is restricted, and the retail demand can scarcely be said to have yet arisen. Freights generally are very firm, except at those ports where prompt cargoes are difficult to obtain.

Inspectorships of Mines and Factories.—The Home Secretary has appointed Mr. George Cook to be a junior inspector of mines under the Coal Mines Regulation Acts, 1887 to 1911, and has directed him to act also as an inspector for the purpose of the Metalliferous Mines Regulation Acts, 1872 and 1875, and of the Quarries Act, 1894, and has further appointed him to be an inspector of factories and workshops for the purposes of the Factory and Workshop Act, 1901.

University of Leeds.—A meeting of the council of the University of Leeds was held on Wednesday, when the following appointments were made:—Mr. H. J. Hodsman, M.Sc. (Leeds), to be assistant lecturer and demonstrator under the Livesey Professor of Coal Gas and Fuel Industries; Mr. H. S. Rowell, A.R.C.S., to be assistant lecturer and demonstrator in the Department of Civil and Mechanical Engineering. Arrangements have been made for series of special lectures to be delivered at the Leeds University during the coming session on the following subjects:—"Mining Legislation at Home and Abroad," "Economic Aspects of Mining," and "Mining Hygiene and Rescue Work."

THE WELSH COAL AND IRON TRADES.

Thursday September 19.

North Wales.

Ruabon.

COAL.

The coal trade in the North Wales coalfield continues satisfactory. All the collieries working full time, there seems to be no lack of orders, and as the autumn approaches a further boom is confidently anticipated. With regard to the various classes of fuel, it may be said that the household coal trade was never better at this time of year than it is now, and some collieries have a greater demand for their best household coal than they can cope with. This has meant that the price of household coal is steadily on the increase, and is not likely to take a retrograde movement for some time to come. During the last week or two there has been an advance of about 2s. per ton, and there is every indication of another immediate advance. Steam coal, too, is in steady demand. Railway companies are taking good supplies on account of their locomotive contracts, and as all the works of the locality, such as ironworks, brickworks are working very well just at present, these works are taking good supplies of this class of fuel, as a consequence of which prices, outside of contracts, are hardening, and are 1s. 6d. to 2s. per ton more than they were a week or two ago. As there has been such a good demand in the open market, there has not been such a large quantity of coal from this district sent down to Liverpool for shipment as is usual, but some collieries have sent down on account of this trade, and have been able to obtain a fair price for their coal. Gas coal is going away in large quantities in respect of the new contracts which have now been entered upon, and, of course, there is no gas coal sold apart from contracts worth speaking of. The colliery companies will now begin to feel the advantage of the higher prices at which the gas contracts have been fixed for the forthcoming year, and those collieries who have a large gas coal business should be in the way of making a little profit during the next six months or so. The probability of the 5 per cent. advance in wages to the men will doubtless mean a further general rise in the price of coal, and as this is anticipated, merchants are fixing up their forward contracts for all they are worth, but colliery owners are not so keen on closing unless they are able to get a good price. The following may be taken as representing the present average prices of the different classes of fuel sold in this locality. Best large household coal, 16s. and 17s. per ton; best smalls and large seconds, 14s. and 15s. per ton; steam coal, 12s. and 13s. per ton; nuts, 12s.; and slack, 7s. 6d. per ton for good rough quality. Gas coke also is advancing in price, and the gas companies are now asking 16s. to 17s. per ton at the works.

* * *

Monmouthshire, South Wales, &c.

Newport.

COAL.

The supply of tonnage continues to be the most important factor in the steam coal trade, the lack of suitable steamers being acutely felt. Chartering has been brisker, and while there are no steamers waiting for coal berths, the number in dock discharging is great, and will ensure considerable help to coal shippers, as undoubtedly the great majority of them will load outwards. The quantity of coal available for prompt loading is abundant, sidings being congested in every direction, and while sellers are freely offering concessions at 6d. for prompt shipment, while still holding out for further positions, buyers who are able to take advantage of the easier terms are very few. Facilities for loading here are now so ample that should the prevailing high freights attract sufficient tonnage, the visible coal here would soon be cleared away to the satisfaction of colliery owners who would like to maintain a more consistent output than of late. For small coals, sellers continue very firm for all positions, while patent fuel and house coals maintain unaltered values. Coke continues extremely scarce, while pitwood importers are hampered by the difficulty of securing empty wagons, despite the concessions they offer. In the freight market more tonnage is now offering, and chartering more freely, with rates fully maintained at recent high levels. Latest approximate quotations may be taken as follows, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 3d. to 15s. 9d.; western-valleys, ordinaries, 13s. 9d. to 14s. 3d.; eastern-valleys, best, 13s. 6d. to 13s. 9d.; other sorts, 13s. to 13s. 3d.; colliery smalls, best, 9s. to 9s. 6d.; seconds, 8s. 6d. to 8s. 9d.; inferiors, 8s. to 8s. 3d.; screenings, 9s. 3d. to 9s. 6d.; through coals, 10s. 6d. to 11s.; nuts, best washed, 11s. to 11s. 6d.; house coals, best, 18s. to 18s. 6d.; seconds, 17s. to 17s. 6d.; patent fuel, 17s. 6d. to 18s. Coke: Furnace, 22s. to 25s.; foundry, 26s. to 30s. Pitwood: Best French fir, 22s. to 23s. ex-ship.

IRON.

There is really no actual change to report in the condition of the local iron and steel trades, the position remaining quite as firm all round, or if anything, the tone is even stronger than a week ago. Works uniformly are well booked for some time ahead, and are now at fullest pressure in the endeavour to keep pace with the fresh specifications which keep coming to hand. Rail mills continue busily employed, and official quotations in this department have hardened on the week, and stand at £6 10s. to £6 12s. 6d. for heavy sections, with the usual extras. Tin-plate bar and sheet bar mills continue very active, with prices strong at £5 15s. Bessemer, and £5 15s. to £5 17s. 6d. Siemens for Welsh bars. Imports of foreign bars just now are exceptionally heavy, and beat all previous records. The tone of the pig iron market continues to gather strength, the latest official price for Welsh hæmatite being 82s. to 82s. 6d. delivered to works in the district. Iron ore is in request at stronger rates, 22s. being asked for best rubio. There is a good enquiry coming along in the tin-plate market, prices ruling much firmer on the basis of 15s. 1½d. to 15s. 4½d. Bessemer, and 15s. 4½d. to 15s. 6d. Siemens for I C 20 × 14 × 112, other sizes and grades *pro rata*.

Cardiff.

COAL.

When the present week opened, there was more tonnage in port than had been recorded for several weeks, but so enormous were the stocks of coal standing about that the situation was but little relieved, and buyers were still able to get very substantial concessions from the prices quoted. There is no disputing the fact that outputs are increasing in all directions, and that owing to the large quantities of coal for disposal, the tonnage question is becoming more acute almost every day. Evidence is constantly forthcoming as to the immense developments that are taking place in the colliery districts, and unless greater facilities are soon afforded for the shipment of coal, the losses sustained by the collieries in demurrage charges alone must be very serious. Although the exports last week from Cardiff alone amounted to close upon 400,000 tons, there is still considerable congestion around all the docks, and though many collieries have vessels ready to load, they are unable to get a tip. Nominally, best steam coals are quoted at 17s., but sellers find it extremely difficult to get even 16s. 6d., and indeed, in some cases, in order to release wagons, they have accepted as low as 16s. 3d. from buyers prepared to take immediate shipment. For second-class coals the quotation is from 15s. 6d. to 16s. 3d. The competition for the tonnage offering is keener than ever, and shipowners are in a position to practically dictate their own terms. As much as 13s. 9d. has been paid for Genoa, and it would occasion no surprise if in the near future the freight were increased to 14s. To Venice from 14s. 6d. to 15s. has been paid, whilst to Monte Video the rate is 23s. 3d. It is stated that one firm of shipowners, with a 6,000 tonner on a round voyage to the River Plate, thence to the United States, and back to Liverpool, realised a profit of not far short of £10,000. They admit that never were such times known. The worst of it is that neither buyers nor sellers see much hope at present of this condition of things being altered. The effect on contract business for 1913 is very serious. Some sellers are offering best steam coals to Genoa at 18s. f.o.b., or 28s c.i.f. This shows no weakening in f.o.b. business, but the 10s. freight indicates a belief that the rate to Genoa may eventually recede 2s. 6d. to 3s., though on what grounds that belief is based it is difficult to see. Before rates are reduced there must be more tonnage available. Certainly chartering last week was more satisfactory, the registered tonnage taken up being over 300,000 tons, but even were this average maintained it would be insufficient to deal with the present outputs. Unfortunately a number of cargo steamers are at present being converted into oil tank steamers by having their holds fitted with oil tanks. No cargo steamers are on the stocks to take the places of these, so that any material relief in the tonnage position is almost hopeless. Had tonnage been available in anything like normal quantities there is no doubt that the price of best steam coals for next year would be at least 18s. to 19s. per ton. All indications point to that. Depot owners everywhere are running on the lowest possible stocks in the hope of being able to obtain better terms later on, both as regards coal and freight, and if tonnage were only sufficiently plentiful to break down the rates of shipowners, there is no doubt that there would soon be a rush for coal, to the advantage of coalowners generally, and indeed of the men also. In order to participate to the fullest possible extent in the high prices which are being looked forward to, colliery firms which have had long standing disputes on their hands are making concessions to effect a settlement. A dispute of over two and a-half years' duration at the Pentre Colliery of Messrs. Cory Brothers, has just been satisfactorily adjusted. The strike at Gelli Colliery, belonging to the same firm, still continues. This has already lasted 27 months, and is the longest in the history of the coalfield. Notwithstanding the heavy shipments last week, there have been a number of stoppages at the collieries, and the diminished production of small coal resulting therefrom has led to a hardening of prices. Best bunkerings are 9s. 6d. to 9s. 9d—in one case 11s. has been paid—whilst for cargo qualities the quotation is from 9s. to 9s. 6d. per ton. Washed nuts are 14s. 6d. and washed peas 13s. per ton. Further particulars have transpired in reference to the contract for the Nord and Midi Railways of France. The small coal contract has been divided between Messrs Morgan, Wakley and Co., Messrs. E. W. Cook and Co., Messrs. J. E. Thomas Limited and Messrs. Franklen, Thomas and Co. Negotiations had extended over several weeks, and in the case of the earlier purchases the price paid was 17 fr. c.i.f. Bordeaux, and 17¼ fr. c.i.f. Bayonne for the Midi railways, and 17¼ fr. c.i.f. Calais and Dunkirk for the Nord railways. For the contracts more recently placed for the Midi railways the prices ruled up to 19 fr. Bordeaux. The through coals required are being supplied by Messrs. C. L. Clay and Co. at an average price of about 21½ fr. Bordeaux. The freight to Bordeaux is at present very high. At the end of last week no less than 9·37½ fr. was asked. This was 37½ cents above the ton figure received during the current year, and 87½ cents in excess of the highest price obtained in 1911. Very little business is doing in Monmouthshire coals and for spot shipment quotations are being shaded. Black Vein coals are selling at 15s. 3d., western valley 14s. 9d. to 15s. and eastern valley (best) 14s. 3d. and seconds 13s. 9d., in each case f.o.b. Cardiff. According to the statistical returns issued by the Customs authorities the quantity of coal exported to foreign countries from the South Wales ports in August was 2,387,934 tons as against 1,863,173 tons in the corresponding month of last year, being an increase of 524,761 tons. From Cardiff alone the shipments were 1,660,446 tons, an increase of 404,361 tons; from Newport 363,111 tons, an increase of 36,462 tons; from Port Talbot 153,101 tons, an increase of 7,611 tons; and from Swansea 301,940, an increase of 81,235 tons. No. 3 Rhondda bituminous coals are nominally 17s., but 16s. 6d. is being taken by some collieries. Through-and-through is 14s. to 14s. 3d., and small 11s. 6d. to 12s. No. 2 large is 12s. 9d., through-and-through 10s. 6d. to 10s. 9d., and small 8s. 9d. to 9s. per ton. There is no change in patent fuel. Best Crown brands still fetch 19s., and other qualities 18s. 6d. per ton. Shipments for the week exceeded 25,000 tons, the Crown Company exporting 6,965 tons, other local firms 9,326 tons, Swansea 7,777 tons, and Newport 2,000 tons. The steamers department of the Sudan Government are in the market for 12,200 tons of Crown brand patent fuel. Tenders will be received at the Khartoum dockyard up to October 14. Coke is unchanged. Ordinary foundry is 25s., and special 27s. 6d. per ton. Pitwood is 22s. to 22s. 6d. per ton.

IRON.

In consequence of the continued advance in tin, which is now quoted at £225 15s., or £5 above last week, makers of tin-plates have put up their prices materially. Bessemer 14 × 20 cokes are officially quoted at 15s. 3d., and oil sizes at 15s. 9d. and 22s. per box. Shipments for the week amounted to 130,221 boxes, or only 11,296 boxes less than the receipts from works, and stocks are now 242,647 boxes. Imports of steel bars, blooms, and billets have been smaller than for some time past, the total being less than 6,000 tons. Every local bar-rolling mill is in full operation, whilst six more mills have been started in the sheet trade. Bessemer bars are quoted at £5 15s., and Siemens at £5 15s. to £5 17s. 6d. In rails there is no change. There continues to be considerable enquiry for galvanised sheets for India, South America, and Australia. The prices of some of the American makers are at least 15s. above English prices, so that their competition is now practically dead. The principal works quote £12 5s. for 24-gauge corrugateds. There is no change in iron ore, but Welsh pig iron is 6d. dearer, being 80s. 6d. f.o.b. The strike of ironmoulders at Cardiff and Barry is still going on. Before the strike commenced the men were offered 40s. for 35 hours, and 43s. when making propellors, which was considerably in advance of the rate paid in Newport and many other towns, but they refused to accept it, demanding 42s. for 47 hours from October 1 to April 1.

Swansea.

COAL.

There was an average attendance on 'Change and the undertone of the anthracite market was weaker, owing to tonnage supplies being still below the demand and difficult to obtain, even at the high rates now ruling. Swansea Valley large for immediate delivery was being freely offered at less than current figures. Red Vein large was steady at last quotations. Machine-made nuts and cobbles were a shade easier, as was also rubbly culm, but duff prices were firmly upheld. In the steam coal market smalls were firm, but large was weaker. The following were approximately the closing quotations—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 17s. to 19s. 6d., less 2½ per cent.; Red Vein large, 13s. 6d. to 14s. 6d., less 2½ per cent.; machine-made cobbles, 22s. to 24s. net; Paris, French, and German nuts, 23s. 6d. to 26s. 6d.; beans, 21s. to 23s. 9d.; machine-made large peas, 13s. to 14s. 6d., all net; rubbly culm, 7s. 3d. to 8s. 9d., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 18s. to 19s.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 9d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 18s. 6d.; through-and-through, 15s. to 16s. 6d.; small, 12s. 6d. to 13s. 3d.; No. 2 Rhondda large, 14s. to 15s. 6d.; through-and-through, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 6d., all less 2½ per cent. Patent fuel, 17s. 6d. to 18s. 6d., less 2½ per cent. Coal quotations are all f.o.b. net cash in 30 days.

IRON.

The steel trade continues in a flourishing condition and every bar-rolling mill was working full periods. The tinplate industry for the moment was in a most flourishing condition. An improvement was seen in the sheet trade, six more mills being in operation. The shipments of tinplates last week were 130,221 boxes, and receipts from works 147,267 boxes, whilst stocks remaining in the warehouses and vans were 242,647 boxes.

Llanelly.

COAL.

If only sufficient tonnage could be got, the demand for all coals in this district would be exceptional. In every department except shipping, the coal trade is very busy, with prices higher than they have been for some time. The delay in boat arrivals is really getting very serious, and collieries are very much handicapped through want of empties. There will be a big scarcity of many classes of coal if only boats can be obtained. The demand from abroad has never been better, and the inland trade is all that can be desired. The local collieries are having considerable trouble with water. They are now feeling the effects of the heavy rainfall of the past month. It is feared that one or two will not be opened again, whilst others are shut down for the time being. For anthracite there is a very good enquiry, and all large kinds and machine-made nuts, beans, and peas are going well. There is quite a scarcity of steam and bituminous smalls, and prices are higher than they have been for some considerable time. This week's quotations are:—Best malting large, 23s. to 25s.; second malting large, 21s. to 23s.; Big Vein large, 17s. 6d. to 19s. 6d.; Red Vein large, 13s. 6d. to 14s. 6d.; machine-made large cobbles, 21s. to 23s.; German, French and Paris nuts, 23s. to 25s.; machine-made large beans, 22s. to 24s.; ditto, second quality, 20s. to 22s.; machine-made large peas, 14s. to 16s.; rubbly culm, 8s. to 8s. 6d.; duff, 5s. to 5s. 6d.; large steam, 13s. to 14s.; through-and-through, 10s. 9d. to 11s. 3d.; small steam, 8s. 6d. to 9s. 6d.; bituminous small, 10s. 6d. to 11s.—all f.o.b.

THE TIN-PLATE TRADE

Liverpool.

The tone of the market is exceedingly firm. Owing to the advance in both bars and tin, some good buying has taken place at increased prices. Works are all very full of orders for the rest of the year, and anything required within that time has to be well paid for. Quotations vary considerably just now, but the following may be taken as about the figures being generally quoted for delivery to suit the works.—Coke tins: I C 14 × 20 (112 sh 108 lb.), 15s. 6d. per box; I C 28 × 20 (112 sh. 216 lb.), 30s. 9d. to 31s. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 10½d. to 16s. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. 9d. to 15s. 10½d. per box; I C 14 × 19¼ (120 sh. 110 lb.), 15s. 9d. to 15s. 10½d. per box; I C 20 × 10 (225 sh. 156 lb.), 22s. 3d. to 22s. 6d. per box; I C squares and odd sizes, 15s. 9d. to 18s. basis for approved specifications. Charcoal tins are firm at 18s. 6d. basis and upwards according to tinning, and terne plates are held at 26s. 6d. for I C 28 × 20. Coke wasters are in good demand. Quotations are very firm as follows:—C W 14 × 20, 14s. 6d. per box; C W 28 × 20, 28s. 9d. to 29s. per box; C W 14 × 18¾, 14s. 6d. per box; C W 14 × 19¼, 14s. 9d. per box; C W 20 × 10, 20s. 6d. per box—all f.o.b. Wales, less 4 per cent.

The tender of the Bridgewater Collieries and Ellesmere Estates has been accepted by Stretford Urban District Council for an annual supply of screened steam coal at 13s. 6d. per ton.

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SUBSCRIPTIONS.

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(A Classified List appears on page 608.)

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WITH THE TEXT OF THE ACT,
AN
INTRODUCTION,
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PORTRAITS
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METROPOLITAN BOROUGH OF SOUTHWARK.
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The Council of the Metropolitan Borough of Southwark is prepared to receive TENDERS for the supply of 10,000 tons of COAL to be delivered on rail at the Council's Electric Light Station, Penrose street, Walworth, S.E., as ordered by the Engineer.
Tenders, duly signed, must be sent in under cover, endorsed "Tender for Coal Supply, Electric Light Station," and addressed to the Town Clerk, not later than noon on Wednesday, October 2nd, 1912.
Forms of tender may be obtained on application at the Town Clerk's office as under.
The Council does not bind itself to accept the lowest or any tender.
Town Hall,
Walworth-road, S.E.,
18th September, 1912.
By order.
PERCY H. GRAY,
Town Clerk.

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SUPPLY ALL KINDS OF COLLIERY TIMBER.
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⁂ *For other Miscellaneous Advertisements see Last White Page.*

Forthcoming Annual Meetings.

Manchester Geological and Mining Society	Oct. 8, 1912
North Staffordshire Institute of Mining and Mechanical Engineers ...	October 14, 1912
South Staffordshire and Warwickshire Institute of Mining Engineers ...	October 1912 (2nd week)
Iron and Steel Institute—Autumn Meeting ...	September 25 & 26, 1912
Association of Mining Electrical Engineers—	September 27 & 28, 1912 (Sheffield)
Institute of Metals ...	Sept. 25 & 26, 1912

The Colliery Guardian.

LONDON, FRIDAY, SEPTEMBER 20, 1912.

Members of the Association of Mining Electrical Engineers are holding their annual general meeting in Sheffield on Friday, September 27. The association now has 11 branches, and the membership is over 1,000. After the general meeting the annual dinner will be held. On the Saturday the delegates will visit Vickers' River Don Work in the morning, and the Dalton Main Company's Silverwood Colliery in the afternoon.

A general meeting of the South Wales Institute of Engineers was held at the Royal Institution of South Wales, Swansea, on Tuesday. Mr. A. O. Schenk, M.Inst.C.E., chief engineer to the Swansea Harbour Trust, read a paper on "The Construction of the Severn Tunnel," and Mr. David E. Roberts, M.Inst.C.E., papers on "Certain Features in the Design of the Molten Blast Furnace," and "A New and Successful Form of Mechanical Puddling Furnace."

The newest British battleships to be laid down by Christmas at Devonport and Portsmouth are, it is stated, to be designed to carry nothing but liquid fuel.

A Provisional Order is to be lodged at an early date by the North British Railway Company for powers to construct a new railway in the Lothians to meet the development of the coal traffic.

Application has been made for the payment of income-tax on the Miners' Federation bank interest for the last ten years. The claim is to be resisted.

At the instance of the executive committee of the Miners' Federation of Great Britain, information is being officially collected from all the affiliated districts regarding the various systems in operation for terminating the men's contract of service.

A meeting of the Scottish Coal Conciliation Board, on the 12th inst., in Glasgow, considered the masters' demand for a 12½ per cent. reduction in miners' wages. After discussion, the meeting was adjourned until a date to be fixed in the second week of October.

The special sub-committee appointed by the Miners' Federation executive to draft a measure for the nationalisation of mines met at the Westminster Palace Hotel on Tuesday, further to consider the measure. Mr. Robert Smillie, vice-president of the Federation, occupied the chair, and the details of the proposed Bill were considered. The committee will report to the Miners' Federation at its annual meeting at Swansea on October 1.

The Scottish Miners' Federation executive at Glasgow have decided to nominate Mr. Robert Smillie, their chairman, as president of the Miners' Federation of Great Britain, to fill the vacancy caused by the death of Mr. Enoch Edwards.

A meeting of the Board of Conciliation for the Coal Trade of Monmouthshire and South Wales was held at Cardiff on Monday, when the recent judgment of the Rhondda stipendiary as to the length of notice to terminate contracts which the owners or workmen should give, was discussed. The Board also considered various questions arising under Lord St. Aldwyn's award, and it was arranged that these questions should be submitted to his lordship.

An important meeting of the Coal Conciliation Board for the Federated Districts of England and North Wales was held at the Westminster Palace Hotel, on Tuesday, to consider further the application of the miners for a 5 per cent. advance in wages. It was decided to submit terms to the employers and workmen according to which the employers offered a minimum of 45 per cent. above the 1888 rates and a maximum of 65 per cent. and an advance of 5 per cent. in wages to all underground workmen, and those on the pit banks and screens manipulating coal (by putting on the reduction of 5 per cent. as from the first making-up day after the 20th March, 1909), such advance to commence as from the third making-up day in October, and that the Conciliation Board be continued as from the 1st January, 1913, to 1st January, 1916, and thereafter subject to three months' notice on either side. The conference was then adjourned to the 10th October, 1912.

THE HOUSING QUESTION.

LIKE the poor, the housing question "is always with us," and for reasons that it is unnecessary to labour, the colliery districts claim their fair share of attention. At the present time interest is concentrated largely upon two widely separated coalfields, in which the conditions, no less than the problems that await solution in them in the matter of housing and domestic hygiene, are entirely dissimilar. Reference is made to Scotland and South Yorkshire.

THE DONCASTER COALFIELD.

In this area the necessity arises from the invasion of districts hitherto devoted to agricultural pursuits, and, as is the case in most English agricultural districts to-day, but sparsely populated by the armies of workers employed in the getting of coal. The recent issue of the collective returns obtained from the last census, held in 1911, enables us to appreciate the extraordinary increase in population that has taken place in the neighbourhood of Doncaster as a consequence of the opening of large collieries such as Bentley, Hatfield, Askern, Brodsworth, Maltby, Hickleton, Dinnington, Dalton, Edlington, Bullcroft, &c. At the outset, it may be remarked that notwithstanding a gain of 278,137 persons in the intercensal period, the West Riding lost no less than 39,017 by migration, in striking contrast to the typical mining counties of Glamorgan and Monmouth, which gained 92,121 and 34,408 respectively by migration. It is not possible as yet to draw very accurate conclusions from the figures presented, but Vol. II. of the Census Returns, dealing with the population in the registration areas, enables us to gain some idea of the increase in certain parishes due to colliery enterprise. Thus the Doncaster registration district, which comprises 112,734 statute acres, contained 83,832 persons in 1901, and 121,512 in 1911, an increase of nearly 50 per cent. The large increase in the parishes shown in the following table is attributed to colliery development:—

Parish.	1901.	1911.
Balby-with-Hexthorpe	6,781	11,570
Edlington	158	580
Stainton	224	463
Adwick-upon-Dearne	373	753
Bolton-upon-Deurne	3,828	8,670
Conisborough	8,549	11,059
Denaby	2,670	5,060
Mexborough	10,430	14,401
Thurnscoe	2,360	4,074
Wheatley	3,580	5,363
Carr House and Elmfield	149	1,006
Adwick-le-Street	307	5,723
Askern	562	988
Bentley-with-Arksey	2,403	6,497
Owston	298	683
Skellow	143	760

The Doncaster registration district, however, does not coincide with the area familiarly known as the Doncaster coalfield, and there has been an increase, for instance, in the Rotherham district from 111,604 to 141,412. Some parishes in this and other districts in which colliery development has led to a large increase in population, are the following:—

Parish.	1901.	1911.
Ashton-cum-Aughton	3,158	4,204
Brimsworth	891	2,007
Dalton	438	3,248
Wath-upon-Dearne	4,847	7,331
Bramley (Maltby)	431	1,335
Maltby	716	1,700
Laughton-en-le-Morthen	631	1,859
Thrybergh	489	2,656
Thorne	3,818	5,290

All the above may be said to come within the nominal coalfield of Doncaster. Rather further south, in the Chesterfield and Mansfield districts, a similar growth of population has occurred. Thus, Bolsover parish now contains 11,214 souls, as against 6,844 at the previous census; Heath 2,132, as against 756; Beighton 4,748, against 3,371; Mansfield Woodhouse 11,015, against 4,877; Warsop 4,221, against 2,132; Shirebrook 11,116, against 6,641; Pinxton, 5,105, against 2,994. The Mansfield district, as a whole, has a population of 125,359, contrasted with 81,618 at the 1901 census.

THE DANGER OF INACTION.

The problem that awaits treatment in the Doncaster, as well as the Mansfield district, is almost entirely one of method. Housing is an elemental necessity and, in a virgin coalfield, the considerations that operate against the expenditure of capital for this purpose are not so great as in declining districts in which the lack of housing accommodation has been brought about by the gradual decay of the existing property, at a rate only slightly more rapid than the exhaustion of the minerals. But, in a district like Doncaster, the future of which no man can mistake, it would be almost criminal if the question were not attacked upon lines that shall provide ample room for developments on a concerted plan; and this observation will apply not only to housing, but to sanitation, water supply, transport, hospital accommodation, educational and religious facilities, and several other concomitants of the social life. The opportunity is one for town-planning schemes on a scale and of a design such as to stand as an example to posterity.

We fear, however, that the work done in regard to town planning, one of those ideals with which everyone is in sympathy—in principle—is not commensurate with the discussion that the subject receives, and there is an imminent danger that the opportunity that exists at Doncaster will be lost, notwithstanding the efforts of the Archbishop of YORK and other public-spirited men. It is of deep interest to read the reference to the subject made in his last report by the late Mr. W. H. PICKERING, who in his great sympathy for the working classes, held this question most nearly to his heart. Mr. PICKERING, in his report for 1910, said:—

> One important corollary of these continual developments is that provision must be made for a very large population in areas which were previously purely agricultural. So sudden an immigration of such a large number of people into a thinly populated district is without precedent in this country, and the question of housing is the most serious problem to be solved. The emergency is now acute, and already there is regrettable overcrowding. The future character and condition of the people is largely dependent upon the way in which the problem is attacked.
>
> Public attention has been directed to it whenever opportunity occurred, and I hope to be able to report next year that statesmanlike steps have been taken for the proper housing of the new mining population. It is possible to provide, on business lines, houses which are neither badly designed ornamental cottages with good environment, nor well-built barracks with squalid and depressing surroundings. For an ideal colliery village the essentials which should be observed are—(a) the rents should be moderate, (b) the houses should be arranged to suit the instincts of the best class of miners and their families, (c) the houses and environments should be bright and cheerful and private family life possible, (d) space for recreation grounds should be reserved in the villages, (e) gardens or allotments should be rented to the householders who may want them.

In his latest report, however, the late chief inspector for the district observes that "the questions have been discussed almost *ad nauseam*, but so far no practical steps have been taken by the public authorities to provide on a generous scale for the health, social needs, and convenience of the rapidly-growing population."

In the meantime, it is obvious to anyone who has seen something of these new communities that the delay is every day rendering the problem more difficult of solution. Houses of the wrong type are being erected to meet the pressing needs of the inhabitants, and, where arranged on any definite plan, the design has very little to commend it from either a utilitarian or an æsthetic standpoint. The same observation applies to the other communal necessities referred to. It is true that some of the colliery companies have made a praiseworthy attempt to grapple with the question. The Woodlands village at Brodsworth Colliery is an admirable example of what can be done to render the pit village of the future an exemplar rather than a by-word of reproach. The villages at Maltby, Askern, and Edlington also represent—or will represent when completed—a high standard of design; but these efforts only touch the fringe of the question. What is wanted is a concerted scheme whereby, it now being possible to appreciate the necessities of the future, the land shall be used to full advantage, and the cost of establishment and administration reduced to a minimum. We are assured that the people of Doncaster will reap one great benefit from such efforts—namely, that they will induce the best type of working man to settle in their midst.

SCHEMES AT PONTEFRACT.

It may be mentioned in passing, that a town not far distant from Doncaster, Pontefract, has embarked upon a scheme which, though small in itself, is worthy of notice. In the Pontefract district the mining of coal has made great strides within the last few years, but the trouble here has not been so much the lack of housing accommodation as the indifferent character of that already in existence, which has called down upon it the scathing denunciation of Dr. Kaye, the West Riding medical officer of health. Largely through the effort of Col. Shaw, a well-known coalowner, in his capacity as mayor of the borough, it has now been decided to adopt a housing scheme, the Corporation having obtained the consent of the Local Government Board to spend £19,000 on the erection of working-class dwellings. The neighbouring colliery township of Featherstone is also adopting a scheme of its own, and no doubt many of the workmen at the collieries there will be housed at Pontefract. A consideration of the conditions here and elsewhere leads us to believe that one of the first necessities is an extension of ratable areas and the centralisation of control; otherwise there will always be a disinclination on the part of an authority to expend money in housing workmen employed in a colliery that does not contribute to its rates. This point is not altogether met by section 55 (3) of the Housing, Town Planning, &c. Act of 1909, which enables authorities, under certain conditions, to acquire land lying in the area of another authority.

Restrictive By-laws.

A further impediment exists in the unnecessary rigidity of the present building by-laws. In many respects a "model" colliery village is far in advance of the requirements of the existing by-laws in force in the districts enclosing them; but these by-laws—where they have been evoked by congested conditions that do not arise in such villages—nevertheless, can only be applied to their disadvantage. This point has already received recognition in the differentiation between rural and urban districts, and section 44 of the Town Planning Act provides in some instances for the repeal or mitigation of the existing by-laws where calculated to impede the building of dwellings for the working classes.

In this connection it is of interest to note that a circular has recently been issued by the Local Government Board, as a consequence, probably, of the Government defeat in Committee on Sir A. Griffith-Boscawen's Housing of the Working Classes Bill. This circular points to greater elasticity in the methods and materials of construction employed in the erection of small dwelling houses, and invites rural authorities to abate their by-laws in these respects.

The colliery village is eminently a case in which pettifogging obstruction may be attended by fatal consequences, for it represents a highly speculative form of enterprise which at no time holds out great attractions either for the local authority, the private builder, the employer, or the workman who desires to own his own dwelling. The wherefore of this has been stated over and over again, and has been practically demonstrated times without number. The colliery village is, in a word, purely an appanage of the undertaking that is its *raison d'être* and coterminous with it; it has no other "irons in the fire," and the house-owner is compelled frequently to sustain the entire burden of damage due to subsidence.

A Scottish Royal Commission.

The problem in Scotland is more akin to that existing at Pontefract than to that found in the Doncaster area—at any rate, in the Lanarkshire and Ayrshire coalfields; in Fifeshire the conditions more nearly resemble those at the race town. In 1910 we published a liberal extract from a report to the Local Government Board for Scotland, by Dr. J. T. Wilson on the housing conditions in the Lanarkshire coalfield, upon which we commented at length at the time.* It may also be remembered that the members of the Royal Commission on Mines were induced to interest themselves in the matter, although somewhat outside their terms of reference. The question has since excited a considerable amount of attention, and the last annual report of the Local Government Board for Scotland refers at length to it.† Reports have been furnished by the medical officers of health for Lanarkshire, Fife, Stirling and Dumbarton, Ayrshire, Midlothian, Linlithgow, Haddington, Kinross, and Clackmannan. In pursuance of these reports the Board have consulted the authorities in various mining burghs with the view to the introduction of town-planning schemes, and the Board has wisely expressed its determination to vary the conditions where necessary to suit the special character of the circumstances.

Following upon this comes the announcement that a Royal Commission has been appointed to consider the entire question of housing in the Scottish coalfields. The report of this Commission will be awaited with interest, because the conditions encountered in some parts of Scotland are of an especially difficult character. Possibly of still greater interest, from the standpoint of the new coalfields, is the announcement that the Belgian Government has appointed a Royal Commission to examine the question in its bearing upon the new Campine coalfield.

---

* *Colliery Guardian*, December 9, 16, and 23, 1910.

† *See Colliery Guardian*, June 14, 1912.

Trade Summary.

The London coal trade continues brisk, but the latter portion of the week shows a marked falling off in the demand. Public prices advanced 1s. per ton on Saturday last and colliery quotations have advanced from 6d. to 1s. per ton on all household qualities, but the advent of milder weather immediately afterwards has considerably lessened the number of orders. The depot and delivery trade continues brisk and a fair number of back orders are now being dealt with. The seaborne market is firm, but freights are high and vessels scarce, so that very little extra tonnage is coming to the Thames. Hard steam coals are weakening somewhat, but small coals and slack continue very firm.

The market at Newcastle is still affected by the absence of tonnage, but prices for prompt shipment have improved somewhat. The forward position, generally, is good.

The Durham coal trade is fairly steady, notwithstanding the shortage of vessels. Prices for forward delivery are well sustained. The bunker market is strong, as is the demand for coke.

House coal prices are firm in Lancashire, although the demand is rather less insistent. Other classes of fuel are steady.

A good tide of business is running in West Yorkshire, and prices are firm all round. House coal is being largely sold to stock.

The South Yorkshire coal trade is strong in all departments, especially the export branch. Coke is in excellent demand.

There is an improved demand for Derbyshire house coal, and prices are firm. The call for manufacturing purposes is maintained at a high level.

More tonnage has come to hand at Cardiff, but stocks are still large, so that prices have not been markedly benefited. Small coal is harder in price. Monmouthshire coals are somewhat easier. Rhondda bituminous coals and patent fuel are unchanged.

The Scottish coal trade continues active, although shipments have been disappointing.

CONTINENTAL MINING NOTES.

Austria-Hungary.

During the first half of 1912 there were imported into Austria 5,655,023 tons of coal (as against 4,924,545 tons in the first six months of 1911), 18,624 tons of lignite (16,285 tons), 420,847 tons of coke (325,800 tons), and 46,808 tons of briquettes (25,242 tons). Imports of German coal rose from 4,501,006 tons to 5,327,388 tons; whilst those of British origin fell from 373,759 tons to 278,225 tons. During the six months there were exported from Austria 324,292 tons of coal (288,349 tons), 3,454,895 tons of lignite (3,560,977 tons), 163,764 tons of coke (131,689 tons), and 69,733 tons of briquettes (62,848 tons).

Belgium.

Several important changes are reported to be under consideration in the constitution of the Borinage companies.

The *Moniteur Belge* of Sept. 5 publishes the terms of a Decree appointing an enquiry to investigate the subject of internal navigation, and to recommend measures for improving the administration and operation of navigable waterways.

A Royal Decree has been issued determining the conditions attached to the transfer of the concession of the Espérance Company to the Charbonnages du Hainaut, of Hautrages. The company will now be known as the Charbonnage de l'Espérance et d'Hautrages, and the concession comprises an area of 4,960 hectares. There will be two winding shafts, and a battery of coke ovens is being laid down.

France.

The 5 per cent. advance in wages conceded in the Nord coalfield will be equivalent to an increase in the aggregate wage bill of over 10 million francs.

Exports and Imports of Coal.—During the first seven months of the present year there were imported into France 8,713,200 tons of coal (as against 9,382,600 tons in the corresponding period of last year), 1,550,900 tons of coke (1,398,700 tons) and 632,300 tons of briquettes (692,200 tons). Exports in the same period included 1,206,397 tons of coal (743,266 tons), 104,307 tons of coke (85,365 tons) and 121,192 tons of briquettes (71,631 tons).

Germany.

Coal Market in Upper Silesia.—The position keeps satisfactory, with no signs of change in the immediate future. In most grades the coal is sent off as quickly as it can be raised, the demand for export being very large, both to Austria-Hungary and Russia, whilst there seems every prospect of acquiring markets which have hitherto been dominated by English coal, which is now too dear to compete. The largest business is that in bituminous industrial coals, and coking coals also sell freely; whilst the colder weather has stimulated enquiry for house coal. Wholesale dealers are quoting the following prices:—Heinitz large coal 14·20 to 14·50 marks, cubes and nuts 12 to 14·20 marks; Recke large coal 14·20 to 14·50 marks, cubes 14·20 to 14·50 marks; Cleophas large 13·60 to 13·80 marks; Kaiser Wilhelm large 13·30 marks, cubes 13·30 to 13·40 marks, nuts 11·60 to 12·40 marks; Wildensteinsegen large 14·20 marks, nuts 14·40 to 14·60 marks.

Coal Market in South Germany.—The protracted cold spell has created a demand for house coal, anthracite and coke, large nuts being in special request and also selling well for industrial purposes since the approximation of the price to that of small nuts. Gas coke is feeling the same conditions, and lignite briquettes are not unaffected. Contracts for next year are not yet on the *tapis*, though those running for Saar coals expire in December. The situation is very firm in the Saar market, the pits being full of orders and short-handed. The Rhine being in good condition, supplies from the Ruhr can be carried as far as Strassburg, but the stockyards are getting overfilled, the current demand for industrial coals being slack.

Ruhr Coal Market.—Deliveries are being delayed to some extent by the shortage of railway wagons, and this will become more acute during the next few weeks. Fortunately, however, many consumers have discounted the inconvenience by laying in supplies well ahead. The iron industry is still the largest industrial buyer, and the trade with northern Germany is growing at the expense of English coal, though the latter is being offered at low prices. The same applies to the export trade to Holland, whilst in South Germany little English coal is on offer. Lean coals for domestic purposes are in better request, owing to the cooler weather, and the demand for gas coals is greater than last year. There is also an improvement in blast-furnace coke, coking coals and briquettes.

THE BY-PRODUCTS TRADE.

Tar products:—The market generally is quiet but steady as regards the majority of products. Pitch, perhaps, shows more signs of weakness than any other product, though prices seem to be more or less nominal. Benzols are firm. Naphthas keep very steady, while carbolics are unchanged. Closing values are:—

Benzols, 90's, 1s to 1s. 1d.; ditto 50's, 11d. to 11½d.; toluol, 1s.; carbolic acid, crude (60 per cent.), 2s. 6d. to 2s. 7d.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 1s. 1d, as in quality and package; crude ditto, 5½d. in bulk; creosote, 3d. for ordinary qualities; pitch, 50s. to 51s. f.o.b. east coast; ditto, 49s. 6d. to 50s. 6d. f.a.s. west coast; ditto 55s. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—The market is very firm, and prices continue to favour sellers. Although American export figures show a sharp decline still, latest advices record a hardening price after a period of stagnation. Home consumption is satisfactory, and the nominal advance of nitrate of soda is at least helpful to vendors. The forward position is very firm. Nearest prompt prices are:—

London (ordinary makes), £14; Beckton, £14 2s. 6d.; Liverpool, £14 15s.; Hull, £14 10s.; Scotch ports, £14 15s. to £14 16s. 3d.; nitrate of soda (ordinary), per cwt., 11s. 4½d

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

ASKERN MAIN COLLIERY.

At the Askern Main Colliery of the Askern Coal and Iron Company Limited, the Barnsley bed of coal was reached on Saturday last, a 9 ft. seam being topped at a depth of 565 yards in the No. 1 shaft. The colliery, which is one of the many new ventures in the Doncaster district, is about seven miles from that town just off the main road between Doncaster and York. The first sod was taken off on February 22, 1911, being the date on which the railway crossed the Campsall-road on to the site of the colliery not quite 19 months ago. The sinking has, therefore, been carried out in a remarkably rapid and expeditious manner, and constitutes, we believe, a record so far as the Yorks coalfield is concerned.

The No. 1 shaft, which is 21 ft. 6 in. diameter finished, was commenced on December 5, 1911. Very few difficulties were met with, when the experiences of other local collieries are taken into consideration. Seventy-six yards of tubbing had to be put into each shaft to dam out the 4,000 gallons of water per minute which were met with. The average rate of sinking, from start to finish, was 14 yards per week, including sinking through the water and tubbing out the same. As soon as the heavy ground had been passed through, however, which it was necessary to line with 18 in. of special brickwork, the rate of sinking was a good deal more rapid, and averaged 19⅝ yards per week, finished. The whole of the day work in the shafts was carried out in a most efficient manner under the supervision of Mr. Sam Howard.

The No. 2 shaft will not be down to coal till the end of the year, so that a fair start will not be made in getting coal out in any quantities until well into next year. The sinking has, so far, been accomplished without fatality or serious mishap of any kind. The whole of the permanent plant is finished with the exception of the screens, which are now in course of erection by Messrs. Plowright Brothers, of Chesterfield. The surface work at the colliery was carried out by Messrs. Charles Baker and Sons, of Chesterfield. While the colliery was being sunk the famous pool at Askern ran dry, but as soon as the tubbing process was completed the waters returned to the lake. The colliery has, of course, completely altered the aspect of Askern, a one time favourite little spa, with numerous visitors all the year round, and with saline waters and baths of remarkable curative properties. The new colliery will be served by the Lancashire and Yorkshire Railway, the North-Eastern, the Great Central, and the Great Northern companies, which will give it unrivalled facilities for developing a seaborne trade, and place it in close communication with Immingham, Grimsby, Hull, Goole, &c. The machinery and appliances which have been installed are of the most up-to-date pattern, the plant being designed so as to be capable of dealing with a daily output of up to 4,000 tons. A large reservoir has been constructed, and it is said to be quite possible that from this a public water supply for Askern may be arranged. The company have secured a coalfield of 15,000 acres. Several small workable seams of coal were found before the Barnsley bed was reached, including the Shafton seam 4 ft. 6 in. thick. It is rumoured that sinking operations will now be continued for another 100 yards below the Barnsley bed to the Haigh Moor seam. The Askern Coal and Iron Company, which was registered with a capital of £400,000, is a combination of the Bestwood Coal and Iron Company and the Blaina (Monmouth) Company, and nearly half a million of capital was raised without appealing to the public. Mineral rights and other benefits were acquired on the Campsmount and Campsall estate. When the pit is in full working order employment will be found for some 2,000 to 4,000 men and boys. The colliery company are erecting the model village for their men in Sutton-road, on the site where the hill was removed. The present council school is being enlarged, and arrangements are being made to build three more schools. A large number of houses in the model village are to be finished this year, about 200 will be erected between Askern and Norton, in the latter parish. A mission church is projected at the Sutton end, and the parish church is in course of time to be enlarged.

THE LONDON COAL TRADE

Thursday, September 19.

The London coal trade for the past week has fully maintained its position, and the volume of trade has been unusually heavy, but towards the close of the week a marked falling off in the orders was clearly noticeable. The demand was more for orders on hand unexecuted than for the placing of any fresh orders. During the earlier part of the week the market was exceedingly buoyant, and a large number of orders were given—attributable in a great degree to the prevalence of the colder weather, and the sudden inrush of orders from the general public, making the depots exceedingly busy and the delivery trade brisk. The merchants also have always at this season of the year to deal with a large number of orders lodged during the period of the lowest summer prices, but whose delivery has been delayed until after the summer holiday, or until the return of the various householders from their annual vacation. In the case of contracts with a fixed summer and winter price, this delayed delivery does not materially affect the local merchant, but in the case of sliding scale contracts, subject to the variations of the advertised public prices, this has meant a somewhat serious loss to the merchant, as the early rise in both the wholesale market and the public prices has caught many of the merchants and dealers unawares, for whilst compelled to deliver at the summer prices they are perforce obliged to pay the advanced current rates for the coal in question. The remarkable feature in connection with the present summer trade has been the keen desire, and almost feverish haste at times, with both manufacturers and householders to lay in a plentiful supply of all kinds of fuel before the winter demand commences. The advent of the warmer weather towards the close of the week has checked the retail trade to a very large extent, but still a fair amount of business was done. The seaborne market also is firm, and prices in the pool have risen 6d. during the week, making the official quotations 21s. 6d. for best Wallsend and 20s. 6d. for seconds. No Yorkshire coal has come forward into the river, other than that already sold, so that prices remain nominal. A small amount of business, however, is reported for forward delivery at firm prices. Public prices advanced 1s. per ton on all kinds from Saturday last, making best Wallsend 29s., best Silkstone 28s., Derby brights 27s., kitchen coal 27s., and stove coal 23s., but ever since the establishment of these prices and the subsequent advance in colliery prices, the market has been decidedly easier, and the orders more restricted. Steam coals also are quiet, but all qualities of small coal and slack continue in good demand. The expansion in the shipping trade has made it very difficult to obtain boats for the necessary conveyance of coal waiting at the docks for shipment and Welsh coal consignments are suffering largely in this respect. The South Yorkshire qualities have been exceedingly scarce during the week and the weekly tonnage has been seriously affected by the stoppage of so many of the collieries during the recent Doncaster races. All prices, however, are firmly maintained, notwithstanding the unusually high prices quoted. The scarcity of tonnage also continues somewhat acute in the Northumberland and Durham qualities (so far as the metropolitan market is concerned) and the high freights now quoted for foreign ports are bringing forward larger tonnage and enquiries for homeward-bound vessels from the Continent. The iron and steel trade in all directions continues good. A somewhat alarming fire took place on Saturday last at the electric light station of the borough of Hampstead. Over 100 tons of coal spontaneously ignited, and some hours elapsed before it was finally subdued. The autumn manœuvres do not usually affect the London coal trade, but this year merchants are complaining bitterly of the delay to the traffic, especially at the Great Eastern and Great Northern railway stations. A circular has been addressed to the trade acquainting them with the fact that the coal traffic is likely to be seriously delayed during the whole of the week on account of the demands for the rapid transport of the 60,000 troops engaged in the operations. The comedy at Unity House, Euston-road, N.W., the headquarters of the Railway Servants' Union, is still proceeding, and the pickets are busy surrounding the offices. Trades unionists picketing a trades union is unquestionably a novel experience, and the headquarters of the Amalgamated Society of Railway Servants is still being watched.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, September 13.—Seaborne house coal was in good demand to-day, but no sales made of Durham at prices offered. Cargoes 14.

Monday, September 16.—Seaborne house coal was in good demand to-day, and one cargo of Durham was sold at an advance on last prices, the top quotation now being 21s. 6d. No Yorkshire on offer. Best Durham 21s. 6d., seconds 20s. 6d. Cargoes 42.

Wednesday, September 18.—There was no alteration in the seaborne house coal market to-day, no Durham or Yorkshire cargoes on offer. Best Durham 21s. 6d., seconds 20s. 6d. Cargoes 11.

THE SCOTCH COAL AND IRON TRADES.

Thursday, September 19.

Glasgow and Lanarkshire.

COAL.

The coal trade has been active since last report, but the shipments have been somewhat disappointing in amount. Clearances at the Scotch ports aggregated 322,594 tons, compared with 346,471 in the preceding week, and 352,800 in the corresponding week of 1911. The decrease has occurred chiefly at Firth of Forth ports. On the west coast there has been a slight improvement, while the shipments at Fife ports are only about 1,000 tons less than in the preceding week. At Glasgow the foreign shipments show an increase of about 15,000 tons, but the quantity despatched coastwise fell off to the extent of 9,000 tons. The total clearances at Glasgow were 74,910 tons (of which 45,192 went abroad and 29,718 coastwise), compared with 68,752 in the preceding week and 84,574 in the corresponding week of last year. Good supplies of coal are readily available, but the export business is handicapped by high freights and scarcity of tonnage. It is feared that these may ultimately tend to curtail our export business. It is reported that out of 120,000 tons of coal required for shipment for the use of the Danish State Railways, between October and March, 60,000 tons, or one-half, has been placed with Scotch shippers, while the remainder has been ordered from Westphalia. The enquiry for long-distance cargoes appears to be about normal, and business is being done with the Mediterranean and South America on a moderate scale. The falling off in the coastwise shipments in the Glasgow district need not occasion much surprise, seeing that in the preceding week these were remarkably good. Demand for steam coal is well maintained, but there is no such pressure as would have the effect of further strengthening prices. The better qualities of ell coal are in good demand for shipment. There are excellent outlets for splint coal, which is in strong demand both for home use and shipment. Prices of shipping coal have not attained the full figures expected at the beginning of the month. The f.o.b. quotations at Glasgow are for steam coal 11s. 6d. to 12s., ell 12s. to 12s. 6d., splint 13s. 6d. to 14s., washed treble nuts 13s. 6d. to 14s., doubles 13s. to 13s. 6d., and singles 12s. to 12s. 6d. per ton. All kinds of small hard coal and dross are in active demand at full prices. The demand for house coal for home use is increasing, and prices are steady.

IRON.

The Glasgow pig iron market has been active since last report, and despite occasional fluctuations, the prices have shown a further very decided increase. Brokers report that the outside public is now taking increasing interest in the business, and there is a general impression that prices may go still higher. Cleveland warrants have sold from 65s. 8½d. to 67s. 10½d. cash, 66s. 3d. to 68s. 8d. one month, and 66s. 7½d. to 68s. 8d. three months. Transactions have also been noted in Cleveland warrants at 66s. 9d. for delivery in 26 days, 66s. 8d. November 30, and 67s. 2½d. 11 days. A quantity of Cumberland hematite warrants brought 81s. 1½d. cash, being 7½d. above the best price of last week. Scotch hematite has been raised from 81s. to 82s. 6d. per ton for West of Scotland delivery, but the demand is only moderate owing to the large supplies and comparative cheapness of scrap steel. The market for Scotch pig iron has been firm, and prices are again higher. Govan and Monkland are quoted f.a.s. at Glasgow Nos. 1, 72s. 6d., Nos. 3, 71s.; Carnbroe, No. 1, 77s., No. 3, 73s.; Calder, No. 1, 78s. 6d., No. 3, 73s. 6d.; Clyde, No. 1, 79s., No. 3, 74s.; Gartsherrie and Summerlee, Nos. 1, 80s., Nos. 3, 75s.; Langloan, No. 1, 80s. 6d., No. 3, 75s. 6d.; Coltness, No. 1, 90s., No. 3, 78s.; Eglinton at Ardrossan or Troon, No. 1, 72s., No. 3, 71s.; Glengarnock at Ardrossan, No. 1, 81s., No. 3, 76s.; Dalmellington at Ayr, No. 1, 74s., No. 3, 72s.; Shotts, at Leith, No. 1, 79s., No. 3, 74s.; Carron at Grangemouth, No. 1, 80s., No. 3, 75s. per ton. The shipments of pig iron from Scotch ports in the past week amounted to 4,647 tons (of which 2,616 went abroad, and 2,031 coastwise) compared with 6,863 in the corresponding week of last year, showing a reduction of 2,216 tons. The arrivals at Grangemouth of pig iron from Middlesbrough and district were 7,375 tons, being 3,350 tons less than in the preceding week. Business in finished iron and steel has been quiet, but the orders in hand will keep the works in full operation for a considerable time.

Renfrew, Ayr and Dumbarton.

COAL.

The coal trade has shown a healthy activity in this district. Shipments are well maintained and home business is on an extensive scale. The past week's shipments were at Bowling 189 tons, Greenock 558, Ardrossan 2,915, Troon 6,527, Irvine 1,123, Ayr 20,173—total 31,504 tons, compared with 31,939 in the preceding week and 34,808 in the corresponding week of 1911. Of the total shipments 4,249 tons only went abroad and 27,246 coastwise. A fair business is being done with Irish ports. The inland trade has been strong, the consumption in iron and steel works being very large, while the demand for household consumption is expanding. Prices are generally without material alteration.

Stirling, the Lothians and Fife.

COAL.

The coal shipments at Firth of Forth ports in the past week show a decrease of nearly 30,000 tons compared with those of the preceding week, 20,000 tons of which occurred at Grangemouth and 8,000 at Leith. The foreign shipments amounted to 80,769 and the coastwise to 21,192 tons. From Granton 9,425 tons were despatched, Bo'ness 18,618, Grangemouth 31,284, and Leith 42,634—total 101,961 tons, against 130,329 in the preceding week and 118,710 in the corresponding week of last year. Prices have scarcely been so firm. Best screened steam coal is quoted f.o.b. at Leith 12s. 6d. to 13s., secondary qualities 11s. 6d. to 12s., treble nuts 14s. to 14s. 6d., doubles 13s. 6d. to 14s., and singles 12s. to 12s. 6d. per ton. Business has been quite active at Fife ports. At Methil 58,917 tons were cleared, Burntisland 48,550, Alloa 2,498, Dysart 1,949, Wemyss 1,463, Tayport 430, Charlestown 421—total 114,228 tons, against 115,461 in the preceding week, and 114,708 in the corresponding week of last year. First-class screened navigation coal is quoted at Methil and Burntisland 16s. 3d. to 16s. 6d., unscreened 13s. to 13s. 6d., first class steam coal 13s. 6d., secondary qualities 11s. 6d. to 12s., treble nuts 14s. to 14s. 6d., doubles 13s. 6d. to 14s., and singles 12s. to 12s. 6d. per ton. The demand for nuts is very strong. House coal is more wanted.

THE IRISH COAL TRADE

Thursday, September 19.

Dublin.

The local trade continues to be fairly active in most classes of coal, and it is not expected that any advance in prices of house qualities will be made before October. The advent of fine weather has caused a little falling off in business amongst retailers, but large consumers are steadily laying in supplies for winter requirements, while prices are at the lowest. The consumption of gas coal is gradually increasing, and supplies of coke are fairly plentiful, with prices unchanged. Quotations for coals in the city are as follow: Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; "ball" coal, 1s. 5d. per sack; steam coals, from 20s. per ton upwards; coke, 23s. per ton. The import trade shows uninterrupted activity, and the freight market keeps very firm. The total quantity of coal landed during the week was 28,291 tons, the coaling vessels arriving totalling 60 as compared with 47 the week previously, chiefly from Liverpool, Workington, Troon, West Bank, Fleetwood, Manchester, Irvine, Ardrossan, Partington, Llanelly, Garston, Newport, Newcastle, Maryport, Point of Aire, Whitehaven, Preston, Ayr, Glasgow and Girvan.

Belfast.

The recent advance in prices has not caused any falling off in demand, all branches of the trade being active with an increasing enquiry for house fuel. There is no further change in prices either of household or steam qualities during the past week. Quotations in the city are:—Giant's Hall Arley coal, 26s. 6d. per ton; Hartley, 25s. 6d.; Wigan, 24s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 22s. 6d.; Orrell slack, 22s. 6d. Quotations ex quay:—Arley house coal, 22s. 8d. per ton; Scotch house, 19s. 6d.; Scotch steam coal, 16s. to 17s. per ton; Navigation steam, 16s. to 17s.; Welsh steam coal, 16s. 6d. to 17s. 6d. per ton. Freights continue to show an upward tendency. Supplies in this port are only moderate, cargoes arriving during the past week being chiefly from Manchester, Liverpool, Ayr, Maryport, Troon, Garston, Sharpness, Lydney, Widnes, Maryport, Ellesmere Port, Glasgow, Girvan, Whitehaven, Newport, Point of Aire, Partington and Workington.

LABOUR AND WAGES.

North of England.

The Wages Board of the Northumberland Miners' Association have issued a report upon the meeting with the coalowners on August 24, when wages were advanced 2½ per cent. At the preliminary meeting of the Board it was decided, according to the report, to ask for an advance of 15 per cent. The coalowners, at the subsequent joint meeting, said they could hardly believe that the men's representatives were in earnest in asking such a large advance. The figures submitted were far beyond the actual prices. The owners themselves had not any absolutely trustworthy information. No ascertainment had been taken for the quarter ended in May. The strike and the abnormal conditions prevailing before and after the strike would have made such ascertainment quite useless. Deductions for contracts, &c., must, therefore, be more or less guesswork. As they (the coalowners) had often pointed out, only a small portion of the total produce was sold in the open market and recorded in the papers. The old contracts were taken at much lower prices than the current rates. Another point of great importance which they wished the men's representatives to bear in mind was that during the strike they could not fulfil their contracts. These fell greatly into arrears, and they had to make up these arrears when the pits started work. Consequently, only a comparatively small portion of the total produce reached the open market. Thus the price of the total produce, as compared with the newspaper quotations, was greatly reduced. It was worthy of note, that in Durham the last ascertainment showed a slight fall in price, though, as a rule, the price in that county was higher than in Northumberland. Reference was again made to the increased cost thrown upon the coal trade by recent legislation. Had the Conciliation Board been in operation this would have been brought before the chairman by the coalowners as a matter deserving of consideration. After an interval to enable the coalowners to consider the application they offered to advance wages to the extent of 2½ per cent. The men expressed dissatisfaction with the amount, but under protest accepted the offer. With reference to their protest they said that, in their opinion, the men were fairly treated. The decision was, therefore, that with pays commencing August 26 and September 2, the wages of underground workmen and "banksmen" be advanced by 2½ per cent. (surface workers in the usual proportion), making the wages of underground workmen and "banksmen" 35 per cent. above the basis of 1879, and other classes of surface labour 28 per cent. above the basis of 1879.

The Wages Board of the Northumberland Miners' Association will meet the local coalowners in Newcastle to-morrow (Saturday), with reference to an effort that is being made to resuscitate the Conciliation Board which went out of existence about a year ago. The lodges voted on the continuance or otherwise of the Board some time ago, and decided against the Board unless certain amendments were made in its rules. These suggested amendments were not settled before the Board passed out of existence, at the expiration of six months' notice.

The Joint District Board of masters and men in the Northumberland coal trade will also meet in Newcastle on Saturday to discuss matters arising out of awards given by district chairmen. In some cases the owners have lodged objections, and on the other hand in some instances the workmen have questioned the legality of decisions given.

Trouble of a serious character is again menacing the Northumberland coalfield as the result of an unfortunate dispute at the Ashington group of collieries. The particular cause of the trouble is in the matter of arranging the hours during which the colliery shall be permitted to draw coals. At present, by an arrangement between the manager and the men, the colliery is drawing coal from 3.30 a.m. to 5 p.m., a period of 13½ hours, two shifts of coal hewers working seven and a-half hours each "from bank to bank." The hewers thus cover a period of 15 hours' coal-getting, an overlap of one and a-half hours over the time for getting the coals to bank. The boys go to work later than the men, and the overlap in their case is correspondingly increased, and the management feel it to be a very great disadvantage. This arrangement, it should be stated, was entered into for the purpose of avoiding the necessity of adopting the three-shift system. Under the Eight Hours Act the manager has power, under certain limitations, to arrange the hours during which coal shall be drawn to the surface, and the hours at present worked were arranged as the result of a temporary agreement between the manager, Mr. F. L. Booth, and the men's leaders. This arrangement expires with the present week, when the quarterly cavils are due to be drawn. Some months ago Mr. Booth proposed that the fore shift should commence work at 2.0 a.m. instead of 3.30, with a view to wiping out the troublesome overlapping, the gain in coal drawing proposed thus being 1½ hours per day, as the pit would be "hung on" 1½ hours earlier, and would cease work at the same time as at present.

It has been necessary, however, to consult not only the collieries at Ashington, but also the other collieries worked by the Ashington Coal Company; and at Woodhorn the men declined to entertain the idea of any change. A meeting of the committee of the federated lodges of the four collieries concerned overruled the proposals of the Ashington lodge to accept the manager's proposals, a decision which was confirmed by the voting at the miners' mass meeting held on Sunday last.

The colliery most closely concerned, Ashington, employs as many workmen as all the other collieries combined, but in this case possessed only 25 per cent. of the voting power to decide the question. The manager has now given notice to the men that he proposes to put the suggested changes into operation with the commencement of the new quarter on Monday next, and meantime the decision of the four lodges not to accept the proposals remains unaltered. One of the most prominent officials of the Northumberland Miners' Association, seen by our correspondent, declared it as his opinion that the position at Ashington is a great deal more serious than that at Seghill, where the men have entered upon the third week of a local strike. He was almost certain that the Ashington difficulty would lead to a county struggle of considerable magnitude.

Federated Area.

A conference of the employers' and workmen's representatives on the Conciliation Board for the Federated Districts of England and North Wales was held at the Westminster Palace Hotel, on Tuesday, to consider the application of the miners for an advance of 5 per cent. in wages. Mr. F. J. Jones (Yorkshire), the new president, was in the chair, and Mr. W. E. Harvey, M.P., was vice-chairman. At the close of the meeting Sir Thomas Ratcliffe-Ellis announced that it had been decided to submit the following proposals to the employers and workmen in the Federated Area:—

> Subject to the approval of both the employers and the workmen, the following terms are suggested as a settlement:—
>
> 1. In the event of the employers offering a minimum of 45 per cent. above the 1888 rate and a maximum of 65 per cent., and an advance of 5 per cent. in wages to all underground workmen and those on the pit banks and screens manipulating the coal by putting on the reduction of 5 per cent. made as from the first making-up day after March 20, 1909, such advance to commence as from the third making-up day in October, the Conciliation Board be continued from January 1, 1913, to January 1, 1916, and thereafter subject to three months' notice on either side.
>
> 2. These proposals are made without prejudice, in the event of their not being accepted, to the rights of the parties to submit the matters under dispute to the chairman of the Board for his decision.
>
> 3. This conference is adjourned to October 10, 1912, and in the meantime the decision of the employers and workmen in the several districts is to be obtained.

Sir Thomas Ratcliffe-Ellis said the first clause meant that the 5 per cent. which was taken off in 1909 from the men's wages would, in the event of the suggestions being approved, be put back again.

At branch meetings of miners held during the present week in South-east Lancashire, adverse comments have been passed on the decision of the Miners' Federation to impose a special levy of 3d. per week to meet expenses incurred in connection with the Minimum Wage Act. Many of the men have openly expressed their determination not to pay the levy, but will leave the union first.

It is stated that the application of the recent agreement in South Yorkshire between the coalowners and the Surfacemen's Federation is proceeding very satisfactorily at all the collieries connected with the Coalowners' Association, but difficulties are being experienced at collieries outside the scope of that organisation. The men at the Wharncliffe Woodmoor Colliery and the Silkstone Colliery at Church-lane complain that the three-quarter shift system is still in existence, and that the management have refused to pay wages in accordance with the newly-fixed minimum. A satisfactory arrangement has been come to at Maltby Main in accordance with terms agreed upon in an interview between the management and Mr. C. H. Blackburn, the Sheffield district secretary of the National Union of Gasworkers. The surfacemen, who had previously been receiving less than the minimum, have now been paid their arrears, amounting in some cases to over £3.

The claim made by the Surveyor of Taxes upon the Miners' Federation of Great Britain for the payment of income-tax on bank interest, which has aroused widespread attention in the trade union world, has already been tentatively considered by a legal gentleman for the Federation. Bank interest, he points out, is undoubtedly an annual profit within the meaning of the Act. Therefore the Federation is liable to make a return for income-tax purposes, and also to pay income-tax on untaxed profits because the only societies exempted are charities, friendly societies, savings banks, industrial and provident societies, duly registered, and trade unions in respect of their provident funds, where they are registered under the Trade Union Acts.

The executive sub-committee of the Miners' Federation of Great Britain has now completed the final draft of its Bill for the nationalisation of mines, and this will be submitted to the annual conference at Swansea next month to serve as the basis of the coming National campaign in support of State-owned mines. The Bill proposes that from a date to be decided hereafter the mines of the country shall become State-owned and be worked under the direction of a Mines Board. All existing shareholders will be credited with the number of shares standing in their names, and the only difference will be that interest on their holdings will be paid by the State instead of by private concerns. Where shareholders are unwilling to take Government stock they will be bought out by the State at the current prices of the holdings. In connection with the present scheme it is estimated that the present valuation of the mines is about £120,000,000 sterling. Arrangements are in progress for a series of meetings in the mining districts with a view to popularising the new campaign.

Forest of Dean.

Speaking at a meeting of colliers at Drybrook on Saturday evening, Mr. G. H. Rowlinson (Dean Forest miners' agent) said they had been trying from the commencement of the month to see whether it was at all possible to get a rise in wages. He was in a position to tell them that it had been decided that day, at a joint meeting of owners and workmen, that the men would start working on Monday morning on a 5 per cent. rise, the coal price going up, of course, 1s. per ton. Referring to the question of a rescue station for Dean Forest, Mr. Rowlinson said the masters were applying that Dean Forest should be exempt, giving a guarantee to have men trained elsewhere, and to keep apparatus in the collieries for use. A resolution was adopted agreeing to this view. Another resolution was passed to give notice of intention to apply to the colliery owners to close the mines at one o'clock on Saturdays.

Scotland.

The executive of the Scottish Miners' Federation met on Monday in the Christian Institute, Glasgow. Mr. Robert Smillie presided. It was arranged to hold a special meeting next week in order to discuss matters on the agenda for the annual conference of the Miners' Federation of Great Britain, which will take place in the first week of October in Swansea. It was resolved to nominate Mr. Robert Smillie for the position of president of the Federation.

The miners employed in the Parkhead Colliery, Bellshill, to the number of 400, were idle on the 13th inst. It was reported that a section of the men were being paid at a rate below the minimum wage, whilst a number were also working more than eight hours a day.

A meeting of the Scottish Coal Trade Conciliation Board was held on the 12th inst. in the North British Station Hotel, Glasgow, for the purpose of considering the request of the colliery owners for a reduction in the wages of the miners in the Scottish coalfields. The matter was first brought before the Board at a recent meeting by the owners' representatives, who asked that a reduction in the miners' wages should be made to the extent of 12½ per cent. At the meeting, which occupied about an hour and a-half, Mr. Adam Nimmo advanced the owners' views, and Mr. Robert Smillie replied on behalf of the miners' representatives. A discussion followed, and the meeting was adjourned until a date to be fixed in the second week of October.

The question of non-union labour has again upset the friendly relations hitherto existing between the Summerlee Company and the Lanarkshire Miners' Union, with the result that on Tuesday the miners employed in the Hattonrigg Colliery, Bellshill, to the number of 650, struck work. Another grievance is that the company have failed to carry out the terms of Sheriff Mackenzie's award under the Minimum Wage Act in regard to certain oncost workers employed at this colliery. The dispute may extend to the other collieries of the company throughout Lanarkshire, and over 5,000 miners may be affected.

— PROGRESS. —

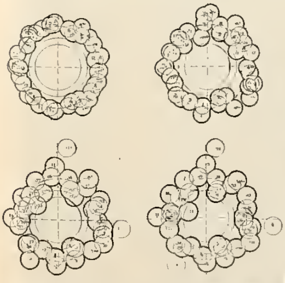
The Freezing Process in the Campine Coalfield.

One of the most interesting features of the development of the Campine coalfield in the Limburg province of Belgium is the extensive use of the freezing process of shaft sinking. Some interesting notes on the subject are given in a recent volume of the *Annales des Travaux Publics de Belgique*. In this coalfield it has been proved in the trial bores that the thickness of cover varies from 1,530 to 1,985 feet. The thickness of the tertiary sandstones, which contain large quantities of water, ranges from 720 ft. on the east (Limbourg-Meuse) to 1,246 ft. on the west (Beeringen). In the secondary measures, the upper part of the cretaceous is much altered, and the chalks with flints have given off strong springs. The Hervian is compact, but contains, immediately above the coal, a layer of sandstones, from which, however, no trouble is expected. At the outset it was proposed to employ the cementation process largely in sinking through the secondary measures, and to limit the employment of the freezing system to the tertiary. But preliminary trials have demonstrated that the Maestricht sandstones do not absorb cement. As a consequence, the Ressaix Company will apply the freezing process right down to the Hervian and the Limbourg-Meuse Company throughout the whole depth of cover. The following table, which gives some interesting facts relating to the work now being done in the Campine basin, is taken from an article by M. Breyre, published in *Technique Moderne*:

Name of concession.	Extent.	Site of first shaft.	Overlying measures.					Depth of frozen section.	Depth to coal.
			Quaternary and tertiary.	Maestricht sandstones.	Chalks with flints.	Hervian			
						Clay.	Sand.		
	Acres.		Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft
André Dumont	5,850	Waterscheid ...	954	170	205	321	4	1,246	1,657
Liégeois	8,300	Zwartberg	1,154	85	250	280	59	1,181*	1,830
Helchteren..............	6,450	Voort	1,154	57	250	364	80	—†	1,974
Zolder.....................	7,600								
Genck-Sutendall	7,450	Winterslag ...	895	98	321	266	—	1,404	1,596
Beeringen-Courcel ...	9,850	Beeringen	1,246	110	418	166	45	1,591	1,988
Ste.-Barbe	4,260	Eysden	726	191	328	272	13	1,542	1,532
Guillaume-Lambert...	5,450								

* Has not been clearly defined. † Stockfisch process.

It was originally feared that the freezing process would be inapplicable to great depths, owing to the effect of the superincumbent pressure upon the ice. This has proved to be ill-founded, as sinkings carried to over 1,300 ft. in depth have revealed no evidence of the influence of such pressure. There is, however, one delicate point connected with such work. It is possible to determine with fair precision the minimum radius of action of each freezing tube—namely, about 3¼ ft. In order that the wall of ice may be continuous on a horizontal section—an essential condition—it suffices that the spacing between the vertical tubes should be less than 6½ ft., in which case the cylinders of frozen ground will overlap. This regular spacing of the boreholes, whilst easy to accomplish near the surface, becomes more difficult to maintain as greater depths are reached, owing to deviations. The remedy is to make a supplementary borehole overlapping those between which a gap exists in the wall. For this purpose it is necessary to use clinometers or similar instruments. The accompanying illustration shows horizontal sections taken in the

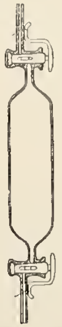


Beeringen shaft. The frozen shaft wall is indicated by the thick line, and it will be noted that, notwithstanding the addition of seven supplementary boreholes, the continuity of this wall is not absolutely assured at all points.

Incidentally it may be observed that 37 tubes have been required at Beeringen, and, as already mentioned, a depth of 1,590 feet has been attained, making a total of over 11 miles of tubing. From this fact alone the cost of bringing a single enterprise to completion may be readily understood.

Gas Sampling and Analysis.

Having in view the difficulty of taking adequate samples of gases without these having to be exposed twice to the solvent action of water, Herr Arthur Wilhelmi, chemist to the Upper Silesian Mining Research Station, Beuthen, has devised a vacuum pipette (shown in figure below). With this a sample can readily be taken; and further, a determinate quantity of gas can be drawn through an absorbent medium. The pipette has two stopcocks, bored obliquely, and these are closed in at one end. The hand-pieces stand parallel to the axis of the pipette when the pipette is closed, and have a wire connected with them, to be tied down to the neck during transport. The pipette is exhausted by a mercury pump (5 minutes), and is then closed and carried to the source of the gas to be analysed. The vacuum is found to remain the same for over 14 days. The gas is admitted to the pipette by opening the stop-cock. In the laboratory, the pipette is opened under mercury. Herr Wilhelmi has also devised a set of apparatus for use along with this pipette, by way of absorption and explosion. He notes that pyrogallol solution comes to liberate carbonic oxide, which tends to vitiate the results, and that an alkaline hydrosulphite solution is better; that absorption of heavy hydrocarbons by anhydrous sulphuric acid dissolved in sulphuric acid is open to the objection that moisture in the gas may confuse the results, and that it is not yet clear whether absorbent oils will work well, but that sulphuric acid works well if the gas be carefully dried; that palladium chloride does not give clear results for percentages of carbonic oxide below $\frac{1}{100}$ per cent., since small quantities of CO_2 are also absorbed; that ammoniacal solution of cuprous chloride sometimes gives erroneous results, and tends to make the residue non-explosive with oxygen, and that a high specific gravity solution of cuprous chloride with sodium chloride, preserved under paraffin oil (Winkler), has some advantages; but for appreciable percentages of carbonic oxide, direct explosion is better than absorption.



Phosphorus in Coking Coal.

A short note on the above subject was recently contributed by Mr. Charles Catlett, Staunton, to the American Institute of Mining Engineers. He says:—While the occurrence of phosphorus in coking coal has assumed less importance with the development of the open-hearth method of steelmaking, it may not be without interest to note the form in which phosphorus exists in one particular coalseam. In the examination of what is known as the Big seam, which outcrops a few miles west of Columbiana, Ala., my attention was called to the distribution through the coal, in the form of minute veins and particles, of a resinous-looking substance. A small amount of this was selected, and was provisionally identified as evansite ($Al_4P_2O_{11}$. 18 Aq). Subsequently, through the courtesy of Dr. Marshall Grasty, of the Geological Department of the University of Virginia, I was able to secure an additional amount of material which was purified down to about 0·3 grammes. This was examined by Prof. John J. Porter, of the University of Cincinnati, and gave the following partial analysis:

	Per cent.
Loss on ignition	37·43
Phosphoric anhydride.........	10·33
Alumina.....	30·33

There was also a trace of silica, and quite a considerable quantity of lime and magnesia. Prof. Porter was led to think that the material was not pure, but a mixture of several of the phosphates of aluminum carrying lime and magnesia. The material available did not permit of the convenient determination of the other ingredients. One form in which phosphorus occurs in coal is evidently as a hydrated phosphate of aluminum; and any coal which shows to the eye the occurrence of a light-coloured resinous-looking material should be looked on with suspicion as being high in phosphorus.

CONNELLSVILLE COKE.

A recent Census Office bulletin says the manufacture of coke in the United States was begun in 1841 near Connellsville, Pa. For many years the industry was confined almost entirely to the western part of Pennsylvania, because coal suited to its manufacture was abundant there and because the iron mills of the Pittsburg district, which consumed it, were near. While coke is now manufactured in a number of States, Pennsylvania still leads in its production and supplies about two-thirds of the total for the country.

The following table presents the statistics for the principal items of materials used and of products manufactured, together with the kind and number of ovens used, for 1909, 1904, 1899:—

Material, product, or equipment.	1909.	1904	1899.
Materials used, total cost	$33,762,453...	$14,978,581...	$11,678,070
Coal charged into ovens, tons	36,983,568...	23,084,044...	19,180,030
Run of mine			
Unwashed.	31,712,482...	20,605,557...	*
Washed.........	2,278,927...	505,527...	*
Slack—			
Unwashed......	1,016,576...	1,070,682...	*
Washed	1,975,583...	902,278...	*
Cost	$32,065,729...	$14,423,048...	$10,899,853
All other materials	$1,696,724...	$555,533...	$778,217
Products, total value	$51,816,449...	$28,924,229...	$22,282,368
Coke, tons	24,905,525...	16,273,046...	13,245,504
Value	$50,377,035...	$28,593,136...	$22,030,161
Made in beehive ovens, tons	22,969,105...	15,767,652...	*
Value...........	$45,315,189...	$27,542,495...	*
Made in retort or by-product ovens, tons	1,936,420...	505,394 ..	*
Value...........	$5,061,846...	$1,050,641...	*
By-products obtained from retort or by-product ovens—			
Gas made, M c.f.	22,255,852...	4,772,401...	*
Used in process or wasted, M.c.f....... ..	21,256,611...	4,638,367...	*
Sold, M c.f. ...	720,214...	134,034...	168,201
Value.........	$16,683...	$11,569...	$32,969
Tar—			
Gallons	14,248,161...	3,815,240...	3,504,428
Value...........	$299,600...	$84,812...	$64,429
Ammonia sulphate—			
Pounds	12,183,510...	1,467,317...	3,049,083
Value	$327,564...	$38,733...	$78,099
Ammonia liquor—			
Gallons	5,808,883...	1,334,775...	899,184
Value...........	$504,378...	$190,164...	$91,073
All other	$290,899...	$5,815...	$6,037
Equipment—			
Ovens, number at end of year	54,506...	37,206...	26,920
Beehive ovens	53,210...	36,976...	26,565
Retort or by-product	1,296...	230...	355

* Figures not available.

During the period covered by the table the quantity of coke produced almost doubled, while its value considerably more than doubled. Although still of minor importance, coke manufactured in retort, or by-product, ovens almost quadrupled in quantity from 1904 to 1909. The value of by-products in 1909 shows a large increase over former years. The growth in the use of by-product ovens promises an important saving through the utilisation of a former waste.

MINING AND OTHER NOTES.

Speaking at the reopening of the Fife Mining School, Cowdenbeath, last week, Mr. William Adamson, M.P., before presenting the prizes, made reference to the claim of the school to be recognised by the Home Office and Education Department, and said that they would not get the full amount of benefit from the institution until it was recognised. The dux of the school for the past year was Mr. Peter Anderson, Lochgelly.

The body of George Ball, one of the two men killed in the Dover Colliery disaster, has been recovered from the 1,100 ft. shaft. When recovered, the body was headless and terribly injured, the unfortunate man evidently having been decapitated by the falling water tank. The pit has now been unwatered, but it is not expected that the second body will be recovered until the *débris* at the bottom of the pit is removed.

In connection with the loading and trimming of coal, the North British Railway Company have issued a revised circular to the shipbrokers of Methil and Burntisland. For the trimming of coal (including gum and duff) the rate remains at 2d. per ton for ordinary vessels, and 1d. for self-trimming vessels. For trimming gas cinders, coke, and pitch, the old rate has been increased from 2d. to 3d. per ton. A new departure has been made in regard to the pokering and digging, this extra labour now being recognised. For gum or duff, fireclay, mill scale, pitch and slag, the allowance is 1½d. per ton extra on the trimming rates, while for pearls an additional ½d. per ton is given. No change has been made in the charges for the levelling of coal, for separation of parcels of coal, or for general cargo, these running from 5s. for levelling on vessels up to 1,000 tons capacity, and to 30s. for vessels of 5,000 tons and over. For bunker coal trimming, the company are charging 6d. per ton, the allowance to the trimmers on this head being 5d. per ton, according to the recent agreement.

Ample provision is being made for the education of mining students at the Nottingham University College, the council of which have arranged complete courses for college diplomas in mining engineering and mine surveying, and also for colliery managers' certificates. The course for the college diploma in mining engineering extends over three years, and is recognised by the Home Office as equivalent to two of the five years' underground training required of candidates for the colliery manager's certificate. The Wm. Cooke and Co. mining scholarship, value £21 per annum for three years, is being awarded this month.

The Mottram Wood Colliery Company, Harbro' Mills, Barnsley, and Fred Earnshaw, coal dealer, Old Mill-lane, Barnsley, were summoned at the local police court on Monday, for two offences under the Sale of Coal Act. The complaints against the company were that the weight of coal on one of their carts was 2 tons 4 cwts. 2 qrs., whereas the ticket stated it to be 2 tons 5 cwts.; the tare, instead of being 1 ton 3 cwts. 2 qr., was found to be 1 ton 2 cwts. 2 qrs., and also the vehicle contained no tare mark. Earnshaw was stated to have offended by stating the gross weight of a cart containing 18 bags of coal to be 1 ton 10 cwts. 1 qr., whereas it was only 1 ton 6 cwts. 1 qr., and also by not having the tare marked on the vehicle. For the defence it was stated that one of the bags of coal which belonged to the same order had been delivered on the previous day. Carelessness, and not any intention to defraud, was the reason assigned by the Bench for the inaccuracies in weight, and each of the defendants was fined 10s. and costs on that charge, and for not having the tare fixed in a proper manner they were ordered to pay 2s. 6d. each, and costs.

A trade representative learns from officials of local co-operative societies in South-east Lancs. that the proposal for the formation of a co-operative colliery company with coalmines of its own has been abandoned for the present, at any rate.

Some weeks ago the Ten-quarter seam was struck in the Ellenborough Colliery, near Maryport, by boring from the Rattler Band seam at the low bottom. In order to get into the new seam it was decided to drive a drift about 18 yards long. This has now been successfully accomplished, the coal has been reached, and already several men have been put in to get it away. The Ten-quarter seam, which was worked to a hitch by the old company, has now been found on the other side of the fault. The coal is about 8 ft. high, and is of good quality.

Mr. Edward W. Stephenson has been appointed to the post of assistant manager and surveyor at Preston Colliery, near North Shields.

A small party of delegates attending the Congress of the Associated Chambers of Commerce at Newcastle, last week, visited the Otto-Vale ovens at Blaydon Burn. They were received by Messrs. R. M. Trail, general manager, Henry Peile, A. E. F. Knott, E. Pumphrey, T. R. Redpath, and W. A. Bower. The works consist of 80 coke ovens in two batteries of 40 each, with complete by-product recovery Otto-Hilgenstock plant.

Messrs. James Joicey and Co., owners of the South Tanfield Colliery, at Oxhill, county Durham, have decided to close down this pit from the end of the present year. The seams are becoming worked out. Five hundred men and boys will be affected, but the company will endeavour to find employment for them at other of their pits in the district.

Mr. Andrew Aird, South Wales, has been appointed to succeed Mr. Joseph McKendrick as manager of Gilbertfield Colliery, Cambuslang, belonging to Messrs. John Watson and Co. Limited. Mr. Aird is well known in Lanarkshire mining circles, having previously been on the management staff at Earnock Colliery, Hamilton.

As tokens of goodwill on the occasion of his leaving to take over the management of Bothwell Park Colliery, belonging to Messrs. Wm. Baird and Co., Mr. Joseph McKendrick has been presented by the workmen and officials at Gilbertfield Colliery, Cambuslang, with a handsome gold albert and pendant.

Messrs. Edward Bennis and Co. Limited, of Little Hulton, have recently supplied four furnaces to the Wombwell Main Colliery, near Barnsley, adapted for hand firing, and two stokers and air furnaces to the Bedwas Navigation Coal Company Limited, amongst numerous orders for stokers, furnaces and elevating and conveying plant.

Mr. Frank A. Blood, of Hereford-street, Sale, Cheshire, who recently resigned from Messrs. Royce Limited, Trafford Park, Manchester, has been appointed resident engineer for the Union Electric Company, of Southwark, London. He has specialised in colliery switchgear and machinery.

Messrs. the Mirrlees Watson Co. Limited, of Glasgow, have recently secured an important repeat order from Messrs. D. Colville and Sons, Motherwell, for a barometric jet steam condensing plant directly connected to rolling mill engines, the steam duty for which is 200,000 lb. per hour. A barometric plant has also been ordered by Messrs. Barber, Walker and Co., for their Bentley Colliery.

It is interesting to note that the Bradford Corporation have decided to print and publish the whole mass of the evidence obtained by them in the course of their enquiry into the expediency or otherwise of establishing a municipal coal supply.

Messrs. Skinner and Holford Limited, proprietors of the Waleswood Collieries, near Sheffield, have just placed an order for a complete coking installation with Simon-Carves direct recovery system for tar and ammonia; also plant for the production of benzol.

Some time ago the Bishop Auckland Board of Guardians appointed Mr. John Horler, a colliery cashier, to the position of relieving officer for West Auckland. The Local Government Board refused to sanction the appointment. The Guardians appealed, but the Local Government Board have replied to the effect that, after giving full consideration to the further representations, they adhered to their decision, and requested the Guardians to proceed to a fresh appointment forthwith. By 18 votes to 16 the Guardians have decided to decline the Local Government Board's request.

Mr. Philip T. Jenkins, of Port Talbot, for some time manager of the Parc-y-Bryn Colliery, Port Talbot, has been appointed by the Home Office as an inspector of mines and factories in South Wales. Mr. Jenkins, who is a native of Llansamlet, Swansea, will be stationed at Newport to carry out his new duties.

At the half-yearly meeting of the Caledonian Railway, Sir Charles Bine Renshaw, who presided, stated that the coal strike had resulted in a loss in minerals of £61,325. Presiding at the meeting of the Glasgow and South-Western Railway Company Mr. Patrick T. Caird referred to the Railways Bill, and said the power to increase rates was nullified by the inclusion of other clauses in the Bill which would leave the companies infinitely worse than they now were.

In connection with the annual congress of the Associated Chambers of Commerce held in Newcastle last week, a visit was paid by a large number of members to the Ashington collieries. The visitors were met by Mr. E. O. Southern, agent, and Mr. J. J. Hall, manager, and a thorough inspection was made of the colliery and plant both on the surface and below ground. The company possesses royalties extending over an area of 27½ square miles of the most satisfactory deposits in Northumberland, and the work of winning the coal is carried on at eight colliery shafts, three at Ashington, two at Woodhorn, two at Linton, and one at Ellington, the latter a recent development, the aggregate product averaging from 9,000 to 10,000 tons per working day, a figure which the company intend to increase by another 2,000 tons per day in the early future. The company employs 9,000 workpeople, and supports a population of approximately 30,000, a large number of whom are provided with free houses and coal. About 1,100 horses and ponies are used in and about the mines, in addition to the large amount of mechanical and electrical haulage employed. After the round of inspection the company repaired to the Portland Arms Hotel, where dinner was provided. Mr. Frank Priestman, chairman of the directors, presided, supported by several fellow directors and the principal officials of the company. The chairman said he agreed that the life of a miner was a hard one, and that they should be well paid, but it was not a life of such terrible misery as Mr. Winston Churchill had described it. In proof of that he pointed to the fact that they had not to look far to see the large number of men rushing to the pits for employment. And there was, after all, not very much to wonder at, for, with a pay bill of from £25,000 to £30,000 per fortnight it meant that every man, woman, and child in the Ashington district received an average of 10s. per week, in addition to free houses and coal.

It is announced that Mr. H. H. Evans, manager of the Bwllfa Colliery, Cwmdare, has been appointed agent of the Albion Collieries at Cilfynydd.

The fifth report of the British Association Committee on gaseous explosions, which was presented at the Dundee meeting, takes the form of a summary of the results of recent and current investigations concerning the flow of heat in the various parts of gas engines.

There was a large and fashionable congregation in St. Cuthbert's Church, Benfieldside, on the 12th inst., when Mr. R. R. Jackson, of Cliff Holm, Tynemouth, was married to Miss Elsie Brunton, second daughter of Mr. P. M. Brunton, coalowner, of St. Cuthbert's, Shotley Bridge.

Mr. Henry Fairclough, of Warrington, president of the South-West Lancashire Coalowners' Association, who died on July 28, aged 62, left estate valued at £27,101 gross, with net personalty £26,827.

Speaking at the half-yearly meeting of the Yorkshire Electric Power Company, which was held at Leeds on Tuesday, Mr. A. G. Lupton, the chairman, referred to the coal strike, and said it stood to the credit of the company that their customers were kept fully supplied, and able to run their works and keep their hands employed and earning full wages throughout this period. In February last the directors reported that they had felt it advisable to order additional generating plant for Thornhill, and the wisdom of this was shown by the further stoppage of July in this year, when the new plant just installed enabled them to supply their customers fully within a few days. They had a further 1,000-horse power of motors for new customers waiting to be taken on, and the directors were convinced that success was coming. The proposal to establish a waste heat station for the generation of electricity from coke oven gas at Barugh, near Barnsley, had been delayed, but it was imperative, therefore, to proceed with the waste heat station at once. The directors expected to appeal for the necessary £25,000 shortly.

THE FREIGHT MARKET.

Tonnage is in rather better supply for outward chartering purposes this week, but the demand is still greater, and rates generally are very firm indeed. On the north-east coast, business has been more active at the following typical rates:—Tyne to London, 4s. 6d.; Hamburg, 5s.; Cronstadt, 6s. 3d. to 7s.; Lisbon, 11s. to 11s. 3d.; and Genoa, 13s. 6d. to 13s. 9d. Chartering at South Wales has been heavy, and the tone of the market is extremely firm at the following representative rates:—Cardiff to Havre, 7s.; Cronstadt, 7s. 6d. to 9s. 3d.; Genoa, 13s. to 13s. 9d.; Monte Video, 23s. 3d.; and River Plate, 23s. 6d. to 25s. At the Clyde, business is quiet at firmly maintained figures. The Humber market is very well held for late figures. Homewards, an average amount of fixtures is reported. The Black Sea market is strong and rates are advancing. There is a brisk demand at the Danube and Azof, and the tone is strong. The Mediterranean and ore trades are steady. The Baltic is unchanged. Eastern markets are quiet, but firm. America and the River Plate are well maintained and active.

Tyne to Ancona, 4,000, 15s.; Aalborg, 3,300, 6s. 7½d.; Barreiro, 2,700, 11s. 3d.; Barcelona, 3,000, 12s. 10½d.; Cronstadt, 4,000, 6s. 3d.; 2,400, 6s. 9d.; 5,500, 7s.; Cherbourg, 1,000, 7s. 3d.; Candia, 1,300, 14s.; Oefle, 1,700, 7s. 4½d.; Genoa, 4,200, 13s. 6d., reported; 3,000, 13s. 6d.; 2,700, 16s. 6d.; 3,300, 13s. 9d.; 5,500, 13s. 6d.; Hamburg, 2,200, 5s.; 3,000, 5s.; Inverness, 200, 5s.; Lisbon, 2,600, 11s. 3d.; 1,600, 11s.; London, 2,600, 4s. 6d.; 1,500, 4s. 6d.; Las Palmas, 4,500, 12s.; Norresundby, 1,600, 6s. 6d.; Porto Vecchio, 5,000, 14s.; Porto Ferrajo, 4,500, 14s.; Port Said, 5,000, 12s. 9d.; Rouen, 700, 7s. 7½d.; St. Petersburg, 2,500, 6s. 9d.

Cardiff to Algiers, 2,000, 15 fr., 600, spot; 3,500, 14¾ fr., ppt.; 5,400, 14½ fr.; Ancona, 6,800, 15s., ppt.; Bordeaux, 2,800, 9·37½ fr., September 20; Barcelona, 4,500, 13s. 3d., ppt., 96 loading hours; 3,500, 13s. 4½d.; 3,500, 13s. 4d.; 13s. 3d., September 19; Bahia Blanca, sail, 18s. 9d., January; Brindisi, 5,000 13s. 6d., September 23; 5,000, 13s. 6d., ppt.; Berehaven, 2,200, 5s., Admiralty; Cronstadt, 4,200, 7s. 6d.; 1,600, 9s.; 2,200, 9s. 3d.; Chatham, 1,550, 5s., Admiralty; Cromarty, 3,800, 6s. 6d., Admiralty; 3,000, ditto; Dover, 1,000, 5s. 3d., Admiralty; 1,450, 5s. 6d.; Fecamp, 700, 7s.; Genoa, 5,400, 13s. 6d., September 16; 6,000, ditto; 4,500, 13s., September 20; 3,300, 13s. 6d., spot; 4,800, 13s. 9d., ppt.; 3,500, 13s. 9d., September 19; 6,000, 13s. 3d., spot; Huelva, 2,200, 11s.; Havre, 1,400, 7s., ppt.; 1,000, 7s.; Honfleur, 1,100, 7s. 3d.; Invergordon, 1,350, 6s. 9d.; 2,200, 6s. 6d.; Leghorn, 4,000, 12s. 10½d., 500, 6½d., Genoa terms, ppt.; Lisbon, 2,600, 9s. 9d., end September; 2,600, 9s. 6d., ppt.; La Pallica, 3 600, 8½ fr.; Monte Video, 5,300, 23s. 3d., September 20; 8,300, 23s. 3d.; Naples, 2,800, 13s., 800, ppt.; Oran, 2,700, 15¼ fr.; 2,000, 15½ fr., 400; 2,700, 15¼ fr., ppt; Port Said, 6,000, 12s. 9d., September 23; Porto Vecchio, 4,500, 14s. 7½d., Genoa terms, ppt.; 5,000, 14s. 7½d., Genoa terms; Portsmouth, 600, 6s. 6d., ships' plates; Piræus, 3,000, 14s., ppt.; Palermo, 2,300, 14s. 9d.; Palma, 1,200, 14s., ppt.; Reval, 3,500, 7s. 8d.; 2,300, 7s. 9d.; 3,000, 7s. 9d., spot; 3,500, 7s. 9d.; Rio de Janeiro, sail, 18s. 9d., January; River Plate, 4,500, 23s. 6d., end September; 4 600, 24s., early October; 4,500, 24s.; 24s., September 23; 5,000, 24s. 6d., ppt.; 6,000, ditto; 5,000, 25s., reported; Salerno, 3,100, 14s. 9d.; Syracuse, 3,200, 14s. 9d., September 23; Savona, 5,400, 13s. 6d., September 16; 4,800, 13s. 9d., ppt.; 6,000, 13s. 3d., spot; Spezzia, 6,000, 13s. 3d., spot; St. Petersburg, 1,900, 7s. 9d.; Teneriffe, 5,500, 11s. 9d., September 19; 3,400, 12s., September 20; Venice, 6,000, 14s. 9d., October 15 cancelling; 6,800, 14s. 6d., 800, ppt.; 6,800, 15s., ppt.; 5,800, 15s.

Newport to Brindisi, 14s. 6d., 500, September 20; Genoa, 2,900, 13s. 3d., ppt.; 13s. 6d., September 20; Bahia, sail, 18s. 9d., 800, October; Rio de Janeiro, sail, 18s. 9d., 1,000, October; Buenos Ayres, 5,000, 24s., ppt.; Aguilas, 1,200, 14s. 6d.

Wales to Port Sudan, 15s., September 20-30; Monte

Video, sail, 20s., ppt.; Bahia, sail, 19s. 6d., 100; Rio de Janeiro, 19s. 6d., 100; Buenos Ayres, 20s. 6d., December; West Coast South America and home to United Kingdom-Continent, sail, 45s. in and out, 45s. 6d. stiffened.

Glasgow to Leghorn, 3,000, 12s. 9d.; Buenos Ayres, 24s., 250, ppt.; Oneglia, 13s 9d.

Middlesbrough to Hamburg, 1,600, 6s. 6d., pig iron.

Fife port to Dieppe, 7s.

Burntisland to Buenos Ayres, 24s., late September; Marseilles, 1,800, 14s.

Forth to Konigsberg, 800, 9s.

Preston to Genoa, sail, 10s. 6d.

Swansea to Bahia Blanca, sail, 17s., 600, October-November; Rio de Janeiro, sail, 17s.; St. Nazaire, 2,500, 9 12½ fr., spot; 2,200, 9 fr., ppt.; Valencia, 2,000, 13s. 9d., 300, September 28; Brest, 1,100, 7s., ppt.; Havre, 700, 7s.; Calais, 750, 7s.; Boulogne, 750, 7s.; Huelva, 2,100, 11s.; Rouen, 1,300, 8s.; 1,700, 8s.; Malaga, 1,500, 14s.; Rouen, 1,700, 8s.; Trouville, 700, 7s. 6d.

Wear to Hango, 1,600, 7s. 9d.; Wyborg, 900, 9s. 6d.

Hartlepool to Leghorn, 3,500, 13s. 3d., 500; Genoa, 4,500, 13s. 7½d.; 5,200, 13s. 6d.; 6,000, 13s. 6d.; Alexandria, 3,000, 12s.

Immingham to Hamburg, 1,500, 5s. 3d.

Hull to Cronstadt, 2,200, 6s. 9d.; Monte Video, 6,000 max., 23s., 250, with 150 hours, September-October; Reval, 2,500, 6s. 9d., end September; Riga, 2,500, 6s. 9d.; Rotterdam, 650, 4s. 9d., end September.

Grangemouth to Riga, 2,000, 6s. 3d.

Antwerp to Valparaiso, Iquique Range, sail, 26s., coke, with stiffening to nitrate port at 13s. 6d.

Garston to South Australia, sail, 16s. 6d., September-October.

Port Talbot to Genoa, 3,000, 12s. 9d., ppt., fixed abroad.

Rotterdam to Malta, 11s. 9d., September 25; Barcelona, 3,300, 12s. 4½d., September 23; Honfleur, 1,500, 6s. 6d., September 23; Boulogne, 1,400, 6s. 6d., September 20-21; Bordeaux, 3,400, 7s. 3d. coal, 8s. fuel, September.

Goole to Ghent, 860, 5s. 3d., ppt.; London, 960, 5s., ppt.

Seaham Harbour to Civita Vecchia, 3,300, 14s. 7½d.

Homeward charters:—Azof, 4,000 max., 18s. 6d. n.o. or any, 19s. Hamburg, ppt.; 3,500, 10 per cent., 19s. 4½d. n.o. or any, 19s. 10½d. Hamburg, ppt.; 4,500, Rotterdam 17s. 6d., Antwerp 17s. 9d., Emden or Weser 18s., Hamburg 18s. 3d., September-October; 4,800, Rotterdam 18s., option Marseilles 18 fr., ppt.; 4,000, 10 per cent., 18s. 6d. n.o. or any, 19s. Hamburg, ppt.; 6,100, Rotterdam 18s. 6d., Antwerp or Emden 18s. 9d., Weser 19s., Hamburg 19s. 3d., with 3d. less barley, ppt.; 6,100, Rotterdam 17s. 4½d., Antwerp 17s. 7½d., Emden or Weser 17s. 10½d., Hamburg 18s. 1½d., early October; 6,000, Rotterdam 17s. 9d., Antwerp, Emden or Weser 18s., Hamburg 18s. 3d., September-October; 4,400, 18s. 6d. n.o. or any, 19s. Hamburg, ppt.; 3,000, 10 per cent., 19s. n.o. or any, 19s. 6d. Hamburg, September-October; 4,500, Rotterdam 18s. 3d., Hull or Antwerp 18s. 6d., Emden or Weser 19s., Hamburg 19s. 3d., ppt.; 3,000, 10 per cent., 19s. 6d. n.o. or any, 20s. Hamburg, ppt.; Novorossisk, 5,300, Rotterdam, 16s. 3d., option Azof loading 17s., ppt.; 3,400, 18s. n.o., ppt.; 6,300, London or Rotterdam, 17s., with 2,000 tons heavy guaranteed, ppt.; Newcastle, N.S.W., 2,521 net, Java, 11s. 9d., end September; Calcutta, 2,752 net, Antwerp or Holland, 30s. one port, 30s. 9d. two ports, d.w. basis, October; 2,966 net, United Kingdom, Antwerp or Holland, 30s. one port, 30s. 9d. two ports, d.w. basis, October; 2,472 net, Dundee, 33s. 9d., jute, October; Kurrachee, 3,516 net, United Kingdom-Continent, 23s., p.p., September-October; about 7,500, 21s. 6d., barley cargo, November; 5,500, 10 per cent., East Coast United Kingdom, ex-London, 21s. 6d. one port, 22s. two ports, barley, October; New York, 25,000 qrs., 10 per cent., United Kingdom-Continent, p.p., basis 4s., heavy grain, October-November; 25,000 qrs., 10 per cent., Mediterranean, basis 5s. 3d., December; Pensacola, 1,250 stds., 10 per cent., Holland, one port, 130s., option Holland and coal port United Kingdom, 132s. 6d., October-November; Galveston, 2,599 net, Liverpool or Bremen, 71s. 3d., cotton, September-October; Buenos Ayres, 6,000, 10 per cent., United Kingdom Continent, 30s. o.c., less 6d., option La Plata 3d. more, September; 8,100, p.p., 30s., no reduction, September; 5,800, 10 per cent., 30s., no reduction direct, 6d. less if Antwerp, cancelling November; 25s. o.c., no reduction direct; San Lorenzo, 5,500, 10 per cent., United Kingdom-Continent, 24s. o.c., less 6d., November 15-December 15; 5,800, 10 per cent., 31s. o.c., less 6d., cancelling October 10; 5,300, 10 per cent., 32s. 6d. o.c., less 6d., September; Bilbao, 3,000, Middlesbrough, 7s. 3d., October; 3,200, 7s. 3d., ppt.; 4,700, Rotterdam, 6s. 9d., ppt.; Hornillo Bay, 3,400, Glasgow, 8s. 1½d., ppt.; Carthagena, 3,200, Jarrow, 6s. 6d., ppt.; Santander, 2,000, Rotterdam, 7s. 3d., ppt.; 2,700, 7s. 3d., complemento loading, ppt.; North Pacific, 2,817 net, United Kingdom-Continent, 50s., October; Fremantle, sail, 32s. 6d., United Kingdom-Continent, option Geraldton 33s., wheat, January-February; 32s. 6d., United Kingdom-Continent, 28s. 9d. South Africa, January-February; Taltal, sail, 30s., United Kingdom-Continent, September-October; 28s., October-November; South Australia, sail, 32s. 6d., United Kingdom-Continent, December-January; Kherson, Nicolaieff or Odessa, 3,500, 17s. 6d. n.o. or any, 18s. Hamburg, end September; 3,700, 18s. n.o. or any, 18s. 6d. Hamburg, ppt.; 6,000, London or Rotterdam 17s., Hamburg 17s. 6d., ppt.; Gulf, 1,000 stds., 10 per cent., Bahia Bahia, 193s. 9d., October; 950 stds., 10 per cent., Holland and Cardiff, 143s. 9d., September-October; 2,299 net, U.K.-Cont., 23s. 6d., net form, September-October; Iviza, 1,850, Thorshavn (Faroe), 14s.; September; Port Said, 5,000, Chittagong, 15s., September; Portland, Or., 2,681 net, United Kingdom-Continent, 50s. 6d., October; Taganrog, 4,500, Marseilles, 18 fr., end September; Smyrna, 2,600, East Coast United Kingdom, basis 18s. 6d. one port, September; Huelva, 5,500, New York, Philadelphia or Baltimore, 11s. 6d., f.d., September; Baltimore, 2,000, Middlesbrough, 7s. 4½d., ppt.; time charter, States and West Indies, 7s. 3d., one round trip, in continuation; time charter, Transatlantic trade, 5s. 3d., two years, delivery and re-delivery United Kingdom-Continent; 12s. one trip; New York, 12s. 6d., Manchester; Nicolaieff or Odessa, 7,000, London or Rotterdam, 17s. 9d., Hamburg, 18s. 3d., on d.w., grain, ppt.; Sydney, N.S.W., sail, 35s., United Kingdom-Continent, January-February; time charter, Canadian trade, 8s., one round trip, delivery United Kingdom, time charter, Brazil and River Plate trade, about 5s. 7½d., 12 months, delivery and re-delivery United Kingdom-Continent; West Australia, 33s., Bombay; Melbourne, sail, 25s., Callao; Mobile, sail, 16 dols. Canary Islands, lumber.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER *and* LAST WHITE *pages.*

SOUTHWARK, OCTOBER 2.—The council of the Metropolitan Borough of Southwark is prepared to receive tenders for the supply of 10,000 tons of coal, to be delivered on rail at the council's electric light station, Penrose-street, Walworth, S.E., as ordered by the engineer. Tenders, duly signed, must be sent in under cover, endorsed "Tender for Coal Supply, Electric Light Station," and addressed to the town clerk, not later than noon on Wednesday, October 2, 1912. Forms of tender may be obtained on application at the town clerk's office, as under. The Council does not bind itself to accept the lowest or any tender. By order, Percy H. Gray, town clerk, Town Hall, Walworth-road, S.E.

Abstracts of Contracts Open.

BARKING, SEPTEMBER 24.—For about 3,000 tons of bituminous slack, for the Urban District Council.

BECKENHAM, SEPTEMBER 23.—For steam coal, Welsh coal, house coal, anthracite stove nuts, and coke, for the Urban District Council.

BUXTON, SEPTEMBER 23.—For steam coal, for the Urban District Council.

CARDIFF, SEPTEMBER 28.—For coal, for the University College of South Wales and Monmouthshire, Cardiff.

COLCHESTER, SEPTEMBER 23.—For about 4,000 tons steam coal, for the Corporation.

CROYDON, SEPTEMBER 26.—For coal and coke, for the Rural District Council.

DUMBARTON, SEPTEMBER 24.—For coals and coke required by the School Board.

EASTBOURNE, SEPTEMBER 23.—For coal, for the Corporation.

ENNISKILLEN (IRELAND), SEPTEMBER 24.—For 200 tons of prime, well-screened English, Scotch or Irish house coal, for the Guardians.

GATESHEAD-ON-TYNE, SEPTEMBER 23.—For coal, for the Corporation.

GREAT YARMOUTH, SEPTEMBER 24.—For 3,000 tons of Derbyshire slack coal for the Corporation.

HEMEL HEMPSTEAD, SEPTEMBER 23.—For coal and coke, for the Hemel Hempstead Joint Hospital Board.

KHARTOUM (EGYPT), OCTOBER 14.—Tenders are invited by the Steamers Department of the Sudan Government for the supply of 12,200 tons of Crown brand patent fuel (briquettes).

LONDON, SEPTEMBER 25.—For coal, for the Hammersmith Borough Council.

MANCHESTER, SEPTEMBER 23.—For coal, for the directors of the Manchester Ship Canal Company.

MERTHYR TYDFIL, SEPTEMBER 23.—For double-screened large steam coal, for the Education Committee.

MOUNTAIN ASH, OCTOBER 14.—For coal and coke, for the Governors of the Gelligaer County Schools.

NEWCASTLE-ON-TYNE.—For (a) coke, (b) firewood, for the Education Committee.

NEWTOWN, SEPTEMBER 24.—For coal, for the Montgomeryshire Education Committee.

NORTHALLERTON, SEPTEMBER 23.—For coal and coke, for the North Riding of Yorkshire County Council (Education Committee).

RIPON, SEPTEMBER 23.—For 4,000 tons of good gas coal, for the Corporation.

RUNCORN, SEPTEMBER 25.—For coal and coke, for the Runcorn Rural Administrative Sub-committee for Education.

SOUTHAMPTON, OCTOBER 7.—For small coal, for the Works Department, for the Corporation.

TAUNTON.—For 2,500 tons of steam coal, for the Corporation.

TYNEMOUTH, SEPTEMBER 23.—For best screened house coal and small coal, for the Corporation.

UXBRIDGE, SEPTEMBER 23.—For hard steam Warwickshire coal and yard slack, for the Urban District Council, the estimated quantity being from 150 to 200 tons of each.

WANSTEAD, SEPTEMBER 25.—For coal (35 tons, more or less) and coke (30 chaldrons, more or less), for the Urban District Council.

WOLVERHAMPTON, SEPTEMBER 25.—For coal, for the Managing Committee of the Wolverhampton and Midland Counties Eye Infirmary.

The date given is the latest upon which tenders can be received

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

BARNOLDSWICK, SEPTEMBER 28.—*Borehole, &c.*—For the sinking of an 18 in. borehole to a depth of 800 ft., pump chamber, pump, with a 75 effective horse-power horizontal producer-gas engine and suction-gas plant, for the Urban District Council.

EDINBURGH, OCTOBER 18.—*Motors.*—For 1,000 motors, 10-12 horse-power chiefly, for the National Insurance Medical Association.

FLAMBOROUGH, SEPTEMBER 30.—*Water Main Extension.*—For about 1,100 yards of 3 in. diameter cast iron socketed pipes, with all appurtenances, for the Bridlington Rural District Council.

HARROGATE, SEPTEMBER 30.—*Ironwork.*—For ironwork, for the Corporation.

LONDON, SEPTEMBER 25.—*Motors.*—For alternating current motors, for the Hammersmith Borough Council.

LONDON, SEPTEMBER 27.—*Cast Iron Segments.*—For the supply of cast iron segments, &c., for the Metropolitan Water Board.

MALVERN, SEPTEMBER 27.—*Gasholder.*—For a gasholder and tank, for the Urban District Council (Gas and Electricity Department).

MANCHESTER, OCTOBER 1.—*Points, &c.*—For the supply of permanent way points, tongues and hardened steel centres, for the Corporation.

MERTHYR TYDFIL, SEPTEMBER 23.—*Cast Iron Pipes.*—For about 100 tons of cast iron pipes and specials for water mains, for the Corporation.

MEXBOROUGH, OCTOBER 5.—*Turbo generator, &c.*—For a 500 kw. turbo-generator with surface condenser and switchgear, &c., for the Urban District Council.

TOTTENHAM, SEPTEMBER 21.—*Steam Road Roller.*—For a 10-ton single-cylinder steam road roller, fitted with an approved scarifier, for the Urban District Council.

WATFORD, SEPTEMBER 30.—*Pumping Machinery.*—For a small electrically driven pumping plant, for the Urban District Council (Callow Land Storm-water Drainage and Balmoral-road Sewerage, Contract No. 3).

COAL, IRON AND ENGINEERING COMPANIES.

Anglo-Mexican Commercial Company Limited.—This private company has been registered, with a capital of £10,000 in £1 shares (1,000 preferred), to carry on the business of tin-plate and galvanised sheet makers, founders, engineers, &c., to acquire 10,000 shares of 100 pesos each in the undertaking known as the Compania Nacional de Hoja de Lata y Lamina Glavanizada, S.A., and to adopt an agreement with J. W. Hughes. Qualification of first directors, who are to be appointed, one share.

Armstrong, Whitworth and Company Limited.—The directors have announced an interim dividend at the rate of 10 per cent. per annum on ordinary shares (same as a year ago), free of income-tax, and at 4 per cent. per annum on the preference shares, less income-tax.

Bettsshanger Boring Company Limited.—This company has been registered, with a capital of £20,100 (200 ordinary shares of £100 each and 2,000 deferred shares of 1s. each), to acquire any options over or interest in land for boring for coal or other minerals, &c., and to adopt an agreement with Canterbury Drillers Limited. Minimum cash subscription, £8,000. First directors, A. Grove, Hon R. James, A. Farquhar, H. C. Embleton and N. P. W. Brady. Qualification (except A. Grove, A. Farquhar and H. C. Embleton), two ordinary or 50 deferred shares. Remuneration, £100 per annum, divisible. Registered office, 7, St. Helen's-place, E.C.

British Insulated and Helsby Cables Company Limited.—An interim dividend is announced at the rate of 8 per cent. per annum, less tax.

Cammell, Laird and Co. Limited.—The directors have decided not to recommend any interim dividend on the preference shares.

Clarke's Patents Limited.—In the liquidation of this company, of 120, Fenchurch-street, E.C., a summary of the company's statement of affairs has been issued showing liabilities amounting to £17,000 10s. 4d., and as regards creditors a deficiency of £17,407 18s. 1d. In regard to contributories a further deficiency of £10,200 is disclosed, making a total deficiency of £27,607 18s. 1d. Mr. H. M. Winearls, assistant official receiver, states that the company was registered on October 11, 1904, to acquire certain patents relating to machinery for loading and discharging vessels of coal and other material in bulk. According to the statement of affairs the assets consist of 1,711 preference shares of the Liverpool Barge and Coaling Company Limited, which are held as security by creditors for £17,302 9s. 8d., and 10,302 shares in the Cowper-Coles Engineering Company Limited, 2,362 of which are deposited as security with a creditor. The failure of Clarke's Patents Limited is attributed to the liquidation of the Cowper-Coles Engineering Company Limited and of Brown's Complete Elevator Company Limited, in which Clarke's Patents Limited had invested £17,500; also to inability to establish subsidiary companies in London and Southampton.

Drop Stampings Limited.—This private company has been formed, with a capital of £5,000 (3,000 ordinary shares of 2s. each and 4,700 5 per cent. preference shares of £1 each), to carry on the business of manufacturers and factors of and dealers in all kinds of drop stampings, tool makers, general machinists, &c. Qualification of first directors, who are not named, one share. Registered office, 20, Manchester-road, Birmingham.

Fenton Collieries Limited.—The accounts for the period from August 5, 1910 (the date on which the properties were taken over), to December 31 last, after charging all expenditure, including debenture interest, directors' and trustees' fees, bad debts, income tax, and £1,350 for depreciation of plant and machinery, show an available balance of £3,387, which the directors recommend should be carried forward.

Harrison Ainslie and Co. Limited.—The directors have brought forward a scheme of capital reorganisation in succession to the proposals submitted towards the end of last year, to which no adequate response was received. The method of reconstruction now formulated is to reduce the existing capital of £200,000 to £50,000 by writing off 15s. per £1 share. This residuum of £50,000 is in future to rank as deferred capital. It is further proposed to create £75,000 6 per cent. cumulative preference shares of 5s. each and £200,000 ordinary shares of 5s. each. Holders of the existing capital will be given a prior right of subscription for the new preference shares, and those who take advantage of this offer will receive a bonus of 50 per cent. in new ordinary shares. Arrangements have been made whereby, in the event of the existing proprietors failing to support the board, whatever new capital is required will be forthcoming, and the board are understood to be in a position to carry out their proposals. The proceeds of the shares about to be created will be utilised in providing working capital and in paying off indebtedness which must be met in the immediate future. The first mortgage debenture holders for £20,000 have agreed to extend the date of repayment of their capital for a further period of 10 years, interest in the meantime to be raised from 5 to 6 per cent. per annum. The extraordinary general meeting to discuss the new scheme is being held to-day.

Hookham (H. J.) and Sons Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of iron, steel and tin-plate and brass and copper workers, founders, engineers, &c., and to acquire the business carried on by H. Hookham at Charles Henry-street, Birmingham, and elsewhere as H. J. Hookham and Sons. First directors, H. Hookham, P. Tonks, C. Fletcher, and J. G. Rolason. Qualification, £50.

Jung and Dreydel Limited.—This private company has been registered, with a capital of £8,000 in £1 shares, to carry on the business of engineers, machinists, metal

COLLIERY REPORT BOOKS & FORMS.

New Forms, &c., recently issued under the Coal Mines Acts.

This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c., as issued.

☞ ISSUED SINCE THE LAST APPEARANCE OF THIS LIST.

Registered No. Please quote when ordering.	NEW FORMS, &c., RECENTLY ISSUED.	
	Statutory Rules and Orders, &c.	
H.O., 511	Explosives in Coal Mines Order of 21st May, 1912 (revoking all previous "Explosives" Orders). Pamphlet Form ...	4d. each. By post 5d.
C.G., 69.	The same (without Schedules). Pamphlet Form	4d. each. By post 5d.
H.O., 34	The same (without Schedules). In Sheet Form for posting ...	1d. each. By post 1½d.
H.O., 1149	Mining Examinations. Order Fixing Times and Places ...	1d. each. By post 1½d.
H.O., 1150	Rules for the Conduct of Examinations	1d. each. By post 1½d.
H.O., 1151	Rules as to the Qualifications of Applicants for First and Second-class Certificates of Competency	1d. each. By post 1½d.
C.G., E.	Special Rules for the Installation and Use of Electricity in Mines. Sheet Form (H.O., 12)	3d. each. By post 3½d.
C.G., K.	Pamphlet Form (H.O., 11)	2d. each. By post 3d.
C.G., L.	Coal Mines Act, 1911. Pamphlet Form	9d. By post 11d.
C.G., L. (Abs.)	Coal Mines Act, 1911, Abstract. Sheet (26 in. by 34 in.) (H.O., 2)...	3d. each. By post 4d.
C.G., M.	Coal Mines (Minimum Wage) Act, 1912. Pamphlet Form ...	1½d. By post 2d.
Cd. 6340.	Mines and Quarries: General Reports, &c. Part I. District Statistics	6½d. By post 8d.
Cd. 6387	Testing of Miners' Safety Lamps. Report of Departmental Committee, August 5, 1912	5½d. By post 7d.
	List of Mines in the United Kingdom for 1911	4s. each. By post 4s. 4d.
☞	List of Quarries in the United Kingdom for 1911	5s. each. By post 5s. 6d.
C.G., F.	Directions as to the Restoration of Persons suffering from Electric Shock (Silvester or Schafer). Sheets (20 in. by 30 in., and 10 in. by 15 in.)	4d. each. 3s. per doz.
	Mounted on Cardboard	6d. each, carriage extra.
	Do. and Varnished	1s. each, do.
	On Enamelled Iron Plates (10 in. by 15 in.)	3s. 2d. each do. { Reduction on a quantity.
	PRESCRIBED FORMS.	
H.O., 11A	Electricity Rules: Daily Log Sheet	1s. 6d. per 100
H.O., 11B	Do. Do. Book	4s. each. By post 4s. 8d.
H.O., 11C	Do. Notice to Inspector of the District under Rule 2 (ii.) ..	1d. each. By post 1½d.
H.O., 11D	Do. Notice to Inspector of the District under Rule 2 (iii.) ..	1d. each. By post 1½d.
H.O., 20	Form of Register of Boys, Girls and Women Employed—Section 94	4d. each, postage extra
H.O., 36	Form of Report Book for Inspection on behalf of Workmen—Section 16 ..	9d. each do.
H.O., 37	Form of Book for Record of Measurements of Air Currents—Section 29 (2) ..	7d. each, do.
H.O., 38	Form of Book for Daily Record of Damage to Safety Lamps—Section 34 (1) (ii)	1s. 6d. each do.
H.O., 39	Form of Report of Thorough Examination of Steam Boiler—Section 56 ..	1d. each do.
H.O., 40	Form of Book for Report on Quarterly Internal Examination of Steam Boilers—Section 56 (1) (*c*) and (3)	6d. each do.
H.O., 41	Form of Book for Daily Report on Condition of Roads as to Coal Dust—Section 62 (5)	1s. 3d. each do.
H.O., 42	Form of Report Book for Firemen, Examiners or Deputies—Sections 64 and 65..	1s. each do.
H.O., 43	Form of Book for Daily Report of Examination of External Parts of Winding Machinery, Guides, &c.—Section 66 (*a*)	1s. 6d. each do.
H.O., 44	Form of Book for Weekly Report of Machinery, Gear and other Appliances (other than Winding Machinery, Gear, &c.)—Section 66 (*b*)	1s. 3d. each do.
H.O., 45	Form of Book for Weekly Report on State of Shafts in which Persons are Lowered or Raised—Section 66 (*c*)	1s. 3d. each do.
H.O., 46	Form of Book for Weekly Report on State of Airways—Section 66 (*d*) ..	1s. 3d. each do.
H.O., 47	Form of Book for Reports on Places from which Workmen have been Withdrawn Section 67	9d. each do.

Continued on Page 603.

THE COLLIERY GUARDIAN COMPANY LIMITED,

30 & 31, Furnival Street, Holborn, London, E.C.

workers, iron and steel converters, &c., and to adopt an agreement with A. J. Dreydel for the acquisition of certain patents, properties and rights. First directors, A. J. Jung and A. J. Dreydel. Registered office, Bannister-road, Kensal Rise, W.

Kayser, Ellison and Co. Limited.—The report shows, including the amount brought forward, a balance of £35,063. The directors recommend a final dividend of 7s. 6d. each on the ordinary shares, making 12½ per cent. for the year, and in addition a bonus of 2s. 6d. per share, placing £5,000 to reserve fund, making it £87,500, and carrying forward £8,313.

Landis and Gyr Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of electrical and general engineers, manufacturers of and dealers in all kinds of plant, machinery, engines, appliances, apparatus and implements used in connection with generation, distribution, supply, and use of electricity, &c. First directors, K. H. Gyr, L. R. Lester and H. Landis. Registered office, 28, Denman-street, S.E.

Lennoxtown Coal and Lime Company Limited.—This private company has been registered in Edinburgh, with a capital of £5,000 in £1 shares, to carry on the business of coalmasters, &c. Qualification of first directors, who are not named, 100 shares. Registered office, 11, Bothwell-street, Glasgow.

Sadler and Co. Limited.—The report for the year ended June 30 last states that the available profit, including the amount brought forward, is £31,165, which it is proposed to deal with as follows:—Interest on debentures and prepaid shares and for income-tax, £4,553; dividend at the rate of 7 per cent. per annum, less income-tax (of which an interim dividend of 3 per cent. was paid on April 10), £11,142; directors' and auditors' fees, £1,000; depreciation of plant, £6,000; to be added to reserve fund (making it £25,000), £5,000; balance to be carried forward, £3,468. The coal-miners' strike during the months of March and April adversely affected the company's operations. The amount owing on debentures has been further reduced by the sum of £7,100 paid off during the year.

Staveley Coal and Iron Company Limited.—The 49th annual report of the directors states that the balance-sheet for the twelve months ended June 30, 1912, shows that the net profits, after providing for debenture interest and the dividend on the preference shares, was £109,239, which, with the balance brought forward, makes a total of £184,409. Out of this amount an interim dividend of 9d. per share on the fully-paid shares and 6¾d. per share on the part-paid shares was paid on February 10, 1912, and the directors recommend a final dividend of 1s. 3d. per share on the fully-paid shares, and 11¼d. per share on the part-paid shares. These dividends absorb £107,524, while the balance carried forward is £76,884. The railway strike in the autumn of last year, and the colliers' strike in the spring of this year which involved a stoppage of between six and seven weeks, and which necessarily led to the closing down of the furnaces, coke works, and foundries, have materially affected the result of the year's working. In the last annual report it was mentioned that a debenture issue, to provide for the capital expenditure upon works then in progress, would shortly have to be made; and in November of last year an issue was made of £150,000 4½ per cent. debentures, which were principally taken up by the company's shareholders. The 50 additional coke ovens referred to in the last report have been erected and are now working, together with the additional plant for the production of sulphate of ammonia. With a range of 150 coke ovens it was found that it would be very advantageous to erect a tar distillation plant, a sulphuric acid plant and a benzole plant, all of which have been completed and are now in full working order. For the purpose of convenience in working, it is considered desirable to make the Yorkshire Main Colliery into a separate company, the whole interest in which, however, will remain in the hands of the Staveley Company. Arrangements are now in progress for carrying out this object. The mining difficulties which have presented themselves in this coalfield have been very great. It can, however, be only a question of a short time when these difficulties will be surmounted. The directors regret to report the decease of Mr. John Fell Swallow, who had been a member of the board since 1896. Mr. W. H. S. Craven, of Manchester, has been appointed in his stead, subject to the confirmation of the shareholders.

Ward (Thos. W.) Limited.—The profit and loss account for the year ended June 30 last shows a credit balance for disposal of £54,618 (including £12,842 14s. 1d. brought forward). The directors will recommend at the annual meeting on the 23rd inst. that a further dividend of 7½ per cent. be paid on the ordinary shares, making 10 per cent. for the year, plus a bonus of 6d. per share; that £10,000 be placed to reserve fund (which will then stand at £70,000), £2,000 to the fund for equalisation of dividends (which will then stand at £7,000), leaving a balance of £12,787 14s. 5d. to carry forward to the current year.

COLLIERY REPORT BOOKS and FORMS.

New Forms, &c., recently issued under the Coal Mines Acts.

This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c.

Continued from Page 602.

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H.O., 51	Form of Annual Return of Horses Used Underground in the Mine—Schedule III. (16)	1d. each	do.
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ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

4941 (1912). *A New or Improved Apparatus for Operating the Stop Mechanism of Colliery Winding Engines.* J. Shrigley, 82, Talbot-road, Northampton.—This invention relates to improvements in that type of apparatus for operating the steam or other brake and valve mechanism employed in connection with colliery winding engines such as is referred to in a previous Application for Patent No. 12065, dated May 19, 1911, the present object being to provide means in conjunction with the apparatus referred to in the specification of the application hereinbefore mentioned for operating the steam valve and the steam brake quickly instead of gradually so that the cage is prevented being drawn through the headgear at the top of the pit or of being dashed to the bottom of the shaft. The present invention consists essentially in providing additional arms carried by the slidable rod and two levers independently operable connected with the steam supply and with the steam brake, one of such levers being held in normal position by a catch capable of being withdrawn on the aforesaid abnormal conditions occurring and so allowing the steam to the winding engine to be shut off and simultaneously admitting steam to the steam brake to enable the latter to be operated, means being employed to allow of the parts being reset after operation. Fig. 1 is a front elevation of so much of the apparatus as is referred to in the prior application for patent hereinbefore mentioned to enable the application of the present invention to be understood, the parts being shown in the normal position. Fig. 3 shows the position of the parts after the main steam supply has been shut off and steam has been admitted to the steam brake. The apparatus acts as follows, it being assumed that the parts are in the position indicated in fig. 1 in which the conditions are normal and the slotted link a^1 is in engagement with the arm 3 and the two operating levers 6 and 9 are projecting towards the right hand of the apparatus. Under these conditions if the catch *f* is traversed towards the outer end of its frame it comes in contact with the additional arm 15 and so moves the rod *i* endwise in the manner described in the previous application for patent hereinbefore referred to, but instead of the effect being to operate the steam brake gradually, the effect is to withdraw the slotted link a^1 from beneath the arm 3 and so allow the weight 11 to turn the shaft 4 and operate both levers 6 and 9, one shutting off the main steam supply and the other admitting steam to the steam brake, both actions taking place simultaneously and quickly and thus effecting the objects in view. When the slotted link a^1 is pulled towards the left in the manner described, the spring on the rod connected to it is compressed, and after the levers 6 and 9 have been brought back into the position indicated in fig. 1 the link may be returned by the compressed spring to its normal position beneath the arm 3 by pulling the handle *c* towards the left, so releasing the weighted pin b^1 from the slot *d* and allowing the link to move to the right, the whole of the parts being then in normal position. To prevent the weight 11 falling too far and likewise to prevent the levers 6 and 9 passing too far forward when released, an adjustable stop 16 is employed to engage with a projection 17 on one of the bearings carrying the shaft 4. (Three claims.)

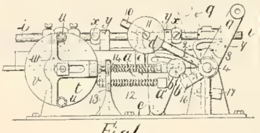


Fig1

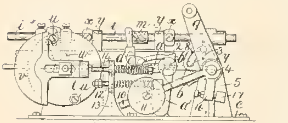


Fig3.

10442 (1912). *Improvements in Lime Cartridges for Breaking Down Coal, Rock and other Minerals.* H. L. Storey, of Bailrigg, Lancaster, and J. Parkinson, of Meadowside, Lancaster.—This invention relates to lime cartridges for breaking down coal or the like, and consists of a hermetically closed outer metal tube, capable of withstanding a high pressure, filled with caustic lime in combination with an interior perforated tube through which water can be forced. According to the present invention, a hermetically sealed metal tube is used, of a gauge suitable to withstand a high pressure, say of 2,000 lb. square inch or more. This tube is approximately the same size or diameter as the borehole, but is of such a length that when inserted into the hole there is left a "bursting" space of 2 in. or 3 in. at the "tight" or rear end of the borehole. The tube is hermetically sealed at its front end, which is provided with a central perforated pipe extending almost to the rear end of the tube; it is then filled with caustic lime, preferably in the form of granules of the size of peas, and the rear end is then hermetically sealed. The charged metal tube is inserted into the borehole and tamped, and water is forced into the cartridge through the pipe, preferably by means of a force pump, the water being prevented from returning by a check valve or other suitable means. The water is thus conveyed to the lime granules, the expansion of which is becoming slaked and the steam generated by the heat exerts a very considerable pressure which ultimately results in the rupture of the external tube, thus obtaining practically a miniature boiler explosion. (One claim.)

15840 (1912). *Improvements in or relating to the Timbering of Mines.* A. Schwesig, Buer, Westphalia, Germany.—In the timbering of mines it is customary to employ wooden props to the head of which a metal cap is applied so as to accommodate the crossbar carrying the roof timbering and enable the prop to be easily removed. The invention relates to a cap of this kind and consists in the provision of two shouldered shells having brackets which intermesh so that, by means of wedges passed through slots in said brackets, the shells can be secured to the head of the prop. Constructed in this manner the same cap will fit props of different dimensions—a fact which is of great advantage since it is necessary to employ props of different carrying capacity and since it is highly inconvenient to make a special metal cap for each particular size of prop. Fig. 1 represent a side view of the device, partly in section; and fig. 2, a plan of the same, also partly in section. (Two claims.)

Fig1

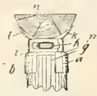
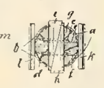
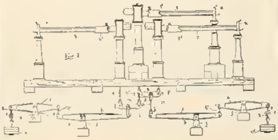
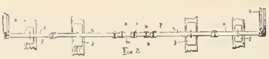


Fig2



18249 (1911). *Improvements in connection with Weighbridges.* W. E. Hipkins, managing director of W. and T. Avery Limited, of Soho Foundry, Birmingham.—This invention has reference to improvements in connection with weighbridges, and more especially to combined weighbridges. Hitherto it has been the practice to put one or more combined weighbridges in or out of gear according to the requirements of the operator; and the novel feature of this invention resides in the combination of weighbridges, whereby the loads thereon may be separately weighed on two or more steelyards, and the combined load on a separate or additional steelyard, the weighing operations being accomplished without the necessity of manual operation of interchanging mechanism; advantages of such construction and arrangement being simplicity of construction and operation, avoidance of error due to repeated connection and disconnection, and the absence of mechanism or gearing for combining the weighbridges. Figs. 1 and 2 show the construction and arrangement of the invention as applied to two weighbridges each having separate connection to a steelyard or other suitable indicating mechanism, and each also having connection to a further steelyard or indicating means for weighing the load on the two weighbridges conjunctively. That is to say, two weighbridges having three





steelyards or other indicating means, two of the steelyards being employed for taking individual or separate loads and one of the steelyards being employed for obtaining the combined load on the two weighbridges. The original combined weighbridge of this type is illustrated in Letters Patent No. 19105 of A.D. 1901, and it is in the achievement of a similar object by more simple means without the employment of changing or operating mechanism or gearing that the present invention resides. In the accompanying figures, *a* is the end of the main transfer lever connected to one of the weighbridges, and *b* is the end of the second transfer lever connected to the other weighbridge or platform in known manner. The levers *a* and *b* are connected by links *c* with the intermediate levers *d* and *e* fulcrummed on bearing blocks *f*. The levers *d* and *e* are in turn connected by links *g* with whipple-tree levers *h* and *i* fulcrummed from brackets *j* by adjustable links or shackles *k*. The whipple-tree levers *h* and *i* are dependent at their one end through links *l* from intermediate levers *m* and *n*, said intermediate levers being respectively supported at one end from the connecting rods *o* and *p*, said rods being separately in connection with the steelyards *q* and *r* for indicating the separate or independent loads on the two weighbridges. The intermediate levers *m* and *n* are supported at their opposite end by the connecting rod *s*, which is connected to the steelyard *t*, said steelyard being for the purpose of indicating the combined load upon the two weighbridges. The weight is indicated in known manner by the poise weights q^1 r^1 and t^1. The free ends of the steelyards move in the usual manner within the carriers or brackets *u*, the purpose of said brackets being to limit the range of movement of the steelyards, said limitation being an essential factor in the operation of this invention. The dependent weights *v* v^1 are for the purpose of ensuring the knife-edges of the levers, being against their bearings and retaining their position, more particularly in the case of the fulcrum bearings of the whipple-tree levers, such means being well known in this connection. The arrows seen in connection with the illustration are for the purpose of indicating the movements of the ends of the levers on application of a load to the weighbridges. The operation of this arrangement and construction of combined weighbridges will now be described when weighing two independent or separate loads, one on each weighbridge. The load on each weighbridge or platform is transmitted through the main transfer levers *a* and *b* and depresses the ends as shown by the arrows (fig. 1), the two loads are transmitted separately through the intermediate levers *d* and *e*, whipple-tree levers *h* and *i* and intermediate levers *m* and *n* to connecting rods *o* and *p*, steelyards *q* and *r*, whereon the loads are separately counterbalanced and indicated by the poise weights q^1 and r^1 respectively. When weighing the separate loads as hereinbefore described the knife-edges m^1 and n^1 of the levers *m* and *n* bearing in the connecting rod *s* become the fulcrums of the levers, the steelyard *t* being held in the bracket or carrier, the connecting rod *s* being therefore vertically held and forming definite fulcrum bearings for the intermediate levers *m* and *n*. The automatic variation in movement effected when weighing the combined load on the steelyard *t* will now be described. The combined load is transmitted through the levers *a* and *b*, *d* and *e*, *h* and *i* in precisely the same manner as when weighing the loads separately; the load is also transmitted to the intermediate levers *m* and *n* through links *l*, but the connecting rods *o* and *p* now become the fulcrum bearings of the levers *m* and *n* and the combined load is transmitted to the connecting rod *s*, steelyard *t* and counterbalanced and indicated by the poise weight t^1; the steelyards *q* and *r* being held within their brackets or carriers u, as previously described. (Four claims.)

18464 (1911). *Improvements in Operating Gear for Internal Combustion Pumps and Compressors.* H. A. Humphrey, 38, Victoria-street, Westminster, W. J. Rusdell, 14, Bean-road, Dudley, and O. D. North, 49, Elm Park-mansions, Chelsea.—This invention relates to operating gear for controlling the valves of internal combustion pumps and compressors. In Specifications Nos. 20736 of 1906, 18594, 19595, 19341 and 22646, all of 1907, and in other subsequent specifications, gear has been described for controlling the valves both for two-cycle and four-cycle types of apparatus. In Specification No. 15820 of 1910 there is described and illustrated an operating device in which a piston of a small motor is caused to move by the changes of pressure in the main apparatus and such movements are utilised to cause a change-over system to take up two alternative positions, such positions acting selectively to lock or release the exhaust and admission valves of the main apparatus. It is also stated in the last-mentioned specification that the valves may be controlled by the pressure changes of the apparatus itself indirectly through a supply of air under pressure, electric current or other independent source of energy. Thus the change-over devices may be utilised to operate two-way cocks so as to supply the compressed air to open or close the valves at the right period of the cycle. It is also mentioned that a pilot valve attached to the piston of the small motor, so that its position is determined by the pressure existing at any moment in the apparatus, may serve to connect the compressed air supply with the pistons attached to the admission valves or to exhaust the compressed air from such pistons. According to the present invention the valves of the main apparatus are locked or released by bolts or by means of pistons acting on the valves or valve stems operated pneumatically or hydraulically and the required compressed elastic fluid or liquid under pressure may be furnished by the small motor operated by pressure changes in the main apparatus, or the main apparatus itself may furnish directly the necessary compressed elastic fluid or the liquid under pressure, which may be contained in a storage vessel whereinto it is forced through a non-return valve from the main apparatus. This method of operating or controlling the valves makes the apparatus self-contained and has the advantage that there is no necessity for an outside source of energy, and that pipes conveying elastic fluid or liquid under pressure may be substituted for the mechanical link work which operates the bolts or other locking device. When applying the invention to a four-cycle pump or compressor the valve-operating gear may be used to lock alternately the

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A large number of these traps have been in use for several years, and our experience has been so satisfactory that we have every confidence in recommending them to steam users. The workmanship and material are of the highest quality, and is altogether a far superior article to the many cheap bucket traps now on the market.

SPECIAL FEATURES.

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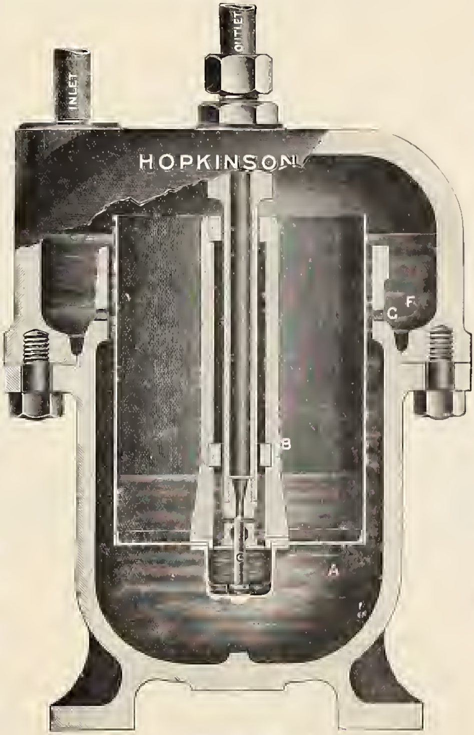
- FITTED WITH VALVE AND SEAT OF HOPKINSON'S 'PLATNAM' METAL, which is five times harder than bronze and admirably suitable for withstanding the cutting action of the water.



CAST IRON BODY AND LID,
HOPKINSON'S "PLATNAM" METAL VALVE AND SEAT.

DESCRIPTION.

This steam trap is of the open float type, and consists in its simplest form of a Water Chamber **A**, Float with central guide **B**, Valve **C**, Water Inlet Pipe, and Water Discharge Pipe. The discharge pipe forms the guide for the float.

The valve remains on its seat until the float has sunk low enough to touch the collar on valve; it then immediately begins to discharge.

The Gallery or Water Pocket **F** is an important feature, as it fills with water when the Float is at rest; when the Float begins to rise from its lowest position, the water thus collected flows through the hole **C** into the body **A**, thus ensuring a rapid elevation of the Float independent of a small amount of water passing into the trap. The valve is not rigidly connected with the bucket, and it is therefore held on to its seat until the Float acts on the Valve. This device is, therefore, most valuable under all conditions of working, but more especially when the volume of water entering the trap is small. Its lifting effect on the Float is indicated by the sharpness with which the water discharge is cut off.

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combustible mixture inlet valves during one out-stroke and the exhaust and scavenging valves during the other out-stroke of the cycle. Also the water valves may be locked and released—as for example, so that the inlet valves may open during the water-suction stroke but are prevented from opening during the period of taking in fresh combustible charge. As another example, the valves on air vessels such as have been described in connection with Specification 19617 of 1910 and which permit the energy causing the return stroke in which exhaust and cushion occur to be less than the energy which causes the instroke during which compression occurs, may also be operated by the present invention. In two-cycle pumps the invention is applicable where, for instance, it is desired to permit first air and then combustible mixture to enter the combustion chamber, or to control the admission of gas or air, the operating gear being used to determine the points of the cycle at which the respective valves open and close. Again, in those types of pumps or compressors where it is desirable that one or more valves should be opened or closed at a given pressure or pressures, the invention is specially applicable because it can be readily arranged to produce the necessary movements when the definite pressures are reached. For instance, the small piston or pistons of the motor can be constrained by springs, the strength of which are adjusted to permit the required movements when the pressures acting upon the piston or pistons reach the desired pressures. The invention is also useful in those cases where, although a valve or valves such as the exhaust valve may be required to open when a definite pressure is reached, no restriction or hindrance may be offered to the free closing of such valve by other means such as by impact, fluid pressure or spring pressure. (Nineteen claims.)

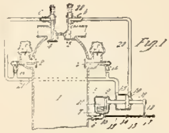
Fig.1

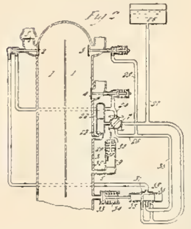
Fig.2

23428 (1911). *Improvements in and relating to Conveyors.* Heenan and Froude Limited, of 4, Chapel-walks, Manchester, Lancashire, engineers, and H. N. Leask, of the same address.—This invention relates to improvements in conveyors, and more particularly to conveyors applicable for use in feeding refuse to the furnaces of refuse destructors. The invention consists essentially in feeding the refuse in any suitable manner, such as by direct tipping or by a hand or other conveyor to a shaker designed to feed the refuse to skips or containers placed upon a travelling band under the feed end of the shaker, each skip or container as it is filled being moved by the travelling band and being then removed therefrom by a crane, trolley or other suitable mechanism and fed to the furnace or furnace container, or stored to be fed to the furnace or container as required. Fig. 1 is a front elevation of one form of the invention; fig. 2, end elevation of same; fig. 3, plan of same. (Four claims.)

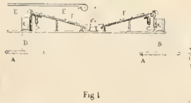

Fig 1

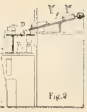

Fig.2

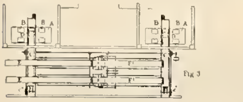

Fig 3

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⁂ Any of the following publications may be obtained on application to this office at the price named post free.

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Woods and Forests: Report, 1911-12, 1s 3d.

Trade of British India, 1906-7 to 1910-11, 1s. 4d.

Statistical Abstract, United Kingdom, 1897 to 1911, 2s. 1d.

East India Railways: Report for 1911, 5s. 6d.

Government Chemist's Report, 1911-12, 4d.

NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

20463. Apparatus for smoke prevention. M. Campbell.
20489. Means for facilitating or expediting the discharge of of coal, ore, grain, and like cargo in bulk from ships and hulks. J. T. Makinson and Mersey Bunkering Company Limited.
20491. Brakes for railway wagons, trucks or the like. D. N. MacClure.
20552. Manufacture of iron or steel. A. Williams and C. P. Williams.
20572. Boiler furnaces. W. H. Holehouse.
20615. Gas-producers. G. H. Bentley and E. G. Appleby.
20629. Fluid compressors. W. R. Hupp.
20643. Furnaces. J. A. Hill.
20675. Weighing apparatus. G. H. Denison.
20676. Hand-actuated brakes of railway wagons and like vehicles. R. Mackie.
20891. Steam generators. E. Makin.
20692. Steam generators. E Makin.
20693. Steam generators. E. Makin.
20698. Automatic couplings for the rolling stock of railways. T. Lee.
20709. Gas generators. C. A. Kuenzel.
20752. Controlling mechanisms for preventing overwinding or running at excessive speeds in winding gears. G. J. F. Black.
20759. Furnaces for decomposing pyrites and other metallic sulphides. W. A. Hall.
20778. Haulage grip wheel. W. Hardcastle.
20788. Treatment of iron for foundry use. A. Rolleson and T. S. Anderson.
20886. Furnaces for utilising oil fuel. H. Hoare and J. T. Evans.
20900. Treatment of gases from coke ovens and of like gases and the recovery of products therefrom. W. H. Coleman.
20930. Apparatus for working brakes. J. E. Anger.
20938. Charging-apparatus or projectors for coal or other solid materials. R. A. Williams and W. J. Jenkins and Co. Limited.
20952. Manufacture of briquettes from ore or blastfurnace dust and organic binding substances soluble in water. Gewerkschaft Pionier.
20968. Air-compressors. M. H. Sturmey and J. J. H. Sturmey.
21015. Centrifugal pumps. A. D. Wadia.

Complete Specifications Accepted.

To be published on October 3.

1911.

13860. Manufacture of blasting explosives. Silberrad.
16168. Working of gas-producers. Chadwick and Hollinshead.
19781. Apparatus for producing gas for driving, heating, and other purposes. Hendunen and Simonenko.
20114. Valves. Havers.
20121. Process and furnace for melting ferro-manganese and other ferro-alloys. Bronn.
29204. Treatment or renovation of foundry sand. Poulson and Poulson's Foundry Specialities Limited.
20312 Fuel-blocks or briquettes. Hoering.
22314. Dumping apparatus for coal cars. Bennett.
23103. Rock drills. Rayner.
23431. Furnaces or the like. Johnson
23524. Construction of elevator. Goodwin.

1912.

1167. Control mechanism for the cage-lifting devices of mining apparatus. Mansfeld'sche Kupferschiefer Bauende Gewerkschaft.
4338. Fuel-economiser. Mulhy.
10577. Device for purifying the steam in steam generators. Luhn.
13657. Rock-drills and like percussive tools. Rayner.
19515. Apparatus for producing gas for driving, heating, and other purposes. Hendunen and Simonenko.

Complete Specification open to Public Inspection before Acceptance.

1912.

550. Portable furnaces. Davis.

PUBLICATIONS RECEIVED.

The Transmission of Heat into Steam Boilers By Hy. Kreisinger and Walter T. Ray. Washington: U.S. Bureau of Mines. (Bulletin 18).

[The results of the investigation described in this lengthy report indicate that the conductivity of the heating plates of steam boilers is so high that the present steaming capacities can be tripled or quadrupled by forcing over the heated surfaces three or four times the weight of gases now passed over them. It is stated that, with well-designed mechanical draught apparatus, this greater weight of gases can be forced through the boilers at small operating cost. The bulletin contains a description and results of original investigations, abstracts from the works of others and discussion thereof, a general discussion of the laws governing the three modes of heat propagation, and the practical application of the laws governing heat transmission to the design of steam plants and steam boilers, and to methods of increasing the capacity and improving the economy of boilers already installed.]

Magazines and Thaw Houses for Explosives. By Clarence Hall and Spencer P. Howell. Washington: U.S. Bureau of Mines. (Technical Paper 18.)

[This bulletin describes the arrangements adopted by the Bureau, and gives a useful summary of foreign regulations relating to the isolation of explosive stores and of various methods of construction.]

The Effect of Stemming on the Efficiency of Explosives. By Walter O. Snelling and Clarence Hall. Washington: U.S. Bureau of Mines. (Technical Paper 17.)

Ignition of Gas by Miniature Electric Lamps with Tungsten Filaments. By H. H. Clark. Washington: U.S. Bureau of Mines. (Technical Paper 23.)

The Publications of the United States Geological Survey (not including Topographic Maps), April 1, 1912. Washington: Government Printing Office.

New Zealand, Mines Department: Mines Statement for the Year 1911. By Hon. James Colvin, Minister of Mines.

Province of Nova Scotia: Report of the Department of Mines, 1911. Halifax, N.S.: Commissioner, Public Works and Mines.

United States Geological Survey: (Bul. 485) "A Geological Reconnaissance of the Iliamna Region, Alaska," by G. C. Martin and F. J. Katz; (Bul. 496) "Results of Triangulation and Primary Traverse for the Years 1909-10," by R. B. Marshall; (Bul. 497) "A Reconnaissance of the Garbridge, Contact, and Elk Mountain Mining Districts, Elks County, Nevada," by F. C. Schrader; (Bul. 500) "Geology and Coalfields of the Lower Matanuska Valley, Alaska," by G. C. Martin and F. J. Katz; (Bul. 506) "Geology and Mineral Resources of the Peoria Quadrangle, Illinois," by J. A. Udden; (Bul. 507) "Mineralogical Notes" (Series 2), by W. T. Schaller; (Water Supply Paper 279) "Water Resources of the Penobscot River Basin, Maine," by H. K. Barrows; (Water Supply Paper 280) "Gauging Stations Maintained by the Geological Survey 1888-1910 and Survey Publications Relating to Water Resources," by B. D. Wood; (Water Supply Paper 282): "Surface Water Supply of the United States, 1910, Part 2, 'South Atlantic Coast and Eastern Gulf of Mexico,'" by M. R. Hall and J. G. Mathers; (Water Supply Paper 285): "Surface Water Supply of the United States, 1910: Part 6, 'Hudson Bay and Upper Mississippi River,'" by R. Follansbee, A. H. Holton and G. C. Stevens; "Technische Auskunft Supplement," Juli; "The Resources of Tennessee" (vol. 2, No. 9), September; "Transactions of the Institution of Mining Engineers" (Vol. xliii., part 5); "Coal near the Black Hills, Wyoming South, Dakota" (United States Geological Survey. Department of the Interior, Bulletin No. 499), by R W. Stone.

Association of Mining Electrical Engineers.—The annual meeting will be held at the Grand Hotel, Sheffield, on Friday, September 27, 1912, at 4.45 p.m.; at 7 p.m. the same evening a dinner will take place at the hotel. On the following day (Saturday) visits will be paid to Messrs. Vickers Limited, River Don Works, Sheffield, and the Dalton Main Colliery Company's Silverwood Colliery, near Rotherham.

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ended Tuesday, September 10, 1912, is as follows:—Amsterdam, 730 tons; Antwerp, 532; Abo, 1,241: Alexandria, 5,068; Bandholm, 2,579; Bombay, 517; Buenos Ayres, 5,887; Bremen, 2,946; Cagliari, 2,732; Constantinople, 1,545; Copenhagen, 200; Christiania, 706; Cronstadt, 10,974; Drammen, 836; Dahlsbruck, 1,814; Drontheim, 132; Danzig, 296; Ghent, 590; Genoa, 4,393; Harlingen, 1,213; Hamburg, 4,580; Harburg, 4,396; Harnes, 1,425; Husum, 480; Kallundborg, 1,121; Kiel, 1.450; Libau, 768; Leghorn, 287: Malmo, 3,932; Nakskov, 939; Naples, 505; Odense, 1,941; Oporto, 1.144; Oxelosund, 3,646; Pernau, 1,438; Port Said, 5,758; Rouen, 2,498; Rotterdam, 7,808; Riga, 2.845; Stettin, 708; Stockholm, 1,298; St. Petersburg, 7,783; Trieste, 147; Venice, 204; Wyborg, 1,087; Wyk, 109; total, 103,226 tons; corresponding period September 1911, total, 83,796 tons; corresponding period September 1910, total, 95,458 tons.

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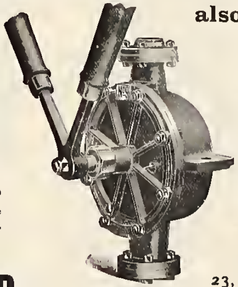

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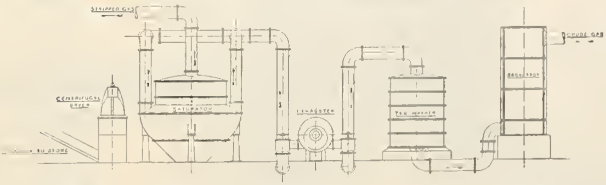

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Purchasers' Guide to Advertisers' Specialities.

Further information can be obtained on reference to the Weekly Alphabetical Index to Advertisers.

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Theedam, E. C., Ld., Dudley
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Accumulators
Pope, Ed., Ld., Belvedere Works, Belvedere, Kent

Acid Plant
Daglish, Robert, and Co. Ld., St. Helens, Lancs.

Air Analysis Apparatus
Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

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Bailey, W. H., and Co. Ld., Salford, Manchester
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co., St. Helens, Lancashire
Davis, John, and Son (Derby) Ld., Derby
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
International Channelling Machines Ld., Sheffield
Llewellyn & Cubitt Ld., Pentre, H.S.O., Glam.
Mining Engineering Co. Ld., (The), Sheffield
Nuneaton Engineering Co. Ld., Nuneaton
Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
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Robey and Co. Ld., Globe Works, Lincoln
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Wood, John, & Sons Ld., Brook Foundry, Wigan

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Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Son, Thompson-street, Bilston
British Mannesmann Tube Co. Ld., London Wall
Lewis, William, and Son, Bilston
Mining Engineering Co. Ld., Sheffield
Stewarts & Lloyds Ld., Birmingham and Glasgow
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Humble, Stephen, 8, Victoria-st., London, S.W.
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Thornton, A. G., Ld., King-st. West, Manchester

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Cables
British Insulated and Helsby Cables Ld., Prescot
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Mavor and Coulson Ld., 47, Broad-street, Glasgow
Shaw, John, Ld., Sheffield

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Haslam and Schontheil Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

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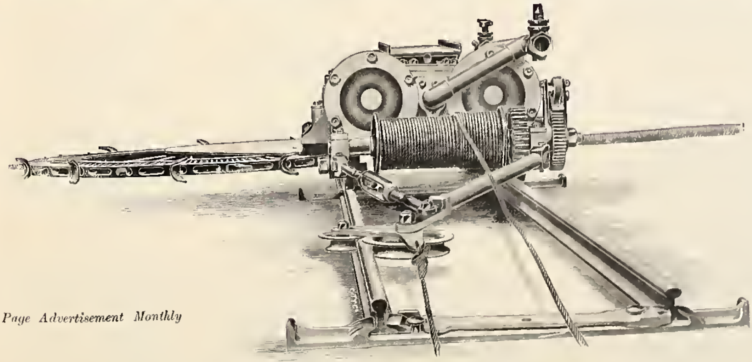

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DOUBLE HELICAL GEAR (MACHINE CUT)
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Citroen, Andre, and Co., 27 Queen Victoria-street, London

DRAIN COCKS
Appleton and Howard, St. Helens, Lancs.
Hopkinson, J., and Co. Ld., Huddersfield

DRAWING INSTRUMENTS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

DRAWING OFFICE STATIONERY
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

DRILLS (ELECTRIC)
United States Metallic Packing Co. Ld., Soho Works, Bradford

DRIVING PULLEYS
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

DUPLEX PUMPING ENGINES
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Evans, Joseph, and Sons Ld., Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Pearn, F., and Co. Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

DUSTBINS (SANITARY)
Baker, John, and Son, Bilston, Staffs
Harvey, G. A., and Co., Lewisham, London, S.E.
Lewis, Wm., and Son, Bilston
Theedam, E. C., Ld., Dudley

DYNAMITE, &C.
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Nobel's Explosives Co. Ld., Glasgow

DYNAMOS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Sutcliffe, Richard, Horbury, near Wakefield

EBONITE AND VULCANITE
Cort, Arthur, & Co., 303½, Camberwell-rd., London

ELECTRIC DETONATORS AND FUSES
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

ELECTRICAL EARTHING CLIPS
Ingle, Albert ... , 13, Albert-place, Bridge street, Manchester

ELECTRICAL ENGINEERS
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mather and Platt Ld., Manchester
Theedam, E. C., Ld., Dudley

ELECTRICAL FAULT INDICATORS
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield

ELECTRIC HAULAGES
Avonside Engine Co. Ld., Bristol
Bridge, David, & Co. Ld., Castleton, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davis, John, and Son (Derby) Ld., Derby
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, R. H., and Co. Ld., Wakefield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

ELECTRIC METERS
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

ELECTRICAL PLANT
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Ward, Thos. W., Limited, Albion Works, Sheffield

ELECTRICAL PUMPS
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

ELECTRICAL STONES
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C., Ld., Dudley

EMERY WHEELS

ENAMELLED PLATES FOR NOTICES FOR MINES
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

ENAMEL MANUFACTURERS (FOR ALL METALS)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalbitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

ENGINEERS (CONSULTING)
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Fell, C. A., Dronfield, near Sheffield
Radford, H. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

ENGINES (BLOWING)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

ENGINES (GAS-COMPRESSING)
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

ENGINES (HAULING AND WINDING)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam
Longbotham, R. H., and Co. Ld., Wakefield

ENGINES (HAULING AND WINDING)—continued.
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, H., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

ENGINES (LOCOMOTIVE)
Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

ENGINES (MARINE TYPE)
Mather and Platt Ld., Manchester

ENGINE MERCHANTS
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

ENGINES (OIL)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

ENGINES PUMPING) (See PUMPS)

ENGINES (ROLLING MILL)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.

ENGINES (STEAM)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

EXHAUST TURBINE REDUCING VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

EXHAUST TURBINE SAFETY VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow

EXHIBITIONS

EXPANSION GEAR
Daglish, Robert, and Co. Ld., St. Helens, Lancs
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

EXPLOSIVES
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

EXPLOSIVES (PERMITTED)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

FANS (AIR PROPELLER)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

FANS (EXHAUST)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

FANS (VENTILATING
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast.
Harvey, G. A., and Co., Lewisham, London, S.E
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

FEED-WATER FILTERS
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

FEED-WATER HEATERS
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

FILES
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & H., & Barber, Bridge-st., Sheffield

FILTERS (OIL)
Pulsometer Engineering Co. Ld., Reading
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Hockley-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

FILTERS (WATER AND GREASE)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

FIRE APPLIANCES
Fell, C. A., Dronfield, near Sheffield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Hockley-lane, Aston Cross, B'ngham

FIRECLAY GOODS
Witton Firebrick Co. Ld., Darlington

FIREWOOD MACHINERY
Glover, M., and Co., Holbeck-lane, Leeds

Purchasers' Guide to Advertisers' Specialities.—(continued).

Firelighter Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Fishplates
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

Fittings (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

Forced Draught
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

Forges
Hardy Patent Pick Co. Ld., Sheffield

Forgings
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld., Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Fuel Economisers
Fell, C. A., Dronfield, near Sheffield
Pillatt and Co., Stapleford, Nottingham
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld., Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Hammerton-st., Burnley
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall

Fuses (Safety)
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Bricks

Gas Engines
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Glover, M., and Co., Holbeck-lane, Leeds
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Gas Exhausters
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Gas Plant
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Tipton

Gas Valves
Haslam and Schontheil Ld., Bristol

Gauge Glasses
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Jacobson, Richard, 70, Shoe-lane, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gear (Special for Motor Lorries Cars &c.)
Brown, David, & Sons (Hudd.) Ld., Huddersfield

Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroën, Andre, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Nuneaton Engineering Co. Ld., Nuneaton.
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Rods Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Gutta Percha
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, R., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Hoists
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Hooks or Links (Safety)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Leampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Hose
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Pulsometer Engineering Co. Ld., Reading
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Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Ryland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hydrometers
Davis, John, and Son (Derby) Ld., Derby

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Bagnall, W. G., Ld., Stafford
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Indiarubber Goods
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Thomas, Wm., Cambrian Mining School, Porth
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Hardy Patent Pick Co. Ld., Sheffield
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Haslam and Schontheil Ld., Cardiff
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Lamps (Miners' Safety)
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Ackroyd and Best Ld., Morley, nr. Leeds
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Lathes
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

Leather Appliances

Lessons by Post
Southern, T. A., Universal Mining School, Cardiff
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Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

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Brown, W. B., and Co. (Bankhall) Ld., Liverpool
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Bridge, David, & Co. Ld., Castleton, Manchester
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Trier Bros., Caxton House, Westminster S.W.

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Lancaster and Tonge Ld., Pendleton, Manchester
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Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Machinery (Second-hand)
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Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Benton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

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Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

Mathematical Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

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Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

Metal Perforators
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

Metallic Packing
United States Metallic Packing Co. Ld., Soho Works, Bradford

Meteorological Instruments
Davis, John, and Son (Derby) Ld., Derby
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Thornton, A. G., Ld., King-st. West, Manchester

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Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
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Robey and Co. Ld., Lincoln
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Thornton, A. G., Ld., King-st. West, Manchester

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Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
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Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

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Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

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British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
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Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

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British Westinghouse Electric and Manufacturing Co. Ld., Manchester
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Avonside Engine Co. Ld., Bristol
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Benton, B. M., and Co., Midland Works, Sheffield

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Oil Bottles
Baker, John, and Son, Bilston, Staffs
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky lane, Aston Cross, B'ham

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Valor Co. Ld., Rocky-lane, Aston Cross, B'ham

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Willcox, W. H., & Co. Ld., 23, Southwark-st., E.C.

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Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland street Works, Birmingham

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Barclay, Andrew, Sons and Co. Ld., Kilmarnock
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
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Robey and Co. Ld., Lincoln
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Walker Brothers (Wigan) Ld., Wigan
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Wright, Joseph, and Co., Tipton

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Greene, Tweed and Co., Westminster
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Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
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Willcox, W. H., & Co. Ld., 23, Southwark st., S.E.

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Theedam, E. C., Ld., Dudley

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Spencer, John, Ld., Tube Works, Wednesbury
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Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Spencer, John, Ld., Globe Tube Works, Wednesbury
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
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Renton, H. M., and Co., Midland Works, Sheffield
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Hardy Patent Pick Co. Ld., Sheffield
Renton, H. M., and Co., Midland Works, Sheffield
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Youngs, Hyland-street Works, Birmingham

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Thompson and Southwick Ld., Tamworth
Thornewill and Warham Ld., Burton-on-Trent
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Spencer and Co. Ld., Melksham, Wilts
Thompson and Co., Wigan
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Mather and Platt Ld., Manchester
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Pearn, Frank, & Co. Ld., West Gorton, Manchester
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Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
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Wood, John, & Sons Ld., Brook Foundry, Wigan

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Tickle Brothers, Vulcan Ironworks, Wigan

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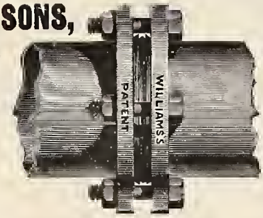

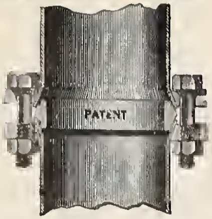

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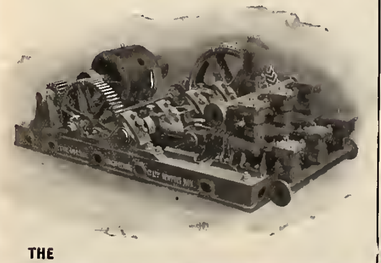

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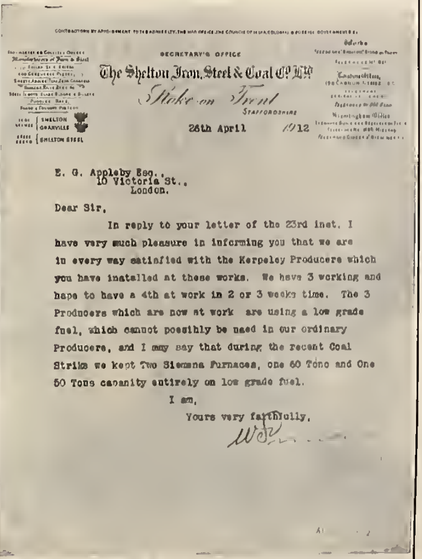

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The Shelton Iron, Steel & Coal Co. Ltd.
Stoke-on-Trent
Staffordshire

26th April 1912

E. G. Appleby Esq.,
10 Victoria St.,
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Dear Sir,

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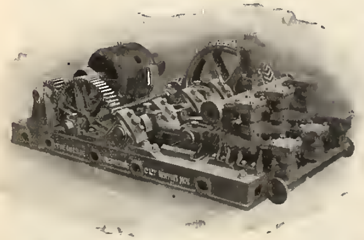

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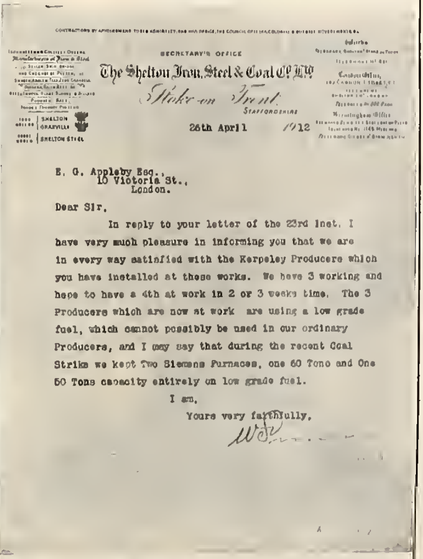

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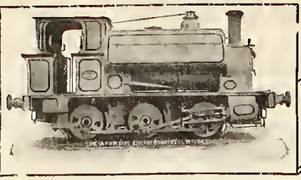

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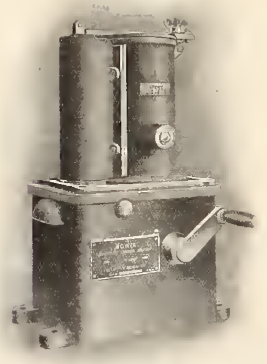

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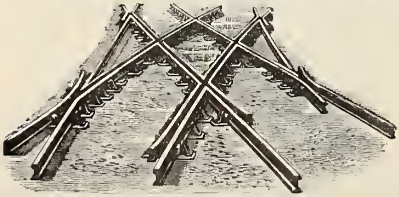

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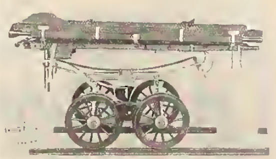

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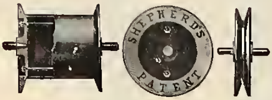

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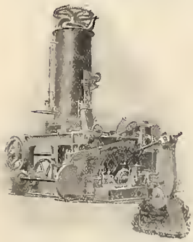

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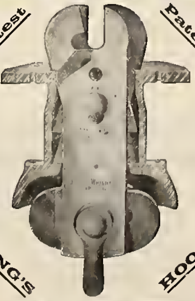

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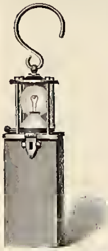

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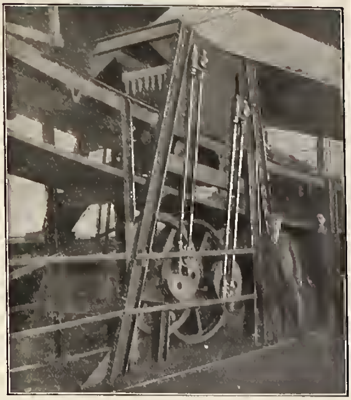

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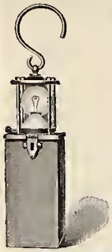

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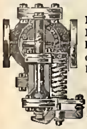

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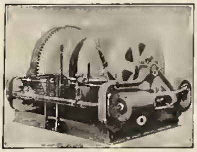

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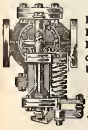

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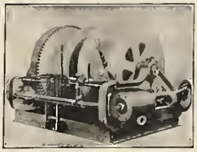

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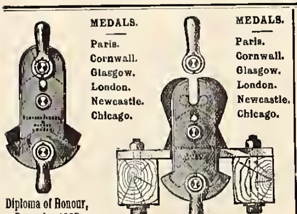

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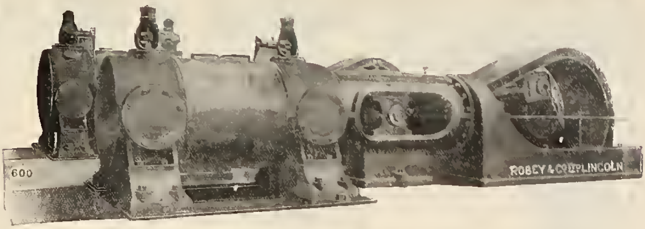

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The Patentee hereby WARNS the trade and the public generally against making, selling, buying, dealing in or using Conveyors made in infringement of the said patent, which it is his intention to support and vindicate by all necessary means including legal proceedings. And further CAUTIONS infringers that they render themselves liable to an injunction or interdict with costs or expenses as well as to damages and delivery up of all infringing apparatus.

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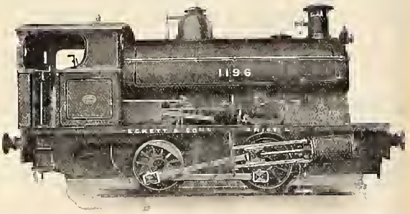

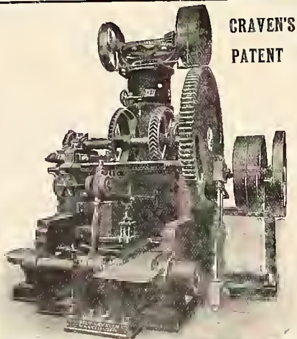

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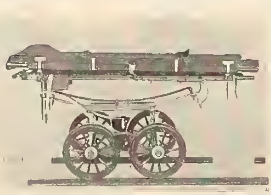

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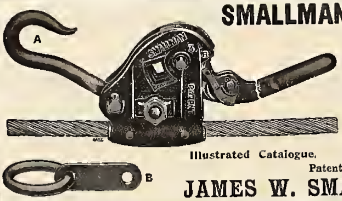

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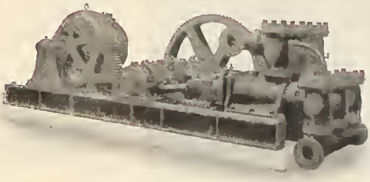

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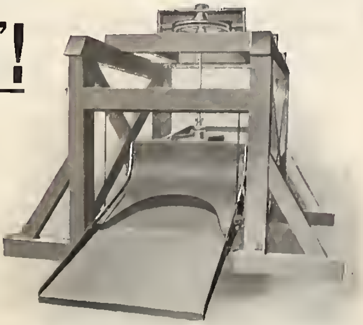

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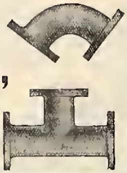

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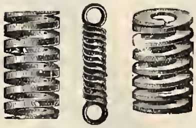

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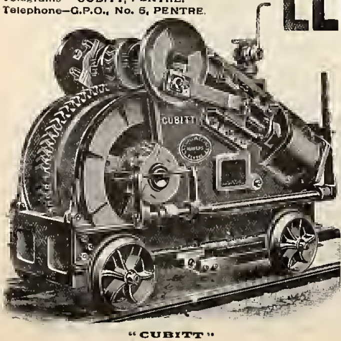

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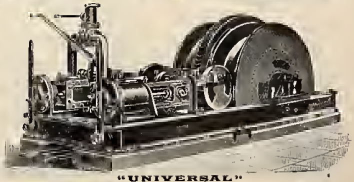

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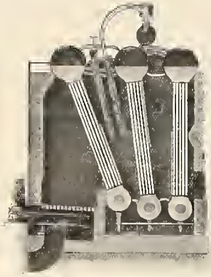
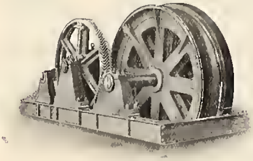


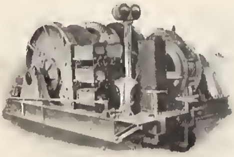
Water-tube Boiler, "Woodeson" patents, Fitted with Patent Superheater and Stoker of the Underfeed Type.

Front Sectional View of Boiler, showing Superheater in Position.



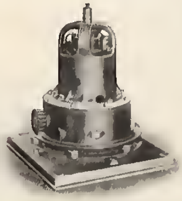
Electric Endless-rope Haulage Gear.

Electric Winding Gear.



Electric Main-and-tail Haulage Gear.

Electric Above-ground Type Capstan.



Electric Above-ground Type Capstan, Motor & Gear with Capstan Removed.

PUMPS "Woodeson" Patents,

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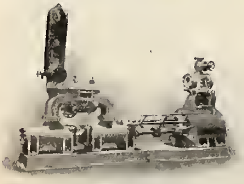
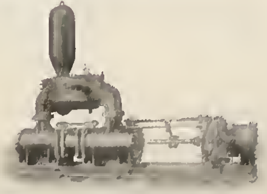


Direct Acting Mine Pump.

Boiler Feed Pump.



Horizontal Coke Quenching Pump.

PAPE ELECTRIC SAFETY LAMPS.

Patent No. 29939—1910

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Lighthouse Type 2/1404.

SPECIFICATION:

Dimensions—
Diameter 2¾ in.
Height 11 in.

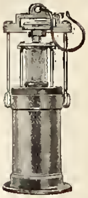
Weight, 5 lb.

Capacity, 2, 1½ o.p. bulbs from from 18 to 20 hours.

Price 37/6.

For use in Gas Works, Oil Tanks, Mines, Garages, Submarines, Sewers, &c.

Type 2 1402.



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10 in. by 3¾ in. diameter.
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Capacity, 1¼ o.p. for 12 hours.

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This lamp has been designed for use by the men in coal mines. The Accumulator is of a specially strong type, and has been manufactured to stand rough usage, to give long life and very low cost of maintenance. The actual capacity also is about 25 per cent. more than is claimed above, which will be found useful in emergencies.

This lamp can also be supplied in quantities on a maintenance contract at a fixed price per lamp per week.

Write for full particulars of our maintenance agreement.

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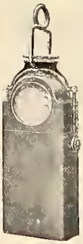

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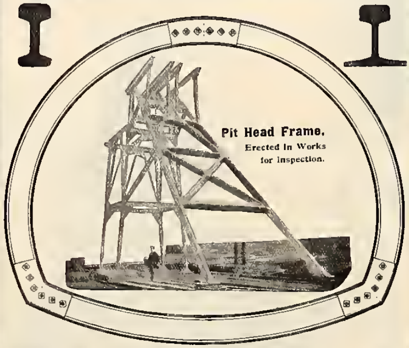

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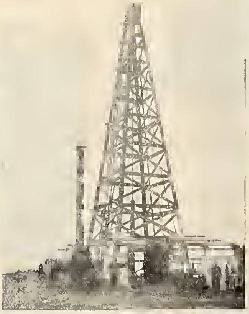

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in Mines and Factories.

— BY —

ELLIS H. CRAPPER, B.Eng., M.I.E.E.,

Head of the Department of Electrical Engineering at the University of Sheffield.

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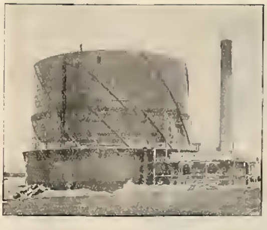

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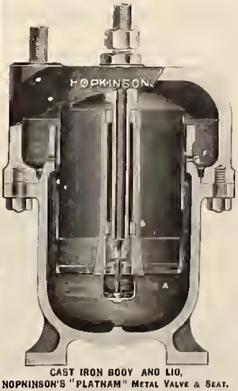

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This steam trap is of the open float type, and consists in its simplest form of a Water Chamber A, Float with central guide B, Valve C, Water Inlet Pipe, and Water Discharge Pipe. The discharge pipe forms the guide for the float.

The valve remains on its seat until the float has sunk low enough to touch the collar on valve; it then immediately begins to discharge.

The Gallery or Water Pocket F is an important feature, as it fills with water when the float is at rest; when the float begins to rise from its lowest position, the water thus collected flows through the hole G into the body A, thus ensuring a rapid elevation of the Float independent of a small amount of water passing into the trap. The valve is not rigidly connected with the bucket, and it is therefore held on to its seat until the Float acts on the Valve. This device is, therefore, most valuable under all conditions of working, but more especially when the volume of water entering the trap is small. Its lifting effect on the Float is indicated by the sharpness with which the water discharge is cut off.

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No. 199.

THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CIV. FRIDAY, SEPTEMBER 27, 1912 No. 2700.

ELECTRIC WINDING ENGINES.[*]

A Comparison of Systems and the Influence of Drum Profile on the Performance Obtained.

By A. E. DU PASQUIER.

(*Continued from page* 584.)

This, then, brings us to one of the principles to be kept in mind when laying out an A.C. winding cycle, and to a large extent for a D.C. winder, inasmuch as the conversion losses are saved; that the accelerating and retardation periods should be so arranged that the accelerating torque turns should equal as nearly as possible the product of the statical moment by the number of revolutions made by the drum in the decelerating period. It is not always possible to arrange for this as closely as one would like, because the wind has to be completed in a given time, and if the decelerating period is extended to utilise efficiently, say, 95 per cent. of the stored energy, it may mean that the maximum velocity may have to be increased, which would again increase the kinetic effect of the system, consequently a compromise has to be struck and the more efficient diagram carefully determined.

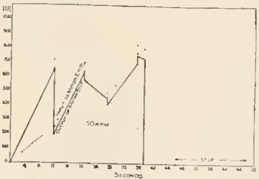


DIAGRAM 9.—WINDING, 3 TONS FROM 1,080 FT.; WINDING, 46 SECS.; BANKING, 20 SECS. (SIMULTANEOUS DECKING); OUTPUT, 164 TONS PER HOUR; CYLINDRO-CONICAL DRUM, 8 FT. 6 IN. TO 13 FT. DIAM. (GEARED 290/50 R.P.M.).

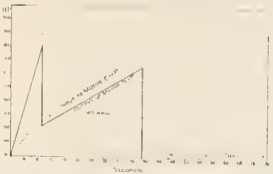


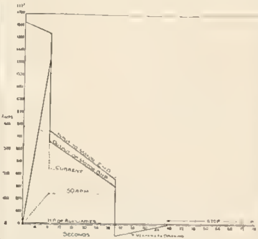
DIAGRAM 10.—WINDING, 3 TONS FROM 1,080 FT.; WINDING, 47 SECS.; BANKING, 30 SECS.; OUTPUT, 140 TONS PER HOUR; PLAIN CYLINDRICAL DRUM, 12 FT. DIAM., TAIL ROPE: 10 LB./FT. (GEARED 290/45 R.P.M.).

Another point in the diagram that has to be carefully considered is the maximum peak load. Having regard to the capacity of the system to which the winder will be connected, it determines whether the load will need equalising or not. Equalising at any reasonable cost is to be avoided. It greatly increases the first cost of the plant, increases the energy consumption per ton of coal raised, and introduces certain additional risks.

This introduces the subject of drum profile. Many most ingenious drums have been designed with a view to getting over the peak difficulty by smoothing out the diagram. Such drums usually contain a nearly parallel starting cone, a rising scroll and a parallel or slightly crowned portion on the largest diameter. The author believes that one of the first drums of quite this type was designed by Mr. Hugh Bramwell for his Maritime pit. It was described at some length in the *Proceedings* of the institute[†] and admirably solved the previously mentioned braking difficulty. In this drum Mr. Bramwell also still further equalised his diagram by arranging for a gradually decreasing rate of acceleration on the scroll; but inasmuch as it is mechanically much more difficult to construct a drum laid out on these lines, and the net gain is small, equalisation is not usually carried to these lengths. The principle of these so-called cylindro-conical drums being, that the acceleration of the drum and motor and descending load shall be completed in the number of turns provided for on the starting cone portion of the drum, during which time the statical moments of the ascending and descending loads are as nearly as possible balanced, so materially reducing the peak demand during the starting period. The drum also has the further advantage that the net statical moment materially increases towards the end of the wind, thus assisting in the more complete utilisation of the stored energy in the masses and thereby increasing the efficiency of the diagram as a whole.

A tail rope is frequently used with a plain cylindrical drum for the same purpose. Though generally less effective, this method of equalising the diagram is sometimes to be preferred to the cylindro-conical drum when dealing with multi-deck cages, as with a cylindrical drum the decking of a two- or three-deck cage can be done with fewer shifts.

Diagrams 9, 10, and 11, calculated for the same duty, bear on this point, and show how the peak load and heating capacity of the motor are affected under these conditions. This particular case was dealing with a three-deck cage, and simultaneous decking was not found practicable. Also, a tail rope was objectionable in this instance, as a muddy sump had to be cleared out every fortnight by winding some 200 trips. The winding performance as shown in diagram 11 was therefore finally selected.



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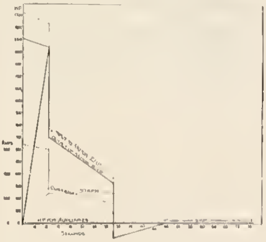

DIAGRAM 12.—WINDING 3 TONS FROM 1080 FT.; WINDING, 47 SECS., BANKING, 30 SECS.; 3-DECK CAGE. OUTPUT, 140 TONS PER HOUR. PLAIN CYLINDRICAL DRUM, 12 FT. DIAM. (GEARED 290/50 R.P.M.).

Diagram 12 was calculated for the same conditions, but with a geared winder. It is worth noting that the peak load is increased, due to the greater inertia of the motor and gearing and slightly decreased efficiency. The greater inertia is again shown in the respective amounts of mechanical braking necessary in each case; but the improvement in the current demand due to the better power factor of the higher speed motor is very obvious, and the geared proposition also had a considerable advantage in first cost.

A comparison of diagram 9 with 11 and 12 shows very clearly the marked improvement which could be effected in the diagram if local conditions would allow. It may be pointed out how the absence of a tail rope not only increases the peak horse-power through the absence of balance, but still further increases it by forcing up the maximum velocity in order to get the cage to bank in the same time without excessive braking. If anyone will take the trouble to recalculate diagram 12 for the same maximum velocity as has been taken in diagram 10 with the 10 lb. tail rope, he will find his diagram quite impossible on this account.

TABLE 1.

Drum.	Drum speed r.p.m.	Motor h.p.	Motor speed r.p.m	Tail rope.	Units per wind.	Accelerating peak.	Price ratio.	Diagram No.
Cylindro-conical 8 ft. 6 in. to 13 ft.	50	480	290	—	4·8	720	1·1	9
Cylindro-conical 8 ft. 6 in. to 13 ft.	50	400	50	—	4·8	700	1·55	—
Cylindrical 12 ft.	50	750	290	—	5·6	1,730	1·1	12
Cylindrical 12 ft.	45	480	290	10 lb. per ft.	4·75	900	1·0	10
Cylindrical 12 ft.	50	730	50	—	5·5	1,030	1·68	11
Cylindrical 12 ft.	50	465	50	10 lb. per ft.	4·6	870	1·58	—

As this is generally typical of the medium-sized A.C. hoist, the principal points have been tabulated in Table 1.

DETAILS OF WINDER.

Depth of shaft	1,080 ft.
Load	3 tons.
Number of decks per cage	3
Weight of each cage and chains . ..	80 cwt.
Number of tubs per deck	2
Weight of each tub.... ..:..... .. .	6 cwt.
Diameter of rope	5¼ in.
Weight per yard	14 lb.
Winding time	47 secs.
Decking time	30 secs.
Output per hour	140 tons.

A hoist of this nature would be quite impossible operated off the ordinary colliery generating station, or small power company, and under such conditions of supply the colliery company would have to adopt an equalised system at a cost of about 50 per cent. more.

---

[*] From a paper read before the South Wales Institute of Engineers, and published in the *Proceedings*.

[†] Vol. 26, No. 1, Part 2, p. 131.

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AND JOURNAL OF THE COAL AND IRON TRADES.

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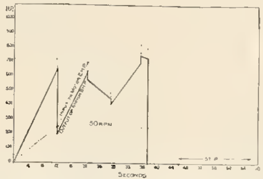

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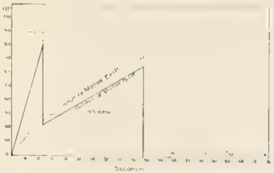

DIAGRAM 10.—WINDING, 3 TONS FROM 1,080 FT.; WINDING, 47 SECS.; BANKING, 30 SECS.; OUTPUT, 110 TONS PER HOUR; PLAIN CYLINDRICAL DRUM, 12 FT. DIAM.; TAIL ROPE 10 LB./FT. (GEARED 200/45 R.P.M.).

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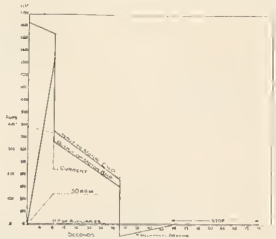

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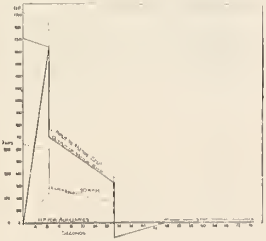

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A tail rope is frequently used with a plain cylindrical drum for the same purpose. Though generally less effective, this method of equalising the diagram is sometimes to be preferred to the cylindro-conical drum when dealing with multi-deck cages, as with a cylindrical drum the decking of a two- or three-deck cage can be done with fewer shifts.

Diagrams 9, 10, and 11, calculated for the same duty, bear on this point, and show how the peak load and heating capacity of the motor are affected under these conditions. This particular case was dealing with a three-deck cage, and simultaneous decking was not found practicable. Also, a tail rope was objectionable in this instance, as a muddy sump had to be cleared out every fortnight by winding some 200 trips. The winding performance as shown in diagram 11 was therefore finally selected.

Diagram 12 was calculated for the same conditions, but with a geared winder. It is worth noting that the peak load is increased, due to the greater inertia of the motor and gearing and slightly decreased efficiency. The greater inertia is again shown in the respective amounts of mechanical braking necessary in each case; but the improvement in the current demand due to the better power factor of the higher speed motor is very obvious. and the geared proposition also had a considerable advantage in first cost.

A comparison of diagram 9 with 11 and 12 shows very clearly the marked improvement which could be effected in the diagram if local conditions would allow. It may be pointed out how the absence of a tail rope not only increases the peak horse-power through the absence of balance, but still further increases it by forcing up the maximum velocity in order to get the cage to bank in the same time without excessive braking. If anyone will take the trouble to recalculate diagram 12 for the same maximum velocity as has been taken in diagram 10 with the 10 lb. tail rope, he will find his diagram quite impossible on this account.

As this is generally typical of the medium-sized A.C. hoist, the principal points have been tabulated in Table 1.

DETAILS OF WINDER

Depth of shaft	1,080 ft.
Load	3 tons.
Number of decks per cage	3
Weight of each cage and chains	80 cwt.
Number of tubs per deck	2
Weight of each tub	6 cwt.
Diameter of rope	5¼ in.
Weight per yard	14 lb.
Winding time	47 secs.
Decking time	30 secs.
Output per hour	140 tons.

A hoist of this nature would be quite impossible operated off the ordinary colliery generating station, or small power company, and under such conditions of supply the colliery company would have to adopt an equalised system at a cost of about 50 per cent. more.

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* From a paper read before the South Wales Institute of Engineers, and published in the *Proceedings*.

† Vol. 26, No. 1, Part 2, p. 131.

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It may be worth noting here that a magnetic coupling is not a flexible coupling and consumes energy, and it is better to provide some approved type of reversible flexible coupling with suitable friction clutch attachment. Some form of brake for promptly stopping the wheel on emergency is usually supplied. This is occasionally made of the eddy current type, consisting of a simple form of electric magnet applied with a reasonable air gap to the face of the wheel, the degree of excitation, and consequently the braking effect, being controlled by means of a small rheostat. It is very questionable whether such brakes have any real advantage over the ordinary hand-operated beam brake. Sometimes when repeated lowering trips are necessary, it has been suggested that such an eddy current brake should be utilised for absorbing the energy which has to be dissipated. This introduces many complications. The A.C. motor must be switched out of circuit. It may mean that the flywheel must be run without wind screens to assist in cooling the rim, which materially increases the running losses, or must be completely enclosed and the pit arranged for flooding and water cooling under these conditions. The better way is to regenerate back on to the line. Lowering trips would not generally be made with the A.C. supply disconnected, and even if it was necessary to do this at least one full trip could usually be lowered without the flywheel attaining a dangerous speed.

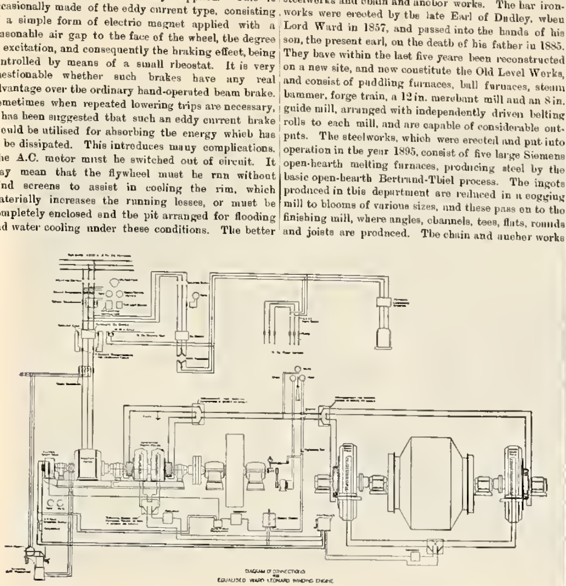

FIG. 2.

Fig. 1 shows a typical Ward-Leonard equaliser layout, fig. 2 being the diagram of connections.

(To be continued.)

Scotch Railway Coal Consumption.—The value of the coal consumed in the locomotive departments of the five principal Scotch railways—the Caledonian, the Glasgow and South-Western, the Great North of Scotland, the Highland, and the North British—during the six months ending July 31 this year compared as follows with the corresponding value in the corresponding period of 1911:—

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North British	130,541	137,423
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The distances run by trains upon the five systems in the periods under review were:—

System.	July 1912. Miles.	July 1911. Miles.
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Great North	990 414	1,078,820
Highland	1,237,230	1,358,070
North British	8,141,017	9,119,367
Total	21,031 207	23,251,206

Electric working has made less progress in Scotland than in England, and a Scotch locomotive coal comparison is, accordingly, closer than in this country. It will be observed that the Scotch have brought their usual economy to bear upon railway working during the last few months, and that a considerable reduction was effected in the past half-year in the number of train miles run. This was due to the alarm occasioned by the great coal strike, and to the restrictive effect which it had upon general traffic. The Scotch companies appear to have sustained the strain of the coal strike very well, all things considered; at the same time, the return obtained upon Scotch railway capital is none too liberal. With these observations, we report the general fact that the cost of locomotive coal upon the five principal Scotch railways in the six months ending July 31 this year was 4·33d. per train mile run, as compared with 3·88d. per train mile run in the corresponding period of 1911.

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During the recent visit of the members of the Institution of Mining Engineers to Birmingham an excursion took place to the Earl of Dudley's Round Oak Works, and the Baggeridge Colliery closely associated with the same undertaking.

The Round Oak Works consist of bar iron works, steelworks and chain and anchor works. The bar ironworks were erected by the late Earl of Dudley, when Lord Ward in 1857, and passed into the hands of his son, the present earl, on the death of his father in 1885. They have within the last five years been reconstructed on a new site, and now constitute the Old Level Works, and consist of puddling furnaces, ball furnaces, steam hammer, forge train, a 12 in. merchant mill and an 8 in. guide mill, arranged with independently driven belting rolls to each mill, and are capable of considerable outputs. The steelworks, which were erected and put into operation in the year 1895, consist of five large Siemens open-hearth melting furnaces, producing steel by the basic open-hearth Bertrand-Thiel process. The ingots produced in this department are reduced in a cogging mill to blooms of various sizes, and these pass on to the finishing mill, where angles, channels, tees, flats, rounds and joists are produced. The chain and anchor works are principally engaged in chain cable and gear for the British Admiralty, and consist of steam hammers of various sizes, and long ranges of side-welding and end-welding fires.

Adjoining the above-mentioned works are his lordship's blast furnaces, where various qualities of pig iron are produced, including basic pig iron for the steelworks. This last-named iron is conveyed by a locomotive in a molten condition to the mixer or large storage furnace, situated midway between the blast furnaces and the steelworks, and is there stored in a molten state until required by the steelworks.

Baggeridge Colliery is interesting as being the first pit sunk over the western edge of the visible coal measures. The South Staffordshire coalfield is bounded on the east and west by large faults, running approximately north and south, bringing in the new red sandstone. These faults are regular and equable, and preserve a mean course with persistency, and, where curving, do so gradually with a wide and steady sweep. For some time it was debated whether the eastern and western boundaries were of the nature of cliffs or faults. If cliffs, a great portion of the coal between this coalfield and others would have been removed by denudation. The Sandwell Park and Hamstead sinkings, which reached the Ten-yard coal at the respective depths of 420 and 620 yards, disproved the cliff theory, so far as the eastern boundary was concerned; but it was not until 25 years had elapsed that the Baggeridge shaft struck the coal, and demonstrated the similarity of the western fault to the eastern one. The sinking has proved the thick coal and its associated seams at an approximate depth of 600 yards.

The principal winding shaft is 17 ft. in diameter in the clear, and will be fitted with two cages, each with four decks, holding two tubs on each deck. The tubs weigh 8 cwt. and carry 16 cwt. of coal, so that the total weight of coal lifted each time will be approximately 6½ tons; but the deadweight on the engine at the commencement of the lift is 17 tons. The maximum velocity attained in the shaft is 63 ft. per second in 7 seconds from rest, retardation also taking 7 seconds. The total time occupied by the cages ascending the shaft will be 43 seconds, and tubs will be changed on all four decks simultaneously by an hydraulic banking arrangement. Subsidiary cages are lifted by hydraulic power, and the tubs are also pushed off and on the principal cages by hydraulic rams.

The whole of the steam-raising plant is to be of modern description. All the engines are of the compound type. The four-cylinder compound winding engines have been designed to avoid certain unfavourable features which sometimes exist in this type of engine adapted for winding purposes. In the first place, they will be attached to a condenser, which not only reduces the back pressure but permits of the complete utilisation of the expansive force of the steam. In the absence of a condenser, the final pressure in the low-pressure cylinder must be much greater than that of the atmosphere in order to obtain a free and rapid exhaust. The high- and low-pressure cylinders are arranged tandem fashion, and are each fitted with a liner which forms a space for jacket steam: the idea being to reduce cylinder condensation. This point is of no little importance, and, in order to reduce the loss still further, the intervals between successive winds are made as small as possible by adopting a rapid method of changing the four decks of the cage simultaneously; and, as a result, the cylinders have a shorter time to cool after the steam has been cut off. The inlet and outlet valves on all four cylinders are of the Corliss type; they are double-ported, and are operated by one wrist plate. The steam valves are closed by vacuum dash-pots, and the point of cut-off is controlled by a governor. With compound engines a high initial steam pressure is essential, and an expansion gear should come into operation as soon as the engine has attained its normal speed, and be so arranged as to produce a low terminal pressure. The range of cut-off is from zero to 40 per cent., and is adjusted to come into operation before the maximum speed is reached. When the engines start, all cylinders will be taking steam practically at full stroke. When at about 80 per cent. of the maximum speed, cut-off commences in the high-pressure cylinder, but does not start in the low-pressure cylinder until a few strokes afterwards. This has the effect of bringing down the receiver-pressure, which rises when the engine has reached full speed. The receiver itself is of the utmost importance. It is placed between the engines, and has a volume equal to from 2½ to 3 times the capacity of the low-pressure cylinder. It is of the reheater type, and restores part of the heat lost by expansion in the high-pressure cylinders. The latter take steam direct from the boilers, admission being controlled by a throttle valve. The low-pressure cylinders take steam from the reheater receiver, admission also being controlled by a throttle valve. Both these valves are of balanced design, are fitted with pilot valves, and are connected together and controlled by one handle on the driver's platform. In this way the receiver pressure is maintained at some fixed amount that enables the engine to start promptly on the return journey, and renders unnecessary the employment of a reducing valve under normal working conditions. The engines are fitted with a steam brake, steam reversing gear and Whitmore controlling gear, by which means full steam can be put against the engines at any time, no matter at what speed they may be running. The high-pressure cylinders are 26 in. and the low-pressure cylinders 45 in. in diameter, by 6 ft. stroke. The drum is slightly conical, commencing at a diameter of 17 ft. and finishing at 18½ ft. It is a built-up drum of wrought steel and weighs 45 tons.

The headgear pulleys are carried on springs, so as to reduce the strain on the winding rope at the moment when the load is lifted; and Beien keps are installed, these allowing the cage to be lowered without first having to be lifted. The guides consist of locked coil wire ropes of special section steel, and the troughs at the pit top are fitted with a sliding locking block, which ensures correct alignment of the cages.

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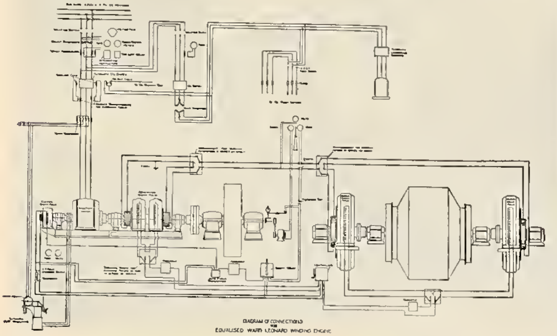

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The whole of the engines will eventually exhaust into a central condenser, which will have to deal with about 90,000 lb. of steam per hour. No engine is strong enough direction, the traveller moves and the stop at once trips the release. The whole action is simplicity itself, and it takes less than a minute to put everything into gear again ready for resuming winding.

The inventors claim that this gear is the simplest and cheapest on the market. Mr. Jackson is well known in the Midlands as a mining engineer; and Mr. Staley, who has been associated with him for many years, has had a long experience in all branches of colliery engineering. It is most highly spoken of by all who have seen it, on account of its simple character, reliability and cheapness. We are given to understand that anyone may see the machine on making an appointment with either Mr. Jackson or Mr. Staley at the colliery.

SOUTH WALES INSTITUTE OF ENGINEERS.

Meeting at Swansea.

A general meeting of the South Wales Institute of Engineers was held at Swansea on Tuesday, September 17. The lecture hall of the Royal Institution of South Wales was well filled on this, the first occasion that a general meeting of the institute has taken place at Swansea since the institute founded a permanent home at Cardiff in the early nineties. For many years after its establishment in 1857, the meetings of the institute were held at different centres of population in South Wales, including, of course, Swansea, in which town resided for a lengthened period the late Mr. Hort Huxham, the secretary.

Prof. W. Galloway, president, explained at the meeting now under notice that some members hailing from the western part of the coalfield had suggested that the importance of the district warranted an effort being made to form an engineers' institute that would consider subjects appertaining to the industries of the neighbourhood; leaving to the South Wales Institute of Engineers matters relating to the eastern district. The council gave the question careful consideration, and came to the conclusion that, in the interests of all branches of engineering in South Wales, it was preferable to have one strong body. In order, however, to meet in some measure the wish of the western members, the council had decided to hold two of the institute's general meetings every year at Swansea, when a strong endeavour would be made to get papers submitted which should have special bearing on the engineering aspects of the important industries that were being rapidly developed in the locality. The council had confidence that in this innovation they would receive the cordial co-operation of engineers in the western district.

Mr. Henry Lynch Blosse, Cardiff, and Mr. D. J. Davies, Aberdare, were elected members of the institute; and the following were added to the roll of student members:—Martin M. Jones, Felinfoel, near Llanelly; R. C. Jones, Llanelly; and D. C. Samuel, Llanelly.

Construction of the Severn Tunnel.

Mr. A. O. Schenk, M.Inst.C.E., chief engineer to the Swansea Harbour Trust, read a paper on the "Construction of the Severn Tunnel," with which great undertaking he was professionally associated in his early career.

In proposing a vote of thanks to Mr. Schenk, the President said the author had invested his subject with intense interest, and most of them must have learned a great deal they did not know before of one of the finest engineering works ever carried through in this country. Although completed many years ago, the Severn Tunnel had still important lessons for them, and Mr. Schenk's record, based on so much first-hand information, was an invaluable document.

The resolution of thanks was adopted with acclamation.

Features in the Design of the Modern Blastfurnace.

Mr. David E. Roberts, M.Inst.C.E., Cardiff, read a short paper on "Certain Features in the Design of the Modern Blastfurnace," the subject being illustrated with numerous lantern views. He showed how increasing use was being made of water for keeping the brickwork cool in the various parts of the blastfurnace, particularly in the lining proper, and in treating this branch of the subject he divided up the furnace into the hearth, the bosh and the stack, and treated of them separately. With regard to the hearth, Mr. Roberts dealt fully with the various kinds of steam jackets that were employed, and explained in detail the several means of applying the water to same. He then referred to the cooling of the bosh, and described fully the several kinds of plated boshes, giving, with details, the various designs of troughing that had been applied, such as the spiral, the cascade and other patterns. He also gave in full detail an account of what, in his opinion, was the best form of bosh cooling—namely, that provided by many suitably arranged copper coolers penetrating well into the material of the furnace. Mr. Roberts then dealt with the third portion—namely, the stack, or body, of the furnace—and described at length the various types of the design now come to be known as the thin-lined furnace. He gave numerous details showing the form of construction employed, and showed photographs of furnaces of this pattern in actual stages of construction. He explained that, in addition to the great advantage of decreased weight on the columns and the reduced cost of material, a very important further advantage was to be considered—namely, that of the maintenance of the correct lines of the furnace over a considerable period—and he expressed the opinion that the thin-lined furnace was a pattern that had come to stay. He also showed how this particular type of lining had been applied to an old furnace without in any way disturbing the old shell or the top.

Discussion on Mr. Roberts's paper was postponed.

A New Mechanical Puddling Furnace.

Mr. David E. Roberts then read a paper descriptive of the Roe mechanical puddling furnace. At the outset, he recalled that during the past 25 or 30 years steel has been replacing wrought iron in almost all directions; but he pointed out that it was now being found that for certain purposes—roof plating and buried pipes, underframes of rolling stock, etc.—steel is not so satisfactory as wrought iron. The puddling of iron in this country was becoming more difficult each year to keep going. It was now only carried on in a few districts, the most important obstacle to the process being the difficulty of obtaining qualified puddlers; and no mechanical means had hitherto been sufficiently successful to entirely replace the simplest puddling furnace operated by human hands. The author of the paper went on to say that Mr. James P. Roe, of Pottsdown, Pennsylvania (originally of Consett, Durham) had been connected with ironmaking all his life, and a few years ago he came to the conclusion that he could devise a scheme for making wrought iron mechanically. His idea was something upon the principle of an inclined trough of indefinite length, lined all the way with the necessary compound or fettling; and he urged that if molten iron was poured in at the one end (and assuming there was no loss of heat), then a point would be reached somewhere down the incline where the necessary change, now brought about in the puddling furnace, would have been reached by the metal running down. As, however, a long trough would be an impracticable arrangement, it occurred to him that a short one arranged as a kind of see-saw would serve the same purpose. Mr. Roe read a paper upon his process before the Iron and Steel Institute in 1906. Since then the design and arrangement of the Roe process had been developed, and recently the Reading Ironworks, the largest makers of iron in America, had taken it up. After a year or two's investigation of Mr. Roe's process, the Reading Ironworks Corporation were so satisfied that they had determined to spend a large sum of money in laying down a plant to produce in this way wrought iron in such quantities and at such cost as would greatly extend their market. The first instalment of this expenditure on the Roe mechanical puddling plant was something like £200,000.

Mr. Roberts proceeded to show slides of the plant. These included the hydraulic squeezer into which the iron bloom is discharged, and which compresses it into a slab; and the furnaces, each of which is capable of making a cast of a 2½-ton ingot once every hour. In fact, it was a case of "making iron on steel lines."

The discussion was adjourned.

Mr. H. T. Wales (presiding over the latter part of the proceedings) moved a vote of thanks to Mr. D. E. Roberts for his papers, and Mr. W. D. Wight (ex-president) seconded.

The council of the Royal Institution of South Wales was thanked for granting the use of the premises, on the proposition of Mr. H. T. Wales, seconded by Mr. John Davies, Cwmfelin, Swansea, and Major J. E. Thomas acknowledged the vote on behalf of the council.

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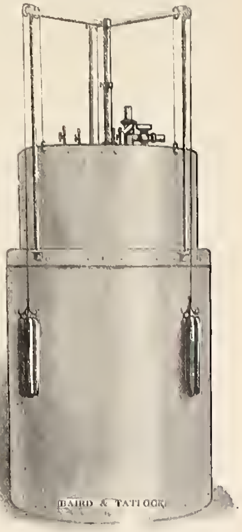

Fig. 1.—Apparatus for Mixing Air and Gas in Definite Percentages.

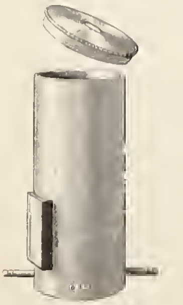

Fig. 2.—Receivers for Safety Lamps.

direction, the traveller moves and the stop at once trips the release. The whole action is simplicity itself, and it takes less than a minute to put everything into gear again ready for resuming winding.

The inventors claim that this gear is the simplest and cheapest on the market. Mr. Jackson is well known in the Midlands as a mining engineer; and Mr. Staley, who has been associated with him for many years, has had a long experience in all branches of colliery engineering. It is most highly spoken of by all who have seen it, on account of its simple character, reliability and cheapness. We are given to understand that anyone may see the machine on making an appointment with either Mr. Jackson or Mr. Staley at the colliery.

SOUTH WALES INSTITUTE OF ENGINEERS.

Meeting at Swansea.

A general meeting of the South Wales Institute of Engineers was held at Swansea on Tuesday, September 17. The lecture hall of the Royal Institution of South Wales was well filled on this, the first occasion that a general meeting of the institute has taken place at Swansea since the institute founded a permanent home at Cardiff in the early nineties. For many years after its establishment in 1857, the meetings of the institute were held at different centres of population in South Wales, including, of course, Swansea, in which town resided for a lengthened period the late Mr. Hort Huxham, the secretary.

Prof. W. GALLOWAY, president, explained at the meeting now under notice that some members hailing from the western part of the coalfield had suggested that the importance of the district warranted an effort being made to form an engineers' institute that would consider subjects appertaining to the industries of the neighbourhood; leaving to the South Wales Institute of Engineers matters relating to the eastern district. The council gave the question careful consideration, and came to the conclusion that, in the interests of all branches of engineering in South Wales, it was preferable to have one strong body. In order, however, to meet in some measure the wish of the western members, the council had decided to hold two of the institute's general meetings every year at Swansea, when a strong endeavour would be made to get papers submitted which should have special bearing on the engineering aspects of the important industries that were being rapidly developed in the locality. The council had confidence that in this innovation they would receive the cordial co-operation of engineers in the western district.

Mr. Henry Lynch Blosse, Cardiff, and Mr. D. J. Davies, Aberdare, were elected members of the institute; and the following were added to the roll of student members:—Martin M. Jones, Felinfoel, near Llanelly; R. C. Jones, Llanelly; and D. C. Samuel, Llanelly.

Construction of the Severn Tunnel.

Mr. A. O. SCHENK, M.Inst.C.E., chief engineer to the Swansea Harbour Trust, read a paper on the "Construction of the Severn Tunnel," with which great undertaking he was professionally associated in his early career.

In proposing a vote of thanks to Mr. Schenk, the PRESIDENT said the author had invested his subject with intense interest, and most of them must have learned a great deal they did not know before of one of the finest engineering works ever carried through in this country. Although completed many years ago, the Severn Tunnel had still important lessons for them, and Mr. Schenk's record, based on so much first-hand information, was an invaluable document.

The resolution of thanks was adopted with acclamation.

Features in the Design of the Modern Blastfurnace.

Mr. DAVID E. ROBERTS, M.Inst.C.E., Cardiff, read a short paper on "Certain Features in the Design of the Modern Blastfurnace," the subject being illustrated with numerous lantern views. He showed how increasing use was being made of water for keeping the brickwork cool in the various parts of the blastfurnace, particularly in the lining proper, and in treating this branch of the subject he divided up the furnace into the hearth, the bosh and the stack, and treated of them separately. With regard to the hearth, Mr. Roberts dealt fully with the various kinds of steam jackets that were employed, and explained in detail the several means of applying the water to same. He then referred to the cooling of the bosh, and described fully the several kinds of plated boshes, giving, with details, the various designs of troughing that had been applied, such as the spiral, the cascade and other patterns. He also gave in full detail an account of what, in his opinion, was the best form of bosh cooling—namely, that provided by many suitably arranged copper coolers penetrating well into the material of the furnace. Mr. Roberts then dealt with the third portion—namely, the stack, or body, of the furnace—and described at length the various types of the design now come to be known as the thin-lined furnace. He gave numerous details showing the form of construction employed, and showed photographs of furnaces of this pattern in actual stages of construction. He explained that, in addition to the great advantage of decreased weight on the columns and the reduced cost of material, a very important further advantage was to be considered—namely, that of the maintenance of the correct lines of the furnace over a considerable period—and he expressed the opinion that the thin-lined furnace was a pattern that had come to stay. He also showed how this particular type of lining had been applied to an old furnace without in any way disturbing the old shell or the top.

Discussion on Mr. Roberts's paper was postponed.

A New Mechanical Puddling Furnace.

Mr. DAVID E. ROBERTS then read a paper descriptive of the Roe mechanical puddling furnace. At the outset, he recalled that during the past 25 or 30 years steel has been replacing wrought iron in almost all directions; but he pointed out that it was now being found that for certain purposes—roof plating and buried pipes, underframes of rolling stock, etc.—steel is not so satisfactory as wrought iron. The puddling of iron in this country was becoming more difficult each year to keep going. It was now only carried on in a few districts, the most important obstacle to the process being the difficulty of obtaining qualified puddlers; and no mechanical means had hitherto been sufficiently successful to entirely replace the simplest puddling furnace operated by human hands. The author of the paper went on to say that Mr. James P. Roe, of Pottsdown, Pennsylvania (originally of Consett, Durham) had been connected with ironmaking all his life, and a few years ago he came to the conclusion that he could devise a scheme for making wrought iron mechanically. His idea was something upon the principle of an inclined trough of indefinite length, lined all the way with the necessary compound or fettling; and he argued that if molten iron was poured in at the one end (and assuming there was no loss of heat), then a point would be reached somewhere down the incline where the necessary change, now brought about in the puddling furnace, would have been reached by the metal running down. As, however, a long trough would be an impracticable arrangement, it occurred to him that a short one arranged as a kind of see-saw would serve the same purpose. Mr. Roe read a paper upon his process before the Iron and Steel Institute in 1906. Since then the design and arrangement of the Roe process had been developed, and recently the Reading Ironworks, the largest makers of iron in America, had taken it up. After a year or two's investigation of Mr. Roe's process, the Reading Ironworks Corporation were so satisfied that they had determined to spend a large sum of money in laying down a plant to produce in this way wrought iron in such quantities and at such cost as would greatly extend their market. The first instalment of this expenditure on the Roe mechanical puddling plant was something like £200,000.

Mr. Roberts proceeded to show slides of the plant. These included the hydraulic squeezer into which the iron bloom is discharged, and which compresses it into a slab; and the furnaces, each of which is capable of making a cast of a 2½-ton ingot once every hour. In fact, it was a case of "making iron on steel lines."

The discussion was adjourned.

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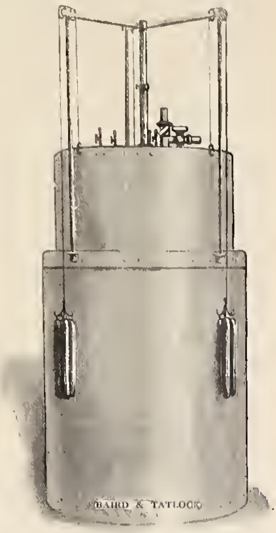
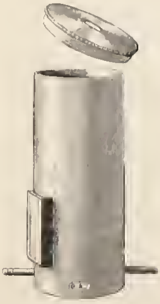


FIG. 1.—APPARATUS FOR MIXING AIR AND GAS IN DEFINITE PERCENTAGES.



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[FROM OUR OWN CORRESPONDENT.]

Interpretation of New District Rules; Independent Chairman Decides—Exemptions Refused to Collieries on the South Crop and in Monmouthshire—Miners' Executive and the Ballot on Re-organisation, Two-third Vote; Centralisation Difficulties Foreseen and Described—The Weakening of the Federation One Result of "Forward" Policy Increased Mixing Charges at Docks in South Wales—High Ship-freights, and the Future Prospect—Annual Conference of Miners' Federation of Great Britain at Swansea.

An important meeting of the statutory District Board took place on Friday, Lord St Aldwyn being present to deal with questions that had been referred to him, arising out of the new district rules. The sitting was a very long one, but it is satisfactory to state that the decisions arrived at dispose of almost all the questions that were in issue between the two sides. On the assumption that no litigation arises as to certain rules being *ultra vires*, peace is assured till the end of the twelvemonth. Several points had been settled amicably, but those which came before Lord St. Aldwyn were of considerable importance.

The employers suggested a clause whereby—when a man found his place become abnormal and claimed the minimum wage, if the management were dissatisfied with the amount of work performed for the minimum wage—they should be at liberty to put him upon the daywagemen's minimum of 4s. 3d. instead of the piecework minimum of 4s. 7d Lord St. Aldwyn, however, decided against this.

Upon an attempted classification of certain men as "flatters," his lordship was also adverse; and these must rank as timbermen, which gives them 5d. per day more in wages. The two sides also failed to agree as to what weeks should be counted in making up the averages—whether they should be two weeks preceding or the two weeks succeeding a dispute; but his lordship decided that they should be two weeks during which the men had been working under normal conditions.

As to classification of roller men, wire men and certain others, he urged the parties to try and reach an agreement between themselves; and this matter was therefore referred back. Another question, however, as to the rate payable to a collier who had worked for more than seven days in three months away from his working place—whether the 4s. 7d. rate must be paid for the whole number of days worked, or only for the number of days exceeding the seven—his lordship ruled that the workman was entitled to the 4s. 7d. throughout if he was employed at another place for more than seven days.

His lordship decided that bonus turns should be paid at the old rate and not at the minimum rate.

With regard to the custom at collieries of ceasing work on account of a fatal accident, Lord St. Aldwyn upheld the owners—this is, his award overruled the former custom that when a fatal accident occurred the whole of the men were entitled to stop work.

Another question was the number of shifts to be worked by night men so as to enable them to qualify for the minimum wage. The daymen have to work five turns out of the six in order to qualify, but as to night men, these are paid six turns for five and the owners held that the men must work five shifts before being entitled to the minimum. Lord St. Aldwyn decided that the five-sixths rule must apply, and decided that a way out of the difficulty was to calculate upon six weeks, so that the night men would have to work on an average five weeks out of six—that is, 25 out of 30 shifts, in order to qualify for the minimum.

Upon the claim of certain owners on the South Crop, and of some others in the Eastern Valleys of Monmouthshire for special treatment, his lordship ruled against them; and it follows therefore that there will be no exception from the award, except in the case of the Pembrokeshire collieries.

The miners' executive meet in Cardiff on Saturday; and although the votes upon the question of re-organisation were only about two-thirds of the membership of the Federation, namely, 85,000 out of about 120,000 (there being a majority of 10,000 in favour of abolishing the present districts), they decided that this was sufficient to warrant their going forward with the new scheme. It has to be noted also that the present membership of the Federation leaves probably 100,000 men outside the organisation; so that the new system will have been brought about by little more than one-third of the workmen in the coalfield. It will do away with the present districts, and extinguish their powers of home rule hitherto exercised, and will centralise the operations. One point as to which criticism has been directed is that in future the detail of disputes, etc., in the different areas will all have to be dealt with by the central authority. There will be no change in subscriptions, although this has been advocated in certain quarters. The executive which is to be established under the new organisation will be composed of the Federation officials, with between 20 and 30 elected members; the agents in the different areas will become servants of this executive, losing their former characteristics of advisers in their own localities. Quarterly conferences will determine the policy.

During the meeting Mr Ben Davies, of the Rhondda, pointed out that it was practically impossible to deal by central conferences with such disputes as in the past had been settled at district meetings. Plenary powers to settle minor disputes should be given to responsible officials. He mentioned several instances where disputes had been settled speedily when such power had been given, whereas had matters been delayed the probability was that a small dispute would have developed into a lengthy and costly struggle. The unfortunate Cambrian dispute was one case in point. In that difficulty the men insisted upon retaining the power to settle, and over and over again they spurned the terms gained for them by their representatives. Hence a strike which cost the federations and men a quarter of a million of money; and after all they were compelled to accept the terms agreed upon by their representatives at the start. There was grave danger in schemes which encouraged delay in the settlement of disputes, while, on the other hand, accredited representatives, if given power to settle in the initial stages, might gain something for the men which would not be offered later.

This speech probably had some effect upon the executive, for the completion of the scheme was referred to the drafting committee, who will bring it before a conference, and it may be that another ballot will be taken upon the final form.

For a good time now the methods of the South Wales Federation have been under the influence of the new school of leaders, and the end is not yet by any means. Already, however, there have been such experiences as should give the workmen pause. From their point of view a strong trade union is essential. How have the doings of the extremists affected the strength and stability of their organisation? The settlement, for the time being, of matters at issue make it opportune to enquire what has been the outcome of agitation and Parliamentary intervention.

Before the recent disputes, the Federation, which now has a membership of less than 120,000, had nearer 150,000 connected with it; and the real difference is much greater than these figures suggest, for in the interval there has been a large increase in the number of men employed—men who should have become recruits to the organisation. The funds were at that time higher than they had ever been before—approximating to a quarter of a million sterling. Good wages had prevailed until the ill-omened Eight Hours Act came into force and reduced the earning power of willing workers.

Extremists were loud and persistent in criticism of the old leaders, those who had steered the ship to the period of high wages and fair terms, and dissatisfaction thus created has had its course during the two years and more that have since passed. It was against the advice of the old leaders that the long and costly Cambrian strike drifted through a whole twelvemonth, to be ended without any benefit to the men. The Aberaman conflict was also a heavy loss. Later came the rejection of the old leaders as members of the Miners' Federation of Great Britain executive; part of the policy which continued to its issue in the national strike, and to-day the position of the Federation tells the tale of "forward" policy—in practical extinction of funds, in heavily-depleted membership, and in internecine struggles over reorganisation, which will make for anything rather than hearty co-operation in building up a powerful union. Frequent levies, heavy burette is filling; and, in case it should be necessary to repeat the analysis, the stopper should be again inserted under water, so that the residual air can be discharged from the burette and curved tube before the second sample is taken in.

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[FROM OUR OWN CORRESPONDENT.]

Interpretation of New District Rules: Independent Chairman Decides—Exemptions Refused to Collieries on the South Crop and in Monmouthshire—Miners' Executive and the Ballot on Re-organisation, Two-third Vote: Centralisation Difficulties Foreseen and Described—The Weakening of the Federation One Result of "Forward" Policy—Increased Mixing Charges at Docks in South Wales—High Ship-freights, and the Future Prospect—Annual Conference of Miners' Federation of Great Britain at Swansea.

An important meeting of the statutory District Board took place on Friday, Lord St. Aldwyn being present to deal with questions that had been referred to him, arising out of the new district rules. The sitting was a very long one, but it is satisfactory to state that the decisions arrived at dispose of almost all the questions that were in issue between the two sides. On the assumption that no litigation arises as to certain rules being *ultra vires*, peace is assured till the end of the twelvemonth. Several points had been settled amicably, but those which came before Lord St. Aldwyn were of considerable importance.

The employers suggested a clause whereby—when a man found his place become abnormal and claimed the minimum wage, if the management were dissatisfied with the amount of work performed for the minimum wage—they should be at liberty to put him upon the daywagemen's minimum of 4s. 3d. instead of the piecework minimum of 4s. 7d. Lord St. Aldwyn, however, decided against this.

Upon an attempted classification of certain men as "flatters," his lordship was also adverse; and these must rank as timbermen, which gives them 5d. per day more in wages. The two sides also failed to agree as to what weeks should be counted in making up the averages—whether they should be two weeks preceding or the two weeks succeeding a dispute; but his lordship decided that they should be two weeks during which the men had been working under normal conditions.

As to classification of roller men, wire men and certain others, he urged the parties to try and reach an agreement between themselves; and this matter was therefore referred back. Another question, however, as to the rate payable to a collier who had worked for more than seven days in three months away from his working place—whether the 4s. 7d. rate must be paid for the whole number of days worked, or only for the number of days exceeding the seven—his lordship ruled that the workman was entitled to the 4s. 7d. throughout if he was employed at another place for more than seven days.

His lordship decided that bonus turns should be paid at the old rate and not at the minimum rate.

With regard to the custom at collieries of ceasing work on account of a fatal accident, Lord St. Aldwyn upheld the owners—this is, his award overruled the former custom that when a fatal accident occurred the whole of the men were entitled to stop work.

Another question was the number of shifts to be worked by night men so as to enable them to qualify for the minimum wage. The daymen have to work five turns out of the six in order to qualify, but as to night men, these are paid six turns for five and the owners held that the men must work five shifts before being entitled to the minimum. Lord St. Aldwyn decided that the five-sixths rule must apply, and decided that a way out of the difficulty was to calculate upon six weeks, so that the night men would have to work on an average five weeks out of six—that is, 25 out of 30 shifts, in order to qualify for the minimum.

Upon the claim of certain owners on the South Crop, and of some others in the Eastern Valleys of Monmouthshire for special treatment, his lordship ruled against them; and it follows therefore that there will be no exception from the award, except in the case of the Pembrokeshire collieries.

The miners' executive meet in Cardiff on Saturday; and although the votes upon the question of re-organisation were only about two-thirds of the membership of the Federation, namely, 85,000 out of about 120,000 (there being a majority of 10,000 in favour of abolishing the present districts), they decided that this was sufficient to warrant their going forward with the new scheme. It has to be noted also that the present membership of the Federation leaves probably 100,000 men outside the organisation; so that the new system will have been brought about by little more than one-third of the workmen in the coalfield. It will do away with the present districts, and extinguish their powers of home rule hitherto exercised, and will centralise the operations. One point as to which criticism has been directed is that in future the detail of disputes, etc., in the different areas will all have to be dealt with by the central authority. There will be no change in subscriptions, although this has been advocated in certain quarters. The executive which is to be established under the new organisation will be composed of the Federation officials, with between 20 and 30 elected members, the agents in the different areas will become servants of this executive, losing their former characteristics of advisers in their own localities. Quarterly conferences will determine the policy.

During the meeting Mr Ben Davies, of the Rhondda, pointed out that it was practically impossible to deal by central conferences with such disputes as in the past had been settled at district meetings. Plenary powers to settle minor disputes should be given to responsible officials. He mentioned several instances where disputes had been settled speedily when such power had been given, whereas had matters been delayed the probability was that a small dispute would have developed into a lengthy and costly struggle. The unfortunate Cambrian dispute was one case in point. In that difficulty the men insisted upon retaining the power to settle, and over and over again they spurned the terms gained for them by their representatives. Hence a strike which cost the federations and men a quarter of a million of money; and after all they were compelled to accept the terms agreed upon by their representatives at the start. There was grave danger in schemes which encouraged delay in the settlement of disputes, while, on the other hand, accredited representatives, if given power to settle in the initial stages, might gain something for the men which would not be offered later.

This speech probably had some effect upon the executive, for the completion of the scheme was referred to the drafting committee, who will bring it before a conference, and it may be that another ballot will be taken upon the final form.

For a good time now the methods of the South Wales Federation have been under the influence of the new school of leaders, and the end is not yet by any means. Already, however, there have been such experiences as should give the workmen pause. From their point of view a strong trade union is essential. How have the doings of the extremists affected the strength and stability of their organisation? The settlement, for the time being, of matters at issue make it opportune to enquire what has been the outcome of agitation and Parliamentary intervention.

Before the recent disputes, the Federation, which now has a membership of less than 120,000, had nearer 150,000 connected with it; and the real difference is much greater than these figures suggest, for in the interval there has been a large increase in the number of men employed—men who should have become recruits to the organisation. The funds were at that time higher than they had ever been before approximating to a quarter of a million sterling. Good wages had prevailed until the ill-omened Eight Hours Act came into force and reduced the earning power of willing workers.

Extremists were loud and persistent in criticism of the old leaders, those who had steered the ship to the period of high wages and fair terms, and dissatisfaction thus created has had its course during the two years and more that have since passed. It was against the advice of the old leaders that the long and costly Cambrian strike drifted through a whole twelvemonth, to be ended without any benefit to the men. The Aberaman conflict was also a heavy loss. Later came the rejection of the old leaders as members of the Miners' Federation of Great Britain executive; part of the policy which continued to its issue in the national strike, and to-day the position of the Federation tells the tale of "forward" policy in practical extinction of funds, in heavily-depleted membership, and in internecine struggles over reorganisation, which will make for anything rather than hearty co-operation in building up a powerful union. Frequent levies, heavy grants from the Miners' Federation of Great Britain, and borrowings, have not availed to make for the success of the schemes put forward. On the contrary, the miners now find themselves tied hand and foot by legal enactments, which not only prescribe the hours of labour but also the rates of pay—a beginning of statutory regulations that destroys freedom of bargaining and opens out an assured prospect of methods of regulation such as its real authors would be the first to object to.

The loss of union funds and the limitation of freedom are only part of the losses that have had to be endured, for to these must be added the heavy loss of earnings during the strikes—many thousands of pounds. A weaker union, a poorer union, reduced earning power through time limit, and the statutory regulation of wages—these are some of the results of the efforts of new men with new methods, who have pushed matters during the past two or three years.

The new and greatly-increased charges of mixing coal at the South Wales and district docks comes into force on October 1; and although, as reported at the time, the Cardiff Chamber of Commerce appointed a committee to confer with the respective dock managers, no meeting has yet taken place, owing to absences on account of holidays. The committee met, went fully into the subject, agreed upon the line of action to be followed, and communicated with the dock offices, seeking an interview; but nothing more than a formal acknowledgment of the letter was received. What is now suggested is that the Chamber of Commerce should endeavour to obtain postponement of the application of the new scale of charges. The Freighters' Association, which met on Monday last, had the matter before them; and a committee was appointed to go into the matter and to co-operate with the chamber. Representatives of the Swansea Chamber, on Tuesday, met representatives of the four railway companies that have interests in that town; and a long discussion took place, but nothing definitive was accomplished

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Mr. H. H. Evans, manager of the Bwllfa Colliery, has been appointed agent for the Albion Collieries, and commences duty on October 1. Mr. Evans (who is a "self-made" man, having had in early life to abandon his apprenticeship and work as collier boy owing to the death of his father in the Mardy explosion of 1885) was presented on Saturday by the Bwllfa staff with an attaché bag and a set of portraits. For some time he was undermanager of the Gelli pits, and he holds the Edward Medal for bravery. He is a member of the Aberdare District Council.

It is announced that Messrs. Baldwin have decided to spend £300,000 upon extension of their steelworks at Port Talbot, three new Siemens furnaces to be erected. Another new plate mill and a section mill will also be constructed.

After hearings which have extended over seven days, the Abertillery magistrates have committed to the assizes eight out of 14 men charged with offences arising out of the disturbances at Cwmtillery Colliery at the beginning of July. Bail was granted.

Special interest attaches to the annual statement of shipping, because of the present scarcity of tonnage, with the consequent very high rates of freight, these being practically double those that have prevailed for years, and thus imposing a peculiar burden upon the coal trade. During 1911, no fewer than 778 vessels were added to Lloyd's Register totalling 748,364 tons; but there is a still larger number yet to be added to the register, for the total number launched was no less 1,398 with a tonnage of 1,107,790; and as is well known the shipyards are at the present time fully employed, so that it cannot be long before the increase of tonnage makes itself felt in the freight market.

Last week, we outlined the work of the annual conference of the Miners' Federation of Great Britain, which commences next Tuesday in Swansea. Strong effort will be put forth by South Wales representatives so that the central body shall take action for bringing surface workers (who in this district, though not in England, are Federation members) under the provisions of the Eight Hours Act, and also the Minimum Wage Act. For South Wales representation on the Miners' Federation of Great Britain executive, local voting is this week in progress, and the result is awaited with all the more interest, because, twelve months ago, old leaders were ousted and men of the more "advanced" school were put into office from this district.

EXAMINATION FOR JUNIOR INSPECTORS OF MINES AND QUARRIES.

We are able to give below, by permission of the Controller of H.M. Stationery Office, particulars of the examination for junior inspectors of mines and quarries held during June 1912. These have been published by the Civil Service Commissioners in a Buff Paper, price 1s.

For the office of junior inspector of mines and quarries, the subjects of examination are as follow:—

(1) English, maximum marks 400; (2) elementary mathematics, 200; (3) elementary geology, 200; (4) coal-mining, 1,000; (5) ore and stone mining, 300; (6) electricity in mines, 300; (7) law relating to mines and quarries, 200; (8) oral examination, 400; (9) chemistry, 400; (10) physics, 400. Candidates must qualify in each of the subjects numbered 1, 4, 5, and 6, and must also obtain such an aggregate of marks in all the subjects numbered 1 to 8 taken together as to satisfy the Civil Service Commissioners. Subjects 9 and 10 are optional, and only one of them may be offered.

The limits of age are 23 and 35, with an extension to 45 in the case of a candidate who has served as a sub-inspector, with the certificate of the Civil Service Commissioners, from a time when he was under 35

The following is a syllabus of the examination:—

English includes composition, the writing of reports and *précis* writing, but does not include indexing. Attention is paid to handwriting and spelling in this as in other subjects.

Elementary mathematics includes arithmetic, algebra to quadratic equations, plane geometry, plane trigonometry, to the solution of triangles.

Elementary Geology. — Outlines of physical geology, including the physical characters and chemical composition of rock-forming minerals and the classification and description of rocks; elements of stratigraphy with special reference to the British Isles; the construction and interpretation of geological maps and sections; the occurrence of coal, stone and metalliferous minerals. In this subject there will be a laboratory test in addition to the written test.

Coalmining, theoretical and practical, including systems of sinking and working, methods of supporting roofs and sides, mechanical engineering applied to coalmining, theory and practice of ventilation, surveying and making of plans, use of explosives, mine gases and their analysis, prevention of accidents, rescue work and the restoration of mines after explosions and fires. Mining hygiene.

Ore and Stone Mining, theoretical and practical, including methods of sinking and working, methods of supporting excavations, mechanical engineering applied to ore and stone mining, ventilation of metalliferous mines, prevention of accidents. Ore dressing. Mining hygiene.

Electricity in Mines.—Installation and use of electricity in mines, including the practical units of measurements and the use of simple measuring instruments; transmission and use of electricity by alternating and direct currents; the construction of cables and the jointing and testing of cables; earthing; the rules as to the use of electricity in mines and the prevention of accidents.

Law Relating to Mines and Quarries.—Knowledge of the Coal Mines Regulation Acts, the Metalliferous Mines Regulation Acts, the Quarries Act, and the rules and orders made thereunder.

Oral Examination.—Questions may be asked on coal-mining, ore and stone mining, and electricity.

Chemistry.—The principles of inorganic chemistry and the study of the occurrence, modes of preparation, and properties of the principal elements and their more important compounds. Questions may be set on the chemical principles involved in the commercial preparation of important inorganic substances. Elementary organic chemistry. In this subject there will, in addition to the written test, be a laboratory test which will include the preparation and qualitative and quantitative analysis of inorganic substances. Candidates may bring into the examination room any printed works on analysis; no written notes of any kind will be allowed.

Physics includes heat, light, sound, electricity, and theoretical and applied mechanics. In this subject there will be a laboratory test in addition to the written test.

The June examination did not include the Coal Mines Act, 1911, but included the special rules for the installation and use of electricity, dated March 1912.

Below we give a selection of the papers set at the examination held on June 4 to 8, 1912. The results of the examination were given in the last issue of the *Colliery Guardian* (p. 584):—

English Composition. (Time allowed, 1½ hours.)

Choose one of the following subjects:—

1. What effect has the miner's occupation on his physique?
2. Describe the system of ventilating mines.
3. "Great Britain depends mainly upon her industrial activities and her ability to compete in the markets of the world." How far is this true?

English. Writing Reports. (Time allowed, 1½ hours.)

Choose one of the following subjects:—

1. An accident has happened in connection with blasting operations at a quarry. Write a report of a visit to the scene of the accident, stating how far the accident seems to you to have been preventable or otherwise, and what steps you would recommend for avoidance of similar accidents in future.
2. You have been asked to visit a mine with a view to reporting whether any general measures can be taken to lessen the number of accidents in its working. Write a report of your investigation.

English. Précis. (Time allowed, 1½ hours.)

Make a *précis* of the printed matter herewith.*

A *précis* of a document or series of documents is intended to enable a person to grasp on reading it the main points and the general effect of the matter summarised.

Your *précis* should take the form of a consecutive narrative, without marginal references; it should be lucid succinct, and omit no important point; the language of the original may sometimes be suitable for your purpose, but it is more likely to be unsuitable. The length of the *précis* should be between 200 and 300 words.

Attention should be paid to neatness, handwriting, spelling, grammar, and style.

Mathematics (Time allowed, three hours).

Tables of weights and measures are shown on the cover of the answer book (those data are shown on page 13). For full credit numerical results must be given only to the degree of accuracy that is asked for or is justified by the data.

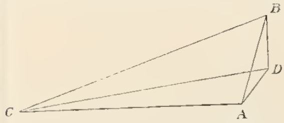
1. The Budget estimates for the United Kingdom for the year 1912-1913 show a total revenue of £187,200,000, and a revenue from taxes of £153,800,000. Of the revenue from taxes, England contributes £124,400,000, Scotland £18,300,000, and Ireland £11,100,000. Find how much per cent. of the revenue from taxes is contributed by each division of the United Kingdom, and how much per cent. of the total revenue is derived from taxes. Give each result to the nearest whole number.

2. Three metals, which weigh p q r lb. per cubic foot, are united in the respective proportions of $a : b : c$ by weight to form an alloy; no change of volume taking place. Show that the volume in cubic inches of 100 lb. of the alloy is

$$\frac{172{,}800}{a+b+c}\left(\frac{a}{p}+\frac{b}{q}+\frac{c}{r}\right)$$

Find the volume to the nearest cubic inch, if the proportions by weight are 21 : 6 : 5, and their weights in pounds per cubic foot are 1·206, 656, 556.

3. A hill rises 1 vertical in 4 horizontal to a height of 300 ft., and a zig-zag road is to be carried up it with a uniform gradient of 1 vertical in 10 horizontal. The figure shows the line of greatest slope A B, one lap C B of the zig-zag, and the vertical rise D B of the lap. The plane A B C is in the surface of the hill, and the plane A C D is horizontal. In terms of B D calculate the other distances shown in the figure; also calculate the angle A B C made by a lap with the line of steepest slope.



4. At a point outside a circular enclosure the angle between the two tangents to the enclosure drawn from the point is 70 degs., and each tangent is 10 ft. long. Calculate the area of the enclosure.

5. Prove that the diagonals of a parallelogram bisect each other. A stile S is at the midpoint of the side B C of a triangular field A B C, the line A S being 45 yards long, and inclined at 20 degs. and 30 degs. respectively to the sides A B and A C of the field. Draw a plan of the field, describing your method of finding B C. Calculate the lengths of the sides of the field, and its area.

6. A tunnel 8 ft. wide makes at one place a sharp rectangular bend. Rails 3 ft. apart are to be laid along the tunnel, so as everywhere to be at least a foot from the walls of the tunnel. The straight parts of the rails are to be connected with each other by circular arcs. Find the greatest possible radii of these arcs, consistent with the conditions. Illustrate by a diagram to scale.

7. A long cylindrical pipe of large bore is sunk vertically into the ground, and within it is a smaller pipe, the two pipes being made of metal ¼ in. thick. They are of such diameters that the inner air-space, and the annular air-space between the pipes, are equal. If the internal radius of the small pipe is x feet, and that of the large one z feet, write down the equation between x and z, and draw a graph showing the values of z corresponding to values of x between 0 and 6 inches. Find from the graph the value of x when $z = 8$ in., *i.e.*, when the internal diameter of the large pipe is 16 in.

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* The printed matter is not given here. It consisted of the minutes of evidence taken on November 12, 1909, before the Departmental Committee on the Employment of Children Act.

Weights and Measures, Imperial and Metric; and Constants

1 MEASURE OF DISTANCE: OR LINEAR MEASURE.

12 inches = 1 foot. 10 millimetres = 1 centimetre.
3 feet = 1 yard. 100 centimetres = 1 metre.
1,760 yards = 1 mile. 1,000 metres = 1 kilometre.
100 links = 1 chain
= 22 yards.
1 cm. = 0 394 inch. 1 km. = 0 621 mile.
1 m. = 1·09 yards 1 in = 2·54 centimetre.

Less important:—

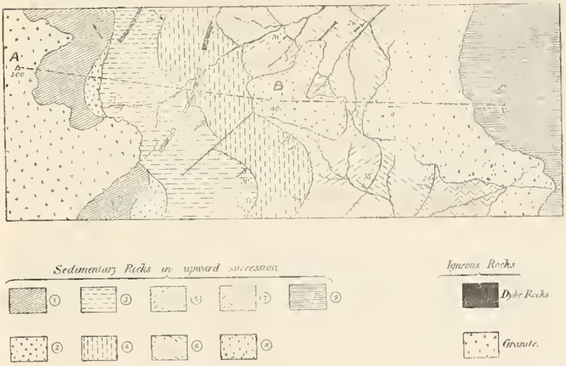
1 pole or rod = 5·5 yards 1 cable = 608 feet.
1 furlong = 220 yards. 1 sea mile = 6,080 feet.
10 decimetres = 1 metre.

2 MEASURE OF AREA: OR SQUARE MEASURE.

144 sq. inches = 1 sq. foot. 100 sq. cm. = 1 sq. dcm.
9 sq. feet = 1 sq. yard. 100 sq. dcm. = 1 sq. metre.
484 sq. yards = 1 sq chain. 10,000 sq m. = 1 hectare.
10 sq. chains = 1 acre. 100 hectares = 1 sq. kilo.
640 acres = 1 sq. mile.
1 sq cm. = 0·155 sq inch. 1 sq. in = 6·45 sq. cm.
1 hectare = 2·47 acres.

Less important:—

1 square rod or pole = 30·25 square yards.
1 rood = 40 square poles. 1 are = 100 square metres.



3. MEASURE OF VOLUME: OR CUBIC MEASURE, MEASURE OF CAPACITY, AND LIQUID MEASURE.

1,728 cubic inches = 1 cubic foot. 1,000 c. cm. = 1 c. dcm.
= 1 litre.
27 cubic feet = 1 cubic yard.
1 gallon = 277 cubic inches.
1 cubic foot = 6·23 gallons.
1 c cm. = 0·0610 c. inch. 1 c. in. = 16·4 c. cm.
1 litre = 0·220 gallons.

Less important:—

2 pints = 1 quart. 8 gallons = 1 bushel.
4 quarts = 1 gallon. 8 bushels = 1 quarter.
100 centilitres = 1 litre.
100 litres = 1 hectolitre.

4. MEASURE OF WEIGHT.

16 ounces = 1 pound. 1,000 grammes = 1 kilogram.
112 pounds = 1 cwt. 1,000 kilograms = 1 metric tonne.
20 cwt. = 1 ton.
1 kg. = 2·20 lb. 1 lb. = 454 grammes.
1 tonne = 0 984 ton.

Less important:—

7,000 grains = 1 pound. 28 pounds = 1 quarter.
14 pounds = 1 stone. 100 pounds = 1 cental.

A circle of radius r has a circumference of length $2\pi r$ and has an area of πr^2, where $\pi = 3\,1416$.

Base of natural logarithms is $e = 2·7183$.

The acceleration of a falling body is 32·2 ft. per second per second or 981 cm. per second per second.

1 kilowatt = 102 kilogrammetres per second. 1-horse power = 550 ft. pounds per second.

1 atmosphere = 760 mm. of mercury = 1·03 kg. per square centimetre = 14 7 lb. per square inch.

Geology. (Time allowed, 2 hours.)

Answer any five questions. All questions carry equal marks.

1. State briefly the mode of formation of the following geological features:—Escarpments, outliers, lakes and caves.

2 Name and describe briefly the various strata which lie (in the south and west of England) between the rhætic and the chalk. Mention materials of economic importance furnished by any of these deposits.

3. Describe the features which would enable you, in the field, to separate the following rocks from each other:—Sandstone, granite, quartzite, limestone, chert.

4 Mention the chief coalfields and metalliferous regions of Great Britain, and describe briefly the geology of any one of them.

5. With the aid of diagrams, illustrate the various ways in which rocks may be faulted, and show the effects of normal faults on the outcrop of gently-inclined strata.

6. What do you understand by the following:—Dip, strike, cleavage, dyke, joint, hade, sill, wash-out, hanging-wall, slickenside?

7. State what you know of the following minerals:—Orthoclase, dolomite, augite, tourmaline, chalybite. Mention rocks of which each is a prevalent constituent.

Geology. Laboratory Test. (Time allowed, 2 hours.)
(All the questions carry equal marks.)

1. Describe and name the rock specimens A, B and C.

2. Describe and name the minerals D, E and F.

3. Say what you can of the specimens G, H and I, and state of what value they would be as a guide to the occurrence of coal-bearing strata.

4. Describe briefly the geological structure and relief of the district represented by the accompanying map (scale, 9 in. = 1 mile).

5 Draw a geological section, as near as possible to true scale, along the line ABC, and estimate the thickness of the bed (4)

Coalmining. Paper 1. (Time allowed, 3 hours.)
(Seven questions, and no more, are to be attempted. The value attached to each question is given in brackets after the question.)

1. Give a brief account of the sinking of a shaft through ordinary strata, stating the precautionary measures which should be adopted in order to avoid accidents. (70)

2. Illustrate by sketches the way in which coalseams are often disturbed by faults and dykes of igneous rock, and explain what changes in quality and regularity of position are caused by such occurrences. (70)

3. Describe, with sketches, the various operations connected with the getting of coal in a longwall *face* where the roof is bad and jointy, giving especial attention to the means taken for keeping the workmen safe. (70)

4. Give an account of the method of electric blasting, describing briefly the machines and appliances used. (70)

5. Describe one method of guiding, and the construction of, a cage for a large modern colliery, giving prominent attention to the safeguards required to prevent accidents to men travelling in the shaft. Sketches should be given. (70)

6. Describe and sketch the arrangement of a self-acting incline underground, enumerating the appliances necessary for reducing the probability of accidents both to the workmen and to the machinery. (75)

7. State the improvements which have recently been introduced for the detection of blackdamp, and for observing small quantities of firedamp. (70)

8. What causes lead to the dry and dusty condition of mines? How would you attempt to prevent the formation and accumulation of coaldust? (75)

9. What are the causes of spontaneous combustion in coalmines? How is the presence of a fire first detected, and how would you proceed on discovering one? (70)

10. Which kind of boilers do you consider best for the safe and economical generation of steam at 150 lb. pressure for colliery engines? Give a description of the mountings or fittings necessary for their safe workings. (70)

Coalmining. Paper 2. (Time allowed, 3 hours.)
(Seven questions, and no more, are to be attempted. The value attached to each question is given in brackets after the question.)

1. Explain how you would proceed to make an underground survey. What are the points to be most carefully watched in order to ensure its accuracy? (70)

2. State the use of compressed air as a motive power in mines, the principle of an air compressor, and how the power is employed. What are the advantages and disadvantages of its use? (70)

3 Explain the difference between a shot which has missed fire and one which has blown out. What are the causes of such occurrences and how can they be prevented? Under what conditions are they especially dangerous in coal mines? (70)

4. What precautions are necessary in the setting and withdrawing of sprags, props, and chocks or cogs. How is the condition of the roof usually tested, and why cannot the result of such test be invariably accepted as accurate? (75)

5. Give a description of the floor and roof of a coal seam you are well acquainted with, and describe and illustrate fully the method of working the seam, pointing out the advantage of the method adopted as compared with any alternative method (70)

6 What are the advantages obtained by splitting the air current? Describe the principle, the effect, and the practical limit of its application, naming the points which have to be attended to in order to obtain the best results. (70)

7. If on examination of the mine you discover a fall of roof with gas issuing at the top of the fall, describe the steps you would take to deal with the emergency and remove the danger. (70)

8. What is the principle of safety lamps, and how far are they safe? Give a full description of one modern lamp, and a sketch of each separate part. (70)

9. What procedure would you adopt for the recovery of a mine after an explosion? (75)

10. If you required a very accurate measurement of the air passing through an underground roadway, describe the instruments you would use, and the plan you would adopt for arriving at the mean velocity of the current. (70)

Ore and Stone Mining (Time allowed, three hours).
(Seven questions, and no more, are to be attempted. All questions carry equal marks.)

1. Describe the method of sinking and timbering a three compartment vertical frame shaft in fair standing ground, giving dimensioned sketches of the timbering and equipment, including ladder ways and pump columns.

2. Under what conditions is underhand stoping the best system of breaking the ore in a mine?

3. In a metalliferous deposit in which the mineral values were disseminated through the gangue and the extent of payable ore uncertain (not being confined between walls): what means would you adopt of defining the boundaries of excavation?

4. Describe fully some method of stoping a lode over 20 ft. wide between walls which were tender, illustrating, by sketches, the method you would adopt of supporting the ground.

5. Explain what sources exist for obtaining "deads" for filling where this system of supporting excavations is adopted.

6. Compare the systems of hoisting mineral by means of cages and skips, giving the relative advantages of each system.

7. To what causes are inundations in mines due? How would you guard against them?

8. What are the functions of air vessels in pumps? Are there any pumps in which their use is no advantage?

9. Describe the wire saw as used in quarrying, and explain its application.

10. Sketch and describe a Frue vanner. For what coarseness of mineral are they best adapted, and how are they best adjusted for close saving?

Electricity in Mines (Time allowed, 3 hours.)
(Eight questions should be answered and no more. All the questions carry equal marks.)

1. Explain the terms electromagnetic induction, electrolysis, delta connected, energy meter, solenoid.

2. Describe and give diagram of a leakage detector.

3. Make a diagram of connections of a slip-ring 440-volt three-phase motor supplied from a 2,200-volt line, showing the necessary switches and apparatus.

4. Is alternating or continuous current preferable for transmission? Give the reasons for your answer.

5. State some of the causes of sparking at the brushes of a dynamo and what steps you would take to stop it.

6. What are the five principal points mentioned in the special rules referring to control of supply of current?

7. The pressure on a feeder supplying 600 ampère continuous current is 10 per cent. low, and a motor-generator is to be used to bring up the pressure to the normal 600 volts. What current will be taken by the motor if working at 85 per cent. efficiency?

8. "The neutral point of a polyphase system may be earthed at one point only." Explain what this means and the reason for such a rule.

9. Describe the process of the testing of earth conductors and metallic coverings for continuity, giving figures of a hypothetical test.

10. Sketch in section a metal plate with a cable passing through it, the hole being properly bushed to prevent abrasion; state the materials used.

Law. (Time allowed, 2 hours.)

(Six questions, and no more, are to be attempted. All the questions carry equal marks.)

1. Define the various classes of workings to which the Metalliferous Mines Regulation Act, the Quarries Act, and the Coal Mines Regulation Act respectively apply. In case of doubt as to which Act should apply to any given working, how is the matter to be decided?

2. What returns have to be made by the owner, agent or manager of a coalmine and a metalliferous mine respectively, and in what particulars do these returns differ from each other?

3. What precautions have to be observed before firing a shot in a working place in a dry and dusty coalmine?

4. Explain what you understand by a permitted explosive, and quote the section of the Act that regulates the use of such explosives.

5. Give a brief statement of the statutory provisions of the Act that limit the hours of work underground in coalmines. Is there any limit to the hours of work underground of any class of workers in metalliferous mines?

6. Enumerate the steps that have to be taken when a metalliferous mine is abandoned.

7. In what respects do the rules concerning travelling roads differ in coalmines and in metalliferous mines?

8. State the general rules that govern the ventilation of coalmines.

Chemistry. (Time allowed, 3 hours.)

(Six questions, and no more, are to be answered. All the questions carry equal marks).

1. Define and explain the terms *equivalent* and *molecular weight*, giving examples in illustration of your answers.

If you were told to mix equivalent quantities of potassium hydrate and sulphuric acid, what proportions would you use? By what tests would you find out whether the mixture was made correctly?

[K = 39; S = 32; H = 1; O = 16.]

2. How would you show experimentally that the substance which is the essential constituent of all limestones is chemically analogous to washing soda?

3. Describe the preparation and properties of sulphuretted hydrogen. What experiments would you make to demonstrate that the composition of this gas is represented by the formula H_2S?

4. Select five metallic elements in common use, and give the chief characteristics of each. State the acid you would prefer to use in each case in order to dissolve the selected metals, and describe what might be observed during the process of solution.

5. How would you determine the percentage of carbon, hydrogen and nitrogen present in gelatine?

6. Acetylene may be described as an unsaturated hydrocarbon, strongly endothermic, containing the group $-C:CH$. Justify this description.

7. Find the volume of hydrogen at 15 degs. Cent. and 700 mm. pressure which could be liberated from dilute sulphuric acid by an electric current which in the same time deposits 2·4 grammes of copper from a cupric sulphate solution. [Cu = 63·5; 11·1 litres of hydrogen weigh 1 gramme at 0 deg. Cent. and 760 mm.]

6. Give concisely the processes involved in the manufacture of any two of the following:—Sodium, white lead, ammonium sulphate, sodium thiosulphate.

Chemistry. Laboratory Test. (Time allowed, 3 hours.)

(Great importance is attached to accuracy and to the manner in which the observations and results are recorded).

1. Heat a weighed quantity (between 1 and 2 grammes) of B* in a porcelain crucible until the metal is thoroughly oxidised. Find the gain in weight and calculate the equivalent of B, assuming that the metal was pure and has been completely oxidised. Examine the action of water on the metal B* and on its oxide. Identify B.

2. *Either*—Analyse C† qualitatively. Or—Prepare a decinormal solution of oxalic acid, using the crystals provided, which have the composition $C_2O_4H_2\,2H_2O$. By means of your oxalic acid solution find the number of grammes of sodium carbonate in each litre of the solution labelled A. *N.B.*—No standard solutions are provided.

Physics. (Time allowed, 3 hours.)

(Eight questions, and no more, are to be answered. All the questions carry equal marks.)

1. Define specific heat and latent heat. A gallon (10 lb.) of water at 6 degs. Cent. is poured on to a 15 lb. mass of iron at red heat, and the final temperature after stirring is 86 degs. C. Taking the specific heat of iron as 0·11, and assuming there are no heat losses, calculate the original temperature of the iron. Later, it is noticed that 0·04 lb. of water had evaporated during the experiment; compute roughly the correction needed in your estimate of the original temperature of the iron.

2. A tumbler of hot water is placed on a table and left to cool. Point out carefully how conduction, convection, and radiation severally contribute to the cooling process, and trace the ultimate distribution of the heat actually in the water.

3. Describe an accurate method of determining the mechanical equivalent of heat.

4. Make graphical constructions to show the paths of rays of light through (1) a biconvex lens of 20 in. focal length and one of 1 in. focal length arranged as a telescope; (2) a biconvex lens of 4 in. focal length and a biconcave lens of 1 in. focal length, arranged as an "opera glass." Indicate plainly in each case the formation of the image of an object placed in a typical position.

5. What is the meaning of the phrase complementary colours? What are the complementary colours of blue and of purple? If you were given a piece of coloured paper, how would you proceed to determine its complementary colour?

6. How has the velocity of sound in air been determined? Discuss briefly the effect of wind and temperature on the propagation of sound in the open air.

7. A sphere of soft iron is placed under the action of the earth's magnetic field in London. Make a sketch of the lines of magnetic force outside and inside the iron in the vertical plane containing the centre of the sphere and the magnetic meridian. Make a corresponding sketch for a sphere of bismuth.

8. Three resistance coils, 10 ohms., 30 ohms., 50 ohms., are connected in parallel, and a current sent through them from a dry cell with internal resistance 4 ohms. and electromotive force 1·6 volts. Calculate the magnitude of the current in each part of the circuit in ampères, and also the heating effects of those currents in watts.

9. Describe any form of moving-coil galvanometer, and explain carefully the magnetic and electro-dynamic principles underlying its construction and use.

10. A jib crane has members of the following dimensions:—A vertical strut AB 18 ft. long, a strut AC 30 ft. long, a stay BC of such a length that the angle BAC is 45 degs., together with certain back stays. Determine in any way the stresses in the members BC, AC produced by a weight of 10 tons suspended at C.

11. Define momentum and kinetic energy. A train weighing 120 tons is travelling on the level at 45 miles per hour: calculate its momentum and kinetic energy. It is pulled up by a brake force of 80 tons; deduce from your previous results the time taken to stop it, and the distance travelled in that time.

Physics. Laboratory Test. (Time allowed, 3 hours.)

(Mark three questions; you will then be asked to perform two of these, selected by the examiner. You should explain clearly the method you adopt, the observations you take, and the precautions needed to obtain accurate results.)

1. Measure the latent heat of fusion of ice by a calorimeter method.

2. By aid of a Bunsen photometer find the intensity of the light radiated in various horizontal directions from the lamp supplied. Exhibit your results on an accurate diagram.

3. Using a resonance tube and a tuning fork of known pitch, measure the velocity of sound in air at the temperature of a room.

4. By aid of a potentiometer and known resistances measure the potential difference at the terminals of a given cell while it is supplying a definite small current. Various small currents not exceeding 0·2 ampère should be used. Plot the results with current as abscissa and potential difference as ordinate.

5. Determine the sensibility of a reflecting galvanometer by means of a standard cell and resistance coils.

6. Find the coefficient of limiting friction between two surfaces by observing the force needed to make one begin to slide upon the other.

The Barnsley seam, which has lately been reached at the Askern Main Colliery, is composed of two qualities of coal, hard and soft. The hard seam varies in thickness from 4 ft. 6 in. to nearly 5 ft., whilst the soft seam is 3 ft. 6 in. in thickness. In celebration of having got down to coal, the management at Askern gave all the pit sinkers who had over three months' service, a shift's wages, varying from 6s. to 8s. 6d. each. In connection with the new colliery, a model village is to be built. A start has, in fact, been made, and there are now 20 houses ready for habitation. A site on the left of the Doncaster-road, just before reaching Askern proper, has been selected, and here will be erected about 1,500 houses. These will be in blocks of six, eight, ten or twelve, thus forming streets. Wide, open spaces, both back and front, are being arranged for, the distance in front being 66 ft. from house to house. Twenty houses to the acre are to be erected, some of four rooms, some six, and others even more. There is no intention at present to fit the houses with baths. The houses present an attractive appearance, being of pressed bricks and stucco work, halved, with blue slates. The erection and laying out is being carried out by the Askern Estates Company, under the supervision of Mr. Leadley. Fifty houses are to be ready for occupation by the end of the year, and by the end of next year it is intended that 350 more shall have been completed. For the convenience of the men a new road is to be made, enabling them to go direct to their work and obviating the necessity of proceeding through Askern.

FOSSIL PLANTS FROM AYRSHIRE COAL MEASURES.

In the *Summary of Progress* of the Geological Survey for 1911, Dr. R. Kidston describes some fossil plants from Garrallan pit sinking, ½ mile south-south-west of Old Cumnock. The plants were collected from two horizons, namely—33 fathoms above the "Maid" or Splint coal, and the shale below the Ell coal lying some 60 fathoms above the "Maid."

The fossils indicate a similar horizon, and the following table shows their distribution in the Westphalian and Lanarkian series, the only divisions of the upper carboniferous with which a comparison is admissible:—

Garrallan pit sinking.	Westphalian series.	Lanarkian series.
Sphenopteris sp.		
Pecopteris cf. Miltoni Artis sp.	×	
Dactylotheca plumosa Artis sp.	×	×
Odontopteris sp.	×	
Neuropteris heterophylla Brongt.	×	×
,, *obliqua* Brongt. sp.	×	×
,, *obliqua* Brongt. sp. *forma impar* Weiss sp.	×	×
,, *osmundae* Artis sp.	×	
,, *Scheuchzeri* Hoffm.	×	
Calamites undulatus Sternb.	×	×
Calamitic cone		
Asterophyllites equisetiformis Schl. sp.	×	×
Annularia sp.		
Sphenophyllum cuneifolium Sternb. var. *saxifragæfolium* Sternb. sp.	×	×
Lepidodendron sp.		
Samaropsis sp.		

Of the nine species which could be specifically determined, all occur in the Westphalian series and six in Lanarkian series, but if one examines more minutely into the relative frequency of the species in the two series to which they are common, the pronounced Westphalian facies of the beds which have yielded these plants is very strong.

Pecopteris cf. *Miltoni* Artis sp.—This species is common in the Westphalian series, and may be regarded as one of its most characteristic species, though it extends upwards into the Radstockian series.

Dactylotheca plumosa Artis sp.—Though this has been met with in the Lanarkian series, it is extremely rare on that horizon. In the Westphalian series, however, of Great Britain it is one of the most characteristic species.

Odontopteris sp.—The occurrence of the genus *Odontopteris* is of interest, for it has never been recorded from the Lanarkian series, whereas in the Westphalian series a few species occur.

Neuropteris heterophylla Brongt.—This is common to both Lanarkian and Westphalian series, and as far as these two divisions are concerned is not a "zonal" form.

Neuropteris obliqua Brongt. sp.—Though this species occurs rarely in the Lanarkian series, it is very frequent and characteristic of the Westphalian series, and forms one of its most characteristic species. The plant was very plentiful at Garrallan.

Neuropteris osmundae Artis sp.—This species is restricted to the Westphalian series.

Neuropteris Scheuchzeri Hoffm.—Though this plant is characteristic of the Staffordian series and Radstockian series, it occurs occasionally in the Westphalian series. It does not, however, pass below that division.

Calamites undulatus Sternb.—This species is common to both the Lanarkian series and the Westphalian series, and is not of "zonal" value in either of these horizons.

Asterophyllites equisetiformis, Schl. sp.—This also is not of "zonal" value, as it extends throughout the whole of the upper carboniferous rocks.

Sphenophyllum cuneifolium Sternb.—This Sphenophyllum is common to both the Westphalian series and the Lanarkian series, and is not of "zonal" value in these rocks.

To sum up, of the 10 species occurring at Garrallan all are well-known Westphalian plants, though six of them occur in the Lanarkian series, but of these six, *Dactylotheca plumosa* has only hitherto been found once, or twice at the most, in the Lanarkian series, and though *Neuropteris obliqua* has been discovered in the Lanarkian more frequently, both are essentially Westphalian species, so that for practical purposes the proportion of Westphalian species to Lanarkian species is 10 to four, showing that the Garrallan beds must be referred to the Westphalian series.

Mine Managers' Examination.—An examination for first and second class certificates of competency as manager and under-manager of mines will be held on November 26 next at the University Old Buildings, Edinburgh; the Armstrong College, Newcastle; the University, Sheffield; the Mining and Technical College, Wigan; the Drill Hall, Cardiff; and Mason College Buildings, the University, Birmingham. An examination for certificates of qualification as surveyor of mines will be held at the same places on November 27. Candidates must, on or before October 15, send their names and state the district in which they are employed to Mr. W. W. Ware, secretary to the Board for Mining Examinations, at the Home Office, Whitehall, London, S.W., from whom all particulars can be obtained.

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* B = calcium filings.

† C = magnesium sulphate and ammonium chloride.

THE COAL AND IRON TRADES.

THURSDAY, SEPTEMBER 26.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 144,150 tons of coal and 618 tons of coke were despatched from Tyne Dock, a decrease of 2,167 tons of coal and 986 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 60,111 tons of coal and 6,006 tons of coke, a decrease of 5,630 tons of coal and an increase of 4,193 tons of coke. The Blyth shipments totalled 103,376 tons of coal and coke, an increase of 6,036 tons. The coking coal market is enjoying a boom on its own account just now, and the following important contracts are reported:—From 75,000 to 100,000 tons of unscreened Durhams, for shipment to Marseilles, for the Paris, Lyons and Marseilles Railways over next year, at from 24s. 6d. to 24s. 9d. per ton c.i.f., or from 13s. to 13s. 3d. f.o.b.; 90,000 tons unscreened and small Durhams, for shipment over next year to St. Nazaire and Bordeaux, for the Paris-Orleans Railways, at 25 fr. per ton c.i.f. for unscreened and 24 fr. for smalls, or rather under 12s. f.o.b. for the former and over 11s. for the latter; 87,000 tons of Durhams, in part allotment of a Belgian contract for 125,000 tons, for shipment over next year, at about 12s. 6d. f.o.b.; a small parcel of bests, for next year's delivery, at 13s.; and 80,000 tons of best unscreened Durhams, for delivery over 1913, at from 12s. 9d. to 13s. f.o.b. The French railways' contracts were placed with Paris merchants. As the Paris-Orleans Railways invariably take the very cheapest qualities of Durham coal, their contract prices are no gauge as to present normal selling values. Other large sales of fuel which have been reported during the week are the following:—About 15,000 tons of Blyth and Hastings-West Hartley steams, for the supplementary requirements of the Swedish State Railways over the next three months, at from 12s. 9d. to 13s. f.o.b. for Blyths, and 11s. 9d. for the secondary sorts; a quantity of best Blyth large and small steams, for delivery over next year, at 13s. f.o.b. for large, and 8s. 6d. for the smalls; 26,000 tons Wear gas specials, for delivery to the Gothenburg Gasworks over next year, at 18s. 7½d. per ton c.i.f.; and a fairly large quantity of Broomhill best steams, for October-December delivery, at 12s. 9d. f.o.b. Scotland secured the order for 25,000 tons of steams, for the Swedish Railways, being the balance of their contract requirements. The Russian Government is reported to be enquiring for a considerable quantity of best Blyth steams for October-November delivery. The Compagnie Générale Transatlantique, which, during the week, placed contracts with Welsh collieries for 300,000 tons of second-class Admiralty large steams at prices varying from 16s. 9d. to 17s. 3d. per ton f.o.b., less discount and the usual special rebate of 3d. per ton, is now enquiring for a large quantity of Durham bunker coal for next year's requirements, shipment to Havre, Marseilles and St. Nazaire. The relatively low price of the Welsh coal—having regard to its quality—may make competition with the Durham coal rather close. There was a collapse in steam coal prices on the local market during the week. For early shipment, best Blyths were sold, by second-hand holders, at from 12s. 3d. to 12s. 6d. per ton f.o.b., it was reported, and the market took fright and a slump ensued. Now, however, although steams have not yet regained last week's figures, they are gradually working their way upwards once more. Tonnage difficulties are less acute than they were a week since, which materially helps matters. All descriptions of Durham fuel are very firm, and several sorts are dearer. F.o.b quotations for prompt shipment are as follow:—Best steams, Blyths (D.C.B.), 13s. per ton, a decline of from 6d. to 9d. on the week; Tynes (Bowers, &c.), 12s. 6d. to 12s. 9d., from 3d. to 6d. cheaper; seconds, Blyths, 11s. 6d. to 11s. 9d., 6d. lower; Tynes (Hastings or West Hartleys), 11s. 9d. to 12s., 3d. down; unscreened, 11s. to 11s. 6d., steady; smalls, Blyths, 9s. 6d. to 9s. 9d., from 3d. to 6d. advanced; Tynes, 9s., stronger; specials, 10s., no change; smithies, 13s. to 13s. 6d., 1s. higher; gas bests (New Pelton or Holmside), 12s. 9d. to 13s., 3d. increased; seconds (Pelaw Main or similar), 12s. 6d., 6d. improved; specials, 13s., unaltered; unscreened bunkers, Durhams, 13s. to 13s. 6d., from 9d. to 1s. more; Northumbrians, 11s. 6d. to 12s., 3d. higher; coking coals, 13s. to 13s. 6d., an increment of 1s.; smalls, 13s., similarly dearer; households, 14s. 6d., steady; coke, foundry, 24s. to 25s., firmer; blastfurnace, 22s., 1s. increased; and gas coke, 21s. 6d., 6d. up.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 95,295 tons of coal and 1,220 tons of coke, as compared with 95,200 tons of coal and 835 tons of coke for the corresponding period of 1911, being an increase of 95 tons of coal and 385 tons of coke. With a fuller supply of prompt tonnage the coal market is decidedly better, the special feature being the strong enquiry for unscreened both for coking and bunkering purposes. For this class of coal prices are also better. The enquiry for best gas coals is maintained with steadier prices. Household coals are quiet. There is a strong demand for coke both for home use and export. More ovens have been put into operation, but the production is well taken up. There is a good enquiry for forward delivery, and 24s. is reported as having been paid for good brands for delivery into next year. The Paris, Lyons and Marseilles Railway is reported to have bought 100,000 tons of Durham coking smalls at about 13s. for delivery over next year, and the Gothenburg Gasworks have contracted for 26,000 tons of special Wear gas coals at 18s. 7½d. c.i.f. Gothenburg. Quotations are as follow:—Special Wear gas, 14s.; best gas, 12s. 9d. to 13s.; seconds, 12s. to 12s. 3d.; household ordinaries, 14s.; bests, 15s.; coking unscreened, 12s. 6d. to 13s. 6d.; smalls, 12s. 6d. to 13s.; smithies, 14s. to 15s.; peas and nuts, 14s. to 15s. 6d.; foundry coke, 24s.; gashouse coke, 21s.; blastfurnace coke, 23s. to 23s. 6d. Bunker coal prices are:—Morrison's Marley Hill, 13s. 6d.; Priestman's Consett Burnhope, 13s.; Pease's South Derwent, Framwellgate, 12s. 9d.; South Hetton, 12s. 6d.; Ryhope, 13s., all f.o.b. South Dock. There is rather a fuller supply of tonnage, but freights continue firm. Recent fixtures are:—Coasting: London 4s., Calais 6s., Nantes 8s. 3d. Baltic: Cronstadt 7s. 6d. Bay is represented by St. Nazaire 7s. 9d., Lisbon 11s. 6d. Mediterranean is a firm market, as shown by Genoa 13s. 6d., Naples 13s. 6d., Algiers 11s. 6d., and Port Said 13s.

Middlesbrough-on-Tees.

COAL.

All classes of fuel are steady and firm. Deliveries of gas coal are increasing. Best gas coal is put at 13s. f.o.b., and seconds at 12s. 6d. The Gothenburg gasworks contract has been signed for Wear special gas coal at 18s. 7½d. c.i.f. The quantity is said to be 26,500 tons. Bunker coal is in very good request. Ordinary Durham bunkers are quoted 13s. f.o.b.; bests, 13s. 6d.; and specials up to 14s. 6d. There is a continued strong enquiry for coking coal, and unscreened kinds range from 12s. 6d. to 13s. 6d.; whilst smalls run from 12s. 6d. to 13s. The coke market is very firm, with a full demand both for home use and for shipment. Local requirements are heavy, and average blastfurnace kinds realise up to 23s. 6d., delivered at Teesside works, whilst superior qualities have commanded as much as 24s. 6d. Gas house coke is quoted 21s. to 21s. 6d. Foundry coke for shipment is in the neighbourhood of 24s. 6d. f.o.b.

IRON.

There is exceptional quietness in Cleveland pig iron; legitimate buyers having withdrawn for the time being, in consequence of rather sharp fall in values, brought about almost entirely by speculative holders of warrants selling out and taking their profits. At the beginning of the week No. 3 g.m.b. Cleveland pig realised 67s. 6d. f.o.b., but the price of the ruling quality is now not above 66s. 6d., and other descriptions of Cleveland iron have also declined. No. 1, though none too plentiful, is put at 71s. 6d. Foundry and forge iron are said to be very scarce, and the former is of almost the same value as No. 3. There are buyers of No. 4 foundry at 66s. 4½d. and of No. 4 forge at 66s. 3d. Mottled and white iron each range from 65s. 9d. to 66s. All the foregoing quotations are for early delivery, higher rates being asked on forward account. East coast hematite is steady and firm. There are fair enquiries in the market, and this week Sheffield consumers have attended the market here. Nos. 1, 2 and 3 stand firm at 80s. for this year's delivery, and for spring business 82s. 6d. is named. There is not a great deal passing in foreign ore, but values are fully upheld. Enquiries for French ore are reported, and a purchase of Canadian has been made, a contract having been fixed for Wabana ore for delivery to a large firm of Cleveland iron producers. Market rates are still based on 23s. ex-ship Tees for best rubio. Producers of all descriptions of manufactured iron and steel are working at full pressure and are being pressed for deliveries. Iron bars have advanced 5s. since our last report. Common iron bars are £8 10s., best bars £8 17s. 6d., and best best bars, £9 5s.—less usual discount. Prices for all other descriptions are very firm.

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South-West Lancashire.

COAL.

The inland household trade continues in a satisfactory condition, orders being in advance of supplies. An advance of 10d. per ton will be made on the 1st proximo, as is usual at this period of the year. Prices at the moment are 15s. 6d. for the best qualities, with good medium grades at 14s. and kitchen coals about 11s. 6d.—all per ton into wagons at the pit. Large supplies of screened fuel continue to go into consumption for forges and manufacturing purposes, with prices ranging up to about 12s. per ton into wagons. Bunkering requirements this week are fully maintained at the high level of recent weeks. The great bulk is, as usual, on contract account, open sale business, whether for bunkering or cargo account, being comparatively quiet owing to the scarcity of tonnage and high freights. There is very little spare coal on the market, and prices of screened Lancashire steam coals now range from 12s. f.o.b. for commoner qualities to 13s. 6d. f.o.b. or thereabouts for the best descriptions. The coastwise and cross-Channel trade for household fuels keeps busy, with hardening prices. For open sale, best coal now rules up to about 16s. 6d., with good medium grades at 15s. or near that, both net f.o.b. Garston. Slack is, with rare exceptions, taken into consumption as produced, and open sale prices are firm at from 9s. 9d. to 10s. for rough slacks of the best quality, with 9s. to 9s. 3d. for good medium sorts, and 8s. 6d., or near that, for the commoner and finer qualities—all into wagons at the pit.

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South Lancashire and Cheshire.

COAL.

There was a fair attendance on the Manchester Coal Exchange on Tuesday, and on the same day it was decided by the Lancashire Coal Sales Association to advance prices of house coal 10d. per ton from October 1. The demand at the moment is somewhat easier. Present prices are 16s. to 16s. 9d. for the best house coals, with good medium qualities 14s. 6d. to 15s. 6d., and kitchen qualities 11s. 9d. to 12s. 9d., all at the pit. Furnace coal is in steady demand, with prices firm at about 12s. 6d. per ton at the pit, and shipping coal is steady at about 13s. to 14s. f.o.b. Partington. Slack continues brisk, and prices are very firm at late rates, 9s. to 9s. 9d. for best, with seconds at 8s. to 8s. 6d., into wagons at the pit.

IRON.

Makers' iron remains firm, with no alteration to report in prices; the warrant market is rather weaker. All the forges are exceptionally busy on Crown iron bars at £8 10s., second quality £8, sheets £9 to £9 5s., hoops £8 12s. 6d., and are very backward with deliveries. Steelworks are also very busy on bars at £8 5s. less 2½ per cent., and billets £6 5s. net. Wagon builders are pulled out of the place for wagons. Ironfounders and heavy engineers fairly well employed. Textile machinery makers report full order books.

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Yorkshire and Derbyshire.

Leeds.

COAL.

There was a very large and representative attendance at the Yorkshire Coal Exchange on Tuesday, and business generally was brisk. The chief item of interest was the announcement of an advance of 1s. per ton on all qualities of house coal and house nuts, the advance to date from October 1 and to apply to the depots in Yorkshire and Lancashire. There was a fair amount of business passing, as merchants were desirous of securing good supplies before the advance begins to operate. A brisk demand was experienced for all descriptions of steam coal and manufacturing fuel, and although no official advance in these qualities took place, prices all round were exceptionally firm. Colliery agents reported full time work at the pits, with some difficulty in clearing the output on account of the scarcity of empty wagons. Business in house coal with London merchants has fallen off to some extent. Reports from the depots indicate a quieter state of things as regards the public demand, but as the collieries locally hold very little stock, pit prices are well maintained. Current quotations for London, the Eastern counties and the Southern counties, may be averaged as follows:—Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. 6d. to 14s.; Silkstone best, 13s. 6d. to 14s. (special qualities, 14s. to 14s. 6d.); Silkstone house, 12s. 6d. to 13s.; house nuts, 11s. 6d. to 12s. The coastwise trade continues fairly busy, with a scarcity of shipping tonnage and very high freights. If anything, prices are higher on the week—especially for the medium qualities of Silkstone house coal. Quotations given in Hull for early October shipments average about the following f.o.b. figures:—Haigh Moor best, 16s. 6d. to 17s. 3d.; Silkstone best, 16s. 6d. to 16s. 9d.; Silkstone house, 14s. 9d. to 15s. 6d.; house nuts, 13s. 6d. to 14s. At the depots in Leeds, Bradford, Halifax, Huddersfield and the heavy woollen district, merchants are fairly well employed. The revised price lists, which are now being issued, give the following pit prices, which are said to be about 3s. per ton higher than the prices quoted a year ago:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. 6d. to 17s.; ordinary house coal, 15s. to 16s.; other qualities, 13s. to 14s. 6d. Manufacturers are buying ahead freely, and the following quotations are firm for both current and forward business: Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small engine nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slack, 8s. to 9s.; small slack, 7s. to 8s.; coking smalls, 7s. to 7s. 6d. The output of washed furnace coke is quite inadequate for market needs, and for prompt supplies 18s. per ton at the ovens is being paid. Makers quote even a higher price than this for contracts to the end of the year. There are no stocks anywhere. The gas coal pits have plenty of business on hand, contract deliveries absorbing quite three-fourths of the output. For the remainder of the coal mined there is a ready outlet for export, and there is every prospect of a very busy autumn and winter in this branch of the trade. Current pit prices average about as follow:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal, 9s. to 10s. For prompt shipment the following are about current values per ton f.o.b. Hull:—Screened gas coal, 12s. 6d. to 13s. 6d.; gas nuts, 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d. to 12s. 6d.

Barnsley.

COAL.

The strong demand for nearly all classes of coal is well maintained, and sellers find themselves able to clear off the output without any undue pressure on the markets. The position of buyers is in no way improved, and the strong tone of the market is reflected by the fact that contracts for forward delivery are not easy to arrange, except at what is regarded as notably advanced figures. The effect of local holidays is still felt in some parts of the district, and probably the output in general is not of the maximum standard. In the steam coal section the demand for both home and export is of an exceedingly active character, and there seems every prospect of this continuing. The deliveries from the Baltic ports are still stated to be in arrear, and with so little of the season left for shipment there is bound to be exceptional activity, whilst the Continental trade, though not so subjected to seasons, is also notably brisk, By way of Hull a big traffic is being dealt with, and whatever trade is being found for Immingham there is little effect felt so far at the head port. However, there is still only a small amount of the best fuel going for shipment, and the bulk of this fuel still meets with a more favourable return in the home market. Prices are again at from 12s. 9d. to 13s. per ton and are firmly held, whilst business for secondary qualities of hards is of a fluctuating character so far as values are concerned. There are special sales reported up to 12s. per ton, but such a price will only be obtainable when special arrangements regarding delivery are to be carried out, and generally from 11s. 3d. to 11s. 6d. per ton will represent operations for this grade of fuel. The market continues to be especially firm in regard to small fuel required for steam purposes, and buyers here again find contracting rather a difficult matter, for holders have strong opinions as to the prices which are to be realised for the open market. The advanced price for nuts, which was made for the best sorts, is now more general, and quotations are now about best washed sorts, 11s. 3d. to 11s. 6d. per ton, secondary qualities 9s. 6d. to 10s. 3d. per ton, slacks (best) 7s. 9d. to 8s. per ton, and rougher sorts about 6s. 3d. to 6s. 6d. per ton. In the house coal trade the increase in prices made a fortnight ago, in regard to the best class of coal, has been more generally adopted, and from the 1st prox. all qualities will be subjected to the usual 1s. per ton winter advance. Quotations will be somewhat difficult to record, as the collieries are acting largely according to the individual circumstances prevailing, but in spite of the brighter weather there has been no difficulty in dealing with the output, the London and southern buying being of a more active character. Best Silkstone are now from 14s. 6d. to 15s. per ton; best Barnsley softs, 13s. 6d. to 14s. 6d. per ton; seconds, 11s. to 12s. 6d. per ton; house nuts, 10s. to 11s. 6d. per ton. Gas coal collieries are fully employed, but little is being sold beyond on contract account; and coke keeps very firm with a robust demand for North Lincolnshire, and values are about 16s. per ton for ordinary qualities.

Hull.

COAL.

Things have been quieter in the Humber coal market during the past week, and prices for steam coal are not so firm, but on the contrary show a decided easing off, due in the main to the difficulty there is of getting suitable tonnage and the high freight rates prevailing. Freights during the past few days have shown a decided upward tendency, and merchants are loth to concede the demands of the shipowners, with the result that trade generally is handicapped very seriously. As the close of the Baltic season approaches, the demand for tonnage will increase, and unless more becomes available and rates assume a reasonable figure, it is feared that much that might otherwise have been exported will not be shipped. The outlook for exporters is anything but encouraging. Under the circumstances of a lessened demand, best South Yorkshire steam hards are now quoted at 15s. top figure, but 14s. 9d. represents the selling value, while it is reported some have changed hands at 14s. 6d. Derbyshire steams and secondary sorts are also weaker in sympathy. The demand for slacks and small coal generally is very strong, and prices are well maintained, while house coals and gas coals are also in good request. A fair quantity of coal has been shipped at the docks during the week, but nothing like so much as in some immediately preceding weeks. Loading conditions are therefore easy, and prompt turns have been the order of the day. Owing, as stated, to the shortage of suitable tonnage, only a limited amount of chartering has been done, the principal fixtures being Hull to Cronstadt three times at 7s. 6d., and later at 7s. 9d. for a 4,000-ton steamer for loading next week, Reval 7s., and other Baltic ports on this basis. The near Continental ports, Hamburg and Rotterdam, have been done at 4s. 6d. to 5s., while in the Mediterranean direction steamers have been fixed for Genoa at 13s. 3d. and Genoa-Savona at 13s. 4½d. In the South American market Buenos Ayres has commanded 24s. The following are the approximate prices for prompt shipment f.o.b. Hull:—South Yorkshire: Best steam hards, 14s. 9d. to 15s.; washed double-screened nuts, 13s. 6d.; unwashed double-screened nuts, 12s. 6d.; washed single-screened nuts, 12s. 9d.; unwashed single-screened nuts, 12s. 3d. to 12s. 6d.; washed smalls, 11s. 9d.; unwashed smalls, 10s. 6d. to 10s. 9d. West Yorkshire: Hartleys, 12s. 9d. to 13s.; rough slack, 10s. 3d. to 10s. 6d.; pea slack, 8s. 6d. to 8s. 9d.; best Silkstone screened gas coal, 12s. 9d. to 13s.; best Silkstone unscreened gas coal, 12s. to 12s. 6d. Derbyshire and Notts.: Best steam hards at Hull, 14s. 6d. to 14s. 9d.; best steam hards at Grimsby, 14s. 6d. to 14s. 9d.; Derbyshire nuts (doubles) at Hull, 13s. to 13s. 3d.; Derbyshire nuts (doubles) at Grimsby, 12s. 6d. to 12s. 9d.; Derbyshire large nuts at Hull, 12s. 9d. to 13s. 6d; Derbyshire large nuts at Grimsby, 13s. 3d. to 13s. 6d.; Nottinghamshire hards at Hull, 14s. 3d. to 14s. 6d.; Nottinghamshire hards at Grimsby, 14s. to 14s. 3d.

Chesterfield.

COAL.

A satisfactory business is being done in house coal, and buyers are placing some substantial orders in anticipation of a rise in prices next week. The bulk of the contracts which recently expired have now been renewed at the advance of 2s. 6d. per ton. Merchants who declined to pay this figure, in hope and belief that the higher prices would not be maintained and that they would secure more favourable terms by waiting, find to their disappointment that in the meantime values have gained in firmness, and are even stronger than they were when first the advanced figures were quoted. Orders for prompt delivery are plentiful, the whole of the pits of the district are working full time, and stocks have quite disappeared. A general advance of prices will be announced on October 1, when new price lists will be issued. An active demand is experienced for all classes of coal for manufacturing purposes, and consumers are pressing for prompt execution of their orders; in the meantime, having little or no reserve stock of coal, they are dependent upon such deliveries as the collieries are able to make from day to day. Slack for steam-raising is in greater request than ever, and in many cases buyers find the greatest difficulty in obtaining sufficient supplies. Every colliery has already sold all the slack that it is likely to produce during the next six months. Prices are higher than they have been for several years. Heavy deliveries of small fuel continue to be made to the Lancashire cotton mills, while the requirements of slack for the collieries' own consumption are becoming increasingly great. From the latter cause, a considerable quantity of small fuel, which was formerly available for trade requirements, has now been taken off the market altogether. Collieries are experiencing an exceptionally heavy demand for steam coal for locomotive purposes, and railway companies have some difficulty in obtaining anything like the full tonnage that they require. The consumption has undoubtedly increased substantially during the past three months, and it seems probable that it will be maintained on a high level certainly for another year. Tenders for a renewal of contracts which expire on the 30th of the present month have been submitted during the present week to two or three railway companies by the coalowners of North Derbyshire; but beyond assuming that the price quoted will be at a substantial advance, it is, of course, impossible to say what the actual figure is. There is a satisfactory business passing in steam coal for shipment, and the collieries are very busy in this department. Much of this class of fuel will be required before the close of the season. With a plentiful supply of shipping tonnage, there will be an active demand for Derbyshire Top Hards for some time. Prices remain firm at 11s. to 11s. 6d. per ton at the pit. A good demand is experienced for cobbles, nuts and slack for near Continental ports at firm rates. Washed nuts and washed slack are in strong request, with supplies below the needs of the market. Prices of these qualities have a hardening tendency. There is no change in the coke trade, which is in a satisfactory condition. The demand is active and the output of the ovens of the district for several months to come is already disposed of. Prices remain at about 18s. to 18s. 6d. per ton at the colliery. Coking fuel continues scarce and dear. Prices are as follow:—Best 13s. 6d., seconds 12s., cobbles 11s., nuts 10s., slack 8s.

IRON.

All the works of the district are in a state of great activity. Orders for manufactured are still plentiful, while pig iron makers are fully sold for several months to come. Prices for all qualities are strong.

Nottingham.

COAL.

The general tone of the coal trade in this county continues of a steady character. In the domestic fuel section, while business is moderately satisfactory, it is hardly so good as is expected at this time of the year by local merchants, who find the public are not eager to lay in much stock, despite the fact that there is a probability of prices advancing. On the other hand, merchants themselves are purchasing freely, and consequently the stocks at collieries are keeping low, although nearly full time is being made. Prices are being well maintained; in fact, owners display much caution in accepting orders for any large amount at present rates. The ruling prices for hand-picked brights are from 12s. 6d. to 13s. 6d. per ton, good households 11s. 6d. to 12s. 6d., large nuts from 10s. to 11s., best small nuts 9s. to 10s., cheap kitchens 7s. 6d. to 8s. 6d. For steam coal the demand is active for nearly all qualities, exports and industrials retaining a satisfactory tone. Second quality steams are going out of hand quickly at remunerative rates. Quotations for best steams are from 11s. 6d. to 12s. per ton, cobbles from 10s. to 10s. 6d., and nuts from 9s. 6d. to 10s. 6d. Gas coal is being sent away in larger quantities, following on the fixing up of contracts, which are higher than last year. Slacks are still in a favourable position, best hard qualities being in strong request at from 7s. 6d. to 8s., seconds 6s. 6d. to 7s., and softs 6s. 6d. to 7s. 6d.

Leicestershire.

COAL.

Since last writing there has not been any material alteration in the condition of business. All the collieries are well provided with orders, and a full week is being generally worked. The demand is such that the output is despatched, and there is but little stock, if any, on hand. All descriptions of coal are in request. Household coal of all qualities is in good demand. Steam coals also are moving very freely. The prospects of business are quite satisfactory, and a busy time is assured for a considerable period. The market fully responds to the activity, and prices are extremely firm. At present the prospects point to further firmness rather than a downward movement. Local merchants are still busy, but the pressure of demand has somewhat eased. Still their prospects are quite encouraging.

South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL

There is little change to report this week in the condition of the coal trade throughout the Cannock Chase district. The enquiry for nearly all classes of fuel is brisk and prices well maintained, and likely to still further increase. It is difficult in some cases to meet the demand, although the collieries are working full time. There is a lively demand for manufacturing sorts, and the house coal trade is in much the same satisfactory condition as when last reported. Railway sales are brisk, and a good business is being done at the landsale depots.

Birmingham

COAL.

The coal trade continues to be remarkably prosperous, though the spell of bright weather has called a halt in the immediate pressure. Merchants have been notified that the October price lists will be advanced by probably another shilling, and doubts are expressed whether the move at this stage is a wise one. Manufacturing fuel is also in brisk request at good prices, and slacks are firm at from 6s. to 9s. 6d.

IRON.

The weekly meeting was well attended, and all the evidences pointed to the iron trade maintaining its strong position. Naturally, with quarter-day being in close proximity, buying was not on a large scale, though there were plenty of enquiries. Meantime, most manufacturers have orders sufficient for the remainder of the year, and new work is taken on the understanding that delivery cannot begin before January 1913. This is particularly applicable to steel. Pig iron remains pretty much as it was, with a tendency towards higher values, though these are already considered high enough in relation to those obtained for finished iron. Smelters, however, confidently assert that prices will further advance. They are full of orders and are being pressed for deliveries, while coke is dearer than it was after the termination of the coal strike. The principal quotations are: South Staffordshire forge, 60s.; part mine, 63s. 6d to 64s. 6d; Northamptonshire, 62s. to 63s.; Derbyshire, 63s. 6d. to 64s. 6d. In the finished branches no alteration falls to be recorded in bar iron. There is abundance of work, and prices are firm. Galvanised sheets have made further progress. There are few sales under £12 15s., and for orders of moderate bulk £13 a ton is asked f.o.b. Liverpool. Makers of black sheets find a ready outlet for their output, and prices are easily maintained. Small rounds, squares and flats are unobtainable under £8 10s. No change was made in gas strip, but steel strips were about 2s. 6d. a ton dearer, ranging from £8 10s. for the stronger to £8 15s. for the lighter qualities. In the steel trade the pressure is unrelieved. Producers of sections have their output sold well into next year in many cases, and a further advance in prices is expected to be declared. Sheet bars and billets are generally quoted £6 to £6 2s. 6d. Makers of railway carriages and wagons are busy, but it is noteworthy that their demands are running more on iron than steel, experience proving that iron for many purposes is a more serviceable material. The Cradley district is also going through a period of extreme activity in chains, cables, and heavy forgings of all descriptions. This is the natural outcome of the prosperity in the shipbuilding industry.

Forest of Dean.

Lydney.

COAL.

The volume of business now passing in household coals is fully up to the average for September; in fact, it surpasses a good many past years. The pits for the most part are putting in five and six days each week, and the output is readily absorbed. Stocks of all qualities are low. Railborne orders do not show any increase, but at the docks good shipments are made daily, though stems generally are kept well in hand. Prices are maintained as quoted last week. The steam coal market is very strong, the demand for industrial consumption being very heavy, and the pits are all fully occupied, with prices firm.

INDIAN AND COLONIAL NOTES.

India.

The Congestion at Calcutta.—A well-attended meeting, convened by the Indian Mining Association, was held on the 24th inst. at the Bengal Chamber of Commerce, at which it was unanimously resolved that, in view of the menace to the industries of India, arising out of the failure of the railways to keep pace with the transport requirements of the country, the Government be requested by a memorial to the Secretary of State for India to give a guarantee that all capital or additional expenditure, which is neither directly reproductive, nor at present essential to the safety and efficient administration of the country, shall cease until the needs of railway equipment have been satisfied, and that the immediate requirements of the railways shall be forthwith ascertained and published.

Japanese Coal for an Indian Railway.—The Great Indian Peninsula Railway, it is stated, have just placed a contract for 55,000 tons of Japanese coal to be delivered to the railway between March 1913 and April 1914. Hitherto the Great Indian Peninsula have only imported an occasional shipload of coal from Japan, and this is by far the largest order which they have placed there.

Africa.

Export Coal Trade.—Our correspondent says. Ever since the Natal Collieries managed to oust the Welsh coal, not only from the Port of Natal, but also from the South African railways, a desire has been displayed, not only to cultivate an export trade along the South African coast, but likewise to extend it to India and the Far East markets. For some time past the bunkering trade at Durban has been steadily improving, and a substantial footing has been now obtained at Capetown, where formerly only Welsh coal was used. This change in the position of affairs has been largely brought about by the higher cost of the Welsh coal caused through labour disputes and higher wages, and also by the preferential treatment of Natal coal to the extent of 3s. per ton as against Welsh. Even when the Cape railways substituted Transvaal coal as a matter of economy as against Natal coal, the latter industry suffered little harm, for the Natal coalowners set about and made up for the loss by increasing their sales both at Durban and Capetown. This success of the Natal coalowners has caused many enquiries to be made both by Natal and Transvaal coalowners as to the feasibility of building up an export trade with more distant markets, more especially those of the Far East, but they have found that, with the old railway rate on export coal the cost delivered, say, at Bombay was about 2s. per ton too high to enable them to compete with Japanese and Australian coals. The Indian railways also have made exhaustive tests with Transvaal and Natal coals, and despatched a commissioner to Natal and the Transvaal to examine and report upon the capability of the collieries in these provinces to adequately supply the demand for the Indian railways. In the matter of quality of the coal and the capability of the Natal and Transvaal collieries to efficiently supply the Indian railways with coal, the commissioner expressed himself in his report as satisfied, but the only stumbling block to this new market for South African coals was the cost of delivery at Bombay, causing the coal to be about 2s. dearer per ton than other coal of similar quality used on Indian railways. Representations were at once made by the colliery representatives to the railways, asking that the railway rate for the carriage of export coal to the coast should be reduced to the extent of 2s. 6d. per ton to enable the Transvaal and Natal collieries to secure this outlet in India for about a million tons annually, but the railways, as then constituted before the Union, could not see their way to fall in with the suggestion, the present rate of about ¼d. per ton per mile in the Transvaal being considered as low as it was possible to go. On the union of the different colonies in South Africa under one Government becoming an accomplished fact, and with it the amalgamation of all the Government Railways, the demand for a reduction in the railway rate on export coal was revived, and, as under the terms of the union between the different colonies a material reduction all round was promised in the railway rates, the coalowners were advised by the Minister of Railways to wait until this general readjustment was made, when the matter would receive attention. That readjustment has just been announced, and for export coal a rebate of 1s. per ton from August 1 is being made. This rebate does not apply to bunker coal. It is scarcely necessary to point out that this rebate of 1s. per ton in the railway rate on export coal in place of 2s. 6d. per ton desired to put the export coal trade of South Africa on such a footing as to send coal to the Eastern markets, is miserably inadequate and quite incapable of adding a single ton to the export trade of South Africa under normal freight conditions, which, beyond a few thousand tons sent to Mauritius, is practically non-existent at the present time. This inadequate reduction has caused anything but satisfaction to the South African coal trade, after the many promises of the Minister of Railways on behalf of the Government, before the general adjustment of railway rates took place. This additional million tons per year would mean entirely new and additional revenue to the railway and, at least for the present, full employment for the Natal and Transvaal collieries. Seeing that the policy of the Minister of Railways is responsible for making this inadequate and futile reduction in railway rates on export coal has not found favour with his colleagues, and he has deemed it expedient to resign the portfolio as Minister of Railways, it is hoped that the Transvaal and Natal coalowners will renew their demands for a suitable and adequate reduction, and that the new Minister of Railways, in view of the benefits of such a reduction to both the railway and coal trade, and all connected therewith, will see his way to make such reduction as will allow a South African export trade in coal to be established. At the last monthly meeting of the Transvaal Chamber of Mines the president referred to this proposed rebate of 1s. per ton on the railway rate for the carriage of export coal to the ports, and pointed out that whilst it might help in abnormal times, a further additional reduction of similar amount was wanted to obtain anything like a satisfactory footing in the Indian markets. Further, for this export coal trade only round coal was required, and as such an increased demand for round coal would lead to a larger output of small coal, which was principally wanted for consumption at the goldmines and power stations, and was just the kind of fuel they were most in need of, the building up of an export coal trade might benefit the gold mines by rendering increased quantities of small and cheap coal available, and thereby reducing materially the cost of fuel. The Coalowners' Association, before this reduction in railway rates on the export of coal, had only been able to send a few thousand tons of export coal to Mauritius, and in July no Transvaal coal whatever had been exported, but in August, owing to this rebate of 1s. a ton coming into force and to a fortunate coincidence of low shipping rates and railway conditions in India, it was anticipated that about 14,000 tons of coal would be sent to India in August. The president of the Chamber of Mines said they must make another appeal to the Union Government to make a still further reduction in the railway rate for the carriage of export coal, as it would benefit not only the collieries and goldmines, but likewise the railway in the shape of increased earnings, as well as the Union Government, who would receive increased revenue by virtue of the Precious and Base Metals Act, 1908, whilst it would also be the means of bringing additional capital to the country.

THE LONDON COAL TRADE.

THURSDAY, SEPTEMBER 26.

The London coal trade for the past week has been largely affected by the comparatively warm and dry weather, and buying on the market has been of a very restricted character. The opening days of the week were marked by a distinct tendency to unload at the earliest opportunity, and factors who had any stock in hand were eagerly seeking buyers even at remunerative rates rather than hold any loaded wagons longer. The fear of siding rent is always a grave consideration at the present time, and then merchants who have only a limited space of siding room at their disposal were equally anxious to dispose of their surplus stock. This is all the more remarkable as October 1 begins the winter months for all fixed price contracts. The summer prices end on September 30, and the winter prices begin, so that usually there is a fairly good demand immediately before October 1, but this year the current market prices have so far outstripped the contract rates that merchants have already begun the equivalent to the winter prices, and apart from the small balance due to them at the summer rates by contracts, very little open market buying has been recorded. The stocks at the various depots are rapidly filling up and the tendency is to hold off buying until the colder weather fairly sets in. The full time worked at the whole of the collieries has brought about an overplus of slack and small nuts, and this has been disposed of with difficulty, and often at a slightly lower figure. Large nuts and kitchener cobbles have continued selling freely, and manufacturing coals have also maintained a fairly steady demand, but all prices at the end of the week were slightly easier. The difficulty of obtaining a sufficient supply of empties is still very keenly felt in many quarters, and as the grain traffic and harvest produce advances it is likely to become a more serious problem in the near future. The attendance on the market has been good throughout the week, but the retail trade at all the depots is reported as poor. Merchants are filling up heavily at the different wharves and depots, and landing ground is very limited at any of the Metropolitan stations. The seaborne market shows a fair demand, and prices are stationary at 21s. 6d. for best Wallsend, 20s. 6d. for seconds. No cargoes, however, are offering for sale of either Durham or Yorkshire qualities, 36 vessels entered the river up to Monday, and 11 were reported on Wednesday. The shipping trade continues good, but factors report a shortage of vessels, so that freights are well maintained. The outlook for the steam coal trade is decidedly firm, for the general run of manufactories are working full time. Many of the London Coal Exchange members were deeply distressed, on Monday last, to hear of the tragic death of Mr. Clement Macrow, the well-known manager and naval architect of the Thames Iron Works, who was killed at the level crossing at Canning Town of the Great Eastern Railway Company, whilst returning from the works in his motor car. Tenders amounting to £2,350,000 have this week been accepted by the Port of London Authority for the extension of the docks on the Thames side. The contractors (Messrs. Pearson and Sons Limited) have work in hand comprising the Albert Dock (south) extension, and also improvements at the East and West India docks and also the London and Tilbury docks. The total proposal, as foreshadowed by Lord Devonport last year, amounts altogether to £14,000,000 This will render, firstly, a material increase in the employment of labour in the Port of London; secondly, considerable increase in accommodation for big liners within the Metropolitan area. The new dock, it is contemplated, will be ready within four years. Two important contracts were reported on the London market on Monday last, which will doubtless affect the Metropolitan trade during the coming winter, viz., that a large quantity of English coal was bought for the French railways for shipment to Marseilles over the twelvemonth, 70,000 tons of Durham unscreened coal at 24s. 6d. to 24s. 9d. per ton delivered and 90,000 tons of Durham unscreened coal and smalls for the Paris-Orleans Railway for shipment to St. Nazaire and Bordeaux. It is also understood that the Transatlantique Company are enquiring for a large quantity of Durham coal.

From Messrs. Dunham, Fawcus and Co.'s Report.

Friday, September 20.—The seaborne house coal market was quiet to-day, no cargoes of either Durham or Yorkshire being on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 32.

Monday, September 23.—There was a fairly good enquiry for seaborne house coal at to-day's market, but no cargoes of either Durham or Yorkshire sold, owing to the scarcity of tonnage. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 36.

Wednesday, September 25.—There was no alteration in the seaborne house coal market to-day, but a part cargo of Durham was sold on Monday last at quoted prices. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 11.

THE IRISH COAL TRADE.

THURSDAY, SEPTEMBER 26.

Dublin.

There is no change of any importance in the local coal trade, business generally keeping fairly active in most branches, and prices of all qualities remaining unaltered. The country trade is opening up well, and stocks are being substantially increased for winter requirements. Next week may probably see an advance in prices of house coal, but as long as the present very fine weather continues there is not likely to be any change. Present quotations in the city are:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; "ball" coal, 1s. 5d. per sack; steam coals, from 20s. per ton upwards; best coke, 23s. per ton, or 18s. per chaldron. Tenders are being invited this week by the Electricity Supply Committee of the Dublin Corporation for a supply of from 1,000 to 2,000 tons of Irish coal for experimental purposes. The import trade is excellent, the coaling vessels arriving during the week amounting to 77, as compared with 60 the week previously, chiefly from Ardrossan, Ellesmere Port, Glasgow, Point of Aire, Liverpool, Neath Abbey, Girvan, Newport, Swansea, Maryport, Cardiff, Partington, Troon, Campbeltown, West Bank, Garston, Irvine, and Preston The total quantity of coal discharged on the quays was 29,044 tons.

Belfast.

There has been no falling away in point of demand, the local market being in a very satisfactory position with regard to all classes of coal, and the same may be said of the inland trade. Deliveries to the interior districts are somewhat retarded by an inadequate supply of railway wagons—a not infrequent occurrence at similar seasons. Prices have not been further advanced in the city, and stand as follow:—Grant's Hall Arley coal, 26s. 6d. per ton; Hartley, 25s. 6d.; Wigan, 24s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 22s. 6d; Orrell slack, 22s. 6d. Scotch steam coals of best quality are 6d. per ton more owing to the position at the Scotch shipping ports, and other classes of steam coals are also slightly advanced. Current quotations ex quay are:—Arley house coal, 22s. 8d. per ton; Scotch household, 19s. 6d.; Scotch steam coal, 16s. to 17s. 6d. per ton; Navigation steam, 16s. to 17s. 6d.; Welsh steam coal, 17s. to 18s. per ton. From the 1st to the 11th inst. 117 coal laden vessels entered this port. Cargoes arriving during the week were chiefly from Garston, Glasgow, Ayr, Ardrossan, Partington, Preston, Newport, Troon, Workington, Ellesmere Port, Girvan, Greenock, Maryport, Whitehaven, Cardiff, Campbeltown, and Sharpness. The supply continues to be only moderate.

THE TIN-PLATE TRADE

Liverpool.

The tone of the market continues very firm. Enquiries are numerous, and a fair amount of business has been placed for delivery over first quarter of next year. Most works are now booked up for the rest of this year, and plates required quickly have to be well paid for. Raw materials are very firm and advancing. Several makers of tinplate prefer not to commit themselves ahead, while others are quoting about as follows:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 15s. 6d. per box; I C 28 × 20 (112 sh. 216 lb.), 30s. 9d. to 31s 3d. per box; I C 28 × 20 (56 sh. 108 lb.), 16s. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. per box; I C 14 × 19¼ (120 sh. 110 lb.), 16s. per box; I C 20 × 10 (225 sh. 156 lb.), 22s. 6d. per box; I C squares and odd sizes, 15s. 9d. to 16s. basis. Ternes rule firm at round 26s. to 26s. 6d. for I C 28 × 20, and charcoal tins are quoted 18s. 6d. basis and upwards according to tinning. Finished black plate can be bought in approved specifications at £11 to £11 2s. 6d. per ton basis, but early delivery is impossible. Coke wasters are in good demand Quotations: C W 14 × 20, 14s. 3d. to 14s. 6d. per box; C W 28 × 20, 28s. 6d. to 28s. 9d. per box; C W 20 × 10, 20s. 6d. per box; C W 14 × 18¾, 14s. 3d. to 14s. 6d. per box—all f.o.b. Wales, less 4 per cent.

Messrs. W. E. Cantrell and Co. Limited, of Beeston, Notts, have just introduced a patent carriage-door lock which is operated by the guard or driver of the train, by simply pulling a small lever. The power to work same is obtained by compressed air, steam or vacuum. The advantages claimed for this lock are that it will act while the train is standing, going slowly, or at top speed, and will work just as well with 2 lb. pressure per square inch as 80 lb., without alteration. Either side can be operated separately at the option of the guard or driver, for the whole length of the train, without moving from the guard's van or the engine. It is especially designed to overcome bad weather or frost trouble. The connection between carriages is with a very small flexible tube, similar to the vacuum brake connection. If any doors should remain open on either side after the lever has been pulled, they can be closed by simply slamming, and cannot be opened until the guard or driver wish. It does not interfere with ordinary latch of door, therefore those carriages not fitted with it do not prevent carriages which are, being used in the same train. The cost of fixing this, together with running expenses and first cost of this stop, is very small indeed.

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SUBSCRIPTIONS.

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⁂ *For other Miscellaneous Advertisements see Last White Page.*

Forthcoming Annual Meetings.

Manchester Geological and Mining Society, Oct. 8, 1912
North Staffordshire Institute of Mining and Mechanicol Engineers ... ... October 14, 1912
South Staffordshire and Warwickshire Institute of Mining Engineers ... October 1912 (2nd week)
Association of Mining Electrical Engineers— September 27 & 28, 1912 (Sheffield)
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The Colliery Guardian.

LONDON, FRIDAY, SEPTEMBER 27, 1912.

A meeting of the Joint District Board for South Wales and Monmouthshire under the Coal Mines (Minimum Wage) Act, 1912, was held at Cardiff on Friday, the Right Hon. Viscount St. Aldwyn presiding. The meeting was called to consider points arising under Lord St. Aldwyn's award on which the owners' and workmen's representatives had failed to agree. After hearing the arguments of both sides, Lord St. Aldwyn gave his decisions on the several points raised. The Board then further dealt with the application for special treatment under the award from the owners of several groups of collieries, a decision being given by Lord St. Aldwyn against the whole of the proposals.

Trouble is threatened at a number of non-associated collieries in Yorkshire owing to the alleged attitude of managements towards the surface workers, who are demanding an increased scale of pay.

The Royal Commission on Fuel and Engines met on Tuesday at Winchester House, St. James's-square. The Commissioners are:—Lord Fisher (chairman), Mr. George Lambert, Sir Boverton Redwood, Sir Philip Watts, Sir Henry Oram, Sir John Jellicoe, Sir William Matthews, Sir Thomas Holland, Sir Thomas Thorpe, Mr. Gracie, Dr. Beilby, and Mr. Yarrow, with Captain Dumas, R.N., secretary.

It is anticipated that the Home Office enquiry into the circumstances attending the Cadeby Main explosion will be resumed at Doncaster next week.

A draft Bill for the nationalisation of mines, to be introduced into Parliament on behalf of the Miners' Federation, has been prepared by Mr. W. Straker, Mr. V. Hartshorn, Mr. W. Adamson, M.P. and officials of the Federation acting as a sub-committee for the purpose.

Mr. E. Wilson Taylor has been reappointed managing director of the Tredegar Iron and Coal Company. Some five years ago Mr. Wilson Taylor was obliged to relinquish the post of managing director owing to ill-health.

The opening meeting of the Institute of Metals was held at the Institution of Electrical Engineers, Victoria Embankment, on Wednesday.

The Mayor of Dover, who is also a Harbour Commissioner, announced at a town's meeting yesterday that the Harbour Board intend to spend £200,000 on increased dock accommodation, principally to deal with the coal export traffic. He also stated that the Tilmanstone and Snowdown Collieries near Dover will be raising coal in six weeks' time and 600 additional miners will be introduced.

The 55th Report of the Inland Revenue Commissioners states that the administration of the Mineral Rights Duty has now reached a normal condition. During the year ended March 31, 1912, £298,982 was paid in, as against £321,911 in 1910-11, and £320,195 in 1909-10.

Indian Railways and the Coal Trade.

IN our issue of August 30 we referred to the prevailing state of congestion on the Indian railways, which has been to a large extent responsible for the failure to secure the free circulation of Indian coal throughout the Empire. If we are to judge from the brief account which has reached us of the meeting convened by the Indian Mining Association on Tuesday, the situation has worsened rather than improved. Almost simultaneously comes the intelligence that the Great Indian Peninsula Railway has contracted for 55,000 tons of Japanese coal to be delivered between March 1913 and April 1914. It is impossible, of course, to say whether this contract is in the nature of an experiment or an expedient; but it is a significant fact that the railway congestion has inconvenienced no one more than the railways. This departure, coming on the top of purchases of Transvaal and Natal coal by the Bombay, Baroda and Central India Railway Company and other companies, does not tend to lighten the difficulties or to smooth the tempers of those engaged in the Bengal coal trade.

The Bombay market has, nevertheless, always been open to foreign competition; last year it took no less than 286,000 tons of foreign coal, as against 940,000 tons of the native product, and it is recognised as one of those *entrepôts* in which—like Singapore, San Francisco and a few other places—a competitive market for coals from many sources may be found. Japan, however, has never secured a very strong hold upon the Indian market, the total quantity of Japanese coal imported by India only once, in 1901, having exceeded 60,000 tons, whilst last year the total fell to less than 7,000 tons.

With the Transvaal and Natal the case is different. Persistent efforts have been made by the Transvaal Coalowners' Association to build up an export trade and to secure from the Government a reduction of 2s. 6d. per ton in the rate from the collieries to the coast, which they regard as necessary in order to gain a footing in Eastern India. The Minister of Railways in South Africa has recently announced a rebate on coal for export of 1s. per ton, to date from August 1. In view of the position in India, it is interesting to note that this reduction is regarded by the collieries in South Africa as quite inadequate, and the dissatisfaction has even led to the resignation of the Minister of Railways.

At the last meeting of the Transvaal Chamber of Mines, the president said the rebate now offered might help in abnormal times, but that a further additional reduction of a similar amount was wanted to obtain anything like a satisfactory footing in the Indian markets. As a matter of fact, this abnormal situation now exists. The combination of railway congestion and high freights which is responsible for it has already been discussed; but so strikingly does it show the effect of Indian railway policy upon the coal trade, that we need make no excuse in returning to the subject.

Mr. H. E. TREVOR, in his "Law Relating to Railways in British India," writing in 1890, says:—"The dominant characteristic of Indian, compared with English, railways is the interest which the Government of India holds, whether as guarantor or partner or proprietor, in the entire railway system of the country." The State influence on the management and political significance of the railways has steadily grown from the early beginning, but many of the defects of the present day are to be traced to the errors of Government control in the middle of last century. Thus it was Lord DALHOUSIE, who in 1849 decided that the gauge of the East India Railway should be 5 ft. 6 in., but this was later supplemented by the metre, 2ft. 6 in. and 2 ft. gauges. It may here be remarked that from the first the Government laid it down that "it is not the wish or the interest of Government to encourage any project of this nature [railway enterprise] which does not hold out a fair prospect of moderate profit without being dependent on the Government for its dividends." It did not contemplate the driving of new highways through inaccessible districts. On the contrary, the idea was to make railways at first only in those places where other forms of transport already existed. Now the early coal industry was developed by inland waterway routes; and if, as in England, the demand for coal had arisen before the railways were invented, there is no question that canals and river routes would have been opened up and developed throughout the great delta of the Ganges and Brahmaputra, which is roughly coterminous with the new province of Bengal, and forms an immense plain in direct communication with the coalfields. It is scarcely surprising, with the prevalence of a railway mania in England, of which one of the manifestations was the thirst for canal-destruction, this opportunity of developing the natural outlets for coal was not embraced in India.

The railways, indeed, were from the first regarded as forming a new self-supporting industry, without regard to the needs of the public, and as providing a lucrative and eminent career for Royal Engineers schooled in the strategy of Chatham. As an indication of this policy, it is only necessary to refer to Mr. HUDDLESTON's contention that it was more necessary to open out the Ganges Valley "than to run a railway through a coalfield which, seeing there was then but a small market for the disposal of coal, was unlikely to yield a traffic for many years; or to traverse an unprofitable route, at a time when the first need was to draw to the railway a traffic that existed, and only needed to be secured and developed." It may be remarked that the adoption of this route involved an enormous expenditure in construction, which would otherwise have been avoided. This was the policy in the early days; it is the policy to-day. Looking at the map it seems extraordinary that the first chord line should not have been run straight up the chain of coalfields which begin at Raneegunge and end at Umaria, and afford the most direct route to Bombay; but it never occurred to the Government that coal traffic and a plentiful supply of coal is the very foundation of all traffic. Had a direct trunk line been thus constructed, branch lines for minerals could have been added and traffic delivered at river ports or canals on the edge of the riverine area, and the present trouble in dealing with fast and slow traffic on the same line been obviated. However, not only was a determined effort made at the outset to crush the water traffic out of existence, but at every subsequent stage a great portion of the railway companies' energy was devoted to meeting, by all sorts of ingenious methods, the so-called unfair competition of the waterways.

Having, however, secured the river traffic and crippled the existing highways, the East India Railway slowly developed the coalfields, secured the bulk of the Giridi field, and finally, in 1894 entered Jherria, the traffic of which it endeavoured to monopolise by excluding the Bengal-Nagpur Railway. So the edifying spectacle was seen of two private companies, each entrusted with the management of a State-owned railway fighting for the privilege of carrying the coal which the State had once owned but had given away, at the time of the permanent settlement, to the tax farmers. In 1889 the railways carried 1,404,711 tons of coal, in 1905 no less than 6,142,264 tons.

The mistakes of the past have been perpetuated in other guises; as a rule transport facilities have been behind the requirements of the trade. This, however, has not been the fault of the railway management so much as of Government finance, for in times of stress and famine the allotments for railways have had to give way to other considerations. Thus not only was mineral traffic, during the period of the Durbar, so to speak, placed on the shelf, but the expenditure incurred by the establishment of the new capital at Delhi and in altering the provinces has been met by retrenchment at the expense of trade. The root of the trouble lies in the general abandonment of the guarantee system, which has been supplanted by the system of allotting funds in accordance with the prosperity or otherwise of the annual budget. This policy has led to a general want of co-ordination, the railway sometimes being blocked with traffic, and at others with idle wagons. The first serious block occurred in 1897, and this was not remedied until 1909, when the railways had just made unusual efforts to increase their rolling stock. Then there were two years of good supply of excess wagons; but the return of prosperity, occurring simultaneously with good crops, has this year created an altogether unprecedented wagon famine.

The railways plead (and not without justice) that in an agricultural country like India it is impossible to hold sufficient rolling stock to deal with regular traffic and the carriage of the crops without delays occurring. They point out also, with truth, that the great demand for wagons for coal carriage occurs simultaneously with the demand for wagons for wheat and seed carriage—that is, at the end of the cold and throughout the hot season. The great brick industry, for instance, is unable to stock coal on the river banks where the bricks are made till the cold weather is well advanced. It would seem, however, that other industries, and that the railways themselves, who use 30 per cent. of the coal raised in India, should be able to stock part of their requirements during that period.

Shortage of wagons is not the only difficulty. The great lumbering 1,000-tons freight trains have to be worked in between the fast traffic and shunted when a fast train is overtaking them. At the time of the Durbar, sidings all over the country were filled with full and empty freight trains, and the trouble then begun has become more and more acute.

The want of wagons has raised the price of "ready" coal to nearly double its former figure. It has pressed with particular severity on those collieries which have laid out capital in endeavouring to improve the quality of their coal and to work on modern lines with the aid of screening and loading plant. On the other hand, the rise in the price of ready coal artificially encourages the temporary opening of small collieries working inferior seams, still further reducing the supply of wagons.

It will not be difficult for the reader to appreciate the causes of the present situation; to suggest a remedy is less easy. Private ownership of wagons has been suggested, but this in itself would not secure, and might even impede the rapid transmission of rolling stock. Something apparently might be done by the carriage and stocking of coal during the slack season, and by other previsionary arrangements as between the railways and traders, somewhat on the lines of the conferences held periodically at Kharkoff, in Russia—another country of long hauls—at which the prospective requirements of trade are canvassed in advance. As regards the paramount question of expenditure, it is at least worth serious consideration whether the present system of State allotments should not be superseded by powers conferred on the companies to raise loans at fixed rates of interest based on the security of their undertakings.

But a condition precedent would seem to be an alteration of the present attitude of the railway administrators, who now seem to regard the coal trade as their traditional enemy, with no mutual interests or common purpose in developing the trade and industry of the Empire. We have at least a suspicion that the recent purchases of Japanese and South African coal have been made with the object, sometimes followed by gas companies in this country, of forcing down prices and creating alarm in the coal trade, with what the railways regard as profit to themselves. Such a policy, it need scarcely be insisted, is suicidal. From a national point of view, it is like taking a tabloid remedy to postpone the effects of an insidious disease. It can only aggravate it in the end.

Governments are proverbially short-sighted where trade is concerned. A British Government could not see that an export duty on coal would curtail the quantity of small coal at the service of the home manufacturer; now in South Africa, the Government have been slow to grasp the same fact—namely, that facilities for the export of round coal will cheapen and enlarge the supply of slack for use at the goldmines. In India, a repression of the coalmining industry can only result in starving innumerable industries, and ultimately in reducing the revenue of the railways themselves.

Trade Summary.

The London coal trade during the past week has only been moderate. The house coal market has been somewhat overdone with supplies, and the depot trade is weak. Prices are stationary, both for the inland and seaborne qualities. Only an occasional cargo of Durham coal is offering, but all inland qualities are easier. Freights continue scarce and railway wagons are also short. The winter contract rates commence on October 1, but current quotations have anticipated this advance. Merchants are busy stocking all the surplus coal at the depots, but sales on the open market are slow. Coke and manufacturing qualities are firm. Slacks and small coals are somewhat easier.

The steam coal market at Newcastle has been variable, and prices collapsed during the week, but have lately recovered ground. Tonnage difficulties are less acute. Gas coals are firm, as are bunkers, coking coals, and coke.

The Durham coal trade has benefited from a better supply of tonnage, and there is a specially strong call for bunkers and coking coals.

Lancashire house coal is on the up grade, and all other classes show a tendency to harden.

The prices of West Yorkshire house coal have been advanced from Tuesday next, and merchants are pressing for supplies. There is a brisk demand for all descriptions of steam and manufacturing coal.

The tone in South Yorkshire is one of unabated strength in all branches. Coke keeps very firm.

House coal users are placing substantial orders in Derbyshire and the pits are all working full time. A general advance will be made on the first day of next month. Manufacturing and steam coals are exceptionally busy.

The general tone of the market at Cardiff is better, though buying is on a small scale. Higher prices are anticipated and tonnage is rather more plentiful. Monmouthshire coals are unchanged. House coals are in better request. Patent fuel keeps very firm.

The Scottish coal trade continues active and rather more has been doing in the shipping department.

LABOUR AND WAGES.

North of England.

A strike has occurred at Dawdon Colliery, Seaham Harbour, belonging to the Londonderry Collieries Limited, and the pit was idle on Tuesday owing to a dispute on the housing question. About 1,400 men and boys are affected. The lodge officials approached the manager for a system of giving the workmen houses in turn according to the length of time the particular workman had worked at the colliery. This, it appears from statements from the men's officials, was declined. The men met Mr. Corbett again on September 4, but an agreement does not appear to have been reached. The men have not the support of the Durham Miners' Association. An urgency committee meeting has been held at Newcastle, and a deputation of two has been appointed to proceed to Dawdon and investigate the position of affairs.

Copies of the executive committee's minutes have been received at the Northumberland collieries. The following resolutions are amongst the more important:—Cramlington Ann Pit: "Overlapping of shifts.—That we are very strongly of the opinion that the manager has no right to compel the fore shift men to stay after the backshift men go in, as he is thus violating one of the oldest customs in this country." Walker:—"Itemised pay notes.—That owing to the difficulty at this and other collieries regarding the character of itemised pay notes, we communicate with the colliery owners with a view to agreeing on a model pay note which will meet the requirements of section 96 of the 1911 Mines Act."

Important meetings with regard to the position of deputy overmen under the new Mines Act took place in Newcastle on Tuesday. A meeting of four representatives of the Coalowners' Association, the Deputy Overmen's Association, and the Northumberland County Council, respectively, was held to consider the question of classes and examinations to enable deputy overmen to qualify as fireman under the Act. It was agreed to form centres for that purpose and details will be submitted to a future conference. A meeting also took place between representatives of the Northumberland Deputy Overmen's Association and the Durham Deputy Overmen's Association to consider the alleged infringements of the Act by the displacement of deputy overmen and the employment of what are termed "timbermen" in their place. When the system was introduced the deputies' association called the attention of the Home Office to the alleged infringement, and the Home Office made certain enquiries, with the result that the system has not been extended. A report as to the position of affairs was given to the meeting, and after consideration it was agreed that the meeting stand adjourned.

Week-end developments at Ashington Colliery have considerably modified the situation there which offered serious menace to the peace of the county last week. The manager of Ashington Colliery (Mr. F. L. Booth) notified his desire to allow the men more time in which to consider the question at issue, together with the concessions which he offered to the men in return for the advantage of starting coal drawing an hour and a-half earlier than at present. He therefore withdrew his notice which intimated his intention of putting the changed hours into force this week, and he has consented to allow the old hours to continue for a little while longer in order that, if possible, an arrangement may be mutually agreed upon between himself and the men. The position is somewhat curious. The men concerned—that is, the employees of Ashington Colliery—are disposed to agree to the request of the management. But they have been out-voted on the matter by a majority of the federated associations in the Ashington group—a body which is not recognised either by the management or by the miners' county organisation. Furthermore it is stated to be the only colliery in the county where the concessions offered by Mr. Booth could be offered by the management in return for the suggested new arrangement of hours. Hence it is open to doubt whether the miners' union will be able to appreciate the case so fully as to warrant their interference. The withdrawal of the notice has, however, so far relieved the situation that the men were at work as usual this week, and there is ground for hope that the respite granted by the manager will result in a permanent settlement. For this purpose it is proposed to take a ballot vote of the miners at Ashington Colliery alone to decide the question, but it remains to be seen what will be the respective attitudes of the federated associations and the Northumberland Miners' Union on such a course of procedure.

The Northumberland Miners' Association have decided to obtain legal opinion on three points arising out of the new Mines Act. Counsel will be asked to express an opinion as to who is responsible for the cost of ballot papers when the manager demands a ballot, as to power of miners to claim a re-ballot on the question of weekly pays, and as to whether itemised pay-notes can be claimed independently of weekly pays.

A meeting between the Cleveland ironstone mine-owners and the Cleveland miners' representatives was held at Middlesbrough on Monday, when consideration was given to claims on behalf of the men for an advance of sixpence per day in the rate paid to face deputies and for a substantial advance on the base rates paid to all surfacemen and lads in the Cleveland mines. The meeting was adjourned until October 14.

As a result of a dispute among the putters of Felling Colliery, the pit was laid idle on Monday, and about 800 men and boys were thrown out of work. It appears that two of the putters had been asked at the week-end to fulfil a certain task, and refused. They were then tendered their notices. A deputation of the strikers met the manager in the course of the afternoon, at which he intimated that he could not consider the matter until the men returned to work. At a meeting of the men held the same evening, it was decided, in view of the management's intimation that they would consider the men's grievances if they returned to work, to resume work the following morning.

The Wages Board of the Northumberland Miners' Association met the representatives of the coalowners of the county at the Coal Trade Offices, Newcastle, on Saturday, to consider a proposal for reviving the Conciliation Board which went out of existence about a year ago. Last year the miners' lodges voted on the continuance or otherwise of the Board, and decided against the Board, unless certain amendments were made in its rules. The suggested amendments were not settled before the Board passed out of existence, at the expiration of six months' notice. When the Board was in operation there was an arrangement whereby the men's representatives were enabled to inspect the quarterly ascertainments of the selling price of coal, but since the Board ceased its work the difficulty on the men's side has been to obtain the information they desire as to the actual selling price of coal. The owners intimated that they would prepare a scheme for a sliding scale, and submit it to a further meeting at an early date.

A meeting of the Northumberland coalowners and the Colliery Mechanics' Association was held in Newcastle on Saturday, when an application for an increase in wages was discussed. It was decided that with the pays commencing Monday, September 23, and Monday, September 30, wages be advanced 1½d. per day. With reference to the fixing of a minimum and the question of a special advance, the owners intimated that these questions were still under consideration.

Representatives of the Northumberland Deputies' Mutual Aid Association met the owners at the Coal Trade Offices, Newcastle, on Saturday with a view to an increase of wages. After considerable discussion, the wages of the deputies were raised 1½d. per day, making the wages of the deputies 6s. 7½d. per day, the advance to take place from the pays beginning on September 23 and 30.

Representatives of the Northumberland Colliery Enginemen's Association met the representatives of the coalowners at the Coal Trade Offices, Newcastle, on Saturday, to consider the general wages question. The employers offered to advance wages 1½d. per day. The increase will be considered by a meeting of the men.

The Joint District Board of masters and men in the Northumberland Coal Trade met in Newcastle, on Saturday, to discuss matters arising out of awards given by district chairmen. In some cases the owners had lodged objections, and, on the other hand, in some instances the workmen had questioned the legality of decisions given.

Under the auspices of the Durham miners' "forward" movement, a conference of lodge delegates and a public meeting were held on Saturday at Shildon. The conference decided to call upon the executive committee of the association to take up a more determined attitude in regard to the claims for an advance of 6d. per day for this class of labour; it reaffirmed its attitude on the minimum wage question, and pledged itself to agitate until the rates are raised and the rules swept away. The mover of the resolution said a basis wage of 2s. 10½d. for surface workers and 42½ per cent., bringing it up to about 4s. 3d. per shift, was a disgrace to their organisation. It was nothing less than a scandal that a man should be able to earn less than 25s. per week.

The management of Garesfield Towneley Collery have stated their intention of appealing against the award recently given by Alderman H. C. Wood, as umpire, with respect to a claim under the Minimum Wage Act by the motor conveyor men and lads to be classified as enginemen under subsection 3 of the Act. The umpire decided in favour of the claimants, which meant that their wages would vary from 4s. to 5s. 3d. per shift, instead of from 3s. 6d. to 3s. 11d. as hitherto.

Federated Ares.

Trouble is threatened at a number of non-associated collieries in Yorkshire owing to the attitude of managements towards the surface members, who are demanding an increased scale of pay. A meeting of men was held at Barnsley, on Tuesday night, which was addressed by Councillor A. J. Bailey, Sheffield, and other speakers, and a resolution was unanimously passed that a ballot should be taken at the non-associated collieries inviting the men to decide whether notices should be handed in or not, should the unions refuse to carry out the agreement in force at associated collieries. It was also decided that moral and financial support should be given in the event of a strike by the men employed at collieries where the new schedule, which establishes a minimum wage of 4s. 2½d. a day, is in force; should the ballot be in favour of a strike, for which a two-thirds majority is necessary, 700 top men and 7,000 bottom men will be affected. Ten per cent. of the Yorkshire collieries are non-associated. Councillor Bailey declared that one of the greatest stumbling blocks they had to contend with in their efforts to get agreements carried out was non-union men. They often proved a greater obstacle than the employers themselves. If the men would give up working a shift and a-half and a shift and three-quarters, it would put into the hands of their leaders the greatest lever they had ever had. He advised them not to be greedy, and to limit their working week to six days of eight hours, in order to abolish systematic overtime.

With reference to the Coal Mines (Minimum Wage) Act 1912, the district rules, as drawn up for North Wales district, and as settled by the independent chairman (Mr. B. Francis-Williams, K.C.) provide for the appointment of a joint committee of masters and employees, three representatives from either side. This committee, in case of disagreement upon any point, is to have the power of calling in an independent chairman, whose decision upon the point in question shall be accepted as final. This outside chairman is to be selected from a panel of six persons, which panel shall be acceptable to either party, and from whom on any necessary point of difference a chairman shall be selected. The joint committee had numerous names under consideration for this panel of chairmen, and ultimately, with the assent of his Honour Judge Moss, to whom the names were submitted, the following gentlemen have been finally selected to form the panel:—H. Croom-Johnson, Esq., engineer, Wrexham; Llewellyn Kenrick, Esq., county coroner, Ruabon; Llewellyn Hugh Jones, solicitor, Wrexham; John Francis, Esq., gentleman, Wrexham; George Cromer, Esq., gentleman, Rossett; and F. Llewellyn Jones, solicitor, Mold.

Proceedings against several miners in the Pendlebury and Clifton districts, near Manchester, who have left the union are to be taken early in October for the purpose of enforcing repayment of their share of the loan raised by the local branch of the Federation during the recent coal strike. Members of the executive of the Lancashire Miners' Federation are visiting the Pendleton, Pendlebury, and Clifton localities, and interviewing men who have left the Federation with a view to persuading them to rejoin.

At a meeting of the council of the Derbyshire Miners' Association on Monday, unpleasantness at Oxcroft and other pits regarding Sunday labour was reported, and a strong protest was entered against the practice. The question of the suggested 5 per cent. advance on the basis of 1888, coupling with it a minimum of 45 per cent. and a maximum of 65 per cent., and the renewal of the Conciliation Board until December 31, 1916, was fully discussed, and the matter was referred to the delegates attending the conference to be held at Swansea next week. It was also further resolved to urge that a special conference should be called at Swansea to consider the basis on which advances and reductions of wages are made by the Conciliation Board which governs the wages operating in the Midland counties, and instructions were given that if their officials thought necessary those conditions should be submitted in a circular to the men and that a ballot should be taken amongst the lodge members as to whether they were in favour of the conditions, the papers to be returned at the earliest possible date, and not later than October 7.

Addressing a meeting of miners employed at the Babbington Coal Company's collieries, held at Tibshelf, Mr. F. Hall, of the Derbyshire Miners' Association, complained that there were certain colliery owners in the county who were not carrying out the Minimum Wage Act as they promised to do.

Scotland.

A meeting of the miners employed at Messrs. William Baird and Co.'s Bothwell Castle Collieries was held near the pits last week. The deputation reported the result of the conference with the manager, Mr. M'Phee; but there being differences of opinion regarding what action should be taken in connection with the contract and new tonnage rates, it was agreed to take a ballot of the men affected. In the result, it was decided by a majority to accept the masters' terms and continue at work.

The dissatisfaction existing amongst the Bellshill miners is now spreading to the Holytown district, where, in the Thankerton Collieries, giving employment to over 300 men, it is alleged that the management are not carrying out the wages agreement, and that there are violations of the working policy in respect to hours.

THE BY-PRODUCTS TRADE.

Tar products:—The market as a whole is rather quiet. Pitch is uncertain in some localities, more particularly on the east coast, while the gas companies' price has for the present been withdrawn. Benzols, naphthas, and toluol are all firm, while creosote holds its own well. Crude carbolic acid is easier on the west coast, but crystals are unchanged. Nearest values are:—

Benzols, 90's, 1s. 1d.; ditto 50's, 11½d.; toluol, 11½d; carbolic acid, crude (60 per cent.), 2s. 5d. to 2s. 7d.; ditto crystals (40 per cent.), 7¼d.; solvent naphtha, 1s. 1½d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 3d. for ordinary qualities; pitch, 49s. to 49s. 6d. f.o.b. east coast; ditto, 51s. to 52s. f.a.s. west coast.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—There has been a falling in the demand, with the result that prices are at a standstill. All the same, the general tone is firm in both prompt and forward positions, despite buyers holding off as much as they can in the hope of inducing a substantial decline in values. Makers, however, have no cause for anxiety, and reflect this feeling in their attitude towards prices for future delivery. Closing prompt prices are:—

London (ordinary makes), £13 18s. 9d.; Beckton, £14 2s. 6d.; Liverpool, £14 12s. 6d.; Hull, £14 10s.; Scotch ports, £14 15s.; nitrate of soda (ordinary), per cwt., 11s. 4½d.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

THE WELSH COAL AND IRON TRADES.

Thursday, September 26.

North Wales.

Ruabon.

COAL.

It is pleasing to be able to write of the continued boom in the coal trade of this district. It is a long while ago since there was such a demand in September for fuel as there has been during the past month, especially at the prices which have been ruling, which are, generally speaking, from 2s. to 3s. per ton higher than they were at this time last year. Practically every colliery is working full time, and even then is finding it difficult to contend with the demand, which is exceeding the output. All stocks have vanished, and collieries are being pressed for all kinds of fuel. With regard to the shipping trade, a fair quantity has been secured for shipment into vessels loading at Liverpool and Ellesmere Port, but owing to the great demand elsewhere the prices for this class of trade are much higher than usual. There is very little tonnage available, but it is anticipated that in the near future a large amount of new tonnage which was ordered when the shipping trade showed signs of an improved state of affairs, will shortly be available, which may have a tendency to relieve freights somewhat, which recently have advanced at the rate of about 25 per cent. New contracts for coal for steamers have been fixed up at about 2s. to 2s. 6d. per ton advance on the last contract figures. With regard to the household coal, while prices are now ruling fairly high, there will be a further advance made as soon as October comes in, with the prospect of a still further advance if the men obtain the 5 per cent. advance. Many merchants are now regretting that they did not close their contracts at the 2s. 6d. per ton advance asked them a month or so ago, as, although they are now anxious to close on those terms, generally speaking collieries will not now book further contracts, as they consider far better prices are likely to rule in the open market. Though, of course, this will much depend upon the state of the weather during the next month or two. Should the present fine weather continue, prices will not advance so rapidly, but in the event of a sharp spell, a rapid advance is anticipated. Owing to the manufacturing concerns of the district working so well, there is a good demand for steam coal, and much of the cheaper quality house coal is being sold readily in this market at a fair price, thus reducing the amount of house fuel available, and making better prices obtainable. In regard to contracts, all the railway companies are taking good supplies, and so are the gas companies. In the case of the latter, the end of this month sees the end of the summer season so far as deliveries are concerned, and as most of the collieries stipulate that a less quantity shall be taken by the gasworks during the six months ending March 31, this will leave a little more fuel on the market available for open sale after the 1st proximo. Apart from contract figures, the following are the present ruling prices. Best large household coal, 16s. to 17s. per ton; best cobbles and large seconds quality 14s. to 16s. per ton; steam coal, and coal for the shipping trade from 13s. to 14s. per ton. There are very few nuts available, but what there are can be easily sold at an average price of 12s. and 13s. per ton. Slack is very scarce at present owing to the great demand for various works, and prices vary from 7s. to 9s. per ton f.o.r. for the roughest quality. Gas coke still finds a ready sale at from 16s. to 17s. per ton at the works.

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Monmouthshire, South Wales, &c.

Newport.

COAL.

During the past week exports of coal have been greater than for some time past. Aided by the large number of steamers arriving with inward cargoes, the amount of tonnage available for coal shipments has been of a much more satisfactory quantity, and tips have been busily engaged. There was no scarcity of coal, owing to the abnormal supplies on hand, so shippers found no difficulty in completing cargoes. Prices continue about last quoted rates, but it must be noted that no concessions are now obtainable from sellers, who are equally firm for immediate or forward delivery. Smalls are inclined to be quieter, and as supplies of these promise to be more plentiful as pits resume full time, values for forward booking are a shade weaker. The house coal trade has opened with a good turnover presaging a busy season. Pitwood is in fair request, values of good wood being fully maintained, there being a good enquiry. In the freight market there has been rather more chartering. Tonnage offering being more plentiful, rates for the Mediterranean are scarcely so firm, but otherwise the high freights recently ruling are being fully held. Latest approximate ruling quotations are as follow, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 3d. to 15s. 6d.; western-valleys, ordinaries, 14s. to 14s. 3d.; eastern-valleys, best, 13s. 6d. to 13s. 9d.; other sorts, 13s. to 13s. 3d.; colliery smalls, best, 9s. to 9s. 6d.; seconds, 8s. 6d. to 8s. 9d.; inferiors, 8s. to 8s. 3d.; screenings, 9s. 3d.; through coals, 10s. 6d. to 11s.; nuts, best washed, 11s. to 11s. 6d.; house coals, best, 19s. to 19s. 6d.; seconds, 17s. to 18s. 6d.; patent fuel, 17s. 6d. to 18s. 6d. Coke: Furnace, 22s. to 25s.; foundry, 28s. to 30s. Pitwood: Best French fir, 22s. to 22s. 6d. ex-ship.

IRON.

Considerably greater activity characterises the local iron and steel trades. More business is passing in all departments and quotations in many instances show substantial increases. The forward tone, too, is slightly firmer, and with works practically fully committed for the next few months, further advances may be confidently anticipated. In all departments work is being carried on at full pressure. Tinplate bar and sheet bar mills find great difficulty in coping with current specifications. To-day's quotations are 2s. 6d. up on the week, at £5 17s. 6d. Bessemer and £5 17s. 6d. to £6 Siemens for Welsh bars. Rail mills continue extremely active, with quotations firm on a basis of £6 10s. to £6 12s. 6d. for heavy sections. The pig iron market is exceedingly strong, and, in sympathy with the north of England manufacturers of Welsh hematite, have still further advanced their quotations, which now rule on 86s. to 87s. for Welsh hematite delivered locally, with further increases adumbrated. Iron ore is firm at 21s. 6d.

to 22s. for best rubio, and inclined to go higher. In the tin-plate trade a better feeling is apparent, and there has been a sharp rise of fully 6d. per box during the week. Quotations, however, are largely nominal, as the whole output for the next couple of months is fully committed without doubt. Latest quotations are based upon 15s. 6d. to 15s. 7½d. Bessemer, and 15s. 7½d. to 15s. 9d. Siemens for I C's 20 × 14.

Cardiff.

COAL.

The general tone of this market is better, though the amount of buying going on is not by any means large. Coalowners, however, have considerable orders on their books, and this is reflected in the shipments. Last week nearly 400,000 tons of coal were again exported from Cardiff to foreign countries, and the number of wagons standing under load is much less than it was a few weeks ago. Judging from the charterings taking place, this quantity is likely to be maintained for at least the first half of October, for last week the tonnage taken up represented a carrying capacity of over 385,000 tons, or 78,000 tons more than in the preceding six days. It cannot be said as yet that there is any improvement in prices, but sellers are certainly more firm in their attitude, with the result that buyers have some difficulty in obtaining such reductions from quotations as they have done within the last fortnight or three weeks. The general opinion is that bottom has at length been touched, and that in the near future prices will appreciably harden. During the whole of the depression recently experienced, sellers have consistently held that it was but temporary, and their views, so far as the future is concerned, have in no wise changed. They express the utmost confidence that with, comparatively speaking, a slighter increased quantity of tonnage offering, prices of coal would immediately benefit. Foreign buyers are already bowing to the inevitable and showing more readiness to pay the enhanced rates of freight which prevail. In fact, many have come to the conclusion that unless they do so they may not be able to obtain their coal. It is very significant that within the last few days the well-known French shipping firm, the Compagnie Générale Transatlantique have placed orders with several collieries for supplies over next year. Last year this company, owing to the labour troubles, and the trouble they experienced in getting Welsh steam coals, except at very high prices, purchased large quantities of Yorkshire and American coal. Now, however, they appear to be reverting to their original practice, and ordering largely of Welsh steam coals. This is no doubt due to the fact that the difference between the price of Welsh and north-country coals is more nearly approaching to the normal. It is difficult to obtain reliable information as to the quantity of coal they have bought. Some of the local newspapers put the amount at about 300,000 tons, but those in a position to know declare that this is a gross exaggeration. All that is known with any degree of certainty is that the company up to the present have only purchased moderate quantities of second Admiralty coals, probably not more than half the quantity mentioned. For the better quality, such as Albion, they have agreed to pay 17s. 3d., less the usual rebate of 3d. and a discount of 2½ per cent. For other descriptions, such as Insoles, Rhymney and kindred coals, the prices are a little less. It is reported in some quarters that the agents of the French company are still negotiating with other collieries, but the most reliable information obtainable is to the effect that no further purchasing is likely to be done at present. At one time this contract was looked upon as a key to the market for the coming year, and so reluctant were buyers to place any orders until they knew what terms had been arranged, that it was mutually agreed between both sellers and buyers that in future the business done should not be disclosed. There is no doubt that buyers on all sides have for some time been keeping off the market as much as possible. Of course, the high freights have had a good deal to do with this. With 13s. 6d. charged for Genoa, 13s. 9d. for Constantinople, 13s. for Port Said, 13¾ fr. for Algiers, 23s. for Monte Video, and 25s. 6d. for Rosario, it was extremely difficult to get anyone to buy, and stocks at the depots are known to be at a very low ebb. Contracts for supplies over next year appear for the moment to be in abeyance. The only shipping companies that have come forward, besides the Transatlantique, are the Orient and the Allan. Sellers, however, are by no means disconcerted. The time is yet quite early for the placing of forward contracts, and rather than yield to the "bearing" tactics of buyers, they prefer to adopt a waiting attitude. Spot business is very dull, and though best steam coals are nominally quoted at from 17s. to 17s. 3d., the latter figure is practically impossible of attainment. Best Admiralty seconds are 16s. 6d., ordinary qualities 15s. 6d. to 15s. 9d. Notwithstanding the large shipments that have taken place, small coal continues very firm. Owing to the shortage of wagons in Italy, pending the vine harvest, a slump is usually expected in prices, but this has not taken place on the present occasion. All through the month best cargo smalls have ranged from 9s. to 9s. 3d., which of course goes to prove that there is a good demand for this commodity. Bunkerings are selling at 10s. 3d. to 10s. 6d. and best ordinaries at 9s. 9d. to 10s. A good many buyers are endeavouring to arrange for supplies of bunkering descriptions over next year, but what prices they are paying is not known. It is said that in some 11s. has been obtained, but this is not confirmed. Washed nuts are round about 15s. and washed peas 12s. 6d. to 13s. There is not much change in Monmouthshire coals. For immediate delivery Black Veins are selling at 15s. 6d., best western-valleys 14s. 9d., seconds 14s. 3d. to 14s. 6d., best eastern-valleys 14s. 3d., seconds 13s. 9d., all f.o.b. Cardiff. House coals are in better request, and fancy qualities are quoted up to 19s. per ton. No. 3 Rhondda bituminous large is 17s., through-and-through 14s. 3d. and small 12s.; No. 2 large 12s. 6d., through-and-through 10s. 3d., and small 8s. 9d. to 9d. Patent fuel keeps very firm, but business is anything but brisk. The shipments for the week were under 19,000 tons, of which the Crown company exported 5,201 tons, other Cardiff firms 1,500, Swansea 11,760 tons, and Newport 3,380 tons. Prices are from 18s. 6d. to 19s. The coke market is strong, special foundry being 27s. 6d., ordinary 25s. Furnace coke is a little firmer at 21s. per ton. Pitwood has gone up to 22s. 3d.

IRON.

Owing to the increasing cost of materials, makers of tin-plates have again put up their quotations. Block tin is now £227 10s., or 35s. above last week, while steel bars have gone up 2s. 6d. per ton. There has been heavy buying of tinplates, especially for forward delivery, and 28 × 20 sheets are fetching 30s. 6d. Some large contracts have been placed for the first half of next year of 14 × 20 cokes, on the basis of 15s. 4½d. per box. For prompt business the price is 1½d. to 3d. more. There is a good enquiry for oil plates and merchants are freely paying 15s. 9d. for 14 × 18¾ and 22s. 3d. for 10 × 20 sizes. In America prices are also going up, the quotation being now 3 60 dols. per base box. It is said that never before has the production of tinplate, terneplate or blackplate been so great. Nearly 10,000 tons of foreign steelplates, bars, and billets have been landed at Newport during the week and the cry is still for greater supplies. All the Welsh works are excessively busy, and Siemens tinbars are now quoted at from £5 17s 6d. to £6, and Bessemer from £5 15s. to £5 17s. 6d. per ton. It is reported that Messrs. Baldwin, who some five or six years ago acquired the Port Talbot Steelworks, have decided to spend over a quarter of a million on their extension. In addition to the three modern smelting furnaces of the Siemens pattern, which are being erected on the old Aberavon football ground, another new plate mill and a section mill are also to be constructed. The galvanised sheet market is very firm and some of the principal makers have raised their price for 10 × 3 corrugateds to £13. At other works, however, buyers are still able to place orders at £12 10s. The rail mills are working at great pressure and heavy sections are now quoted at £6 10s. to £6 12s. 6d., with the usual extra for light sections. The pig iron market is very strong, Welsh hæmatite being 82s. 6d. to 83s. 6d. f.o.t. Scrap metals are dearer, as much as 66s. to 67s. being demanded for new steel crop ends.

Swansea.

COAL.

Last week the trade of the port was again of a satisfactory nature. There was an improvement in the supply of tonnage in the latter part of the week. The shipments of coal and patent fuel amounted to 96,643 tons. There was a good attendance on 'Change this morning, and owing to a better supply of tonnage in dock there was a steadier feeling in evidence on the anthracite coal market, and the undertone was slightly firmer, but no actual alteration was noted in quotations generally. Swansea Valley large was in fairly good demand, and Red Vein large was firm at last prices. Machine-made nuts and cobbles were barely holding their own. Rubbly culm was in rather better request, whilst duff remained a firm market. In the steam coal market there was no material alteration to report. Large was still weak, and smalls steady. The following were approximately the closing quotations—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 17s. to 19s., less 2½ per cent.; Red Vein large, 13s. 6d. to 14s. 6d., less 2½ per cent.; machine-made cobbles, 22s. to 24s.; Paris, French, and German nuts, 23s. 6d. to 26s.; beans, 21s. to 23s. 9d.; machine-made large peas, 13s. to 14s. 6d.; ditto fine peas, 11s. 6d. to 13s., all net; rubbly culm, 7s. 3d. to 7s. 9d., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 18s. to 19s.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s. 9d. to 11s. 6d.; smalls, 9s. 3d. to 10s. 9d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 18s. 6d.; through-and-through, 15s. to 16s. 6d.; small, 12s. 6d. to 13s. 3d.; No. 2 Rhondda large, 14s. to 15s. 6d.; through-and-through, 10s. 9d. to 11s. 6d.; smalls, 9s. 3d. to 10s. 6d., all less 2½ per cent. Patent fuel, 17s. 6d. to 18s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

The usual activity was observed at the blastfurnace, Landore, during the past week, and the steel-smelting establishments in the district were fully operating. Notwithstanding the continued importation of foreign rolled bars, a good demand existed for the home material for tin-plate and sheet making. The full complement of sheet mills were once more at work, and the activity associated with the tin-plate trade for some years past showed no sign of decline. Employment at the foundries and engineering works could not be better. The shipments of tin-plates last week were 164,261 boxes, receipts from works 132,251 boxes, and stocks remaining in the dock warehouses and vans 210,637 boxes.

Llanelly.

COAL.

The position still continues very satisfactory in this market as far as orders are concerned, but the great scarcity of tonnage is upsetting everything. Many of the collieries have large cargoes under load waiting shipment, and the difficulty in getting boats along is responsible for idle days at most pits. The position is getting serious, and what should be a period of activity is being really spoiled through lack of sufficient boats. There is a big demand from the Continent, and buyers there are experiencing considerable trouble in having their wants supplied. The enquiry from inland is not quite so good, and orders for some sorts are quickly attended to from the stocks. The smaller machine-made kinds are still going well. Steam and bituminous smalls have a very good demand at high prices. Bunkers are easy and are being quoted quite 6d. per ton down. This week's figures are:—Best malting large, 23s. to 25s.; second malting large, 21s. to 23s.; Big Vein large, 17s. 6d. to 19s. 6d.; Red Vein large, 14s. to 14s. 9d.; machine-made large cobbles, 22s. to 23s. 6d.; German nuts, 24s. to 25s. 9d.; French nuts, 24s. to 25s.; Paris nuts, 24s. to 25s.; machine-made large beans, 22s. to 24s.; ditto, second quality, 20s. to 22s.; machine-made large peas, 14s. to 15s.; rubbly culm, 8s. to 8s. 6d.; duff, 5s. to 6s.; large steam, 16s. to 16s. 6d.; through-and-through, 10s. 6d. to 11s.; small steam, 8s. 6d. to 9s. 6d.; bituminous small, 10s. 6d. to 11s. 6d.—all f.o.b.

OBITUARY.

We regret to announce that Mr. James Coats, who has been chief draughtsman to Messrs. Andrew Barclay, Sons and Co. Limited for over 30 years, died at his residence, Dundonald-road, Kilmarnock, on the 14th inst. Mr. Coats was known to a large circle of colliery proprietors, managers, and engineers all over the country. He was under 60 years of age, and had been at the Caledonia Works of Messrs. Andrew Barclay, Sons and Co. Limited during the whole of his working lifetime.

THE SCOTCH COAL AND IRON TRADES.

Thursday, September 26.

Glasgow and Lanarkshire.

COAL.

There has been rather more doing in the shipping department of the coal trade. The aggregate shipments from Scotch ports in the past week amounted to 368,246 tons, being 45,652 tons more than in the preceding week, but 15,068 tons less than in the corresponding week of 1911. The shipments at Glasgow showed an improvement of between 4,000 and 5,000 tons, so that the main increase occurred on the east coast. There has been a very considerable decrease in the foreign shipments at Glasgow, but the quantities despatched coastwise have increased to some extent. Increased freights are undoubtedly exercising a repressive effect on the export branch of the trade, but shippers seem to anticipate that some improvement may soon take place in this respect. The season is now so far advanced, however, that it is hardly to be expected that the decreased shipments on the year to date, can now be transformed into an increase. The decrease at present amounts to about 965,000 tons. But while the export department of the trade is thus in a somewhat backward condition, the inland consumption is very active, and this feature is likely to be maintained for a considerable time at least. In the past week, there has been a moderate demand for steam and house coal for export, but splint has been in very good demand. The current quotations f.o.b. at Glasgow are for steam coal 11s. to 12s., ell 11s. 6d. to 12s. 6d., splint 13s. to 13s. 6d., treble nuts 13s. to 13s. 6d., doubles 12s. 9d. to 13s., and singles 11s. 6d. to 12s. per ton. A very large consumption of coal is taking place at the iron and steel works and other factories, and prices of all good furnace coal are well maintained. The demand for house coal for home use is expanding, prices being steady.

IRON.

The upward movement in pig-iron warrants has sustained a check since last report. Cleveland iron touched 68s. 1½d. cash, and from that figure a sharp reaction occurred in consequence of holders realising profits. The occasion was chosen to do this when foreign reports were exceptionally favourable, but still a considerable reaction took place in prices. Business has taken place in Cleveland iron from 67s. 4½d. to 66s. 1d. cash, 67s. 8d. to 66s. 6d. one month, and 68s. 2½d. to 66s. 11d. three months. Transactions have also been noted at 67s. 5½d. for delivery October 23, 67s. 10d. November 3, 67s. 6d. November 4, and 67s. 7½d. for December 6. The arrival at Grangemouth of pig iron from Middlesbrough and district was 12,428 tons, which is considerably larger than in some recent weeks. There has been more enquiry for hæmatite pig iron, which has had an upward tendency in price. Scotch hæmatite is quoted 82s. 6d. per ton for West of Scotland delivery. A fair business is reported in Scotch pig iron, and prices are again somewhat higher. Govan and Monkland are quoted f.a.s. at Glasgow Nos. 1, 74s., Nos. 3, 72s. 6d.; Carnbroe, No. 1, 78s. 6d., No. 3, 74s. 6d.; Calder, No. 1, 79s., No. 3, 74s.; Clyde, No. 1, 80s., No. 3, 75s.; Gartsherrie and Summerlee, Nos. 1, 81s., Nos. 3, 76s.; Langloan, No. 1, 81s. 6d., No. 3, 76s. 6d.; Coltness, No. 1, 97s. 6d., No. 3, 79s. 6d.; Eglinton at Ardrossan or Troon, No. 1, 74s., No. 3, 73s.; Glengarnock at Ardrossan, No. 1, 81s., No. 3, 76s.; Dalmellington at Ayr, No. 1, 75s. 6d., No. 3, 73s. 6d.; Shotts at Leith, No. 1, 80s., No. 3, 76s.; Carron at Grangemouth, No. 1, 81s., No. 3, 76s. per ton. The shipments of Scotch pig iron were 2,773 tons foreign, and 2,515 coastwise, the total of 5,288 tons being 1,038 tons more than in the corresponding week of last year. Business in finished iron and steel is quiet, but the orders in hand are sufficient to keep the works running to their full capacity for a considerable time.

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Renfrew, Ayr and Dumbarton.

COAL.

The coal shipments at the various ports are well up to the average, although they come short of the preceding week by about 2,000 tons. About 6,800 tons were despatched abroad, the coastwise and Irish shipments reaching 23,000 tons. At Bowling 268 tons were cleared, Greenock 517, Ardrossan 4,514, Irvine 1,290, Troon 6,950, and Ayr 16,427—total 29,976 tons, compared with 31,504 in the preceding week, and 29,848 in the corresponding week of last year. There is a heavy demand for coal for use in manufacturing works, iron and steel works, foundries, etc., and the inland household demand is steadily expanding. Prices are steady, hard qualities of coal suitable for furnace use and dross being comparatively firm.

◆

Stirling, the Lothians and Fife.

COAL.

Business has been active in coal shipments at Firth of Forth ports, where the clearances show an increase over those of the preceding week amounting to 30,000 tons. The increase is due to an additional supply of steamers at Grangemouth and Leith. The shipments were at Granton 7,610, Bo'ness 11,626, Grangemouth 53,900, and Leith 58,319—total 131,455 tons, compared with 101,961 in the preceding week, and 128,961 in the corresponding week of last year. The demand for steam coal has been very active at harder prices, and small hard coal and nuts have been in strong request. Best screened steam coal is quoted at Leith 12s. 9d. to 13s., secondary qualities 11s. 6d. to 12s., treble nuts 13s. 6d. to 14s., doubles 12s. 9d. to 13s., and singles 12s. 3d. to 12s. 6d. per ton. A good business has been done in Fifeshire, and the shipments are up 13,000 tons from the preceding week, chiefly owing to a larger supply of tonnage at Burntisland. The clearances were at the last-named port 61,820 tons, Methil 60,852, Alloa 2,364, Dysart 1,023, Wemyss 892, Tayport 685, Charleston 133—total 127,769 tons, compared with 114,228 in the preceding week and 138,748 in the corresponding week of 1911. First-class screened navigation coal is quoted at Methil and Burntisland 15s. 6d. to 16s. 6d., unscreened 13s. to 13s. 6d., steam coal 11s. 6d. to 12s. 6d., treble nuts 14s. to 14s. 6d., doubles 13s. 6d. to 14s., and singles 12s. to 12s. 6d. per ton. Inland demand is growing, and a good deal of contract business is reported.

BOOK NOTICES.

Regulation Act, 1911: How to Remember It.
y HENRY DAVIES, director of mining
for the county of Glamorgan. Wigan:
and Sons. Price 1s. 6d. (cloth); 1s.

ent of this book and its convenient size
mmend it. Not only is the Act of 1911
he Rescue and Aid Order, the Electricity
losives Order, Minimum Wage Act,
ors' Order, and Fireman's Certificate
ulation, so far as we can see, consists
ent of the sections of the principal Act
cal headings. We cannot say, however,
een done as well as it might have been
true alphabetical sequence is not always
, again, references are made at times
ly confuse the reader, who, it may be
be a busy man to enlist the services of
r example, we find under the heading
ficate)" the direction "see section 11,"
to the rearrangement of clauses, it is a
ifficulty to find the page on which the
Under the circumstances, the absence
f contents is inexcusable.
observed that, on the cover of the book,
is spoken of as the Coal Mines *Regula-*
orrectly named on the title-page and in
es, but in his preface Mr. Davies again
r denomination—a small point, perhaps,
e interpreted as an index of general

rors in Surveying. By HENRY BRIGGS,
don: Charles Griffin and Co. 1912.
t.

of this work is to investigate the extent
combine in affecting the accuracy of
o frame rules with the object of
ccuracy. Errors are of several kinds.
stakes due to carelessness; cumulative
a wholly positive or wholly negative
for example, the error caused by
th a faulty link; and lastly, accidental
g from personal and instrumental
It is with these last the author deals,
n the first place that such accidental
ee noticeable properties—viz., they are
ticely small, small errors are more
larger ones, while positive errors are as
ative ones. The magnitude-frequency
the probability curve, is the graph of
equation $y = k\,e^{-h^2 x^2}$, where k, h, are
is the exponential law of error.
owever, very properly shows that there
with in surveying which do not follow
law, such as errors arising from reading
rom eccentric centring, because these
a definite maximum, which is precluded
s function given above. Of the three
rmining degree of uncertainty, known
, mean-square error and average error
ts the last as being not only the most
lso the most intelligible.
devoted to a study of the best shape
d the author discusses the form of
st affects the accuracy of an area, and
involves the least chaining. The
gle, which involves the least trouble in
is not necessarily the theoretical "best
connection the important case of
gle, for conveying true bearing under-
a vertical shaft, is discussed, and the
st error are considered.
ing chapter the propagation of error
considered. This includes errors in
hs and angles, and is complicated by
of cumulative error, as well as by
such as, for example, the nature of the
ading lengths to the nearest link or
n division of a tape, the average error,
with the length of the line—that is,
of applications of the measure. The
erned by the length of the measure,
with the chain than with the tape. As
mine surveying are generally worse
ce, the accuracy is rather less, and the
the average error in this case, when
el tape, from the equation

$$l = \pm 0{\cdot}0063 \sqrt{L},$$

ed form of Prof. Lorber's well-known
is the average error and L the length

surveying will find much instructive
apter, with not a few practical hints
respecting the use of instruments with a view to securing a satisfactory traverse. The author proceeds to consider certain traversing problems in practice, and then considers the propagation of error in minor triangulation. The book concludes with a useful summary of the conclusions arrived at, and an appendix contains a set of tables designed to facilitate the calculation of the average error in surveys. We can thoroughly recommend this work for the use of engineering students generally, and for mine surveyors in particular. The latter will find frequent reference to mine surveying problems which the author has selected as being particularly suitable for the illustration of the subjects treated in this volume.

Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

BELLEVUE EXPLOSIONS, ALBERTA, CANADA.

SIR,—The paper read before the meeting of the Institution of Mining Engineers at Birmingham, on September 11, 1912, by Mr. John T. Sterling (H.M. inspector of mines, Alberta, Canada) and Prof. John Cadman, D.Sc., on the above, and published in your issue of September 13, mentions that one of the rescue party wearing the Draeger rescue apparatus was killed. It is further stated that it is not known what failed in the apparatus, and that the writers suspect that some of the joints must have been leaking and permitted afterdamp to get inside.

According to reports received and notices in the local Press, and in the *Canadian Mining Journal*, the reason given for the man being killed is that he deliberately took off his helmet to put it on one of the imprisoned miners, in order to enable him to penetrate through the noxious atmosphere.

One of the local papers (the *Standard*) reports under December 12, 1910, as follows:—

> A Mr. Anderson, who was a member of a rescue party from Hosmer, sacrificed his own life for that of a brother miner. Mr. Anderson came in contact with one of the victims, who was almost overcome by firedamp. There was only one chance of him getting the man to a place where he might be revived, and that chance was taken at the cost of the rescuer's life. Mr. Anderson unbuckled his oxygen helmet from his head, by means of which he was advancing through the fire-stricken section, and placed it on the head of the now nearly unconscious man. Scarcely had he performed this act of heroism when he himself was overcome by the poisonous gas and died in a few minutes. The man for whom he sacrificed his life made his way with difficulty until he was met by others of the rescue party and taken out of the mine.

A similar report appeared on January 1, 1911, in the *Canadian Mining Journal*, page 64. It is also here stated that Alderson (Anderson), the mines' boss from Hosmer, lost his life trying to save others.

Under these circumstances, the fatal accident can hardly be described as being attributable to any mishap or failing of the Draeger rescue apparatus. No doubt the writers of the above paper have been misinformed, and as such misleading statements may be apt to injure the cause of rescue apparatus, I hope you will give this letter publicity in your valued columns.

RICHARD JACOBSON.

70, Shoe-lane, Holborn, London, E.C.,
September 20, 1912.

THE STATUS OF COLLIERY SURVEYORS.

SIR,—It seems to me that the present is an opportune time for the formation of an Institute of Mine Surveyors.

Now that the Government are compelling surveyors to hold certificates, surely surveyors themselves can do something towards raising the standard of surveying in this country, and at the same time raise the status of the profession. There are very many problems which have been and are being met with daily which, if discussed and published, would do much to attain the end mentioned above.

If other surveyors are interested in this direction, perhaps they will ventilate their views in this column, and if a sufficient number show a healthy interest, some practical means could be adopted for furthering the object in view.

WM. B. H. LOCKERBIE.

18, Gordon-terrace, Southwick-on-Wear,
Sunderland, September 17, 1912.

SUGGESTED SOCIETY FOR COLLIERY CHEMISTS.

SIR,—May I be allowed to ask those of our readers who are colliery chemists whether they think it would be possible to form a society enabling colliery chemists to hold meetings and to discuss matters periodically appertaining to that particular branch of their scientific work. I am under the impression that such meetings might be useful in a high degree not only to colliery chemists themselves, but to their employers and others. The association could, for instance, be divided up into a number of colliery districts, each with their own officials, &c. It might be possible to arrange works excursions, and, indeed, to transfuse a little pleasure generally into our daily lives.

A COLLIERY CHEMIST.

September 20, 1912.

TO CORRESPONDENTS.

Electric Miners' Lamps

T. H. (Wigan).—We should advise you to address your enquiry to the Home Office. It is clear that all lamps must pass the official test; whether any of the lamps entered for the Rotherham competition have yet been submitted to the official test, we are unable to say.

WORKMEN'S COMPENSATION.

(SPECIALLY CONTRIBUTED.)

The Recurrence of Nystagmus

Morris v. *Watson and Co.*—This case (Newcastle, July 19) involved a curious point in relation to nystagmus. The applicant was employed as a hewer and stoneman by the respondents. He began to experience trouble with his eyes in February 1910. In June of that year his eyes became so bad that he had to visit the certifying surgeon, from whom he received a certificate that he was suffering from nystagmus. On that certificate being presented to the employers, applicant received compensation at the rate of £1 a week from the beginning of July 1910, until February 11, 1911. There was no further evidence from the certifying surgeon, and the employers, for reasons of their own, cut down the compensation to 10s. 3d. The applicant, in seeking a renewal of the full payment of compensation, said that he was very anxious to do his work, and that as a matter of fact he asked his employers to find him some light work on the surface which he could do. It was submitted in any case that he was entitled to the arrears of compensation, it being said that the employers had no right to terminate or reduce the compensation.

Called on behalf of the respondents, Dr. Percival declared that he was strongly of the opinion that nystagmus was due to a natural tendency or defect in the patient, who was born with that defect. One in ten working in a pit would get it, while the others working under the same conditions would not.

The employers denied liability because the certifying surgeon did not certify that the applicant was suffering from nystagmus. It was contended that Parliament had thought that nystagmus should be made an industrial disease, and a man suffering from it compensated; but it never meant that afterwards the employer should go on paying compensation on account of the disease.

His Honour observed that he thought on the evidence there must be an award for the applicant for the full amount of compensation to the extent to which it was stopped before June 6 of this year. It seemed to him to be admitted that a man suffering from nystagmus was more liable to suffer from it again, and he thought that was the fact in this case.

On the other point raised by Mr. Jones he confessed there was a great deal to be said for it, so far as it had been discussed; but in face of what the Master of the Rolls and Lord Justice Moulton said in a case quoted, it was not, he thought, open for him to take the view counsel suggested, and he would leave it for him to raise it in the Court of Appeal. Therefore he would make the award for plaintiff. Costs were granted with one qualifying fee.

Dismissal for Drunkenness.

Heenan v. *Dalton Main Collieries Company Limited.*—In this case (Rotherham, July 19) a pitman had met with an accident to his right hand, blood-poisoning supervening and preventing him from working for some weeks. He lost part of his third finger. Compensation was paid, but in July he commenced light work at the pit-bottom, for which he was paid 4s. 6d. a day. He continued to work until December 7, and the company then sent him back to his old work, which he found he could not manage at all.

About the end of December he resumed his light work, and continued up till March 2, when the strike took place. He came back again and worked until May 7, when he was discharged on the ground that he had been found drunk in the mine. He denied the allegation.

Judge Benson said the applicant had lost his light work with which he was provided through his misconduct, but that did not deprive him of the compensation due to him in so far as he was unable to earn such wages as he was earning before the accident

His Honour awarded the applicant compensation at the rate of 3s. a week, calculating the sum to be the difference between the wages he might have expected to earn and the wages earned by an ordinary able-bodied man in a similar position.

Arising out of the Employment.

Burwash v. *Frederick Leyland and Co. Limited.*—In this case (Court of Appeal, July 18) a seaman who was suffering from Bright's disease fell overboard at night It was proved that his complaint made it necessary for him to go frequently to the lavatory on the upper deck, and it was contended, on behalf of his widow, that this increased the probability of his falling overboard. The Court of Appeal, however, held that the cause of the accident was at best only a matter for surmise, and that the claim must fail.

⁂ *We shall be pleased to answer in this column questions relating to Workmen's Compensation and Employers' Liability. All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.*

CONTINENTAL MINING NOTES.

Belgium

Boring operations carried out by the Société Campinoise pour Favoriser l'Industrie at Slagveld, near Oostham, have led to the discovery of the coal formation at a depth at 666 m.

Holland.

A new floating elevator having a capacity of 1,056 tons of coal an hour, and constructed in the Gusto dockyards at Schiedam, has been put in service at Rotterdam by the Steenkolen Handels Vereeniging. The company have also installed at Amsterdam a coal elevator capable of dealing with 600 tons an hour.

Germany.

Ruhr Coal Market.—The first half of the month brought no appreciable change in the condition of this market, the long-continued activity being, if anything, increased, so that the deliveries are even larger than in August. Owing, however, to the fact that the trade and many consumers have got in their supplies early, in order to discount the coming scarcity of railway wagons, it is not improbable that there will be a certain slackening off after a while. The large export demand also contributes to the present activity, Ruhr coal practically dominating the market in Holland, where it has largely displaced English coal, although the latter is being offered at low prices. Consignments to Belgium are also increasing, and in Northern Germany, round the Elbe and Weser, the ground gained by Ruhr coal during the English miners' strike is being retained and even widened. Owing to the favourable state of the Rhine, the shipments to South Germany are very considerable, though, apart from house coal, the demand there is not developing sufficiently to absorb them, and stocks are growing. In other respects there is little change, even in the coke market, where the supply and demand are still inharmonious.

Coal Market in Upper Silesia.—The favourable condition of the market remains unchanged, and the volume of business has beaten all records. This is due in part to the fact that the means of transport are ample up to the present, and in part to the probability of an increase in prices. The home market is laying heavy demands on the capacity of the pits, so that practically the whole output is disposed of at once, so far as industrial coals are concerned. House coal is in better request since the weather became cooler; and coking coals are also selling well. In fact, so great is the demand for these latter that it has to be partially met by other grades. The advance of the season is also favourably affecting the demand for gas coal. The export trade is on an equally satisfactory footing, English competition being effectively met in the districts of Northern Germany, whilst both Russian Poland and Austria-Hungary are extensive buyers. The coke market is also in a very satisfactory state, the entire output of blastfurnace and foundry coke being taken up; and the other kinds are attracting renewed interest.

Partnerships Dissolved.—The *London Gazette* announces the dissolution of the following partnerships:—H. P. Saunderson and A. V. Gifkins, engineers and ironfounders, Elstow Works, Bedford, under the style of Saunderson and Gifkins; W. Holland, G. H. Melly, A. Cook, and C. S. Jones, shipowners, Water-street, Liverpool, under the style of Lamport and Holt.

MINING AND OTHER NOTES.

An important decision regarding section 16 of the new Coal Mines Act has been obtained from the Home Office. The appointment of two checkweighers as workmen's examiners of coalmines was opposed by the management at a South Wales colliery, who contended that checkweighers were ineligible The men's agent referred the matter to Dr. Atkinson, chief inspector of mines for South Wales, through whom the Home Office have now laid down the ruling that checkweighers who have been practical miners may be appointed by the workmen to examine pits.

It is stated that Lord Furness will be unable to preside at the annual meeting of Palmer's Shipbuilding and Iron Company Limited, to-day, and that his lordship has tendered his resignation as chairman. In communicating this decision, he states that while the claims of many other business interests would be sufficient reason for his taking this step, considerations of health likewise prompt him, as he must in deference to the counsel of his medical adviser do less work than has been his custom in the past.

There was a large gathering of officials of the Burradon Coal Company and others on Tuesday, when a presentation was made to Councillor George Emmerson, who has officiated as under-manager at the Burradon Old and the Weetslade Lizzie pits for some time, and who is leaving to take over the management of an important colliery at Whitehaven. The presentation consisted of a handsome Chippendale cabinet and a silver cigar case, with a silver-mounted umbrella for Mrs. Emmerson.

During the coal strike the miners in North Wales received loans from the Poor Law authorities, and the point was raised at the Hon. R. C. Grosvenor's West Denbighshire Revision Court at Llangollen, on Tuesday, whether they were disqualified as voters. The revising barrister said it was astonishing to him that, although the Act was passed 78 years ago, no case had arisen under it that had been taken to the superior courts. Relief given in loan set up the condition of an ordinary civil debt, and if he were correct in taking that view, the recipient was not disqualified.

A meeting of the Arbitration Committee of the Newcastle Chamber of Commerce, was held on Tuesday at the Exchange, when the new coasting coal charter as brought forward by the Documentary Committee of the Chamber of Shipping was considered. Several important alterations are proposed in the charter, and the Chamber of Shipping suggests that it should come into force on January 1. It was resolved to call a meeting of all those interested in the question in the Mayor's Chamber, Guildhall, this (Friday) afternoon, when definite action will be taken.

At the provincial meeting of the Law Society at Cardiff on Tuesday an important contribution was read by Mr. Hugh M. Ingledew, of Cardiff, upon the development of railway law. He said it was left to the recent case of Spillers and Bakers *v.* the Great Western Railway Company to finally decide that a railway company was not under any specific statutory obligation to haul a trader's private wagons, and that the rights of the trader to provide his own wagons for his own goods and to call upon the company to haul and convey the same depended upon the circumstances of each case. There was little doubt that the extraordinary intricacies of railway rates had led or contributed to many of the difficulties and suspicion which exist between the railway companies and the public. In many cases the method of arriving at the true figure was extremely complicated, and afforded room for distrust, and in some cases hostility. The requirements of the trader might be summed up in one word, "despatch," and the essential for despatch was an efficiency which could only arise from the provision of ample accommodation, not only in permanent works, but in an efficient staff, locomotive power, and general equipment.

At last week's meeting of the Doncaster Rural District Council, correspondence was read between the clerk of the council and Mr. Maurice Deacon, managing director of the new colliery which is being sunk at Rossington, with regard to the sewage scheme for the new colliery village.

Mr. James Bell has recently been appointed as an assistant manager under the Manvers Main Colliery Company. Not many years have passed since he commenced work as a pony driver at the Hickleton Main Colliery. Last year he left Hickleton to take over the managership of the Rosebery Iron Mines, Cleveland. His father, Mr. Henry Bell, holds the position of assistant under-manager at Hickleton.

Following upon the adoption of electricity for various purposes at his numerous collieries and workshops and at his Lancashire seat, Worsley New Hall, the Earl of Ellesmere has just completed arrangements with the Lancashire Electric Power Company by which Worsley village will, at an early date, be in the enjoyment of electricity supply for lighting or power. It is now proposed to extend the service cables to Worsley, and to establish a sub-station in the village.

In addition to the coking plant mentioned in our last last week's issue, Messrs. Skinner and Holford Limited have also placed an order with Messrs. Simon-Carves Limited, Manchester, for Baum coal-washing plant and coal storage bunker, to be erected at Waleswood Collieries, Sheffield.

The collieries in the Doncaster district are not only equipping themselves with the very latest and best in the way of winding machinery and so forth, but are also making ample provision for minimising the dangers and loss of life which unfortunately seem to go hand in hand with coalmining. One of the local colliery proprietors has just had a handsome motor ambulance built for use at the pit, a conveyance which provides the most modern equipment possible. It comprises two collapsible stretchers together with a complete set of splints, also appliances for first aid treatment It is lighted inside by electricity and provided with a seat for the nurse or attendant. The vehicle can also be used for rescue station work if required, inasmuch as the stretchers can be folded away underneath the shelves carrying them, and cushions can be fitted on to the shelves, thus making it possible in an emergency to take the members of the rescue brigade from one colliery to another which might be in dire need of their services. To avoid shock to the injured the springs on this motor ambulance are of extra length and are also provided with shock absorbers. The entrance to the ambulance has been left full size, so that the stretchers can be put in and out with the minimum of exertion. A four-cylinder engine of the latest design is fitted to the conveyance, and the whole vehicle, which has been built in Doncaster, represents the very last word in colliery motor ambulances. It also affords evidence of a genuine desire to place the very best appliances and means of reaching the hospital at the disposal of the injured.

A lecture on "Ancient and Modern Methods of Mining" was delivered on Monday night at the Dewsbury Technical School by Mr. David Bowen, of the Mining Department of the Leeds University. Mr. A. W. Firth presided. Mr. Bowen stated that some of the best types of machinery and methods of mining of the present day were foreshadowed in early times. Surveying was first practised in Egypt, and the oldest evidence of the solution of mathematical problems in connection with mine surveying was afforded by a papyrus in the British Museum, which was believed to have been copied about 1700 B.C. from a much older work. The first writer who treated mining systematically was Georgius Agricola, in his Latin work "De re Metallica," published in 1556. In those days what are known as gob-fires—due to spontaneous combustion of coal, and such as might have been the cause of the recent disaster at Cadeby—were not uncommon, and Agricola remarked that some of the gob-fires in the district had continued to burn from time immemorial. The most efficient types of pumps of the present day were simply perfected types of those in use in Agricola's time. Three-throw pumps and multiple lifts were quite a common feature. Dealing with modern conditions, the lecturer said the conditions of labour were vastly improved as regarded safety of life and comfort, and we might confidently look forward to exploiting in the near future those coal seams which lay at comparatively great depths, and which involved conditions rather more intricate and difficult than those of the present day.

During the visit of the Iron and Steel Institute to Leeds, the university has decided to confer the honorary degree of LL.D. on its president, Mr. Arthur Cooper, and degrees of D.Sc. on Sir Robert Hadfield, past-president, Mr. John Edward Stead and M. Adolph Greiner, vice-presidents, and Herr Kommerzienrat Friedrich Springorum, the president of the Society of German Ironmasters. The degree of D.Sc. *honoris causa* will be conferred on the following representatives of the industry of gas lighting:—Mr. Charles Carpenter, chairman of the South Metropolitan Gas Company; Mr. Corbet Woodall, president of the Institution of Gas Engineers; and Mr. Thomas Newbiggin, lately gas engineer at Manchester. The degree of LL.D. will be conferred on Mr. W. E. Garforth, chairman of the Advisory Committee on Mining to the University and president of the Institution of Mining Engineers, and Sir Swire Smith, of Keighley. The ceremony will take place on October 3.

A splendid record of quick coaling was accomplished on Friday morning at Immingham, when, without entering the docks, the steamship "Moordrecht," took in a cargo of 1,379 tons of coal in 4¾ hours. The vessel was moored alongside the river jetty at 11 o'clock on Thursday night, and feeding from a single spout, 290 tons per hour were poured into her holds, 45 minutes being allowed for shifts. She was finished and ready to put off on her voyage at 4.30 o'clock.

A fine show of colliery horses was made at the Cardiff Horse Show last week. The first three prizes for colliery horses that have been worked underground in a colliery for at least three months previous to September 1, 1912, exhibited with colliery gear on, were taken by Messrs. D. Davis and Sons Limited, of the Ferndale Collieries, Ferndale.

There is now being completed at the Darlington works of the North-Eastern Railway Company the first batch of 20 new powerful eight-wheeled coupled locomotives primarily intended for the haulage of heavy mineral trainloads. These engines follow closely a design developed some few years ago by Mr. Wilson Worsdell, the late chief mechanical engineer of the North-Eastern Railway, but 10 of the new engines are equipped with a superheater arrangement, and have one or two other incidental modifications. The eight coupled wheels are each 4ft. 7¼in. in diameter, and the fixed engine wheel base is 17 ft. 2 in. The cylinders are 20 in. diameter and 26 in. stroke. The boiler is of almost maximum dimensions, and its barrel is 4 ft. 9 in. in diameter. The total heating surface amounts to about 1,700 square feet, to which the tubes (193 in number and each 2 in. in diameter) contribute 1,550 square feet. The tender is carried upon six 3 ft. 9½ in. diameter wheels, spread over a wheel base of 12 ft. 8 in. Although the tender is fitted with an arrangement for taking up supplies of water whilst travelling over the track troughs, it has a carrying capacity in the well of 3,700 gallons of water and space for 5 tons of fuel. These engines were originally designed to haul trains of 60 laden wagons, the tare weight of which varied from 6 to 6¼ tons each, and the load of coal from 10 to 10½ tons each, the average weight, therefore, of each loaded truck being about 16¼ tons, so that the total load of a 60-wagon train was 975 tons, which, with the addition of a 10-ton brake van, gave a total of 985 tons. This load was subsequently increased until the ordinary running load was 72 laden wagons, or, with the brake van, 1,180 tons. Some time ago one of the original engines was submitted to the exhaustive test of hauling no fewer than 81 laden wagons from Stella Gill (which is the collecting yard for several collieries in north-west Durham) to Tyne Dock, a distance of 11 miles. This load was taken up an incline ¾ mile in length, with a gradient of 1 in 108 at its worst point, and with two curves. The total length of the train was 569 yards 1 ft., representing a total weight of 1,326½ tons, and this was the longest and heaviest mineral train with which the North-Eastern Railway had ever dealt. The engine was fully up to its work in steam-raising power, and tractive effort and adhesion. The time taken for the 11 miles journey from Stella Gill to Tyne Dock was 52 minutes.

In the shipment of coal from the new dock at Immingham, Grimsby, some remarkable records of quick loading are being made, demonstrating the advantages of the latest systems and appliances for saving the time of steamers in port. The steamship "Otto Hugo-Stinnes" has just taken in 2,410 tons in seven and a-half working hours, thus loading at the rate of 320 tons per hour.

Mr. Thomas Barnes, who has been employed as under-manager at Lord Ellesmere's Mosley Common Collieries, Tyldesley, has been appointed manager of his lordship's extensive Bridgewater (Sandhole) Collieries, Walkden. He succeeds Mr. J. W. Ainsworth, who has been given charge of the Linnyshaw, Ellesmere and Ashton Field Collieries, in the Walkden district.

Morning classes for colliery workers who cannot attend the night sessions will be commenced next week at the Technical School, Walkden, near Manchester. A considerable number of men employed at Lord Ellesmere's pits have signified their intention of joining these mining classes.

The news that Mr. H. S. Witty is to resume the managership of the Cadeby Colliery has given a good deal of satisfaction in the Conisborough district. Mr. Witty formerly held this position for many years. He knows every inch of the mine, has an intimate acquaintance with its peculiar conditions, and as a fighter of gob fires has had great experience and can produce a fine record.

The Church of England, the Wesleyans, and the Primitive Methodists having taken steps to provide for the spiritual well-being of the hordes of colliers and their families who are flocking to the coalfield in the Doncaster area, the latest to enter the lists are the Congregationalists. At the autumnal assembly of the Sheffield, Rotherham, and Doncaster district of the Yorkshire Congregational Union just held, it was reported that in another ten years there would be a further 100,000 persons added to the new mining villages of South Yorks. The Congregationalists had decided to begin work in three places. At Maltby they had secured a site for a building, and were borrowing the money to pay for it. At Greathorpe they had obtained the best site in the place, and had accepted a tender for an iron building to hold 400 people. At South Elmsall and Moorthorpe, where there was a population of nearly 10,000, they were also moving. If all the population in the last-named place wanted to attend worship only one in nine could be accommodated, counting all the churches and chapels. For what they are doing in these three places the Congregationalists want £5,000, and have so far received £1,800. Six people have given £1,000 of this.

In the Denaby Colliery of the Denaby and Cadeby Main Colliery Company, a shaft is being sunk from the Barnsley bed to the Silkstone seam. On Thursday morning, while work was proceeding, a capstan rope became loose, owing, it is stated, to a mistake by the operator in charge, and part of the scaffolding fell. The heavy steel rope broke loose and travelled at high speed a distance of 780 yards from the pit surface, throwing the scaffold to one side of the shaft, where it became jammed. The rope broke and curled round in coils, many of the men having miraculous escapes. In trying to avoid it, James Hebberd, of Melton View, Denaby, sustained a broken leg, broken arm, and scalp wound, and was removed to the Fullerton Hospital, whilst the foreman sinker and electrician, Jack Jeffcote, of Mexboro, sustained cuts and bruises. The men working on the two decks of the scaffold were kept prisoners for seven hours before they could be liberated. The work of rescue was superintended by Mr. W. H. Chambers and other officials.

Part I. of the Poor-law Report for 1911-12, dealing with the administration of the Poor-law, the Unemployed Workmen Act, and the Old-Age Pensions Act in England and Wales, has been issued as a Blue Book. The total number of persons in receipt of relief on January 1 last was 801,881. Compared with the number on January 1, 1911, this represents a decrease of 89,926. Referring to the dispute in the coal trade which arose in the months of February and March 1912, and of the effect of that dispute upon the statistics, the report states that those statistics were apparently first affected in the second week in March, and the total number of paupers rose rapidly until the last week in that month, when there was an excess, as compared with the figures for 1911, of 63,607 persons, that though the rise of the total number of paupers practically ceased at this point the greatest excess as compared with 1911 was not reached until the second week in April, when it amounted to over 65,000. From that point the excess fell rapidly, but even at the end of May 1912 there remained an excess as compared with 1911 of nearly 14,000, and this excess must be regarded as largely traceable to the effects of the dispute.

STANDARD SPECIFICATION FOR REFRACTORY MATERIAL.

At the recent meeting of the Institute of Gas Engineers, the Refractory Materials Committee presented their annual report, which includes a standard specification for silica bricks, blocks, tiles, &c., which has been drawn up by the committee in collaboration with representatives of the retort and firebrick section of the Society of British Gas Industries, together with several other leading makers of this class of material.

The specification has been prepared upon the basis of the results of tests undertaken by Dr. J. W. Mellor, D.Sc., principal of the Staffordshire county pottery laboratory, who acted as technical adviser to the committee. In presenting the specification, the committee state that owing to the almost entire absence of authentic tests and results on a working scale of silica and siliceous material, the specification must not be regarded as final, and that revision will be made from time to time as experience is obtained. The following is a copy of the specification referred to:—

Standard Specification for Refractory Materials.

SECTION 3.—SILICA BRICKS, BLOCKS, TILES, &c.

The material covered by this specification is divided into two classes:—

(1.) That containing 92 per cent. and upwards of silica, and hereinafter called "silica" material.

(2.) That containing from 80 to 92 per cent. of silica, and hereinafter called "siliceous."

Refractoriness.

1. Test pieces of the material shall show no sign of fusion when heated to the following temperatures:—

> "Silica" material, not less than Seger cone 32 (about 1,710 degs. Cent.).
>
> "Siliceous" material, not less than Seger cone 29 (about 1,650 degs. Cent.).

The test shall be carried out in an oxidising atmosphere, the temperature of the furnace being increased at the rate of about 50 degs. Cent. per five minutes.

Chemical Analysis.

2. A complete chemical analysis of the material is to be provided when required by the engineer (or purchaser) for his personal information only.

Surfaces and Texture.

3. The material should be evenly burned throughout and the texture regular, with no holes or flaws. All surfaces shall be reasonably true and free from flaws or winding.

Contraction and Expansion.

4. A test piece, when heated in a gas muffle or electric furnace to a temperature of Seger cone 12 for two hours shall not show, on cooling, more than 0·75 per cent. linear contraction or expansion. The temperature of the furnace shall be maintained constant throughout the testing period; and the test piece shall be at least 4½ in. long by 4½ in. wide—the ends being ground flat, and the contraction or expansion measured by means of vernier callipers reading to 0·1 mm.—a suitable mark being made on the test piece, so that the callipers may be placed in the same position before and after firing. The test samples shall not be taken out of the middle of a brick, block, or tile, but shall be representative of the whole.

Variations from Measurements.

5. In the case of ordinary bricks, 9 in. by 4½ in. by 3 in. or 2½ in. thick, there shall not be more than ± 1½ per cent. variation in length, nor more than ± 2½ per cent. variation in width or thickness; and in all cases the bricks shall work out their own bond. Special bricks, blocks, or tiles shall not have more than ± 2 per cent. variation from any of the specified dimensions.

Cement Clay.

6. This shall be machine ground, and at the discretion of the manufacturer may contain a suitable percentage of fine grog. But in all cases the cement clay shall be quite suitable for the purposes of binding together the bricks, blocks, or tiles for which it is supplied, and shall be capable of withstanding the same test for refractoriness.

Inspection and Testing.

7. The engineer (or purchaser), or his agreed representative, shall have access to the works of the maker at any reasonable time, and shall be at liberty to inspect the manufacture at any stage, and to reject any material which does not conform to the terms of this specification. Pieces representative of the bulk may be selected for the purpose of testing either before or after delivery; but in every case a representative of the maker shall, if he choose, be present when such selection is made, and shall be supplied with a similar piece of the material to that taken for the purpose of testing.

Any complaint as to quality of material to be made by the purchaser before the expiration of 10 days after delivery.

If the engineer (or purchaser) and the maker are not prepared to accept each other's tests, they shall agree to submit the samples for testing to an independent authority, to be mutually agreed upon; and the engineer (or purchaser) reserves to himself the right, if the material does not conform to the tests laid down in the specification, to reject any or all the material in the consignment from which the test pieces were taken.

The cost of these independent tests, and of any bricks, blocks, or tiles damaged before delivery for obtaining test pieces, shall be equally divided between the purchaser and the maker, if the test proves satisfactory; and if unsatisfactory, such cost, and that for all other subsequent tests required on this account from the same consignment, shall be borne by the makers.

The cost of any tests of or any material damaged for the purpose of obtaining test pieces after delivery shall be borne by the purchaser in the event of the test being satisfactory, and, if unsatisfactory, by the manufacturer, in a similar manner to that specified for the tests prior to delivery.

Appendix and Notes.

Refractoriness.

Clause 1.—For general remarks and suggestions for testing, also table for softening temperatures of Seger cones, *vide* appendices of sections 1 and 2. The cones should in all cases be placed relative to the sample, so that both are subjected to the same temperature.

Contraction or Expansion.

Clause 2.—For general remarks, *vide* appendices of sections 1 and 2. As soon as cone 12 has squatted, it ceases to furnish any further indication of the temperature of the muffle; so that the subsequent temperatures should be ascertained, at about 15-minute intervals, by means of a pyrometer. It is essential, however, that the temperature should be maintained constant; and if it is necessary to remove plugs, &c., for the purpose of obtaining the temperature, great care must be taken to avoid cooling the furnace by such means. As in the test for refractoriness, the cone should be placed in such a position relative to the sample under test, that both may be subjected to the same temperature.

Inspection and Testing.

Clause 7.—It has been pointed out by the representatives of the manufacturers that, owing to the high cost of carriage, they may be involved in serious loss if material is extensively condemned after delivery. They agree that the purchaser must have entire freedom to test, and reject, if necessary, any material delivered to him; but it is suggested that until all the manufacturers have suitable arrangements and appliances for constantly testing their goods, it may be possible to render them some assistance by allowing a fairly large sample of their material to be sent in for testing and general approval before extensive deliveries are made. This is in no way, however, to be construed as removing the right of the purchaser to test material in any subsequent consignment.

Speaking at the annual meeting of the Lothian Coal Company at Edinburgh, Mr. James A. Hood, chairman, said he did not know that the Minimum Wage Act had given satisfaction to either side, but one effect of it undoubtedly was that it had increased the cost of production at the collieries. That, together with the new Coal Mines Act, 1911, the Insurance Act, and the old increase from the Eight Hours Act, had had the effect of permanently increasing the cost of production. The directors had had constantly in view the application of labour-saving machines, and had installed several with a view to reducing the cost of production. In the autumn of 1911 there was an improvement of trade, which, he was glad to say, had continued, and if that should continue it would help largely to meet the increased cost of production with which they were now face to face. Referring to the Railway Bill promoted by a majority of the coalowners in Mid and East Lothian, he said the result of what the North British Railway Company had offered to do was that they had agreed to go to Parliament next year and ask for powers to build a portion of a new railway avoiding the congested district of Portobello down to Leith, and running the coal part of the way where there were no passenger trains. Although they could only regard that as a half measure, he thought it proved that the coalowners were amply justified in going to Parliament and asking for the powers they did. Another question which was a serious matter was the condition in which the supply of wagons was at present. The railway companies had taken up the position that they would not allow the coalowners to increase the number of their own wagons on their railway, and they did not give the coalowners enough of their wagons to supply their wants. These questions were under consideration of the coalowners, who would consider the best way of dealing with the situation.

COAL, IRON AND ENGINEERING COMPANIES.

Birmingham Small Arms Company Limited.—The report for the year ended July 31, 1912, states that the profit available for distribution amounts to £178,453 13s. 7d., to which must be added the amount brought forward from last year, making £233,889 7s. 5d. Deduct interim dividend of 5 per cent., free of income-tax, on the ordinary shares, and 2½ per cent. on the preference shares, paid on April 1 last, £43,131 11s. 9d., there remains a balance of £190,757 15s. 8d., which the directors recommend should be appropriated as follows: To payment of 2½ per cent. on the preference shares, £4,782 9s. 9d.; to payment of 5 per cent. and a bonus of 1s. per share on the ordinary shares, free of income-tax, £76,698 4s.; to transfer to reserve fund (which will then amount to £290,000), £50,000, leaving balance to carry forward £59,277 1s. 11d.

Burnyeat, Brown and Co. Limited.—The ordinary general meeting of the shareholders of Burnyeat, Brown and Co. Limited was held on the 18th inst. at 7, Whittington-avenue, London, E.C., Mr. F. Shadforth Watts presiding. The report and accounts were adopted, and resolutions were passed allocating £15,000 to the reserve fund, which is now brought up to £60,000, and placing £5,000 to a special reserve account for the purpose of duplicating the ventilating appliances at Abergorky and Nine Mile Point Collieries. A final dividend of 15 per cent., making 20 per cent. for the year, was declared.

Cleveland and Durham Electric Power Company Limited.—The report for the year to June 30 shows that during March, April and May last a direct loss of about £8,000 was incurred in consequence of the national coal strike. The gross profits for the year amounted to £25,784, as against £20,973 for the preceding year. The capital expenditure on works was £10,333. After providing for debenture and other interest, there remains a net profit of £6,720, which, with £8,343 brought forward, gives a balance of £15,063, to be distributed as follows:—Two per cent. on preference shares, £6,674; in writing off discount on second debentures, £2,800; in transferring to depreciation and renewals account, £2,000. There is carried forward £3,589. The connections at June 30 last aggregated 48,429-horse power, an increase of 7,969-horse power connected during the year. During the year the company has started to work additional waste heat generating stations at the Lackenby ironworks of the Tees Furnace Company, the Horden and Shotton collieries of the Horden Collieries Limited and the Port Clarence ironworks of Messrs. Bell Brothers, of Middlesbrough.

Coltness Iron Company Limited.—The profits for the year ended July 31 amounted to £114,721. The directors recommend a dividend on the ordinary shares of 8 per cent., together with a bonus of 2 per cent. They further recommend that £37,314 be written off for redemption and depreciation, that £3,000 be added to blastfurnace relining reserve fund and £15,000 carried to ordinary reserve fund, £17,015 being carried forward.

Edinburgh Collieries.—Interim dividend of 7½ per cent. per annum, less tax, on the ordinary shares for the half-year.

Emanda Engineering Company Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of manufacturers of engines, machines, instruments, tools, appliances and articles used in electrical, mechanical engineering and boiler making trades, &c. First directors, W. E. Upton (managing director), F. Pratt and Mrs. R. Bradford (all permanent). Qualification, 25 shares. Registered office, Sumner-avenue, High-street, Peckham, S.E.

Glenboig Union Fireclay Company Limited.—The report states that the profits for the year ended August 31, including £1,597 brought forward, amount to £32,564. The directors recommend that £4,000 be set aside for depreciation, that £3,000 be written off cost of new plant, and that a dividend be paid at the rate of 15 per cent. (free of income-tax), leaving £3,064 to be carried forward.

Greaves (James) (Dewsbury) Limited.—This private company has been registered, with a capital of £4,000 in £1 shares, to carry on the business of drawers and polishers of wires, hardeners and temperers of steel, stampers and piercers of steel, &c., carried on by J. E. Greaves at Cloth Hall Reed Works, Cloth Hall-street, Dewsbury, as James Greaves. First director, C. Fisher. Qualification, 50 ordinary shares. Registered office, Cloth Hall Reed Works, Cloth Hall-street, Dewsbury.

Harrison, Ainslie and Co. Limited.—At an extraordinary general meeting held on the 20th inst., it was decided that the capital of the company be reduced from £200,000, in shares of £1 each, to £50,000, in shares of 5s. each, and that such reduction be effected by writing off from the 200,000 shares of £1 each, which have already been issued, and upon which a sum of £1 has been paid up, the sum of 15s. per share which has been lost or is unrepresented by available assets. A further extraordinary general meeting was held, at which resolutions amending the articles of association and providing for the capital of the company being increased by £275,000, divided into 300,000 cumulative preference shares of 5s. each and 800,000 ordinary shares of 5s. each, were unanimously adopted.

Menzies Coal Company Limited.—This private company has been formed to acquire and take over as a going concern the businesses of coal merchant and colliery agent carried on in Edinburgh and Leith under the name of Robert Menzies. Capital, £2,500 in £1 shares. Subscribers, Robert Menzies, coal merchant and colliery agent, 17, Haymarket-terrace, Edinburgh; James Kennedy, coal merchant and colliery agent, 17, Haymarket-terrace, Edinburgh.

Palmer's Shipbuilding and Iron Company Limited.—The directors, in the annual report, state that, after providing for the cost of repairs and upkeep, there is a trading profit of £660. Debenture and other interest amounts to £32,240, leaving a net loss for the year of £31,580. The directors decided to exercise the option, referred to at the last annual meeting, of purchasing the Hebburn property held on lease from the receiver of Robert Stephenson and Co. This property will be transferred to a new private company, already incorporated, called Palmer's Hebburn Company the directorate and management of which are the same as those of the company. Of the share capital, £100,000 will be issued to and held by the company, and a working arrangement will be made between the two companies whereby the management of the business of Palmer's Hebburn Company will be under the direction and control of the board of Palmer's Shipbuilding and Iron Company. To provide additional capital, an issue of debentures was offered to the existing share and debenture holders in June. In the absence of sufficient response from them, the directors decided not to proceed with it.

Partington Steel and Iron Company Limited.—In submitting their report and balance-sheet for the year ending June 30, 1912, the directors have to record with deep regret the death of their late colleague, Mr. William Henry Bleckly. During the year substantial progress has been made with the new works, but unfavourable weather conditions have considerably delayed outdoor operations during the last six months. Work is in a forward state in the coke-oven and residual by-products plants, and it is anticipated that a portion of the ovens may be ready to commence operations in January. Most of the steel structural work in connection with the furnaces and stoves is complete, and the brickwork lining of the stoves, &c., well advanced. It is hoped that two blastfurnaces will be ready to commence operations in the early part of next year. A considerable proportion of the work connected with the foundations in the steel furnaces and rolling mills departments is completed, and the execution of the contracts for engines and machinery are proceeding satisfactorily.

Pearson and Knowles Coal and Iron Company Limited.—The profits for the year ending June 30, 1912, amount to £78,141 3s. 10d., and the balance brought forward from last year is £13,359 3s. 8d., together £91,500 7s. 6d. An interim dividend at the rate of 6 per cent. per annum on the first and second preference shares and 3 per cent. per annum on the ordinary shares was paid in March last for the half-year ending December 31, 1911, amounting to £19,633 15s. 0d. The directors now recommend that a dividend be paid for the past half-year at the rate of 6 per cent. per annum on the first and second preference shares, and 7 per cent. per annum on the ordinary shares, making with the interim dividend 5 per cent. for the year, and a total distribution of £50,755 16s. 8d. The directors further recommend that £12,393 10s. 8d. be added to the reserve fund, raising it to £352,500; that the sum of £14,528 3s. 8d., which represents the expenditure on capital account for the year, be written off, leaving a balance of £13,822 16s. 6d. to be carried forward. The directors record, with deep regret, the loss which they and the company have sustained by the death of their late deputy chairman, Mr. W. H. Bleckly, who was one of the pioneers of the Lancashire iron trade, and who had been continuously connected with the works now carried on by the company since the year 1856. The members of the board are now reduced to five in number, and the directors consider it desirable that additional appointments be made, and they recommend for election Mr. John Bleckly, junior, and Captain Harmood Banner. The Maypole pit of the Moss Hall Coal Company Limited is again in full operation, and a large output of coal is being produced. The progress made at the works of the Partington Steel and Iron Company Limited during the year has been satisfactory. Trade during the year, both in coal and iron, has shown considerable improvement, but the stoppage of the works due to the prolonged strikes at the collieries among the transport workers and other workmen prevented the management from taking full advantage of a position otherwise satisfactory. The reduction of output, together with advanced wages, entailed serious losses in some departments, and materially affected the profits of the year. The effects on the year's profits of the charges imposed for imperial taxes, local rates, and workmen's compensation—over the amount of which the directors can exercise no control—have of late assumed such large proportions that it is thought desirable that the shareholders should have the actual figures for the year placed on record to enable them to appreciate how far their dividends are affected. They are as follow:—Imperial taxes, £9,209 15s. 6d.; local rates, £13,548 5s. 10d.; workmen's compensation, £11,024 12s. 10d.; total, £33,782 14s. 2d. The short experience already obtained of the working of the National Insurance Act gives ample proof of the burdensome character of its provisions, and the directors are confident that they will have the acquiescence of the shareholders in recording the opinion that the Act not only contributes to the causes of unrest among the workmen, but is unjust in its incidence, and inequitable and unfair in placing the whole cost, in the case of industrial companies, upon the ordinary shareholders. The effect of the Act upon the company's various undertakings represents a new tax of over 1 per cent. per annum upon the amount of the ordinary capital.

Proctor (A.) and Co. Limited.—This private company has been registered, with a capital of £1,500 in £1 shares, to take over the business of coal merchants and colliery agents, &c., carried on by A. Proctor and A. Brown at Castleton. First directors, A. Proctor and A. Brown. Qualification, 100 shares. Registered office, John-street, Castleton, Lancs.

Record Engineering Company Limited.—This private company has been registered, with a capital of £5,000 in £1 shares, to adopt an agreement with J. Davidson and W. O. Larmuth and J. F. Adye for the acquisition of patents granted to J. Davidson and W. O. Larmuth for the United Kingdom for inventions relating to improvements in steam traps, internal combustion engines; also patents granted to E. L. Rankin for improvements in piston rings, together with all subsequent improvements therein, extensions of such patents; and also the patents granted to the said J. Davidson and W. O. Larmuth by the Governments of the United States of America, France, Germany, Belgium, Austria, Canada, and Hungary for inventions relating to improvements in steam traps.

Russian Anthracite Collieries Limited.—This company has been registered, with a capital of £408,250 (£1), to take over the business and all or any of the assets and liabilities of the Vagliano Anthracite Collieries Limited, and to carry on the business of colliery proprietors, ironmasters, &c., and to adopt an agreement between the Vagliano Anthracite Collieries Limited, the City Safe Deposit and Agency Company Limited, W. F. Aldous (on behalf of the company), Messrs. L. Ehrlich and Co., and the Oceana Consolidated Company Limited.

Sheepbridge Coal and Iron Company Limited.—The forty-eighth annual report of the directors for the year ended June 30, 1912, states that the net profit amounts to £90,579 9s. 4d., making with the balance brought forward from last year £35,055 18s. 8d., and less dividend paid £17,926 12s. 6d.—£107,708 15s. 6d. The directors recommend that this sum be appropriated as follows:—Amount to be retained towards the development of new properties £30,000; final dividend making 10 per cent. for the year, less income-tax, payable October 1, 1912—549,700 ordinary shares at 1s. 6d. each £41,227 10s., 112,275 cumulative preference shares at 1s. 6d. each £8,420 12s. 6d., 137,725 cumulative preference shares at 7·2d. each £4,131 15s., balance carried forward to next year £23,928 18s. The prices of coal, which in the early part of the financial year were lower than in the previous year, improved slightly towards the end of 1911. The strike of miners caused the total stoppage of the collieries for the whole of March and part of April. The Coal Mines Act, 1911, the National Insurance Act, 1911, and the Coal Mines (Minimum Wage) Act, 1912, have increased the working cost. The pig iron market continued very weak for the greater part of the financial year. The price of bar iron was maintained at a more satisfactory level. Advances in wages paid to the ironworkers, together with the unusual rise in the prices of raw materials and the reduction of the working hours of blastfurnacemen to eight per day, have increased the working cost in a marked degree. The Newstead and Dinnington collieries continue to yield satisfactory results. Good progress has been made at the Maltby Main Colliery, and the output of coal is now about 1,400 tons per day. The erection of a large washery, coke ovens, and by-product plant is proceeding. At Rossington the freehold of the site of the colliery has been purchased, the first sod was cut on June 10, and sinking operations are in progress. A further large area of freehold land has been acquired for the purpose of building the colliery village. The Great Northern Railway Company have constructed a branch line to the colliery. In order to provide further capital for improvements in connection with the ironworks and collieries of the company, and of other companies in which the Sheepbridge Company holds the predominant interest, and also to meet the calls payable on the 255,000 £1 shares taken in the Rossington Main Colliery Company Limited, the directors propose to create £250,000 5 per cent. first mortgage debentures, of which £100,000 will be issued very shortly. The shareholders in the company, the Dinnington Company, the Maltby Company, and the Rossington Company, will be given priority in allotment. The directors deeply regret the loss by death of their esteemed colleague Mr. Walter S. B. McLaren, M.P., who had rendered valuable service to the company during the last 16 years. Sir Henry Norman, M.P., has been appointed to take his place. Mr. W. B. M. Jackson, who has acted as general manager for the past seven years, has also been elected a director.

Sheffield Electric Steel Castings Company Limited.—This private company has just been registered, with a capital of £4,000 in £1 shares, to take over the business of a steel merchant and steel manufacturers' agent, carried on by G. Fischer, as the Sheffield Electric Steel Castings Company, at Melbourne-Chambers, Cambridge-street, Sheffield. The first directors are G. Fischer and P. Altenbach, of Scheffhausen (both permanent). Registered office, Melbourne-chambers, Cambridge-street, Sheffield.

United Collieries Limited.—The directors announce that the half-year's interest on first debentures A, which falls due on 1st proximo, will be paid on and after that date. Interest on the first debentures B, which fell due on October 1, 1911, and April 1, 1912, will also be paid on and after 1st proximo.

Mortgages and Charges.—The following have been registered in pursuance of the Companies Acts, 1907:—Bolckow, Vaughan and Co. Limited (issue on June 27, 1912, of £6,200 debentures, part of a series); Callender's Share and Investment Trust Limited (trust deed dated May 30, 1912, to secure £115,000); Evershed and Vignoles Limited (issue on June 28, 1912, of £2,500 debentures, being balance of a series for £15,000); Grimsby Engineering Company Limited (particulars of £2,000 debentures created February 26, 1912, whole amount now issued); Hesketh Steel Castings (British) Limited (satisfaction in full on July 1, 1912, of debentures bearing various dates from January 22, 1912, securing £3,000; particulars of £10,000 debentures, created June 6, 1912, present issue £8,400); Holly Bank Coal Company Limited (issue on June 27, 1912, of £200 debentures, part of a series); Horden Collieries Limited (mortgage dated June 29, 1912, to secure £30,000); Midland Railway Carriage and Wagon Company Limited (issue on July 3, 1912, of £85,400 debentures, part of a series); Wharncliffe Woodmoor Colliery Company Limited (issue on June 13, 1912, of £700 debentures, part of a series); British Wagon Company Limited (issue on May 9 of £450, on May 30 of £14,850 2s. 9d. and on June 10, 1912, of £15,416 8s. 6d. debentures, parts of a series); General Drillers Limited (particulars of £2,000 debentures created March 31, 1912, whole amount now issued); Mallinson Machine Tool Company Limited (debenture dated August 19, 1912, to secure £200); North Central Wagon Company Limited (issue on August 14, 1912, of £1,550 debentures, part of a series); Baxendales Limited (in liquidation) (satisfaction in full on May 18, 1912, of mortgage and further charge dated April 1, 1910, securing £100,000); Bolckow, Vaughan and Co. Limited (issue on August 29, 1912, of £2,200 debentures, part of a series); British Metals Extraction Company Limited (equitable mortgage, dated August 22, 1912, to secure all moneys due or to become due from the company to the Metropolitan Bank (of England and Wales) Limited, Swansea, not exceeding £8,000); Denbigh Engineering Company Limited (debenture and agreement executed in connection therewith, both dated August 22, 1912, to secure £1,250); Dowlais Anthracite Collieries Company Limited (satisfaction to the extent of £500 on July 16, 1912, of debentures dated July 16, 1907, securing £5,000); Galloways Limited (charge dated August 16, 1912, to secure all moneys due or to become due from the company to the Manchester and County Bank Limited, 55, King-street, Manchester); Liverpool Engineering and Condenser Company Limited (trust deed, and debenture issued thereunder, both dated August 16, 1912, to secure £4,000); North Central Wagon Company Limited (issue on August 28, 1912, of £985 debentures, part of a series); Rawang (F.M.S.) Coal Syndicate Limited (trust deed dated August 21, 1912, to secure £5,000 and a bonus of £15,000); W. G. Bagnall Limited (particulars of £11,000 debentures created August 8, 1912, whole amount now issued); Standard Steel Company Limited (agreement dated August 8, 1912, to secure £1,000); Wallsend and Hebburn Coal Company Limited (satisfaction in full on mortgage dated June 23, 1910, created to ebenture stock, of which only £20,000 was ntended to issue the balance of £10,000); ate Company Limited (particulars of £7,500 ted August 14, 1912, whole amount now Oven Machinery Company Limited (par- 0 debentures created August 1, 1912, present spel Oak Galvanising and Manufacturing d (statement under section 12 of 1907 Act, tanding on July 1, 1908, now first regis- nortgage debenture dated May 2, 1898,), amount paid off prior to July 1, 1908. etals Company Limited (particulars of £500 ed July 4, 1912, whole amount now issued); and Engine Co. Limited (issue on August 28 . debentures, part of a series of £1,000,000); Colliery Company Limited (particulars of ures created August 9, 1912, whole amount conveyance and four assignments. dated to secure £41,285); New Garter Foundry d (mortgage for £650 and two debentures ll dated August 29, 1912); Newport Ahsr- Steam Coal Company Limited (mortgage r 2, 1912, to secure £8,000); Shale Mining ed (issue on August 31, 1912, of £200 t of a series); Tannett, Walker and Co. culars of £15.000 debentures created , present issue £7,500).

TS OPEN FOR COAL AND COKE.

dvertised in this issue received too late for is column, see Leader *and* Last White

ober 15.—The London County Council or the supply and delivery from November 1, , 1913, of about 110,000 tons of coal for the ion (Tramways Department), East Green- rs may quote for the whole or a portion of ated quantity. Full particulars as to the ntract appear on the official forms of tender, tained on personal application or by sending essed foolscap envelope to the clerk of the y Hall, Spring-gardens, S.W. No tender l a.m. on Tuesday, October 15, 1912, will be urence Gomme, clerk of the London County Hall, Spring-gardens, S.W.

stracts of Contracts Open.

, October 1.—For coal, for the Rural

ber 3.—For Allerton Main and Derbyshire oke, for the Education Committee.

September 30.—For best crank coal, for the Bwlchgwyn Council Schools.

ptember 30.—For coal, for the Chorley Rawcliffe Hospital Committee of Manage-

er 8.—For about 18 tons of coal, 25 chaldrons ewood per 100 bundles, for the Education

ber 30.—For coal and split firewood, for the ucation Committee.

Egypt), October 14.—Tenders are invited Department of the Sudan Government for 12,200 tons of Crown brand patent fuel

sh, October 14.—For coal and coke, for the e Gelligaer County Schools.

on.).—For house coal, for the Newport and Hospital.

, October 7.—For small coal, for the Works the Corporation.

October 2.—The council of the Metro- of Southwark is prepared to receive tenders 10,000 tons of coal.

, October 1.—For coal slack, for the l Ashby Joint Water Committee.

October 5.—For best machine-washed for suction-gas plant, for the Tamworth sposal Committee.

tober 7.—For deep and shallow nuts and nagers of the Rushall Council Schools.

eptember 30.—For supplying the Town l.

ton, October 7.—For fuel, for the

the latest upon which tenders can be received.

OPEN FOR ENGINEERING, IRON D STEEL WORK, &c.

gypt), September 30.—*Wrought Iron Pipes.* iron pipe, 1 m. diameter, 18 m. in length; pe, 1 m. diameter, 12 m.; wrought iron pipe, , 15 m.; wrought iron pipe, 1 m. diameter, nspector of Irrigation, Fourth Circle, Beni

r), October 15.—*Fire Engines.*—For fire e Under-Secretary of State, Ministry of Tenders to the Personnel and Equipment eam and Ohafir Office, Ministry of Interior).

(Norway), October 17.—*Steel Bars.*— ted by the Director of Lights at Christiania rs of rolled steel ("Fluss-staal") of various

ober 1.—*Cast Iron Pipes.*—For 2,500 2 in. or the Water Commissioners.

tember 30.—*Steel Sleepers, &c.*—For the e directors of H.H. the Nizam's Guaranteed Company Limited: 48,600 transverse steel h. F.F. rails, 209,650 steel keys, for above; 5 lb. F.F. rails in lengths of 39 ft. 6 in., 101 . rails in lengths of 39 ft., 6,254 pairs of for above. Mr. M. T. Walker, secretary, se, Old Broad-street, E.C.

London, S.E., October 2.—*Cable.*—For the following alternative lengths of cable, for the Southwark Borough Council:—440 or 880 yards 0·1 × 0·05 × 1, 440 or 880 yards 0·05 × 0·03 × 0·05.

Manchester, October 1.—*Points, &c.*—For the supply of permanent way points, tongues and hardened steel centres, for the Corporation.

Mexborough, October 5.—*Turbo-generator, &c.*—For a 500 kw. turbo-generator with surface condenser and switch-gear, &c., for the Urban District Council.

Pretoria (Transvaal), September 30.—*Iron Pipes, &c.*—For about 513 tons 18 in., 15 in., and 12 in. iron pipes and specials, for the Corporation.

Rotherham, October 12.—*Cast Iron Pipes.*—For 1,330 tons or thereabouts of cast iron spigot and socket pipes, with such special castings as may be necessary, the sizes ranging from 8 in. to 3 in., for the Rural District Council.

Sligo.—*Electric Lighting.*—The Sligo Corporation will be prepared to consider tenders from qualified electrical engineers for a complete scheme (with specifications, &c.) to light the borough of Sligo with electricity.

Stockholm (Sweden), October 15.—*Electric Lift, &c.*—Tenders are invited for the machinery required at the Porjus Power Works, viz.:—(1) An electric lift for passenger and goods with a carrying capacity of 1,000 kilogs.; (2) two electrically-driven oil pumps, each with a pumping capacity of 100 litres of oil per minute, or 200 litres, as an alternative, at a drawing height of 22 m.; and (3) three electrically-driven water pumps, each with a pumping capacity of 1,500 litres of water per minute at a total drawing height of 20 m. Copies of the specifications, &c., can be seen by British manufacturers and contractors at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Wellington (New Zealand), October 17.—*Economiser.*—Tenders are invited by the Wellington City Corporation for an economiser for the Electrical Tramways Department.

THE FREIGHT MARKET.

There is a rather better supply of tonnage at north-east coast ports this week, and rates for near destinations are weaker. The following are typical quotations for Tyne loading:—London, 4s.; Hamburg, 4s. 6d. to 4s. 9d.; Havre, 6s.; St. Nazaire, 7s. 9d.; and Genoa, 13s. 6d. At South Wales, chartering has been active. The Mediterranean is rather easier, orders having fallen off in volume and boats being more plentiful. The River Plate and Brazils are steady. There is little change to record in the nearer trades, although the tendency is in favour of charterers. At Glasgow there is a moderate business, and rates are barely maintained. The Humber market is firm. Homewards, business done hardly reaches the average. Black Sea advices report a firm market, and an inclination towards dearer tonnage. Forward business is checked by high rates. The Azof and Danube are quiet, but steady. The Eastern market is firm, with a good enquiry, and the same is true of Australia. The Mediterranean and ore ports are steady, as is also the Baltic. America is very firm. The River Plate is quiet, but rates favour owners.

Tyne to Algiers, 3,000, 11s. 6d.; 2,000, 11s. 6d., 1,000; Abo, 1,200, 9s.; Amsterdam, 2,000, 4s. 6d.; Bona, 2,000, 14s. 10½d.; Bari, 3,100, 17s., 250, 10d.; Barcelona, 2,000, 14s. coal, 16s. coke; Civita Vecchia, 3,000, 14s. 3d.; Carloforte, 2,300, 15s., 300; Cronstadt, 4,700, 7s. 8d.; Devonport, 700, 7s. 3d.; Elsinore, 1,200, 7s. 9d.; Genoa, 3,000, 13s. 6d.; Havre, 2,000, 6s., two voyages, from Dunston; Lisbon, 1,700, 11s. 3d.; 1,650, 11s. 3d., 300; Mariager, 800, 8s. 3d.; 1,100, 8s. 6d.; Monaco, 2,000, 15s.; Naples, 13s. 6d., 800; Ornskoldsvik, 2,000, 8s.; Port Said, 4,900, 18s.; Pillau, 1,700, 6s. 6d., 700; Rotterdam, 3,000, 4s. 6d.; 1,800, 4s. 6d.; 3,000, 4s. 4½d.; Rouen, 1,800, 6s. 6d., from Dunston; Santos, 29s., early October; St. Petersburg, 1,500, 7s. 4½d.; Savona, 5,000, 13s. 3d.; St. Nazaire, 1,500, 7s. 9d.; Sundsvall, 2,300, 7s. 9d.; Schiedam, 2,000, 4s. 6d.; Venice, 14s. 9d., Dunston loading; 4,400, 14s. 9d.; 5,000, 14s. 9d.; Wyborg, 1,000, 9s.

Cardiff to Alexandria, 4,000, 13s., ppt.; 13s., September 28; 3,700, 14s., ppt.; Algiers, 2,800, 14½ fr., ppt.; 3,800, 14½ fr., October 3; part cargo, 2,800, 14½ fr., ppt.; 6,700, 13¾ fr., 800, early October; 3,800, 14 fr.; 4,300, 14 fr., early October; Bahia, 5,000, 24s. 6d., September; Barcelona, 3,900, 13s., ppt.; Bayonne, 1,500, 10 fr.; Belfast, 350, 4s. 9d.; Corcubion, 14s. 9d., 300; Cronstadt, 3,000, 7s. 9d., early October; 4,000, ditto; Chantenay, 2,400, 9 fr.; Constantinople, 4,400, 13s. 9d., ppt.; Castellamare, 5,200, 13s. 6d.; Campana, 3,000, 25s.; Civita Vecchia, 4,800, 14s. 3d., 500, ppt.; Cadiz, 1,900, 11s.; Genoa, 5,500, 13s. 3d., ppt.; 3,700, 13s. 6d., ppt.; 2,600, 13s. 6d., end September; 3,500, 13s. 3d., October 5, reported; Gibraltar, 2,500, 10s., ppt.; 2,600, 9s., net terms; Havre, 1,200, 7s., ppt.; Leghorn, 4,000, 12s. 9d., 800, ppt.; Licata, 2,000, 15s., 250, ppt.; Lamlash, 2,800, 5s. 1½d., Admiralty; La Pallice, 2,200, 8¾ fr., ppt.; Las Palmas, 3,800, 11s. 9d., early October; Madeira, 2,700, 12s., ppt.; 4,700, 12s., October 1; Marseilles, 5,600, 15¾ fr., ppt.; 2,700, 15¾ fr., end September; Monte Video, 5,000, 23s., October 10; Naples, 4,000, 12s. 9d., 800, ppt.; Oporto, 1,500, 12s., early October; Oban, 230, 6s. 6d.; Oreoe (near Volo), 3,600, 14s.; Port Said, 6,600, 13s., ppt.; 5,000, 13s., ppt.; 6,500, 13s., end September; 4,200, 13s., end September; Palma, 1,700, 13s. 3d.; Piræus, 3,700, 14s., ppt.; River Plate, 5,000, 24s., early October; 5,000, 24s. 6d., reported; 6,200, 24s. 6d., October; 5,000, 24s. 6d., early October; 2,500, 25s., early October; Rio de Janeiro, 5,500 max., 24s. 6d., October 5-19; Rosario, 3,000, 25s. 6d.; 25s. 3d., mid-October; Sheerness, 2,500, 5s. 3d., Admiralty; St. Petersburg, 2,500, 9s. 6d., September 30; Torre, 4,800, 14s. 3d., 500, ppt.; Venice, 3,500, 15s., ppt.; 6,800, 14s. 6d.; Villa Constitucion, 3,000, 25s.; Vigo, 1,100, 9s.

Port Talbot to Leghorn, 5,800, 13s. 3d., ppt.; Malaga, 1,700, 13s.

Leith to Lubeck, 1,800, 7s. 6d.

Thames to Buenos Ayres, sail, 20s., cement.; 1,586, 20s. 6d., cement.

Swansea to Civita Vecchia, 3,000, 14s. 6d.; Cagliari, 2,000, 15s., end September; Calais, 2,600, 6s. 9d.; 1,600, 7s. 6d.; Charente, 1,250, 10 10½ fr.; 1,250, 10 fr. coal, 10½ fr. fuel, ppt.; Boulogne, 2,000, 6s. 9d.; Palermo, 1,700, 15s.; Chantenay, 1,850, 9¾ fr.; Rotterdam, 600, 6s. 6d.; Caen, 1,720, 7s.; Havre, 700, 7s., ppt.; Rouen, 1,200, 7s. 9d.; Honfleur, 750, 7s. 6d.; Stettin, 2,600, 8s.

Llanelly to Königsberg, 750, 9s. 6d.

Partington to Buenos Ayres, 4,200, 24s., 200 October.

Glasgow to Buenos Ayres, 25s. 3d.; Bordeaux, 2,800, 8 fr.; Leghorn, 2,600, 13s.

Forth to Genoa, 4,000, 14s.

Wear to Nantes, 1,900, 8s. 3d., 600.

Methil to Nyborg, 1,100, 7s. 9d.

Grangemouth to Cronstadt, 2,800, 7s. 6d.; Kiel, 2,000, 7s.

Burntisland to Rouen, 1,500, 7s. 7½d.; Genoa, 14s.; Porto Vecchio, 15s.

Hull to Buenos Ayres, 4,400, 24s. with 200, 23s. 9d. if 250, October 14; 6,400, 23s. 9d., October 15; Santos, sail, p.t., September-October; Reval, 3,000, 6s. 9d., end September; Cronstadt, 5,500, 7s. 6d., ppt.; Swedish Sound port, 1,600, 7s. 9d., ppt.; Pernau, 2,200, 7s.; Wilhelmshaven, 3,000, 6s., ppt.

Hamburg to New York, 11s. 6d., early October.

Goole to Bruges, 1,400, 5s. 7½d., ppt.

Antwerp to Rio de Janeiro, sail, p.t., November.

Newport to Leghorn, 4,700, 13s., Genoa terms, September 28.

Blyth to Helsingfors, 1,600, 8s. 3d.; Windau, 1,800, 7s. 3d.; Caen, 1,500, 7s.

Hartlepool to Hamburg, 3,000, 4s. 9d.; Naples, 3,500, 13s. 3d., 800.

Rotterdam to Porto Vecchio, 5,100, 12s. 10½d., ppt.; Marseilles, 2,700, 14¾ fr., September 20-30; Bordeaux, 5,100, 7s. 3d. coals, 8s. 3d. fuel; 3,400, ditto; Genoa, 3,700, 13s. 6d., September.

Fife port to Stockholm, 2,800, 8s.

Homeward charters:—Azof, 5,500, Rotterdam, 17s., with options, ppt.; 5,700, 17s., no reduction, barley, ppt.; 3,000, 18s. 3d. n.c. or any, 18s. 9d. Hamburg, early October; 5,000, Rotterdam 17s. 6d., Antwerp, Emden or Weser 17s. 9d., Hamburg 18s., with 3d. less barley, ppt.; 4,400, ditto; Nicolaieff or Odessa, 7,500, London or Rotterdam 17s. 6d., Weser 17s. 9d., Hamburg 18s., on d.w., grain only, ppt.; Novorossisk or Theodosia, 5,200, Marseilles, 17½ fr., ppt.; Dalny, 8,318 net, Hull, 36s. for 3,000 tons, October; Kurrachee, 5,000, 10 per cent, United Kingdom, 22s. 3d., barley cargo, October; 5,700, 10 per cent, 22s. o.c., barley cargo, October; 7,000, Antwerp, 23s., October; 5,500, 22s. 6d., United Kingdom, barley cargo, November; 21s. 6d., November; 6,000, United Kingdom-Continent, 23s. 6d., pp, less 2 per cent., October; 5,000, 23s. 3d.; Philippines, 2,656 net, United States, 40s. two ports to one port, 41s. 3d. two ports to two, October; Bombay, 7,000, Hull and Antwerp 28s. 6d., option Antwerp and Hamburg, 29s., on d.w., September; Buenos Ayres, 4,500, 10 per cent., United Kingdom-Continent, 21s. 9d. o.c., less 6d., November-December; Huelva, 4,200, London, 10s., early October; Wilmington, 2,402 net, Liverpool or Bremen, 60s., October 15-31; 152 ft., 60s., October; 52s. 6d., October; Bilbao, about 3,000, Middlesbrough, 7s. 3d., ppt.; 2,500, ditto; 3,200, Glasgow, 7s., ppt.; 3,600, Rotterdam, 7s., ppt.; time charter, States and West Indies, £950, three years; time charter, Brazil and River Plate trade, 6s. 11d., one round trip, delivery Hull, re-delivery United Kingdom-Continent; 7s., one round trip, delivery Antwerp; Savannah, about 57s. 6d., U.K.-Continent; Vladivostok, 4,200-4,600, U.K.-Cont., 37s. 6d., November; Sulina, 5,500, Rotterdam 16s. 3d., Antwerp 16s. 6d., September; Kherson, Nicolaieff or Odessa, 4,100, London or Rotterdam 17s. 6d., Emden 17s. 9d., Hamburg or Weser 18s., on d.w., grain, ppt.; 6,800, Rotterdam, 17s. 3d., Weser 17s. 6d., Hamburg 17s. 9d., on d.w., grain, ppt.; 6,800, London or Rotterdam 17s. 3d., Antwerp or Emden 17s. 6d., Hamburg or Weser 18s., on d.w., grain only, ppt.; San Lorenzo, 6,300, 10 per cent., Rotterdam, 28s. 6d., no reduction, ppt.; 5,300, 10 per cent., United Kingdom-Continent, 30s., o.c., less 6d., September-October; 4,500, 10 per cent., 24s., o.c., less 6d., December; Alexandria, 1,592 net, London, 15s., per 60 c.f., end September; Bougie, 1,800, Middlesbrough, 8s. 3d., ppt.; Algiers, 3,600, Tyne Dock, 7s. 3d., early October; Pomaron, 2,000, Stettin, 10s. 9d., early October; Poti, 4,400, Boulogne, 19s. 6d., October; Philadelphia, 2,055 net, St. Petersburg, 5s. 6d., heavy grain, spot; Gulf timber port, 1,000 stds., 10 per cent., West Italy, 160s., Dec.-Jan.; Sea of Marmora, 1,459 net, Marseilles, 18 fr., ppt.; Santander, 2,600, Rotterdam, 7s. 1½d., with 600-600, ppt.; Portland, Or., 2,287 net, United Kingdom-Continent, 51s. 3d., October-November; nitrate ports, sail, 28s., United Kingdom-Continent, season 1913; time charter, European trades, three vessels, each over 2,000 tons, £700, £860 and £900, six months each, delivery United Kingdom-Continent, time charter, fruit trade, 2,050, £825, five months, delivery United Kingdom-Continent; Newcastle, N.S.W., 11s. 6d., Java; Sariboult or Theodosia, 8,000, Marseilles, 18 fr. one port, 18½ fr. both ports loading, ppt.; Kherson or Nicolaieff, 4,700, Bergen-Christiania, 20s. 9d. three ports, ppt.; Buenos Ayres or La Plata, 6,300, 10 per cent., United Kingdom-Continent, 26s. 1½d. o.c., less 6d., ppt.; Sfax, 3,000, Tonnay Charente, 11s., early October; Baltimore, 30,000 qrs., 10 per cent., Antwerp or Rotterdam, 3s. 1½d., oats, October; Gulf, 2,111 net, Buenos Ayres, 18s., November-December; sail, 16 dols., Monte Video or Buenos Ayres, lumber; South Australia, sail, 37s. 6d., United Kingdom-Continent, new crop loading; time charter, Transatlantic trade, 7s. 1d., two round trips, delivery United Kingdom-Continent.

Another important conference on town planning, which is felt to be so essential in the rapidly developing colliery district of South Yorkshire, will be held shortly in the Mansion House, at Doncaster. A meeting of the consultative committee took place last week-end at Bolton-on-Dearne, when representatives were present from the councils of Thurnscoe, Mexboro', Bolton and Doncaster rural district, and it was agreed that the conference with owners and other persons interested be held at Doncaster. The consultative committee also decided to approve the plans submitted to date, and discussed the actual area to be included in the application to the Local Government Board for permission to prepare a town planning scheme. It was decided that the necessary plans for each individual area be made by the authority for that area," but seeing that Wath urban, Darfield urban, and Barnsley rural district councils are not sending representatives to this committee the cost of preparing the book of reference and necessary plans for such amended areas be apportioned as joint expenses under the scheme."

TRADE The Pulsometer MARK.

Steam Pump

A STRONG SIMPLE PUMP

That needs no oil or packing, has nothing to get out of order, and can be left at work for weeks without attention.

FOR PIT SINKING &

The absence of exhaust steam, the facilities for slinging, and its capacity for pumping dirty water render it unsurpassed for this work.

COAL WASHING.

Having no frictional parts, it will pass large quantities of coal dust, grit, &c. To withstand the wear, special patterns are made for this work.

Please write for List No. 37a.

Branch Offices:	Telegraphic Addresses:	Telephone Nos.:
15, King Street, Leeds.	Pulsometer, Leeds.	1925 Central.
160, St. Vincent St., Glasgow.	Pulsometer, Glasgow.	8526 City; 1426 Central.
2, Strand St., Liverpool.	Pulsometer, Liverpool.	4184 Bank.
206, Corn Exchange Buildings, Cathedral St., Manchester.	Pulsometer, Manchester.	45 City.
50, Central House, New Street, Birmingham.	Pulsometer, Birmingham.	6774 Central.

Pulsometer Engineering Co., Ltd.

Offices—11, Tothill Street,
LONDON, S.W.

Telegrams—"Pulsometer, London."
"Egyptian, London."
Telephone—165 Westminster.

Nine Elms Iron Works,
READING.

Telegrams—"Pulsometer, Reading."
Telephone—583 Reading.

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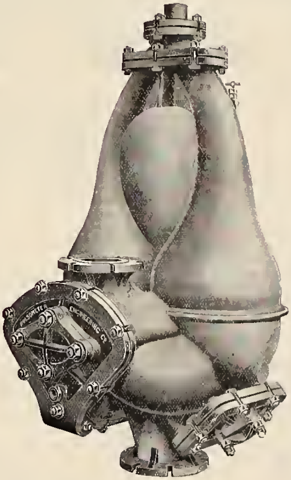

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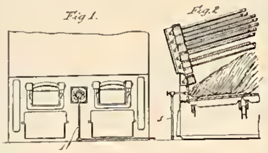
LONDON, S.W.

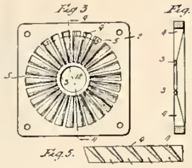
Telegrams—"Pulsometer, London."
"Egyptian, London."
Telephone—165 Westminster.

Nine Elms Iron Works,
READING.

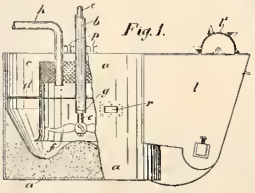
Telegrams—"Pulsometer, Reading."
Telephone—583 Reading.

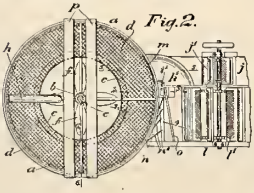
fuel, such as gas, oil, or solid fuel, into the combustion chamber. The burner is connected to a supply pipe 1, and terminates in proximity to a central opening in the impeller plate; that is, it may terminate a short distance in front or rear of said plate, or within said opening, in order that the issuing stream of fuel may be acted upon immediately by the whirling air current or currents. In the use of burner such as that employed by the inventor, the fuel, as it is projected into the furnace chamber, assumes a conical shape, the blades acting to deflect the column of air from its normal path as it enters the combustion chamber around the burner. As shown, the blades are mounted on a plate, either integral with the plate or secured thereto by any suitable means, so that they may be conveniently handled and mounted in the furnace wall. Referring to figs. 3, 4 and 5, the plate 2 is in the form of a square or rectangular casting having suitable provision for securing it in an opening in the wall of the furnace. The plate comprises a central ring 3 to provide an opening through which the fuel may be projected from the burner. The latter does not completely fill the space within the ring, so that, in addition to the air admitted between the blades, a relatively small column is admitted through the ring opening. From this ring radiate a series of blades 4, inclined inwardly from ribs 5. (Six claims.)





24406 (1911). *Improved Apparatus for Washing Coal, Ores of the Precious Metals and Other Ores and Minerals.* J. Dodds, of 30, Farmloan-road, Rutherglen, Glasgow.—This invention relates to an improved apparatus for separating, by washing, materials of different specific gravities. The invention is specially designed for separating coal from dirt and shale, for washing ores of the precious metals and for separating or treating other ores and minerals by washing.





Under this invention, which is a development of a prior invention No. 5970 of 1910, the washing apparatus is improved so that it can deal with large quantities of materials on a small consumption of water which does not require to be under pressure as formerly. To this end the water, which may be supplied at the centre of the machine, is drawn downwards and then forced upwards through the perforations of the rotating table by the action of mechanical means, such as a propeller or equivalent. The apparatus is constructed so that, in operation, there is a complete circulation of water therethrough, thereby enabling the same water to be used repeatedly and economising its consumption, which is an important matter when dealing with large quantities of materials. The construction of the apparatus is also otherwise improved. Fig. 1 is an elevation, partly in section; and fig. 2 is a plan of the apparatus. The apparatus may be employed singly or as one of a series, according to the material to be washed. In operation, the coal to be washed is placed upon the table d and water is admitted at the inlet h and is projected, by the rapidly revolving propeller f downwards on to the curved base and then upwards, along the sloping sides, through the perforated table d. The dirt and shale in the coal tend to sink and rest upon the table d, but the agitation caused by the rising water and the action of the propeller f prevent the dirt choking the perforations. The dirt moves outwards by centrifugal action and passes away from the vessel a through the opening i and channels i^1 and i^{11} into the shale elevator casing j, from whence it is removed from the apparatus by the elevator j^1, any dirt finding its way through the perforations of the table d being passed out through the opening i^2, whilst the coal, which is lighter, floats on or is held suspended in the water and passes through the water and coal outlet k and is conveyed by the channel k^1 to the coal elevator casing l and is removed therefrom by the elevator l^1 whilst the water passes through and under the partition o and is guided through the opening n, back to the vessel a, by the guides or sweeps n^1. During the above operations a current of water is caused, by the propeller, to circulate downwards through the revolving drum and then upwards through the revolving table. (Three claims.)

GOVERNMENT PUBLICATIONS.

⁂ Any of the following publications may be obtained on application to this office at the price named post free.

ROYAL COMMISSION ON METALLIFEROUS MINES AND QUARRIES: Minutes of Evidence, Vol. I., 3s. 6d.

Foreign Trade Returns for August, 6d.

Report on the Manufacture of Tin-plates, 1s.

National Insurance Act, 1911: Part II. (Unemployment Insurance)—Decisions of Umpire, Vol. I., with Index, 10½d.

Annual Statement of Shipping and Navigation for 1911, 3s. 5d.

Meteorological Committee: Report for 1911-12, 1s. 11d.

Colonial Report: Basutoland, 1911-12, 1½d.

Board of Education: Regulations for Scholarships in Science in 1913, 1½d.; Whitworth's Scholarships Prospectus, 1½d.

Housing: Costs of Arbitration Rules, 1½d.

PUBLICATIONS RECEIVED.

REPORT OF THE CHIEF INSPECTOR OF MINES IN INDIA FOR THE YEAR ENDING DECEMBER 31, 1911. By G. F. Adams, Chief Inspector of Mines in India. Calcutta: Superintendent Government Printing.

"The British Chamber of Commerce, Turkey, Quarterly Journal," June, price 2s. 6d.; "Revue Universelle des Mines de la Métallurgie" (tome 39, No. 2), Août; "Boletin del Cuerpo de Ingenieros de Minas del Peru" (No. 77); "Estadistica Minera en 1909-10," by Carlos P. Jimenez; "Peru To-day" (Vol. 4, No. 4), July, price 5d.; "The Mining Magazine" (Vol. 7, Nos. 2 and 3), August and September, price 1s.; "Le Mois Scientifique et Industriel" (No. 156), Août, price 2 fr.; "Bulletin Mensuel de la Société du Nord de la France" (No. 158), Août; "The Journal of the Franklin Institute" (Vol. 174, No. 3), September, price 50 c.; "Cassier's Magazine" (Vol. 42, No. 3), September, price 1s.; "What Might Have Been: Ballads and Poems for Reading and Reciting," by W. N. Stedman; "The Quarterly Journal of the Geological Society" (Vol. 68, Part 3, No. 271), price 5s.; "Trade of the Union of South Africa, Southern and North-west Rhodesia and British South Africa, for the month of July."

The Edward Medal.—Notification has been received at Tredegar that his Majesty the King has been pleased to award the Edward Medal of the second class to Messrs. W. D. Woolley, Arthur Thomas Wimborn, James Leach and Llewellyn Howells for their gallant action at the Markham Colliery explosion in May last. Mr. Woolley is the manager of the colliery where the explosion occurred, Sergeant Wimborn is the instructor at the mines rescue station at Crumlin and Messrs. James Leach and Llewellyn Howells (both of Tredegar) are members of the rescue brigade. These four descended the shaft in which the explosion occurred, and which caused the death of five men, in the face of great danger owing to the presence of noxious gases and the shattered shaft. They descended in a "bowk" temporarily fixed up, and after three or four attempts succeeded in bringing to the surface a man who was in the shaft at a depth of 350 yards. In addition to the Edward Medal, they have each been awarded the silver medal and certificate of the Royal Humane Society and a framed certificate, and, in the case of Messrs. Leach, Howells and Wimborn, £5 each by the Carnegie Hero Fund Trust.

NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

21028. Controlling gear for winding and hauling engines and the like. Worsley Meenes Ironworks Limited and W. H. Bedford.
21035. Pump-bucket and the like piston-ring packings. A. Clegg.
21103. Regulating devices for pumps. British Thomson-Houston Company Limited.
21106. Diesel and like engines. M. Churchill-Shann.
21110. Ore feeders. H. E. Waters and J. R. Cawthorne.
21137. Oil, petrol, and gas engines, and the preparation and use of fuel therefor. F. J. Langley.
21138 Explosives. S. Salisbury and Lancashire Explosives Company Limited.
21149. Smoke-consuming apparatus for steam generators. M. Carr.
21160. Steam generators. J. I. Thornycroft and Co. Limited, T. Donaldson, and R. Mackie.
21190. Screen conveyors. H. Pynegar.
21223. Process or processes for the purification or recovery of tin from alloys or mixtures containing smaller quantities of other metals. P. Bergsoi.
21235. Grates for gas-producers. J. Wingen.
21236. Horse and vehicle fare indicator for coal and other trades. W. Titterington and S. Smith, trading as Silkburn Coal Company.
21237. Eye-guards for pit ponies. J. Millar.
21281. Electric furnaces. E. Stassano.
21290. Electric furnaces. J. Marie (known as Johannés) Bocuze.
21291. Mining cartridges. N. Field.
21305. Rock-boring apparatus and cartridges therefor. May Mining Company Limited and C. H. Stocks.
21306. Safety scotch for colliery tub wheel. R. Halliwell and J. Wood.
21326. Pit pony eye-guards for use in coalmines. S. Mitchell.
21341. Pulley blocks. C. H. M. Dörnte.
21359. Method of increasing the calorific value of blast-furnace gases. W. Zimmermann.
21432. Recovery of metals from slags. C. Vautin.
21435. Clamping device for use with core boxes, casting moulds, and the like. D. Jones and H. Trueman.
21441. Distillation of shale and other bituminous substances. J. Nond.
21467. Scotch for colliery tubs and the like. T. Smith and E Forrest.
21470. Couplings for colliery trams or corves. D. Hughes.
21476. Process of recovering and treating sulphurous and the like gases from industrial or other furnaces. D. Peniakoff.
21477. Levelling-apparatus for coke ovens and the like. S. E. Gunyon.
21476. Electric furnaces for producing gas-reactions. H. Pauling.
21495. Manufacture of fuel briquettes, ovoids, and the like from waste products. A. D. Furse.
21512. Protectors for the points of miners' pick blades. E. Watkins.
21534. Steam generators. L. Steinmüller.
21535. Mounting for percussive coal-cutters and the like. W. Mauss.
21547. Steam boilers. P. Kestner.

Complete Specifications Accepted.

To be published on October 10.

1911.

20404. Roasting of iron ores. Boult.
21019. Hauling-rope grip for rope railways. Bleichert and Bleichert.
21111. Rotary pumps, compressors, and the like. Parsons and Carnegie.
22755. Method of producing ferro-silicon. Bingham.
24736. Furnace fronts and firedoors. Wallace.
25574 Pumps or compressors. Gumprecht and Collingwood.
25646. Centrifugal fans, pumps, or like appliances for exhausting or compressing, or for generally operating upon or imparting motion to fluids. Jacobsen.
26357. Winding drums for hoists or cranes. Petersen.
27631. Haulage clips. Wood.
28749. Electric safety lamps suitable for use in mines. Lowe.
28980. Turbo-compressors or centrifugal pumps. Warwick Machinery Company (1908) and Collingham.
29111. Axle-boxes for railway wagons. Thomas Burnett and Co. and Burnett.

1912.

279. Sand hoppers for moulding machines. Barnes.
1158. Apparatus for delivering measured quantities of coals and the like. Lachmund.
2684. Safety appliances for pit cages and other lifts and the like. Reynolds.
5329. Apparatus for superheating air under pressure. Gobert and Meyer.
5549. Valve apparatus for percussive rock-drills, tools, and the like. Rayner.
6986. Hoisting, hauling and winding apparatus. Lindsay and Couper.
6497. Apparatus for returning condensation water to steam generators. Pitschel.

Complete Specifications open to Public Inspection before Acceptance.

1912.

19266. Treatment of metals or alloys to render them ductile and malleable. Westinghouse Metallfaden Glühlampenfabrik Ges.
20445. Device for use in blasting coal, rock, or the like. Lamour.

Grimsby Coal Exports.—The following are the official returns as to the quantity of coal exported from Grimsby during the week ending September 20, 1912:—Foreign destinations, 24,054; coastwise, 754, distributed as follow:—Ahus, 3,457 tons; Dieppe, 1,005; Hamburg, 803; Riga 1,646; Antwerp, 724; Ystad, 3,747; Gothenburg, 2,749, Stockholm, 2,876; Sodertelje, 752; Rotterdam, 102; Esbjerg, 385; Bremen, 372; Reval, 2,234; Stocka, 1,174; Malmo, 2,028; Ramsgate, 550; and London, 204 tons.

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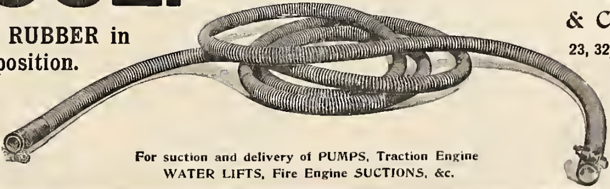

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Purchasers' Guide to Advertisers' Specialities.

Further information can be obtained on reference to the Weekly Alphabetical Index to Advertisers.

Acetylene Lamps
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Accumulators
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent

Acid Plant
Daglish, Robert, and Co. Ld., St. Helens, Lancs.

Air Analysis Apparatus
Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

Air Compressors
Bailey, W. H., and Co, Ld., Salford, Manchester
Bellis and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co., St. Helens, Lancashire
Davis, John, and Son (Derby) Ld., Derby
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
International Channelling Machines Ld., Sheffield
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Mining Engineering Co. Ld., (The), Sheffield
Nuneaton Engineering Co. Ld., Nuneaton
Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., F. Department, Ipswich
Robey and Co. Ld., Globe Works, Lincoln
United States Metallic Packing Co. Ld., Bradford
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Air Pipes
Allen, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Son, Thompson-street, Bilston
British Mannesmann Tube Co. Ld., London Wall
Lewis, William, and Son, Bilston
Mining Engineering Co. Ld., Sheffield
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C., Ld., Dudley

Air Pumps.
Bailey, W. H., and Co. Ld., Salford, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Wood, John, and Sons Ld., Wigan

Alternators
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Mavor & Coulson Ld., 47, Broad-street, Glasgow

Ambulance Carriages, Stretchers, &c.
County Ambulance Carriage Works, Mill-street, Pontypridd
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley

Anchors
Wright, Joseph, and Co., Tipton

Anemometers
Davis, E., 2, Aire-street Leeds
Davis, John, and Son (Derby) Ld., Derby
Humble, Stephen, 9, Victoria-st., London, S.W.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Angles and Sections (Steel)
Firth, Wm., Ld., Water-lane, Leeds

Anthracite Breaking, Sizing and Washing Plant
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Sheppard and Sons Ld., Bridgend
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Anti-Corrosive Compositions
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

Anti-Friction Metal
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Anvils
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Asbestos
Asbestos and General Paint Co. Ld., Birmingham

Axle Greasers
Wakefield, C. C., and Co., 27, Cannon-street, E.C

Barrows (Ore)
Bagnall, W. G., Ld., Stafford
Haslam and Schontheil Ld., Cardiff
Heenan and Froude Ld., Worcester
Theedam, E. C., Ld., Dudley

Bars (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mining Engineering Co. Ld., Sheffield

Bars (Screen)
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Head, Wrightson and Co. Ld., Stockton-on-Tees
Renton, B. M., and Co., Sheffield
Wood, John, and Sons Ld., Wigan

Bearings
Bridge, David, & Co. Ld., Castleton, Manchester
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham

Bellows
Hardy Patent Pick Co. Ld., Sheffield
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Bells (Signal)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Humble, Stephen, 9, Victoria-st., London, S.W.
Theedam, E. C., Ld., Dudley

Belt Fasteners
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Belt Food

Belting
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Frost, Albert, and Co., Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Sutcliffe, R., Horbury, near Wakefield
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Belts (Chain)
Ewart's Chain Co., Derby, England
Heenan and Froude Ld., Worcester
Wright, Joseph, and Co., Tipton

Benzol Plants
Coke Oven Construction Co. Ld., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Bitumastic Solution
Wailes, Dove & Co., Ld., Newcastle-on-Tyne

Blasting Apparatus
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
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Tangyes Ld., Cornwall Works, Birmingham

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Stringer, John, and Son, Blackburn

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Hopkinson, J., and Co. Ld., Huddersfield
Stringer, John, and Son, Dept. 11, Blackburn
Wellington Tube Works Ld., Great Bridge, Tipton

Boiler Removers
Stringer, John, and Son, Blackburn

Boiler Tubes
Lewis, Edwin, and Sons, Wolverhampton
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Gt. Bridge, Tipton

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Avonside Engine Co. Ld., Bristol
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Daglish, Robert, and Co. Ld., St. Helens, Lancs.
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Horsfield, J. and J., Ld., Dewsbury
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Peckett & Sons, Atlas Locomotive Works, Bristol
Robey and Co. Ld., Globe Works, Lincoln
Spurr, Inman and Co. Ld., Wakefield
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Jardine, John, Deering-street, Nottingham
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Theedam, E. C., Ld., Dudley
Ward, Thos. W., Ld., Albion Works, Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Books on Mining
Colliery Guardian Co. Ld., 30 & 31, Furnival-st., Holborn, E.C.
Griffin, Charles, and Co. Ld., Exeter-st., Strand
South Wales Institute of Engineers, Cardiff
Southern, T. A., Universal Mining School, Cardiff

Boring Contractors
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-rd., Lambeth, S.E.
Davidson, J. S., & Son, St. Bees, Cumberland
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
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New Calyx Drill and Boring Co. Ld., Millwall, E.
Thomson Bros. (Dunfermline) Ld. Glasgow
Trefor Boring and Mining Co. Ld., 41, rue Royale Brussels
Vivian's Boring & Exploration Co. Ld., Parkside, Cleator Moor, Cumberland

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Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co, Ld., Lincoln

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Peckett & Sons, Atlas Locomotive Works, Bristol
Railway and General Engineering Co. Ld., Notts
Russell, John, and Co. Ld., Alma Works, Walsall

Brattice Cloth
Davis, John, and Son (Derby) Ld., Derby
Evans, D. Llewellin, 120, Bute-street, Cardiff
Moritz, George, Ld., Clayton, Manchester

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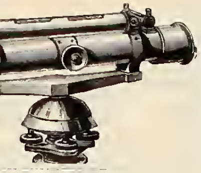

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Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, E., 2, Aire-street, Leeds
Davis, John and Son (Derby) Ld., Derby
Fraser & Chalmers Ld., 3, London Wall Bldgs, E.C.
Hardy Patent Pick Co. Ld. Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Haslam and Schonthell Ld., Cardiff
Hathorn, Davey and Co. Ld., Leeds
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Improved Coal Mining Co., Sacriston, nr. Durham
Isca Foundry Co., Newport
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, R. H., and Co. Ld., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld. 47, Broad-street, Glasgow
Mining Engineering Co. Ld., (The), Sheffield
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Pillatt & Co. Ld., Stapleford, Nottingham
Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
Railway and General Engineering Co. Ld., Notts
Reavell and Co. Ld., Ipswich.
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Waddle Patent Fan & Engineering Co., Llanelly
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton
Yeadon, Son and Co., Albion-place, Leeds
Yorkshire Engine Co. Ld., Sheffield

Condensers & Condensing Plant
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Constructional Steel and Iron Work
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Cantrell, W. E., and Co. Ld., Beeston, Notts
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Newton Heath, Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Norton's (Tividale) Ld., Tipton
Longbotham, R. H., and Co. Ld., Wakefield
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Wood, John & Sons Ld. Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Conveyor Belts
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, R., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Conveyors and Elevators
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Cantrell, W. E., and Co. Ld., Beeston, Notts
Chain Belt Engineering Co., Derby, England
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Diamond Coal-Cutter Co. Stennard Wks. Wakefield
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Improved Coal Mining Co., Sacriston, nr. Durham
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Mather and Platt Ld., Manchester
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Primus Patents Co., Falcon-street, Oldham
Reddaway, F., & Co. Ld., Pendleton, Manchester
Sheppard and Sons Ld., Bridgend, South Wales
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts.
Sutcliffe, R., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Yorkshire Engine Co. Ld., Sheffield
Wright, Joseph, and Co., Tipton

Corner Plates
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lewis, Wm., and Son, Bilston, Staffs.
Thoedam, E. C., Ld., Dudley

Couplings
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham
Thoedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Crab Winches
Hardy Patent Pick Co. Ld., Sheffield
Renton, R. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

Crane Makers
Middleton, Robert, Sheepscar Foundry, Leeds
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Cranes
Appleby, E. G., and Co., 10, Victoria-street, Westminster
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Ryland-street Works, Birmingham

Creepers
Tickle Bros., Vulcan Ironworks, Wigan

Cut-off Gear
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Thornewill and Warham Ld., Burton-on-Trent
Wood, John, and Sons Ld., Wigan

Detonators
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Disintegrators
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Middleton, Robert, Sheepscar Foundry, Leeds
Simon-Carves Ld., 20, Mount-street, Manchester
Yeadon, Son and Co., Albion-place, Leeds

Diving Apparatus
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Pulsometer Engineering Co. Ld., Reading
Siebe, Gorman and Co. Ld., Westminster S.W.

Dog Spikes
Frost, Albert, and Co., Sheffield
Souten, B. M., & Co., Midland Works, Sheffield

Double Helical Gear (Machine Cut)
Brown, David, and Sons (H'fi'd) Ld., Huddersfield
Citroen, Andre, and Co., 27. Queen Victoria-street, London

Drain Cocks
Appleton and Howard, St. Helens, Lancs.
Hopkinson, J., and Co. Ld., Huddersfield

Drawing Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drawing Office Stationery
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drills (Electric)
United States Metallic Packing Co. Ld., Soho Works, Bradford

Driving Pulleys
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Duplex Pumping Engines
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Evans, Joseph, and Sons Ld., Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Pearn, F., and Co. Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Dustbins (Sanitary)
Baker, John, and Son, Bilston, Staffs
Harvey, G. A., and Co., Lewisham, London, S.E.
Lewis, Wm., and Son, Bilston
Thoedam, E. C., Ld., Dudley

Dynamite, &c.
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Nobel's Explosives Co. Ld., Glasgow

Dynamos
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Sutcliffe, Richard, Horbury, near Wakefield

Ebonite and Vulcanite
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Electric Detonators and Fuses
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Electrical Earthing Clips
Ingle, Albert E., 13, Albert-place, Bridge street, Manchester

Electrical Engineers
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Heslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mather and Platt Ld., Manchester
Thoedam, E. C., Ld., Dudley

Electrical Fault Indicators
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield

Electric Haulages
Avonside Engine Co. Ld., Bristol
Bridge, David, & Co. Ld., Castleton, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davis John, and Son (Derby) Ld., Derby
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, R. H., and Co. Ld., Wakefield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Electric Meters
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Electrical Plant
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Ward, Thos. W., Limited, Albion Works, Sheffield

Electrical Pumps
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Electrical Stores
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Davis, John, and Son (Derby) Ld., Derby
Heslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Thoedam, E. C., Ld., Dudley

Emery Wheels

Enamelled Plates for Notices for Mines
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Thoedam, E.C., Ld., Dudley

Enamel Manufacturers (for all Metals)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalbitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Engineers (Consulting)
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Fell, C. A., Dronfield, near Sheffield
Radford, R. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

Engines (Blowing)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Gas-Compressing)
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Hauling and Winding)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, R. H., and Co. Ld., Wakefield

Engines (Hauling and Winding)—continued.
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, R., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

Engines (Locomotive)
Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)
Mather and Platt Ld., Manchester

Engine Merchants
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

Engines (Oil)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping) (See **Pumps**)

Engines (Rolling Mill)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.

Engines (Steam)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Exhaust Turbine Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allan, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Thoedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanell
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Files
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & H., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Thoedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

Fire Appliances
Fell, C. A., Dronfield, near Sheffield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

NINERY
Co., Holbeck-lane, Leeds

ply Co, Ld., 1, Pearson-pl., Cardiff
Ld., Leeds
eral Engineering Co. Ld., Notts
nd Co., Midland Works, Sheffield
el, & Coal Co. Ld., Stoke-on-Trent
Ld., Albion Works, Sheffield

ND STEEL)
Wagon Co. Ld., Chorley, Lancs.
is Ld., Nile-street, Birmingham
Works Ld., Great Bridge, Tipton

Co. Ld., Little Hulton, Bolton
house Electric and Manufacturing
nchester
andler Ld., Hednesford, Staffs.
, Ld., Belfast
ude Ld., Worcester
d., Stapleford, Nottingham

ck Co. Ld., Sheffield

Ld., Stafford
Wagon Co. Ld., Chorley
ck Co. Ld., Sheffield
., Lowmoor Ironworks, Bradford
nd Co., Midland Works, Sheffield
ring Co. Ld., Newport
Wigan) Ld., Wigan
and Co., Tipton
e Co. Ld. Sheffield

ES
and Co. Ld., Bradford, Yorks.
Co. Ld., Castleton, Manchester
and Co. Ld., St. Helens, Lancs.
s Ld., 3, London Wall Bldgs., E.C.
and Co. Ld., Nailsworth, Glos.
B., and Co. Ld., Wakefield
le) Ld., Tipton
Ld., Ipswich
Co. Ld., Pendleton, Manchester
Ld., Dudley
Vulcan Ironworks, Wigan
s (Wigan) Ld., Wigan
ons Ld., Brook Foundry, Wigan
and Co., Tipton

RS
field, near Sheffield
Stapleford, Nottingham
nd Son, Dept. 11, Blackburn
Co. Ld. Bradford

rt, Sheepscar Foundry, Leeds
ring Co. Ld., Newport
Co., Albion-place, Leeds

Co. Ld., Little Hulton, Bolton
d., Stapleford, Nottingham
Ld., Hammerton-st., Burnley
Vulcan Ironworks, Wigan

RE
n Ld., Worcester and Manchester
Vulcan Ironworks, Wigan
l Sons Ld., Wigan

S Co, Ld., Tuckingmill, Cornwall

& Co, Ld., Tuckingmill, Cornwall
o. Ld., 32, Queen Victoria-st., E.C.
vey Ld., Cannon-st. House, E.C.
Son (Derby) Ld., Derby
Apparatus Co. Ld., Cinderford
es Co. Ld., Glasgow

o., Ld., Elverton-st., Westminster
house Electric and Manufacturing
nchester
Co., Holbeck-lane, Leeds
eral Engineering Co. Ld., Notts
d., Lincoln
rnwall Works, Birmingham

oke Oven and Bye-Product Co.,

ouse Electric and Manufacturin
chester
oke Oven and Bye-Product Co.,

, Ld., Manchester

and Co., 10, Victoria-street,

PS
t Ld., Morley, Leeds
Son (Derby) Ld., Derby

FITTINGS
d Sons, Wolverhampton
s Ld., Birmingham & Glasgow
Works Ld., Great Bridge, Tipton

ntheil Ld., Bristol

-street, Leeds
Son (Derby) Ld., Derby
9, Edmund-pl., Aldersgate, E.C.
d Co. Ld., Huddersfield
d, 70, Shoe-lane, London, E.C.
Ld., Dudley
s Co., 8 & 12, Vauxhall-rd., L'pool

ITECTORS
-street, Leeds
d, 70, Shoe-lane, E.C.
d Co. Ld., Huddersfield
Ld., Dudley

-street, Leeds
ng Ld., 28, New Bridge-st., E.C.
d Co. Ld., Huddersfield
Co. Ld., Bradford

R MOTOR LORRIES CARS &C.)
Sons (Hudd.) Ld., Huddersfield

and Helsby Cables Ld., Prescot
Sons (Hudd.) Ld., Huddersfield
ndler Ld., Hednesford, Staffs.
nd Co., 27, Queen Victoria Street
nd Co. Ld., St. Helens, Lancs.
ering-street, Nottingham
age Ld., Pendleton, Manchester
ering Co. Ld., Nuneaton.
Warham Ld., Burton-on-Trent
(Wigan) Ld., Wigan
Son Ld., Brook Foundry, Wigan

D STEEL)
d Co. Ld., St. Helens, Lancs.
Water-lane, Leeds
de Ld., Manchester
lass, Liverpool
, Newport, Mon.
d Co., Midland Works, Sheffield
l., Leeds Steel Works, Leeds
el and Coal Co. Ld., Stoke-on-

Limited, Albion Works, Sheffield

RERS (TUBE RODS ENAMELS)
9, Edmund-pl., Aldersgate, E.C.

Purchasers' Guide to Advertisers' Specialities.—(continued).

GOVERNORS (ENGINE)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

GOVERNORS (HYDRAULIC)

GREASE
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

GRINDING MACHINERY
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

GRINDSTONES

GUNPOWDER
Curtis's and Harvey Ld., Cannon-st. House, E.C.

GUTTA PERCHA
Cort, Arthur, & Co. 303½, Camberwell-rd., London

HARNESS

HAULING DRUMS
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, B., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

HEADGEARS
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

HEADING MACHINES
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

HEAPSTEADS
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, B. B., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

HOISTS
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

HOOKS OR LINES (SAFETY)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

HOPPERS
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Leampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

HOSE
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

HUMIDIFIERS
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

HYDRO ELECTRIC PLANTS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

HYDRAULIC JACKS
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

HYDRAULIC MACHINERY
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Ryland-street Works, Birmingham

HYDRAULIC REDUCING VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow

HYGROMETERS
Davis, John, and Son (Derby) Ld., Derby

INCLINE ROLLERS
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

INDIARUBBER GOODS
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Reddaway, F., & Co. Ld., Pendleton, Manchester

INDICATORS (STEAM ENGINE)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

INDUCED DRAUGHT FANS
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

INJECTORS AND EJECTORS
Bailey, W. B., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. B., & Co. Ld., Southwark-st., S.E.

INSTRUCTION (POSTAL)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

INSTRUMENTS
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

IRON AND BRASS FOUNDERS
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

IRON AND STEEL
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

JACKS (HYDRAULIC)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

JIGS
Ormerod, Edward, Atherton, near Manchester

JIM CROWS
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

JOINTING CEMENT
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

JOINTING (SHEET)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

JOISTS (ROLLED STEEL)
Heenan and Froude Ld., Worcester
Renton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

KEPS (FOR WINDING CAGES)
Bonthaus, D., 45, Bank-street, Sheffield
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

LAMP CLEANING MACHINES
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP GAUZE BRUSHES
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP GLASSES
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP OIL FILLING MACHINES
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP RE-LIGHTING APPARATUS (UNDERGROUND)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMPS (ARC)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

LAMPS (ELECTRIC)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

LAMPS (ELECTRIC SAFETY)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent
Photos Miner's Electric Lamp Ld., Queen's-road, Battersea
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMPS (MINERS' SAFETY)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMPS (OUTDOOR)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

LATHES
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

LEATHER APPLIANCES

LESSONS BY POST
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

LIFTING AND HOISTING TACKLE
Renton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

LIGHTNING CONDUCTORS
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Shaw, John, Ld., Sheffield
Theedam, E. C., Ld., Dudley

LOCKNUT WASHERS
Renton, B. M., and Co., Sheffield

LOOSE COLLARS
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster S.W.

LUBRICATORS
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

MACHINERY (SECOND-HAND)
Bute Works Supply Co. Ld., Cardiff
Foot, R. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Renton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

MACHINE TOOLS
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

MATHEMATICAL INSTRUMENTS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

MECHANICAL STOKERS
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

METAL PERFORATORS
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

METALLIC PACKING
United States Metallic Packing Co. Ld., Soho Works, Bradford

METEOROLOGICAL INSTRUMENTS
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

MILLS (GRINDING)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

MINING DIALS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C
Thornton, A. G., Ld., King-st. West, Manchester

MINING MACHINERY
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

MINING TOOLS
Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

MOTORS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

MOTOR STARTERS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

MOTOR VANS AND WAGONS
Avonside Engine Co. Ld., Bristol
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.

NAILS SPIKES, &C.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Frost, Albert, and Co., Howard-street, Sheffield
Renton, B. M., and Co., Midland Works, Sheffield

OFFICE FURNITURE AND APPLIANCES
Glover, M., and Co., Holbeck-lane, Leeds
Thornton, A. G., Ld., King-st. West, Manchester

OIL BOTTLES
Baker, John, and Son, Bilston, Staffs
Theedam E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

OIL CABINETS
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

OIL SWITCHES
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

OILS AND LUBRICANTS
Ackroyd and Best Ld., Morley, nr. Leeds
Asbestos and General Paint Co. Ld., Birmingham
Gaunt and Hickman, Oil Works, Wolverhampton
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., & Co. Ld., 23, Southwark-st., E.C.

OVERHEAD TRAVELLERS
Spencer and Co. Ld., Melksham, Wilts
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

OVERWINDING GEAR
Barclay, Andrew, Sons and Co. Ld., Kilmarnock
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

OXYGEN MANUFACTURERS
British Oxygen Co. Ld., Elverton-st., Westminster
Knowles Oxygen Co. Ld., Wolverhampton

PACKING (ENGINE)
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Green and Boulding Ld., London, E.C.
Greene, Tweed and Co., Westminster
Lancaster and Tonge Ld., Pendleton, Manchester
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. B., & Co. Ld., 23, Southwark-st., S.E.

PAINT
Asbestos and General Paint Co. Ld., Birmingham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Kalbitum Paint Co. Ld., Belvedere, Kent
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

PAINT (FIREPROOF)
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent

STEWARTS AND LLOYDS LTD.
Wrought Iron and Steel Tubes & Fittings.
SPECIAL JOINT FOR COLLIERIES.
THE "ALBION" LOOSE FLANGE JOINT.
41, Oswald St., Glasgow. Nile St., Birmingham.
These Tubes are specially suitable for use in Mines, being both light and strong; Joints are easily connected, and a Tube can be removed without disturbing the run.
See page Advertisement July 26 issue.

Purchasers' Guide to Advertisers' Specialities—(continued).

PATENT AGENTS
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Bedford, B. H., Son, and Squire, Sheffield

PEDESTALS
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham

PERFORATED PLATES
Barns, W., & Son, Queensland-rd., Holloway, N.
Firth, William, Ld., Leeds
Harvey, G. A., & Co., Leampit Vale, Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Norton's (Tividale) Ld., Tipton
Theedam, E. C., Ld., Dudley

PICKS AND SHOVELS
Baker, John, and Son, Bilston, Staffs
Fell, C. A., Dronfield, near Sheffield
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Theedam, E. C., Ld., Dudley

PINIONS
Cort, Arthur & Co., 303½, Camberwell-rd., London

PINIONS (RAW HIDE AND PAPER)
Bridge, David, & Co. Ld., Castleton, Manchester
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan

PIPE JOINT PASTE
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

PIPES (STEAM AND WATER)
British Mannesmann Tube Co. Ld., London Wall
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Isca Foundry Co., Newport, Mon.
Lewis, Edwin, and Sons, Wolverhampton
Pulsometer Engineering Co. Ld., Reading
Hassell, John, & Co. Ld., Alma Tube Wks., Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Nile-st., Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

PISTONS
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

PISTON SPRINGS
Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

PIT PROPS (STEEL)
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Bute Works Supply Co. Ld., Bute Docks, Cardiff
Firth, William, Ld., Leeds
Heenan & Froude Ld., Worcester
Henderson and Glass, Liverpool
Lewis, Edwin, and Sons, Wolverhampton
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Spencer, John, Ld., Globe Tube Works, Wednesbury
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton

PIT PROPS (WOOD)
Baird, J. W., and Co., West Hartlepool
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Osbeck and Co., Newcastle-on-Tyne

PIT PROP WITHDRAWERS
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Spencer, Matthias, and Sons, Sheffield

PIT WATER GAUGES.
John Davis & Son (Derby) Ld., Derby

PLANING MACHINERY AND APPLIANCES (WOOD)
Glover, M., and Co., Holbeck-lane, Leeds

PLATES FOR COLLIERY NOTICES
Davis, John, and Son (Derby) Ld., Derby
Railway and General Engineering Co. Ld., Notts
Theedam, E. C., Ld., Dudley

PLATES (IRON AND STEEL)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Stewarts & Lloyds Ld., Birmingham & Glasgow
Stringer, John, and Son, Dept. 11, Blackburn

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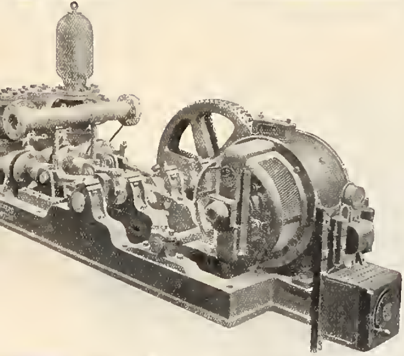

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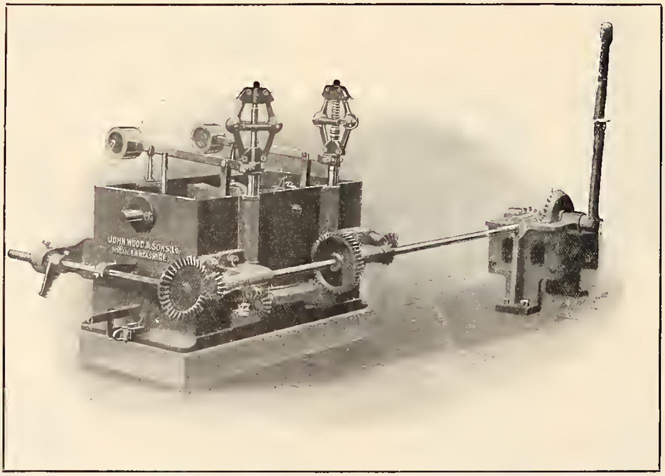

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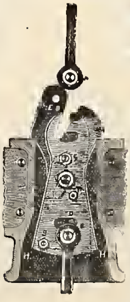

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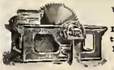

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New Forms, &c., recently issued under the Coal Mines Acts.

This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c., as issued.

☞ ISSUED SINCE THE LAST APPEARANCE OF THIS LIST.

Registered No. Please quote when ordering.	NEW FORMS, &c., RECENTLY ISSUED.	
	Statutory Rules and Orders, &c.	
H.O., 511	Explosives in Coal Mines Order of 21st May, 1912 (revoking all previous "Explosives" Orders). Pamphlet Form ...	4d. each. By post 5d.
C.G., 69	The same (without Schedules). Pamphlet Form	4d. each. By post 5d.
H.O., 34	The same (without Schedules). In Sheet Form for posting ...	1d. each. By post 1½d.
H.O., 1149	Mining Examinations. Order Fixing Times and Places ...	1d. each. By post 1½d.
H.O., 1150	Rules for the Conduct of Examinations	1d. each. By post 1½d.
H.O., 1151	Rules as to the Qualifications of Applicants for First and Second-class Certificates of Competency	1d. each. By post 1½d.
C.G., E.	Special Rules for the Installation and Use of Electricity in Mines. Sheet Form (H.O., 12)	3d. each. By post 3½d.
C.G., K.	Pamphlet Form (H.O., 11)	2d. each. By post 3d.
C.G., L.	Coal Mines Act, 1911. Pamphlet Form	9d. By post 11d.
C.G., L. (Abs.)	Coal Mines Act, 1911, Abstract. Sheet (26 in. by 34 in.) (H.O., 2)...	3d. each. By post 4d.
C.G., M.	Coal Mines (Minimum Wage) Act, 1912. Pamphlet Form ...	1½d. By post 2d.
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Cd. 6387	Testing of Miners' Safety Lamps. Report of Departmental Committee, August 5, 1912	5½d. By post 7d.
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	List of Mines in the United Kingdom for 1911	4s. each. By post 4s. 4d.
	List of Quarries in the United Kingdom for 1911	5s. each. By post 5s. 6d.
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H O., 11C	Do. Notice to Inspector of the District under Rule 2 (ii.) ..	1d. each. By post 1½d.
H.O., 11D	Do. Notice to Inspector of the District under Rule 2 (iii.) ..	1d. each. By post 1½d.
H.O., 20	Form of Register of Boys, Girls and Women Employed—Section 94	4d. each, postage extra
H.O., 36	Form of Report Book for Inspection on behalf of Workmen—Section 16 ..	9d. each do.
H.O., 37	Form of Book for Record of Measurements of Air Currents—Section 29 (2) ..	7d. each, do.
H.O., 38	Form of Book for Daily Record of Damage to Safety Lamps—Section 34 (1) (ii)	1s. 6d. each do.
H.O., 39	Form of Report of Thorough Examination of Steam Boiler—Section 56 ..	1d. each do.
H.O., 40	Form of Book for Report on Quarterly Internal Examination of Steam Boilers—Section 56 (1) (*c*) and (3)	6d. each do.
H.O., 41	Form of Book for Daily Report on Condition of Roads as to Coal Dust—Section 62 (5)	1s. 3d. each do.
H.O., 42	Form of Report Book for Firemen, Examiners or Deputies—Sections 64 and 65..	1s. each do.
H.O., 43	Form of Book for Daily Report of Examination of External Parts of Winding Machinery, Guides, &c.—Section 66 (*a*)	1s. 6d. each do.
H.O., 44	Form of Book for Weekly Report of Machinery, Gear and other Appliances (other than Winding Machinery, Gear, &c.)—Section 66 (*b*)	1s. 3d. each do.
H.O., 45	Form of Book for Weekly Report on State of Shafts in which Persons are Lowered or Raised—Section 66 (*c*)	1s. 3d. each do.
H.O., 46	Form of Book for Weekly Report on State of Airways—Section 66 (*d*) ..	1s. 3d. each do.
H.O., 47	Form of Book for Reports on Places from which Workmen have been Withdrawn Section 67	9d. each do.
H.O., 48	Form of Notice of Accident Causing Loss of Life or Serious Personal Injury to be sent to Representative of Persons Employed—Section 80 (1)	1d. each do.
H.O., 49	Form of Notice Specifying the Period of Employment and Times Allowed for Meals of Boys, Girls and Women—Section 93	1d. each do.
H.O., 50	Form of Book for Horsekeeper's Record and Daily Report of Horses under his care—Schedule III. (13)	2s. 6d. each, do.

Continued on Page 667.

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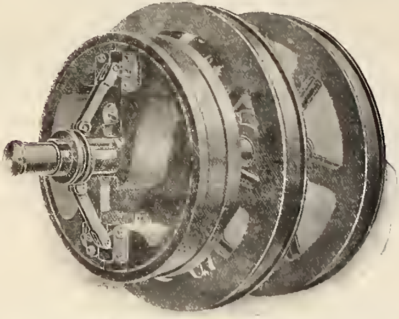

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Continued from Page 666.

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H.O., 51	Form of Annual Return of Horses Used Underground in the Mine—Schedule III. (16)	1d. each,	postage extra
H.O., 52	Form of Book for Daily Record of Shots Fired—Explosives in Coal Mines Order	9d. each	do.
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	"COLLIERY GUARDIAN" SERIES.		
C.G., 15	Report on Electric Power Plant. Books containing 100 Forms of Report, with duplicates perforated	6s. each.	By post 6s. 5d.
C.G., 15A	Report on Electric Power Plant. Books of 100 Forms of Report, with duplicates perforated	6s. each.	By post 6s. 5d.
C.G., 20	Overman's Daily Report. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 24	Report of Inspection of Ventilation, &c. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 27	Foreman Enginewright's Daily Report to Manager. Books of 200 pages ..	4s. each.	By post 4s. 5d.
C.G., 31	Authority to Fire Shots and carry and use Detonators. Books of 100 Forms, with rules on back	8s. each.	By post 8s. 6d.
C.G., 31*	The same as C.G. 31, but without rules on back	4s. each.	By post 4s. 5d.
C.G., 31A	Authority to Carry a Lamp Key. Books of 100 Forms	4s. each.	By post 4s. 5d.
C.G., 32	Authority to have charge of Detonators. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 4d.
C.G., 34	Appointment of Deputy, Fireman, &c. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 4d.
C.G., 35	Workmen's Contracts and Workmen's Deductions. Books of 200 pages, Forms 35A and 35B combined	4s. each.	By post 4s. 5d.
C.G., 35A	Workmen's Contracts. Books of 200 pages..	4s. each.	By post 4s. 5d.
C.G., 35B	Workmen's Deductions. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 47	Veterinary Surgeon's Weekly Report. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 48	Daily Return of Early Riders and Damaged Lamps. Books of 200 pages ..	4s. each.	By post 4s. 5d.
C.G., 49	Accident Report to Manager. Books of 50 Reports and duplicates	4s. each.	By post 4s. 5d.
C.G., 50A	Abstract of all Persons Employed, to facilitate the making of the Annual and other Returns. Books of 96 pages	3s. each.	By post 3s. 4d.
C.G., 50B	Register of Officials, with Particulars of Engagement. Books of 96 pages ..	3s. each.	By post 3s. 4d.
C.G., 50C	Register of Persons Employed, with Particulars of Engagement. Books of 96 pages..	3s. each.	By post 3s. 4d.
C.G., 50D	Book made up of 48 pages 50A; 24 pages each 50B and 50C; indexed for easy reference	3s. each.	By post 3s. 4d.
C.G., 51	Coal-cutter's Daily Report. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 70	Appointment of Winding Engineman. Books of 100 Certificates with counterfoils	4s. each.	By post 4s. 4d.
	Forms under the Quarries Act, 1894.		
C.G., 20Q	Daily Report by Foreman. Books containing 400 Forms of Report.. ..	4s. each.	By post 4s. 5d.
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Candidates must, on or before the 15th October, send their names and state the district in which they are employed, to the Secretary at the Home Office, Whitehall, London, S.W., from whom all particulars can be obtained.

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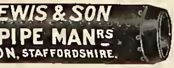
County Hall,
Spring-gardens, S.W.,
24th September, 1912.

LAURENCE GOMME,
Clerk of the London County Council.

⁂ *For later* **Advertisements** *and* **Scale of Charges,** *see* **Page 644 (Leader Page).**

Printed and Published by the Proprietors, The Colliery Guardian Company Limited, 30 & 31, Furnival Street, Holborn, London, E.C. Friday, September 27, 1912.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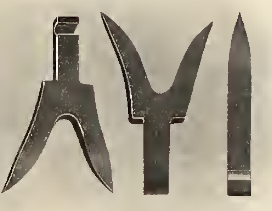
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Davis, E.	Davis, Leeds	682
Davis, John, and Son (Derby) Ld.	Davis, Derby	678
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Elliot, George, and Co. Ld.	Elliot Co., London	Cover ii
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Evans, Joseph, & Sons (Wolverh'pton Ld.)	Evans, Wolverhampton	—
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Fairclough and Sons		720
Farnley Iron Co. Ld.	Farnley, Leeds	Cover i
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Glover, M., and Co.	Glovers, Leeds	670
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Green and Boulding Ld.	Temperature, London	670
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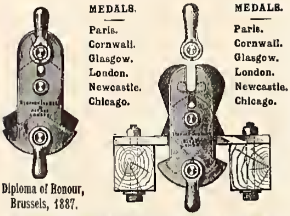

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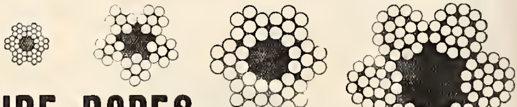

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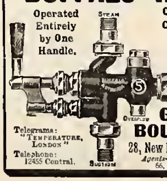

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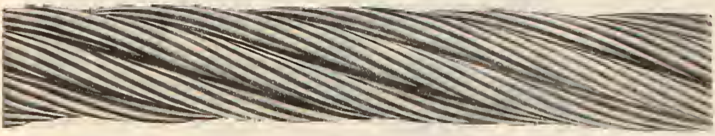

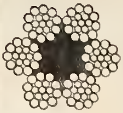

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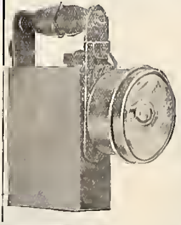

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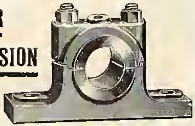

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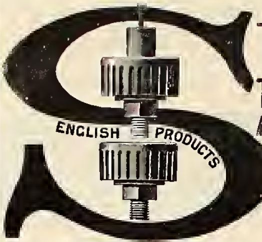

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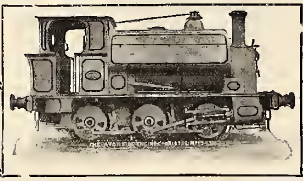

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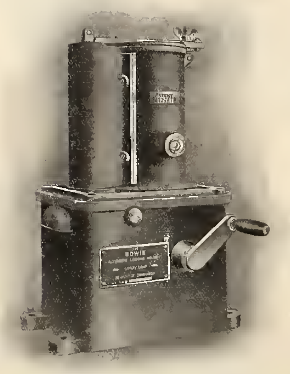

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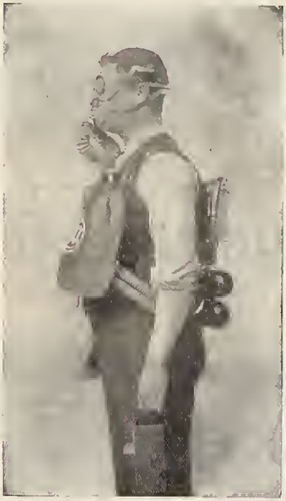

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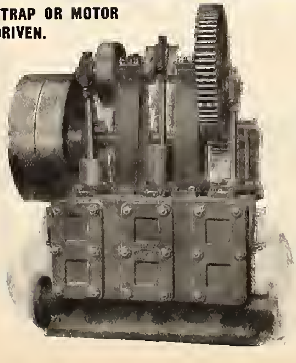

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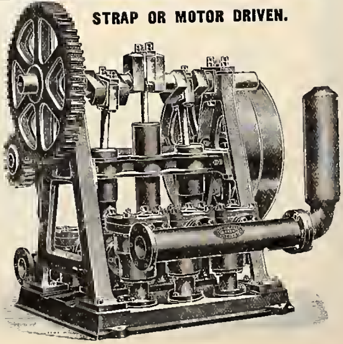

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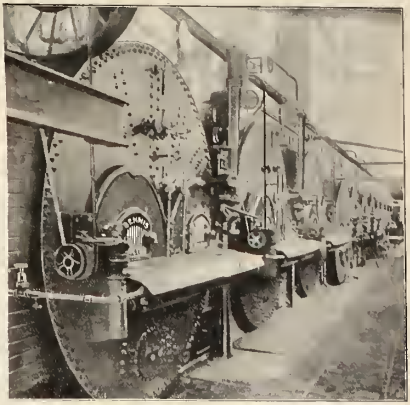

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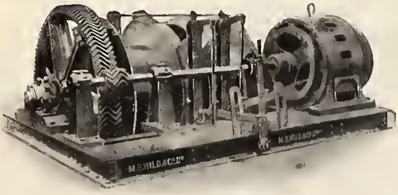

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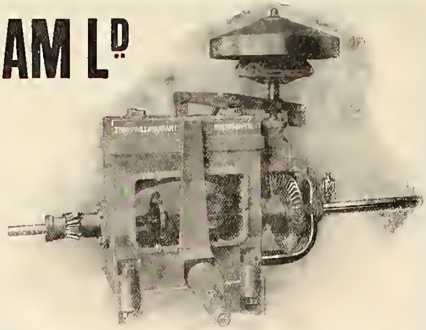

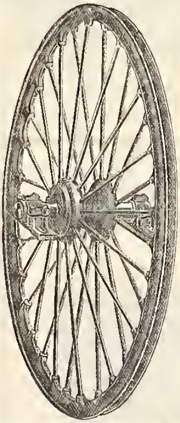

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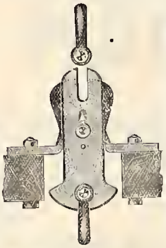

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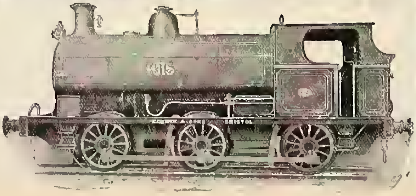

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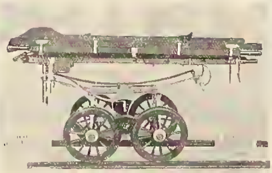

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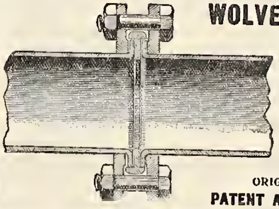

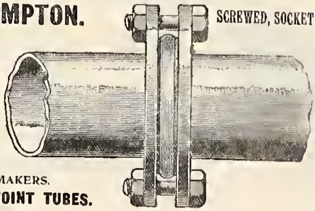

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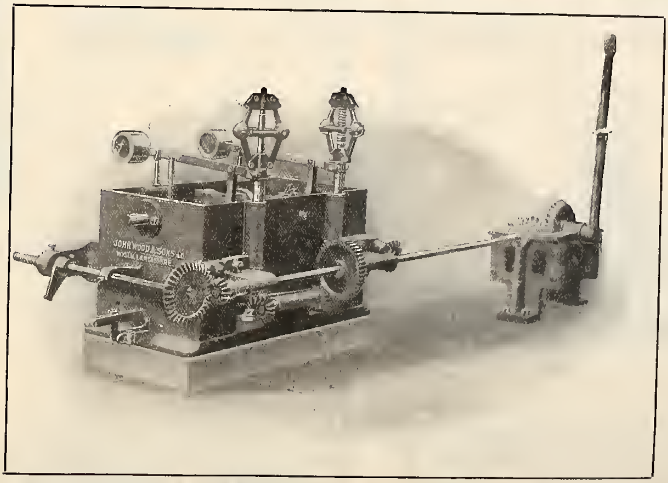

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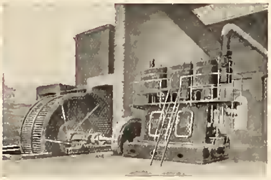

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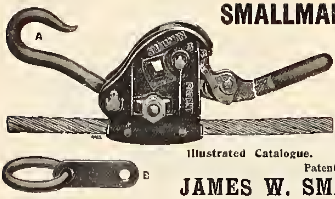

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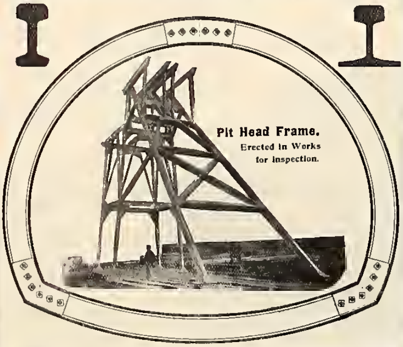

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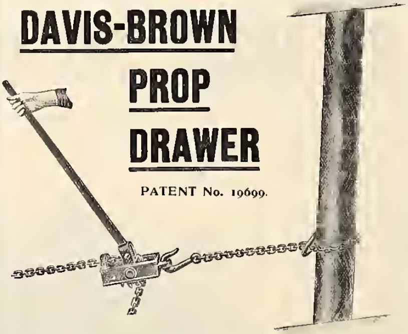

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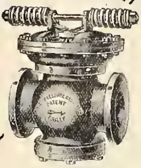

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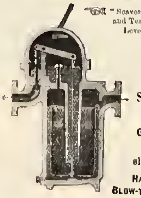

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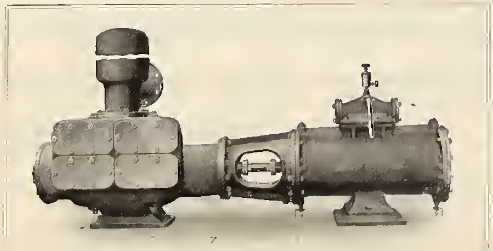

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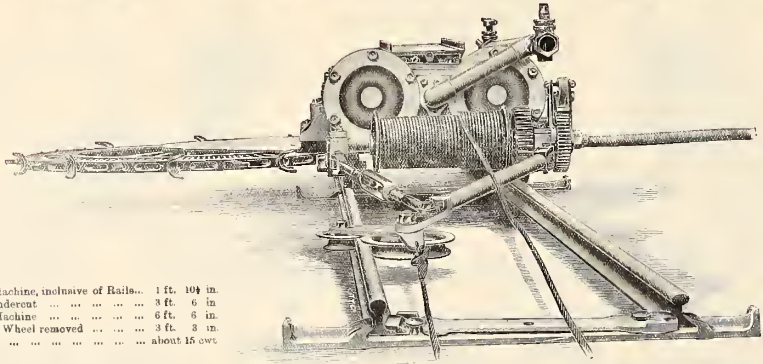

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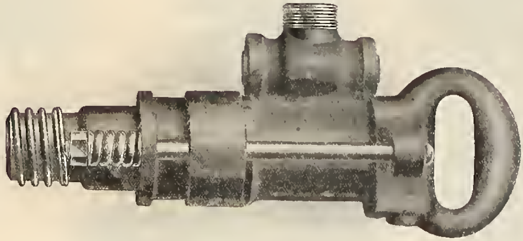

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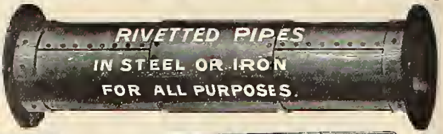

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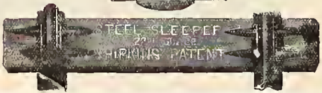

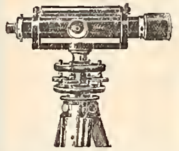

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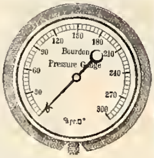

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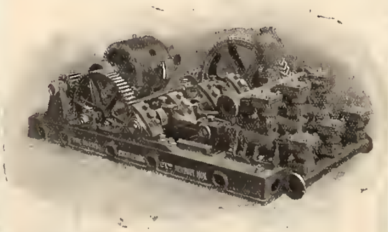

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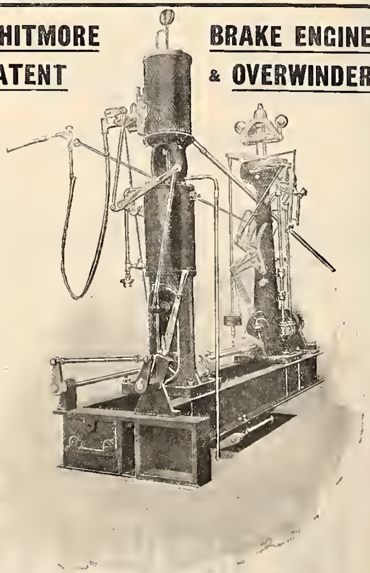

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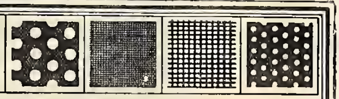

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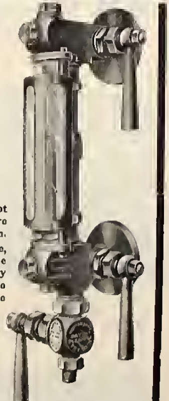

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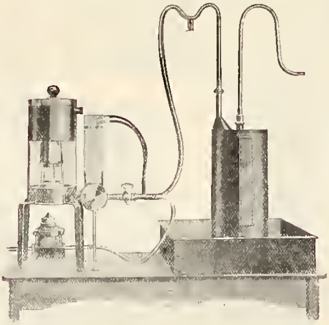

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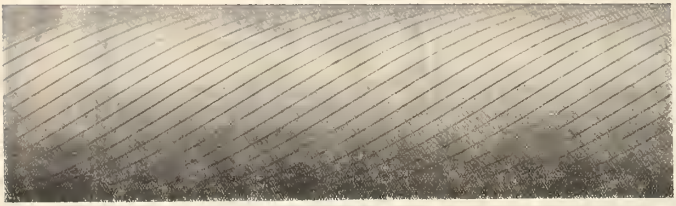

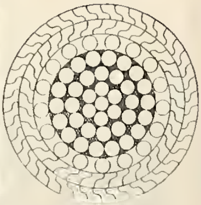

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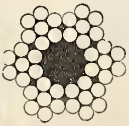

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THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

V. FRIDAY, OCTOBER 4. 1912 No. 2701.

BOILER-HOUSE INSTALLATION A FRENCH COLLIERY.

Mines de Dourges Company (Pas-de- e erection of a central electric power This was designed to contain eight ube boilers working at 14 kilogs. per e pressure (200 lb. per square inch), each heating surface of 270 square metres). There is a superheater of 85 square are feet) to each boiler, formed of less tubing of 38 mm. (1½ in.) outside 16 in. thick. This superheater raises of the steam to 325 degs. Cent. The includes four Green's economisers, one boilers, each economiser consisting of es, 10 mm. (0·4 in.) thick, 2·717 m. (9 ft.) an internal diameter of 99 mm. (4 in.). joined into 24 "elements" or groups by boxes. The heating surface of each 8 square metres (1,910 square feet).

e usually fed by an electric centrifugal ateau type. There is also a double- mp driven by two compound steam eding arrangements are completed by which regulate the admittance of the ers in such a way as to ensure a constant

fired by eight triple mechanical stokers tent type, one of these triple stokers

IEW OF BOILER-HOUSE OF THE ES DE DOURGES COMPANY.

"Bennis" stokers and Buttner water-tube boilers.

ch boiler. Each triple stoker includes rovided with air-circulating channels, on the gearing bracket, three feed boxes, lly-closing firedoors, and the supports for the shaft driving the bars.

a total width of 3·217 m. (10 ft. 6 in.), and 21 movable compressed air bars divided seven bars each, the sets of movable bars by two fixed bars. The movable bars ype—they are trumpet-shaped outside within the furnace they take a channel per part of which there are at given ars which support the groups of grids. f the channel is pierced with holes in e dust, which drops through the grids, movable side bars of each set of seven their lower portion outside the furnace ed with a chilled wearing piece, and on there are two projections. The middle ve a recess on their under surface in ed a wearing piece, and on their upper ne projection. The movable bars have four sets of 5 grids in the upper part of the trough portion. The back of the bar is closed by a block B, a small space being left open between the bar and the block. The moving bars are supported in front and outside the furnace on rollers by bearers, and at the back they are supported by fixed bearers. Cleaning slides are placed in the bottom of the trough portion. These are provided with slots which correspond at intervals with the holes in the bottom of the troughs. These cleaning slides are kept fixed by the back bearer.

In the centre of the trumpet portion, at the front of each movable bar, and near the front, there is placed a small copper jet of special type, which is fixed in a tube passing the whole length of the movable bars. This jet throws superheated steam into the moving bar, which draws in and compresses the air in the bar, thus increasing the draught, and also keeping the grids cool. At the same time it ensures the clearing out of any ash which may fall through the grids. The total grate surface of each of these machines is 7·35 square metres (80 square feet).

A shaft driven by an electric motor on which is keyed a coned pulley for each of the triple mechanical stokers drives the cone pulley on the gearing bracket of each of these machines. This movement is communicated by means of worm gearing to the feed shaft, and to the bar shaft of the machines. The feed shaft in turn moves round the scroll cams. These latter work the pushing shovel, giving to it a to and fro movement, thus pushing forward the quantity of fuel required over the grate according to the regulation of the scroll cams. Meanwhile the four-armed cam, which is also fixed on the same shaft, draws back the throwing shovel and gets up pressure in the pneumatic cylinder, while the coal to be thrown on to the grate is falling in front of the throwing shovel. As soon as the lever of the throwing shovel escapes from the cam this shovel is rapidly drawn forward by the pneumatic cylinder. It strikes the fuel and projects the same to a certain distance over the grate. Since the arms of the cam are unequal, four different throws are given to this shovel, and four different sections of the grate are successively covered with fuel. The distance to which the fuel is thrown at each turn is regulated according to the quality of the fuel by adjusting the pneumatic cylinder.

While the fuel is being fed as described above, the grate is itself operating, as follows:—The shaft driving the bars is moved by gearing, which takes its movement from the cone pulley. This shaft is divided into three parts, and on each portion there are placed the cams driving the bars. The three portions of the shaft are joined together by couplings. The end cams of each set of seven bars press on the heel of the side bars Nos. 1 and 7. These bars move 7 cm. (2¾ in.) out of the furnace and then remain stationary. Then the cam of middle bar No. 4 comes into contact with the wearing piece on that bar and withdraws it the same distance. After this the cams of bars Nos. 2, 3, 6, 5 cause these bars to move forward in a similar way successively. Thus each bar is moving between two stationary bars. When the side bars Nos. 1 and 7 move forward, an iron bar, which is placed between two projections on the upper surface of these bars, comes with them, and the intermediate bars then move forward until projections on their upper surface touch this iron bar. The cam shaft continuing to turn, the other cams of the movable bars Nos. 1 and 7 come into action and force these bars into the furnace again, and by means of the iron bar mentioned above and the projections, the intermediate bars go in simultaneously. The same series of movements is repeated at every turn of the cam shaft, the object being to break up the clinker on the grate, to separate this from the

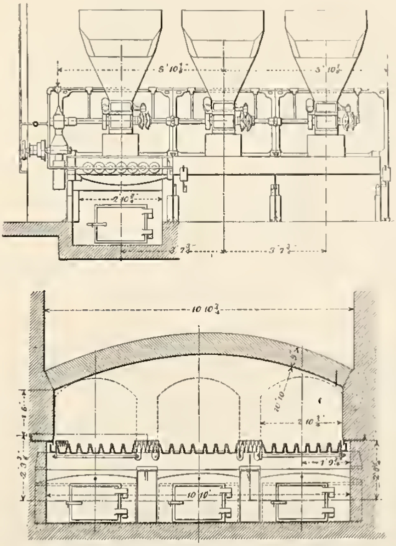

FIG. 2.—"BENNIS" TRIPLE MECHANICAL STOKER AND SELF-CLEANING COMPRESSED AIR FURNACE OF THE MINES DE DOURGES COMPANY.

coal, and to cause the whole to move gradually towards the end of the grate, where it finally falls into a chamber which is provided between the end of the grate and the bridge of the boiler. The ashes are withdrawn from this chamber at intervals during the day, either by means of conveyors or by hand.

In order to avoid the admission of cold air by this back chamber, this is separated from the space beneath the bars by a partition, which is provided with hermetically sealed doors The small ash falling through the grids drops through the holes in the lower part of the trough into the space below the bars. The fuel is thrown intermittently in small quantities and on to different portions of the grate, each feed varying according to circumstances from 300 to 500 grammes (0·66 lb. to 1·1 lb.).

The coal lights up rapidly, and the fire is always bright, being constantly cleared from ashes and clinker. The maximum efficiency appears to be obtained by means of rapid and complete combustion, which results in the abolition of black smoke.

The fuel is brought in trucks into the mixing room, where it is placed in towers provided with an arrangement similar to ploughshares, which ensure the mixing in proper proportions of the various qualities of fuel which are to be burnt together. From these towers the mixed fuel is fed into the hoppers of the mechanical stokers by means of an elevator and conveyor. The ashes are removed in a similar way.

The fuel used at this colliery is at present made up of a mixture as follows:—75 per cent. of mixed washings, including very small pebbles of coal and a lot of fine dust which it is not easily possible to separate from it; 25 per cent. of small matter, carbonaceous earth, and of the matter forming the walls of the mine. These two fuels give the following analysis:—

SMALL COAL.

	Per cent.
Moisture	15
Ash	35 to 37
Volatile matter	16 to 17

Calorific value 6,500 to 6,600 calories.

REFUSE.

Moisture	2½
Ash	25 to 28
Volatile matter	23 to 24

Calorific value 6,050 to 6,070 calories.

The engine room includes two turbo-alternators of an output of 3,000 kw. each.

This central station, No. 2, which has recently been erected, provides energy for working the cages, No. 2 washery, and pit No. 4, including screens, lifts, conveyors and lighting. The central station is worked together with No. 1 station, and supplies energy for the working of the pits and the coke ovens; it also supplies power to pit No. 6B for the fans, ovens, screens, cages, pumping, lighting and workshops, and the coke-oven charges, &c.

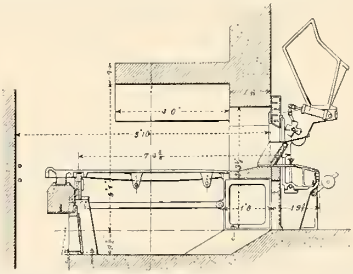

FIG. 3.—SECTIONAL ELEVATION OF STOKER AND FURNACE.

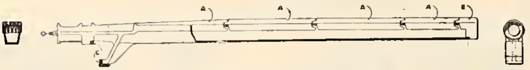

FIG. 4.—THE "BENNIS" PATENT COMPRESSED AIR BAR.

Fourteen millowners in the cloth trade at Morley (Yorks), have formed themselves into the Morley Coal Consumers' Association, a private company not offering any shares to the public. Their purpose is to cheapen their supplies by direct buying, and after a 5 per cent. dividend has been paid, the remaining profits are to be divided amongst the shareholders in proportion to the quantity of coal consumed by them.

MIDLAND COUNTIES INSTITUTION OF ENGINEERS.

Annual Meeting at Nottingham.

The annual meeting of the Midland Counties Institution of Engineers was held last Saturday at Nottingham. At the outset the retiring president, Mr. J. P. HOUFTON, of Mansfield, presided, and there was a good attendance, amongst those present being Major Leach, Messrs. G. S. Bragge, F. Chambers, B. McLaren, D. Bayley, W. Hay, J. Piggford, J. Mein, G. Spencer, J. Strachan, S. Evans, R. Laverick, and G. Alfred Lewis (secretary).

The SECRETARY announced the election of the following:—Members: Albert Beeston, colliery manager, Clifton Colliery, Nottingham; Oliver Watts Hind, solicitor, 14, Fletcher-gate, Nottingham; Will Halder, mining engineer, South Carlton, near Worksop; Charles Edgar Woodward, mining engineer, Oakholme, Worksop, Notts; Charles Lloyd MacCarthy, of Stewarts and Lloyds Limited, Birmingham, 93, Willow-crescent, Cannon-hill, Birmingham. Students: Wilfred H. Sansom, mining pupil, Newstead Colliery, near Nottingham; Cyril A. Robotham, mining student, Haunchwood Collieries, Nuneaton; Wilfred Haden Hickman, mining student, Haunchwood Collieries, Nuneaton.

Annual Report.

The annual report expressed regret that the number of members again showed a slight decrease, there being on the institutions's books, on July 31, 1912, 13 honorary members, five life members, one subscribing firm, 255 members, nine associate members, 50 associates and 37 students, giving a total of 370, as compared with 385 a twelvemonth previously. An improvement is again shown in the financial position, the expenditure having considerably decreased. Several general meetings have been held during the year, and the attendance of members is found to be considerably better when these are held in Nottingham. Some improvement is to be noted in the attendance, and more interest has been visible in regard to the reading and discussion of papers. There is much room, however, for improvement in these respects.

Mr. HOUFTON moved the adoption of the report and accounts and commented upon the decrease in the membership, which he was at a loss to explain. It was, however, satisfactory to note that they had more than paid their way and that they ended the year with an increased balance in the bank.

Mr. HEPPLEWHITE seconded the motion, which was carried unanimously.

Election of Officers.

The ballot for the election of officers was announced to have resulted as follows:—

President: W. H. Hepplewhite. Vice-presidents: C. R. Hewitt, G. H. Fowler, J. W. Fryar, Major R. P. Leach, H. E. Mitton, D. N. Turner. Councillors: H. O. Bishop, G. S. Bragge, F. Chambers, G. C. Fowler, R. H. F. Hepplewhite, B. McLaren, W. E. Walker, P. Beaumont, E. E. Bramall, C. Chandley, T. G. Lees, J. T. Todd. Ex-officio members of the council for ensuing year: J. A. Longden, W. Spencer, M. H. Mills, W. D. Holford, Maurice Deacon, W. B. M. Jackson, W. G. Phillips, G. J. Binns, W. Hay, J. Piggford, J. P. Houfton (past presidents), J. Mein and G. Spencer (vice-presidents of previous year).

Thanks to the Late President.

Mr. HOUFTON, in vacating the chair, extended a welcome to his successor, and expressed the hope that he would have a pleasant and successful year of office.

Mr. HEPPLEWHITE, on assuming the presidency, said that his first duty was the pleasant one of moving a vote of thanks to Mr. Houfton.

Mr. J. PIGGFORD (Teversal) seconded the resolution, which was cordially adopted, and briefly acknowledged by Mr. HOUFTON.

The Late Mr. Pickering and Mr. Hewitt.

The PRESIDENT observed that his next duty was a very mournful one. He had to ask them to express their condolence with the widows and families of the late Mr. W. H. Pickering and Mr. H. R. Hewitt, both of whom were connected with their institution, the former as a member of the council and the latter as one of their vice-presidents. After touching on the circumstances under which these two gentlemen met their deaths at Cadeby, he said that Mr. Hewitt was for 20 years a colleague of his, and the news of his death came to him as a very severe personal blow. In offering their condolences to the relatives of both gentlemen, he hoped that they would extend them to those of the exploring party as a whole.

Mr. HOUFTON, in seconding the resolution, said that he knew Mr. Pickering very well indeed. He met him on a great many occasions, and he always gave him the impression of being a highly-educated and highly sympathetic man. He understood the difficulties and responsibilities of a colliery manager's position, and was willing to give all the assistance and advice he could to those who needed it. Besides taking such an interest in the mining industry in the district in which he was placed, he manifested a very great interest in ambulance work and in the occupations of miners outside their work, and was further taking an active part in the establishment of religious organisations in the Doncaster district. They had to mourn the loss of an able, energetic and sympathetic man—one whose like it would be long before they saw again in the garb of an inspector of mines. With regard to Mr. Hewitt, he had known him for many years—as a matter of fact, there was a distant blood relationship between them, and he felt his loss very keenly. He was a man devoted to his profession, and spent day and night in making himself efficient to carry out his duties. He identified himself very closely with the work of that institution, and they could not let his memory pass away without paying a tribute of respect to him. At the same time, he would like to add, with the president, his tribute to the heroism displayed by those who formed the rescue party and met their deaths at the same time as Mr. Pickering and Mr. Hewitt. It had been his experience that where there were those to lead there were always men ready to follow, and he felt sure that that was a characteristic which would remain with the British collier as long as coal was worked in this country.

Mr. B. MCLAREN (Pye Hill) supported the resolution, remarking that the late Mr. Pickering was a fellow student with him, and their early associations were very close. Mr. Pickering was a youth of very high ideals, and what was more, he never lost his hold of them, but they had rather developed with his later years. He had not known Mr. Hewitt so long, but the more he knew him the better he liked him.

The resolution was then put to the meeting, and was carried in silence, each member rising from his seat.

Presidential Address

Mr. HEPPLEWHITE, after thanking the members for his election, said that it was an honour which he highly appreciated, more especially because he was the first Government inspector of mines to hold the post of president, although not the first to be invited. The late Mr. A. H. Stokes was twice approached to occupy the position, but he stedfastly refused to accept, under the belief that he could best serve the interests of the institution by reserving himself as a free lance and take part in the discussions. It would be news to many members that he (Mr. Hepplewhite) was one of the first students of the original institution, when it was known as the Chesterfield and Derbyshire Institute of Mining, Civil and Mechanical Engineers, with its headquarters at Chesterfield. Mr. Hepplewhite then proceeded rapidly to sketch the early days of the institute, and gave some interesting reminiscences of the discussions when what was locally known as "the battle of the fans" took place on papers read respectively by Mr. Robert Howe on "Guibal Fan Experiments at Staveley" and Mr. Charles Houfton (father of their late president) on "Experiments upon a Waddle Fan at High Park Colliery."

Turning to the training of colliers, the president said that one of the greatest assets for the prevention of accidents to workers, especially at the working face,

ion, the proper education and training
before commencing upon his work. He
uir knowledge of the Mines Act, and
ainted with the Special Rules and
orce applicable to his calling. There
ng the fact that at the present day the
men were in many instances somewhat
the elder workers in the stalls before
many weeks amongst them. Quite
nent had been started in the Tamworth
he was informed, had borne good
ng workers to forbear using obscene
at work or elsewhere. He would make
for all youths to attend continuation
in their curriculum should include
ing to daily work culled from the Act
les. They should then pass on to the
which were now so liberally provided for
nining centre, and the subjects taught
ipally upon the roof stratum, its con-
fication, tenacity, weight of a given
, the various methods of supporting it,
nin of timber, and the yielding propensity
rs. The reading and study of gas caps
should also receive attention.

of packwalls so as to remain intact in
ression, was, in his opinion, an extremely
ect which would bear excellent results
ughly understood. Another important
avage of roof and coal. That should
r attention; as a matter of fact it was
tial factor in the working of the coal to
tage combined with safety to workers.
aximum results of reaping the coal with
nditure of labour the line of working
ays be advanced at the angle to take the
of Nature's laws.

oon after attaining their majority were
d to the responsible position of stall-
n, or contractors. By the new Coal
was enacted that no person should be
he position of manager until he was
, although if he satisfied the board of
was granted a manager's certificate at
Now as regards the position of respon-
d officials they were somewhat analogous
e knowledge required for the safety of
nd it therefore appeared to him that the
raining should be relatively equal, no
ewy and intelligent the worker might
y he should not be allowed a responsible
e had reached the age of 25. By the
reached this age his manhood would
matured, and his general practical
all work pertaining to safety and
h the other workers developed. He
d up to with some confidence and respect.
obedience would hover around the
and he felt sure it would tend to obtain
ount of labour from all honest workers.
nake it one of the conditions of becoming
orker that he possessed some knowledge
work and was capable of rendering first

e aware of the difficulties besetting the
onal work. One was how to get students
, and another was how to retain them.
en were somewhat assertive and indepen-
more so now that they were assured of a
eapened amusements provided at a small
strong counter-attraction to educational
reasonable attendance at continuation
encouragement to attend mining classes,
e given for attendances apart from prizes
. He would also hold out some induce-
estions for original safety devices, or
of anything pertaining to their work.
ht, would give young men a chance of
initiative they might possess, and would
f benefit to the manager. Before his
as stallman, he thought it would be
t the applicant through the same test as
r as relates to eyesight, hearing, reading
d his general knowledge of roof stratum
methods of timbering, and a record should
capabilities. It was well known that
as well established, with its complement
cancies for stallmen only occasionally
he did not see any difficulty in the
aspirants by the management. Migratory
ession of a certificate of proficiency from
oyer, would have no difficulty in obtaining
new and developing mines. The manager
ed of at least a fair proportion of practical
hewers.

He had the greatest admiration for the workers. For upwards of 40 years he had almost daily been amongst them underground, and therefore claimed to have more than a passing acquaintance with them. They were, taking them on the whole, when at work well behaved, civil and obedient to the officials, and he was sure they in no way tried to evade the responsibilities which the Mines Act and regulations cast upon them. Furthermore, he was certain they would compare favourably with any other class of industrial workers. The hewers' avocation was somewhat precarious, and the danger to life and limb surrounding them was altogether different from nearly every other industry

In a recent paper which he contributed to that institution on "The Action and Control of Coal Roofs," he stated that the average output of mineral raised for the past 38 years was over 3½ million tons, and the average yearly increase of persons employed underground was about 11,600. Last year (1911) showed an increase of 7,458,871 tons over 1910. This was more than double the average for the previous 38 years, as stated in his paper. There was an increase of 15,131 persons underground over 1910, or an increase of 3,531 on the average for the same period. The death-rate from falls of ground per 1,000 persons employed underground was 0·71, as compared with 0·76 in the previous year. This was something to be thankful for, when it was considered that 15,131 more persons were employed underground as compared with 1910. The output per person employed underground in the different inspection districts offered a wide field for controversy. Scotland headed the list with 415 tons, and South Wales was the lowest with 267 tons. The Yorkshire district yielded 351 tons. By taking all the districts together the average was 331 tons. There was an increase of 3 tons on the previous year. The advancement of science in regard to mining generally had undoubtedly done much for the hewers' protection. The law had done something also, and with the advent of the new Coal Mines Act and the Explosives Order, both of which were extremely drastic, accidents ought to be reduced to a minimum. The spread of education had given workers a more intelligent appreciation of the dangers that menaced them. In spite of all, however, that had been done to lessen its risks, mining remained, and always would be, an essentially dangerous occupation.

Mr. Houfton, in moving a vote of thanks to the president for his address, alluded to the mention made of the paper written by his father on the Waddle fan, and observed that he (Mr. Houfton) was about 12 years of age at the time. He prepared every plan and diagram which was used in that paper, so that he started early in life in assisting to prepare papers for that institution. Mr. Hepplewhite's remarks on the education of colliers might give rise to some little controversy. Mr. Hepplewhite was a man of original ideas—from tapered props to other things upwards, or downwards. Whether they agreed with his views or not, they would agree that he had had a long and wide experience, that he had been brought into contact with large numbers of men, and that he did not go about their mines with his eyes shut.

Mr. Piggford, in seconding the resolution, said that their anticipations of a practical address had been fulfilled.

Mr. W. Hay (Shirebrook) remarked, amid some laughter, that when he was president he suggested that a collier should be washed at the time he left the colliery, and the Government had taken his advice and passed an Act accordingly. He hoped that Mr. Hepplewhite would be equally successful in getting them to pass an Act prohibiting indecent language in collieries.

Mr. J. Mein (South Normanton), who also supported the resolution, maintained that, with regard to the age at which a man should be permitted to become a stallman, a good deal should be left to the discretion of the manager, for one man at the age of 22 might be a first-class man, while another at 44 was far inferior, and would never be a stallman if he lived to be 144. The fascinations of football and picture palaces and the doctrines preached nowadays amongst the workers created difficulties in the way of the realisation of Mr. Hepplewhite's high ideals.

The resolution having been carried unanimously, Mr. Hepplewhite replied, observing that while the education of officials was important, that of the collier ought not to be overlooked, but every effort should be made to bring him in line with the officials.

Boiler Deterioration.

Discussion was resumed on the paper by Mr. A. H. Bonner on "The Causes of Boiler Deterioration and their Remedy," read at the last meeting.

Mr. G. S. Bragge (Swadlincote) urged that the soundest principle was to spend their money before the water went into the boiler. Very often money which was spent on the nostrums brought out for dealing with boiler scale or corrosion would be better expended in collecting rain-water on the surface. Money paid to a qualified chemist to analyse the water they were going to use, and to point out its faults, they would find would be money well spent.

Mr. Houfton said he was convinced that the great cause of deterioration in boilers was the fact that they were worked at a very much higher pressure than formerly. A companion cause to that was that the supply of steam required from a colliery boiler was more irregular than from boilers in every other class of work where steam was used, and hence they got considerable variations of temperature which caused grooving. His own experience was that they had more trouble to-day with grooving than with corrosion. They could deal with corrosion, and, as Mr. Bragge had said, the best way of dealing with it was outside the boiler; but grooving was a more difficult matter. It usually took place where the tube joined the end-plate, and he understood that some of the insurance companies were bringing out a device which would give more play for contraction or expansion at that particular point. Instead of putting chemicals in their boiler, let them treat the water outside, and, above all, have plenty of boilers for the steam they required. It was false economy to have their boiler power too small. If it were not equal to the maximum requirements of steam, they put a needless strain upon their boilers and so shortened their lives.

On the motion of the President, seconded by Mr. Hay, thanks were accorded to Mr. Bonner for his paper, the discussion upon which was closed.

Prevention of Overwinding.

A short discussion followed upon a paper by Mr. James Black on "Overwinding Prevention and Controlling Gear for Colliery Winding Engines."

Mr. G. A. Lewis said there were so many different kinds of apparatus to prevent overwinding; but was there one which was really infallible?

Mr. J. Strachan (Pinxton), Mr. W. Hay, Mr. Houfton, Mr. Mein and the President continued the discussion, several of the speakers referring to the Visor apparatus as working most successfully.

Explosions in Mines.

In connection with the paper by Dr. John Harger on "The Prevention of Explosions in Mines," Mr. Mein said he would like to express the conviction that if the Government and those in authority had directed their attention not so much to what was to be done after an accident, in compelling owners, managers and other officials to spend their money and energies upon so-called rescue appliances, but had turned their attention to the prevention and removal of coaldust, it would have been better. It was the old story that prevention was better than cure.

This concluded the meeting.

The Kent Coalfield.—A correspondent says: Work at the collieries already established in the neighbourhood of Dover is still going on, and new borings by independent companies are increasing the field of exploration. The Shakespeare Colliery is, of course, the most advanced, 1,000 tons of coal having been raised and sold to the South-Eastern and Chatham Railway Company. At these pits the work of clearing away the *débris* after the late accident is still proceeding at No. 3 pit; but otherwise the work is being carried on most successfully, over 200 men being employed. Ferro-concrete is being largely employed, and it is now being seriously considered by the company whether they should not manufacture their own cement, tests having shown that the grey chalk which is above the coal measures for 200 ft., burnt with the white chalk, makes a Portland cement of first quality. At Tilmanstone and Snowdown collieries the work is satisfactorily progressing; 1,200 ft. in two pits have been reached. Boring is also taking place in the Alkham Valley and near to Betteshanger, the Hon. R. James, a son of Lord Northbourne, being one of the directors of the latter company. At Chislet, near Canterbury, the Anglo-Westphalian Company are making progress with their borings. Altogether, the "Concessions" group have 12 or 14 companies, including the light railways. The latter will be of immense value when coal is raised, as it is linked up with the South-Eastern and Chatham system; but as it is confidently predicted that there will be an enormous output from the Kent mines when they are fully at work, a port for seaborne traffic is absolutely necessary. To meet this the Dover Harbour Board are proposing, by a Bill in Parliament next session, to make a deep-water dock for colliers inside the great National Harbour, to enable colliers to load up for the Thames and French and German ports.

ASSOCIATION OF MINING ELECTRICAL ENGINEERS.

Annual Meeting in Sheffield

The annual meeting and dinner of the Association of Mining Electrical Engineers were held at Sheffield on September 27 and 28. At the business meeting, on the first day, the opening proceedings were presided over by the retiring president, Mr. W. Maurice, and about 60 members were present.

The annual report of the council stated that during the year a branch had been established in Mount Morgan, Queensland, Australia, and it was contemplated forming branches in other parts of the world in due course. There were now 11 branches of the association, and the membership was over 1,000. The second examinations were held at various centres on March 16 and 23, 1912, and proved very successful, the number of candidates being 29, of which number 11 passed for first-class certificates, 10 for second-class certificates, and eight failed. Service certificates have been issued to 34 members during the year. The issue of service certificates was discontinued on June 30, 1912. The chief examiner, Dr. W. M. Thornton, of Armstrong College, Newcastle-on-Tyne, in his report, stated "The standard of the papers set was somewhat, though not markedly, higher than last year; and that of the answers very much the same as before."

The ballot for the election of officers resulted in the following gentlemen being unanimously chosen:—President, Mr. W. C. Mountain, Newcastle; vice-presidents, Mr. Alexander Anderson (Motherwell) and Dr. W. M. Thornton (Armstrong College, Newcastle); treasurer, Mr. C. F. Jackson, Bedworth, Nuneaton.

Presidential Address.

Mr. W. C. Mountain, in his presidential address, gave an interesting description of how the various classes of plant had been developed. They seemed to have settled down, he said, at any rate temporarily, to a standard type of continuous-current and three-phase plant, but they now heard of the proposal, and in fact the use, of single- and three-phase alternating-current motors with commutators to obtain speed regulation, and it looked as if the much abused commutator was again to come back and help them to get over many difficulties in connection with speed variations.

There was in this country a very large amount of good continuous-current machinery running in collieries, and he knew that there was a feeling amongst the owners of such plant that it was looked upon with disfavour by the Home Office. He was satisfied that this feeling was not justified in positions where it was safe to run electrical machinery at all, and he thought he might go so far as to say that the Home Office authorities had no intention of preventing its use, or even extension where circumstances permitted or rendered it desirable. There were many positions in a colliery and classes of work for which continuous current had advantages. There was no doubt, however, that for large plants such as they had nowadays, where it was necessary to take several hundred horse-power down the pit—sometimes even thousands of horse-power—the use of continuous-current plant was not desirable or even commercially possible, and they had therefore adopted the three-phase alternating-current system and higher voltages.

He felt confident that in modern collieries where there was no waste heat or power available, such as from blastfurnaces or coke ovens, the combination of steam winding with exhaust-steam turbines would be found much more economical than putting down large generating plants and attempting to adopt electric winding. Even if power were available from a power company for large winding units, it would be found cheaper to adopt this combination than to purchase power at any price at which it would be possible to supply it with any profit to the power company.

There was no question that as regarded power consumed, and also the cost of operation, particularly as regarded the wear and tear of ropes, tubs, &c., the endless rope system had many advantages. A very large field still remained open for the use of subsidiary haulages to dispense with horses. There were many positions in pits where, possibly, electrical plant was not suitable, or even safe, and in such circumstances electricity could be carried a considerable distance in-bye and compressors operated by means of electric motors.

The recent legislation in connection with the use of electricity in mines, and also the action of the miners themselves, had for a time checked the progress of electric coal-cutting, but he was satisfied that it was only a temporary matter, and that in places where electrical machinery could be safely run the electrical coal-cutter had many advantages over the older compressed air machine. If they were forced to use compressed air where electricity could be safely used, every coal-cutter worked in that way would cost the owners about £300 per year extra, which would be a very heavy handicap on the coalowners, and, of course, tend to increase the price of coal, and thereby injure the worker.

In regard to the new rules for the installation of electricity in mines, he spoke with special authority. Taken generally, he said, the main object and intention of the new rules was unquestionably to make armouring compulsory in the future, although in some cases exempted until 1920. There was no question that armouring afforded a good mechanical protection, and was also convenient for earthing, but his experience went to show that although it might appear simple to carry out an earthing system in this way, it really became a very difficult matter. The association was likely to be of the greatest value in the selection of the class of men employed as electricians. By means of their examinations they were able to select from the successful candidates men who had by their examination proved themselves as possessing both technical and practical knowledge. He felt that the colliery owners, and particularly colliery managers, would readily recognise that it was desirable to employ men who possessed a sufficient amount of technical knowledge to enable them to deal with the practical problems in a proper and safe manner.

The President was warmly thanked for his address. In proposing a vote of thanks to Mr. William Maurice, the retiring president, he remarked that there were cases where electrical plant had been put down at a cost of many thousands of pounds, and it had been considered good enough to appoint a man at 24s. a week, paralysed in one arm, to look after it. That had been the trouble in the past; but under the new rules proper men had to be appointed.

Annual Dinner

The annual dinner of the Association of Electrical Mining Engineers was held at the Grand Hotel, Sheffield, on Friday night, September 27. Mr. W. C. Mountain, the new president, was in the chair.

After the loyal toast had been honoured, the President submitted the toast of "The City of Sheffield." The Lord Mayor, in response, observed that Sheffield was the metropolis and centre of a huge mining area, and they felt they had an important duty to perform at the University in providing that scientific education which would train young men in the most economical production of everything that was turned out at a colliery. The additions to the Applied Science Department would cost nearly £40,000, and, when completed, they would have the finest mining department in the north of England.

Mr. S. Z. de Ferranti, in proposing the toast of "The Association of Mining Electrical Engineers," observed that perhaps he had been entrusted with the toast because he objected most strongly to their formation. He felt they came into existence because existing societies had not been doing their duty. He objected to the multiplicity of societies just as he did to the multiplicity of technical reading matter. Unless societies were very big and powerful or wonderfully well run, they failed to get to such a position by receiving sufficient recognition from the public as would enable them to do good work for the industries or interests with which they were connected. From his experience of mining work he could only say that the standard of many of the men who had considerably important work to do had not in the past been up to the standard of the work or up to their responsibility. One of the good works they had to do was to change that. One thing they must guard against was the natural commercial instinct on their part of forcing to the front electricity for every purpose in relation to mines. He begged them, however, to devote their most earnest efforts to making electricity so good for all purposes in connection with mining that there could be no question of its being the right thing. In doing anything they could as an institution of electrical engineers to help the association they would only be following their traditions and doing their plain duty. He did not think that eventually every colliery or even collections of collieries close together would do their own complete business. To his mind in order to make the complement of the use of the coal, it would be necessary to do the business on a very wholesale scale. He thought coal could be collected together at suitable places where coke, gas and by-products would be produced, and the business of electrical generation carried on upon on a huge scale in a comparatively small number of places. When electrical processes were sufficiently perfected to enable us to use electricity direct instead of coal direct, the black cloud of smoke would be removed from Sheffield. There were many advantages which would flow not only from the more scientific mining of coal but the more scientific use of it.

Mr. J. Elce seconded the toast.

The President, in reply, said Mr. Ferranti had been exceedingly candid, and perhaps he would not mind his being equally candid in the remarks he was going to make in regard to the Institution of Electrical Engineers. He had been a member for nearly 20 years, and he had felt for a long time that the institution was not run on such lines as would make it the service it should be to the electrica engineers of this country. He always felt there was far too much science and very high discussions which ordinary men could not join in, and that an institution such as the Electrical Mining Engineers would have a useful field. When that association was formed he felt it would give men engaged in practical work and in difficult problems in practical working an opportunity of meeting together and discussing these problems in a way they could not do before such an institution as the Electrical Engineers. To-day, a colliery electrician must be a mixture of the chemist, electrician, engineer and colliery manager and have a full knowledge of the Coal Mines Act and the regulations as regarded the use of electricity in mines. He had no doubt the Coal Mines Act and the use of electricity in mines would almost fill his whole time without having anything else to do, but the institution would be of value in producing a body of electrical engineers who could look after electrical plants in a way that had not been the custom in the past. When their institution was first formed it was feared that colliery managers might regard it as a kind of protection or trade union business designed to force the members of it into collieries. That never had been the intention, but they wanted to feel that if men became qualified and capable of being put in responsible positions, the society would be recognised as producing men who would be of service to the colliery owners.

Mr. G. Blake Walker proposed "Kindred Institutions and Associations." He said he had been very much interested in the question of the supply of electricity in bulk during the two years he had been occupying the position of the president of the Sheffield Society of Engineers and Metallurgists, because they were all desirous of removing the black cloud which hung over Sheffield, which they were beginning to realise was unnecessary. They all looked forward to the time when coalfields would be utilised in order to substitute electrical production for mechanical steam-engine production. He had no doubt that in 10 years hence they would look back on the days of sparking as being the dark days of the past, and electricity would be much more universally available than it was to-day. He referred with regret to the resignation of Prof. Hardwick at the end of the year of his post as professor of mining of the Sheffield University. He felt that when they parted with him they would part with a man whose place would be exceedingly difficult to fill, and he was almost in despair at being able to find anyone who would adequately carry on his work.

Prof. Hardwick, in reply, remarked that it was possible, he thought, to extend the scope of any society to too great a degree until it became unwieldy, and probably a number of institutions working side by side, and to a certain extent exchanging views—since people who were members of one institution would probably in most cases be members of another also—would in that way gain considerable advantage and knowledge. Knowledge was now so specialised that it was necessary to work on specialised lines, and the difficulty was to limit the number of lines taken by the particular institution.

Mr. Roslyn Holiday submitted the toast of "H.M Inspectors of Mines." He said it looked as if the duties of H.M. inspectors were going to consist of running round and opening books and seeing if the signature was there. Surely that was not what the class of men they had known should be there for. They had always looked up to them as men thoroughly capable in their profession. He thought their new duties would be putting such men in a wrong position. This legislation was forced upon them by people who did not know the conditions. They knew inspectors did know the conditions, and they had always looked up to them to interpret the Act not, as a rule, in its direct letter but in its broad principle. Things, however, had been made so that they would be scarcely able to do so.

Mr. Robert Nelson, in response, observed that Mr. Maurice, in his address at Manchester, referred to colliery electricians in these words: "The colliery electrician's position was somewhat dubious; he was only that vague abstraction a competent person." All that had now been changed; he was something more than a competent person; he was an electrician.

Mr. Alexander Anderson proposed the toast of "The Guests."

Prof. Ripper, in reply, said he had had a good deal of experience in the formation of societies, and he grew more and more to realise the enormous advantage there was in the formation of local societies for local interests and local purposes. They wanted to know not only what was good for the great societies, but what was good for the industries, and he was quite sure in his experience that the strong local societies were of incalculable value to the industries. Referring to Mr. Ferranti's remarks about the formation of great centres of power, he said it was a very interesting proposition, and there was no doubt that theoretically it was perfectly sound; but he thought the difficulties were very great towards its realisation. There was a terrible lot of unnecessary inefficient method, and there was tremendous room for developing scientific method, and there was no doubt that Mr. Ferranti's proposals were scientific and in the direction of efficiency; but so long as they had such conditions as they had he was afraid that in their lifetime these

would not be accomplished; and, there-
d to do, it seemed to him, was to do the very
the present circumstances, with also e
the direction of these more desirable
e health of the society, it was extremely
is view that the electrician and engineer
in hand.

Maurice proposed the toast of "The
hich Mr. Mountain replied. He said they
ricians, except in Home Office rules, in the
those days. An electrician must be a man
knowledge; they could not make an elec-
t of an electrician purely. They had made
e Home Office rules in regard to the use of
es; those rules, while at the moment they
with some clauses in them, were in the
There was no doubt the type of apparatus
the use of high-tension alternating current
way to get this safety end, as Mr. Nelson
aid, if they only used the apparatus in
proper and suitable positions it was the
ay of driving machinery—they could drive
ns.

r then proposed the toast of "The Retiring
e said it was greatly to Mr. Maurice's
as the first man in this country to recognise
o be obtained by the use of exhaust steam
ieries. It had opened up a method of
ower at a price which he did not believe
pply company in the world could possibly
He knew of several installations where
een produced at prices considerably below
, after allowing interest and depreciation
ne installations where the cost was as low
was after allowing necessary amounts for
o for contingencies and possible costs.
thing alone Mr. Maurice had done a great
country, because if he had not been bold
that step he did not think they would have
urbines introduced among collieries in the

Maurice, in response, expressed his warm
Ferranti for the very kind way in which he
elcome of the Institution of Electrical
heir association, and assured him that never
ment had he any idea of entering into rivalry
ution. While devoting all possible attention
ractical work of the association, he hoped
n at the back of their minds another object
actical importance—viz., that of developing
the use of electricity in mines. Efficiency
st; but those who devoted the whole of their
g expert workers in order to gain the greatest
competitors in the economic struggle were
g up an atmosphere of professional and
ness. If the modern phrase "Get on or get
e limits of a member's ambition, the associa-
be their very faithful servant; but so far
t in its foundation he could assure them that
ded it for such a very small service. It was
arily intended to aid in the promotion of
ctricity in mining operations, and thus
position of the mining industry; but over
motive he looked to the association to serve
hool civic education.

g closed with the National Anthem and the
ld Lang Syne."

er 28 visits were paid to the works of
rs Limited, Sheffield, and the Silverwood
Rotherham. At the former the manufac-
ical machinery was witnessed, as well as
an armour plate and other interesting

s were entertained to luncheon at the
Schools by the Yorkshire branch of the
d to tea by the Dalton Main Collieries
th of whom hearty thanks were accorded.

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s meeting of the Gloucestershire Education
F. W. T. Brain, on behalf of the Mining
, reported that Mr. Albert T. Buffrey had
the mining scholarship of £100 per annum
pon the result of the annual mining scholar-
on, and that Mr. Buffrey had taken up his
rs. Pearson and Knowles' Colliery, Wigan
each had been made to 12 students to enable
collieries in Durham. Four scholarships of
n given to Gloucestershire students attending
ing classes—two by the vice-chairman of the
mmittee (Mr. Thomas Davies), and two by
e, chairman of the local Higher Education
the Bristol area. The winners of the
ere Messrs. Woodruff, Mahoney, Emes, and
t was reported that the Education Com-
en appointed by the Home Office, under the
es Act, an authority for granting certificates
to firemen and examiners in local mines.
had been made for the conduct of the
inations so far as the Forest of Dean was
appointing Mr. J. W. Baldwin, mining
lliery manager, Ruardean, as examiner; and
been submitted to the Home Office for the
f similar examinations for the Bristol end of

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Notice Term: 24 hours or What?—Startling Statement as to Federation Weakness—Anthracite District Resolves to Secede—Cardiff and the Tyne Contrasted in Coal-shipping Facilities—The Coal-Mixing Charges Again—Election to Miners' Federation of Great Britain Executive: Extremists versus Old Leaders—Employers' Liability to Provide Work—Confusion in the Names of Local Docks—Iron and Steel Workers' Wages Reduced.

An important discussion took place at the Conciliation Board meeting last week. The point at issue had been raised by a judgment of the Pontypridd stipendiary in the case of a man at the Glamorgan Collieries who was dismissed on a day's notice. The Federation tested the legality of the notice, and won their case, the magistrate deciding against the colliery company. It being understood that the employers would appeal to the High Court, the men's representatives on the Conciliation Board approached the employers, and the matter came up for discussion, with a view to compromise. It was suggested that during the continuance of the present Conciliation Board agreement (which runs until 1915), weekly or fortnightly contracts should take the place of monthly; and at the outset there was an apparent agreement as to substituting one week's notice for the month. When, however, the parties proceeded to draft a clause by way of addendum to the agreement, in order to give effect to the compromise, a difficulty arose, objection being taken from both sides that the proposed draft interfered in some respects with the clauses in the Conciliation Board agreement.

From the owners' side an endeavour was made to embody in the new clause a memorandum by which the two sides pledged themselves to abide by the remainder of the agreement, and that nothing contrary thereto should be raised until its expiration except by mutual assent.

The workmen's representatives refused to sign this, and they made a counter proposal which would have given them a free hand with regard to raising the question of the lower-paid surfacemen. The owners' representatives would not accept an allegation that the stipendiary's decision had practically nullified the agreement. On the contrary, it was stated that they had never contended it was not in operation, and in proof they adduced the fact that recently an increase of wages had been granted under the Conciliation Board agreement.

A long discussion took place, the workmen's side first putting forward the proposal that the part of the existing agreement which related to the wages of surfacemen should be eliminated. The owners refusing this, they offered to accept the owners' draft clause subject to there being a reservation as to the case of the surfacemen, their arguments being that something similar had taken place in regard to the hauliers by means of an addendum to the agreement. The employers, however, rejected this, and the meeting came to an end without any settlement being reached. It is probable that the matter will be once again brought up, in order to avoid litigation.

A startling statement was made at Swansea on Saturday last, by Mr. John Williams, M.P. for Gower. Out of over 200,000 workmen in South Wales, he said, not 50,000 were paying into the Federation funds. He could not recall such a situation as existed in the coalfield now. The Federation had no money, and was impotent. They were "suffering from an over-production of men of talent and brains." What was required was the application of principles which they knew would have practical results. The chairman of the same meeting said that, under the new centralisation scheme, districts like their own would lose their autonomy, which was a matter of regret. He suggested that a protest should go to the central executive against the manner of electing members of the executive. By a general vote of the Federation there was little likelihood that smaller districts would have any representation.

One whole district of the South Wales Miners' Federation, about 17,000 to 18,000 in number, has decided to secede because of the ballot vote favouring centralisation under the new re-organising scheme. This is the anthracite section in the west of the coalfield. This action of the anthracite miners is important, because they really have separate interests from those of the steam coal men. Their work is subject to different circumstances; and the method of trade is different from that of steam coal. They have their own difficulties to meet, and therefore act as a unit rather than as a section of the larger body. At one time, Mr. Abraham, M.P., served as their agent as well as being agent for the Rhondda steam coal miners; and their present agent (Mr. J. D. Morgan) is a level-headed experienced man, not much in the limelight, but thoroughly capable and well trusted as a leader.

The Association met at Swansea on Saturday, and dealt with a resolution to consider their position in relation to the South Wales Federation in view of the result of the ballot; and a striking feature of the gathering was that almost everyone present opposed the centralisation scheme—not only because their own association would surrender its own interests, but also upon the general principle of home rule industrially, to which in many parts of the district great importance is attached. The feeling was so strong that a definite resolution of severance was passed as follows:

> The Anthracite Miners' Association sever its connection with the South Wales Miners' Federation, and form an independent district and seek direct connection with the Miners' Federation of Great Britain.

In regard to the ballot, it should be noted that the voting of the anthracite men themselves is said to have been two to one against the centralisation scheme. The general result of that voting, in which only two-thirds of all the members of the Federation throughout the coalfield took part, is complicated by this action of the anthracite miners; for, seeing that the membership of the Federation itself is only about half the total number of employees in the coalfield, and the voting of that half was only two-thirds in favour of centralisation, it follows that there must be an inherent weakness. Any contemplated new development, which shall be based upon what is practically only one-third of the whole of the employees, whilst a large section, like those of the anthracite, is in direct revolt, has no clear promise of ultimate success. Ebbw Vale, also one of the important areas, has pronounced strongly against the new development

Addressing the Cardiff Chamber of Commerce last week, Mr. R. O. Sanderson, who was one of the delegates to the meeting of the Associated Chambers in Newcastle, referred to the coal-shipping facilities on the Tyne. He said they were shown a tip which had done 700 tons per hours—an extraordinary performance—something for them at Cardiff to ponder over, and vessels could be taken into the Tyne at any state of the tide, and bunkered or loaded. The development of the Tyne with regard to the loading of coal put that district into a very strong position. He wished that all the members of the Chamber could have taken that trip and have seen for themselves the improvements and extensions that had taken place. Mr. J. A. Jones, who followed, declared that the trip had "opened his eyes."

Mr. F. H. Lambert, presiding at that meeting of Cardiff Chamber, made further reference to the increase in charges for coalmixing at the South Wales Docks. It was, he said, a very serious matter to have notice that the charges would be doubled. The railway companies might be able to prove something, but they could not prove an increase of 100 per cent. in the cost of coalmixing. The Chamber should strongly oppose the new charges. The shippers had asked for a meeting, but had been unable to get it. Apart from the question whether the railway companies were justified or not, it must be remembered that many persons had entered into engagements based upon the present rates. The increase was most unreasonable.

The result of the voting for new members from South Wales to the executive of the Miners' Federation of Great Britain, is the ousting of one of the three extremists who a twelvemonth ago re-placed the old leaders on that executive. Last year, Messrs. Hartshorn, Barker, and Stanton were elected; but this year, whilst the two former have been re-elected, Mr. W. Brace, M.P., president of the South Wales Federation, heads the poll by a large number, and consequently, Mr. Stanton is excluded. Mr. Stanton is the fourth on the poll, but is not elected; and the fifth and sixth are Mr. T. Richards, M.P., secretary of the local Federation; and Mr. Onions, its treasurer. Mr. Brace secured nearly 41,000 votes, Mr. Hartshorn 35,619, and Mr. Barker 32,000. Of those not elected, Mr. Stanton comes first with just under 30,000, Mr. Richards, M.P., followed with 24,454, and Mr. Onions had 22,361.

The annual conference of the Miners' Federation of Great Britain, is being held this week, at Swansea. Mr. Smillie, who presided, in his opening speech said he regretted to see signs of upheaval in South Wales, and alluded to the action of the anthracite men in their resolve to secede. Any movement he said, which would break up a local organisation and divide the miners into different sections, was not healthy for the trade union movement.

A haulier employed in the Rhondda was unable to continue work because of a fall in the colliery, but had to cease after having been for two hours in the mine; and he claimed a full day's pay, instead of the half-day which the management offered him. The case came before the Pontypridd stipendiary; and, for plaintiff, it was contended that, having presented himself for work, there was an obligation upon the company to provide work for him. The magistrate gave judgment for the claimant, on the ground that hitherto, when a partial stoppage occurred, the usage at the colliery had been—he said he could not call it a "custom"—that the men had insisted upon the management finding them work or paying them a full turn. He added, however, that it must not be assumed that his decision applied to cases which arose out of a complete stoppage of the colliery.

Some confusion having arisen because the new dock at Cardiff bears the name "Queen Alexandra" similar to that of the dock at Newport, the matter was discussed at the meeting of the Newport Chamber of Commerce on Friday last. Captain Cutliffe, of the Newport Dock Company, said he knew of two steamers intended for Newport which had gone to Cardiff in error. It was decided to call the attention of the Cardiff Chamber to the difficulty. As a matter of fact, however, the difficulty is being already dealt with, for the Cardiff dock is being more frequently termed the "Queen" dock, leaving the name "Alexandra" for Newport.

Mr. Watts Morgan, miners' agent, Rhondda, informed a meeting of the men on Monday that it was the intention of the federation to test the legality of the new district rule which put an obligation on the workman to give notice when he could not earn his wages on the price list.

The new pit at Bryn, near Port Talbot, which has been sunk by Messrs. Baldwin, is to be fully developed without delay. More men have been put on, the latest type of electrical machinery and plant have been installed, and an output of about a thousand tons a day is expected when full working is established.

As the result of a meeting of the iron and steel workers' joint committee, it is announced that the wages of all classes of workmen under this organisation will be reduced by 2½ per cent. in the South Wales district, as from October 1.

Mr. D. R. Morgan, manager, and two timbermen (B. Evans and T. R. Evans), were on Saturday, at Cwmbach, presented with certificates given by the Carnegie Trust Fund, for bravery in rescuing a collier at the Llettyshonkin Colliery who was imprisoned under a fall.

The South Wales Miners' Federation has given notice terminating contracts to about 60 medical men who hitherto have been under agreement with them in Glamorgan. This is not a retaliatory measure arising out of the Insurance Act, but is said to be due to the fact that that Act has created new conditions such as make a change of agreements compulsory.

During the delivery of certificates to firemen at Treorky, on Friday, it was stated that of the 2,500 candidates for examination, the largest number of veterans came from the Ocean Collieries. Many were over 60 years of age. Mr. Henry Davies, the director of mining instruction under the Glamorgan Council, remarked that one could always gauge the discipline at a colliery by noting the number of greyheaded men thereat. There had been almost, if not complete, immunity from firedamp explosions at the extensive Ocean Collieries for thirty years, and Mr. William Jenkins, the general manager, was to be heartily congratulated on this remarkable record. Mr. E. Edwards who presided, said they selected their officials at the Ocean, not only for their excellence as workmen, but also for their good moral character, and they had over 1,500 men who had served the company for twenty years and upwards.

It may be noted that the chief proprietor of the Ocean Collieries is Mr. David Davies, M.P., whose munificence has established in Wales a special organisation for combatting consumption. He and members of his family initiated a fund with donations from themselves amounting to £125,000, and, having secured a charter, are now working the whole of Wales with medical officers in every district under their council. Mr. Davies has also quite recently given a sum of £50,000 to the forward movement of the Calvinistic Methodist Church. Another proprietor in the Ocean Company is Mr. H. Webb, M.P. for the Forest of Dean. He is a Junior Lord of the Treasury and Liberal Whip.

IRON AND STEEL INSTITUTE.

Autumn Conference at Leeds.

The autumn meeting of the Iron and Steel Institute opened on Tuesday in Leeds at the Philosophical Hall. There was a large attendance of members, who were officially welcomed by Alderman Penrose-Green, Deputy Lord Mayor, and by Lord Airedale (chairman of the local reception committee). The civic compliments were cordially acknowledged by the president, Mr. Arthur Cooper, of Middlesbrough, who afterwards presented to Mr. J. H. Darby, of Sheffield, the Bessemer gold medal for 1912, awarded to him in May last. The rest of the session was occupied in the reading and discussion of three papers dealing chiefly with methods for producing sound steel ingots and revealing segregation. The afternoon was given up to the visiting of local works, while the members' ladies, who number about 200, went on an excursion to Bolton Abbey. At night the Lady Mayoress (Mrs. Nicholson) held a reception at the City Art Gallery, and during the evening a lecture on "Art in relation to the iron industry" was delivered by Mr. Frank Rutter (Curator of the Art Gallery). The meeting was resumed on the following morning when a paper written by Dr. J. Puppe, of Breslau, on rolling mill practice in the United States was discussed.

Mr. Alan E. L. Chorlton, of Manchester, read a paper on a new type and method of construction of large gas engines which has been placed on the market by Messrs. Mather and Platt Limited, the feature being the absence of valves. Mr. Chorlton described in detail the construction of "duplex" two-cycle vertical gas engines, which he claimed can be made to develop enormously high brake horsepower, and which are at the same time simpler than the four-cycle horizontal form of engine. Mr. Chorlton's paper will be given in next week's *Colliery Guardian*.

The South Yorkshire Coal Trade.—At the annual meeting of the shareholders of the Sheepbridge Coal and Iron Company, which was held on the 30th ult. at the Royal Victoria Hotel, Sheffield, the chairman (Mr. Frederick Fowler) stated that the profits for the past year were about £6,000 less than those for the previous year, but this was mainly owing to the colliers' strike, and also in some degree to the lower prices of coal in the first half of the year. The tonnage raised showed a decrease of about 100,000. At Maltby Colliery the daily output was increasing, and it was hoped that a total of about 400,000 tons would be reached before the end of the current year. The prospects of the year in regard to coal were considerably better, but the increased burdens which recent legislation had put upon their company, as well as others, were very serious, and meant a very heavy sum indeed. He was not sure that they were at the end of these matters yet. A considerable amount of plant was now on the ground at the new Rossington Colliery, and the sinking of the two shafts had been begun. The work had been a little hindered by the very heavy floods on the ground, but everything was now in order for going on as rapidly as possible. It was proposed to take power for raising £250,000 of debenture stock, but they intended to issue stock to the amount of only £100,000. They did not want the money at present, but they would want it before very long. They had heavy commitments in connection with Rossington and other collieries, and they thought it wise, at any rate, not to be short of money when they wanted it.—Lord Aberconway said he quite agreed with Mr. Fowler's view of the future of the company. It seemed to him very promising from every point of view. Dealing with the development of the business during the past 20 years, he said that while their capital account remained practically the same as in 1892—£717,000—they had paid £75,000 off debenture capital. Their plant account had been increased £54,000, their turnover had increased from £498,000 to £879,000, and their output of coal, in the Sheepbridge collieries proper, had increased from 849,000 tons to 1,120,000 tons. This last figure took no account of the large volume of coal they were now raising from Newstead, Dinnington and Maltby, in which they had very large interests. Of pig iron bars, castings, pipes and ore, the output had increased from 131,000 tons to 268,000 tons. Considering the way they had kept up their dividends and kept down their capital account, he thought the shareholders would agree that these figures showed the company to be in an extraordinarily sound position—as good a position, he thought, as that of any company doing the same class of business in the United Kingdom.

MINERAL RIGHTS DUTY.

The fifty-fifth report of the Commissioners of H.M. Inland Revenue for the year ended March 31, 1912, contains an account of the administration of the various duties upon land values imposed by Part I. of the Finance (1909-10) Act, 1910. We extract the portion relating to the Mineral Rights Duty.

The Commissioners state that the administration of this tax has reached a normal condition, and subject to the following observations, they anticipate that a full year's duty will in future be assessed and collected during each period of 12 months. The only disturbing factor at present is the existence of several outstanding legal questions as to the liability of certain payments and the admissibility of certain deductions which are the subject of references to the Courts. When the final decision of the Courts on these questions has been given, a considerable amount of duty which is at present unpaid will be either collected or discharged, and figures showing the final yield of the tax will thereafter become available.

In the following tables are given particulars of the assessments made for each of the three years 1909-10, 1910-11, and 1911-12, and particulars of the duty actually collected to March 31, 1912:—

Number of Assessments and Amount of Duty Assessed.

	Assessed on or before March 31, 1911.	Assessed in in year ended March 31, 1912.	Total.
England and Wales—	1909-10.	1909-10.	1909-10.
Number	8,316	351	8,667
Amount £	274,834	9,753	284,587
Scotland—			
Number	1 385	28	1,413
Amount £	52,181	625	52,806
Great Britain—			
Number	9,701	379	10,080
Amount £	327,015	10,378	337,393
England and Wales—	1910-11.	1910-11.	1910-11.
Number	7,054	1,586	8,640
Amount £	221,242	62,756	283,998
Scotland—			
Number	1,334	122	1,456
Amount £	48,440	4,085	52,525
Great Britain—			
Number	8,388	1,708	10,096
Amount £	269,682	66,841	336,523
England and Wales—	1911-12.	1911-12.	1911-12.
Number	—	8,404	8 404
Amount £	—	277,052	277,052
Scotland—			
Number	—	1,131	1,131
Amount £	—	48,833	48,833
Great Britain—			
Number	—	9,535	*9,535
Amount £	—	325,885	*325,885

* These are not the complete statistics of assessments for the financial year 1911-12, as certain assessments were not made until after the close of the year, and therefore do not appear in the above table.

Amount of Duty Paid to March 31, 1912

Year.	Paid on or before March 31, 1911.	Paid in year ended March 31, 1912.			Total paid to March 31, 1912.
	Great Britain.	England and Wales.	Scotland.	Great Britain.	Great Britain.
	£	£	£	£	£
1909-10	304,623	13,634	1,938	15,572	320,195
1910-11	201,053	96,108	24,750	120 858	321,911
1911-12	—	253,209	45,773	298,982	298,982

The difference between the aggregate amount of duty assessed shown in first table, and the amount of duty paid shown in the foregoing table, is made up of—

(*a*) Adjustments made as the result of claims for allowances, &c., received or allowed after issue of the notices of assessment.

(*b*) Amounts the subject of correspondence or appeal at the end of the year, including amounts standing over pending the decision of certain legal questions mentioned above.

(*c*) Arrears not collected by the end of the year. There were on March 31, 1912, few such arrears for 1909-10 and 1910-11, and a larger number for 1911-12, for which year the duty did not become payable until after January 1, 1912.

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ended Tuesday, September 24, 1912, is as follows:—Amsterdam, 1,773 tons; Abo, 151; Antwerp, 207; Altona, 251; Bandholm, 1,458; Barcelona, 2,008; Buenos Ayres, 4,120; Bremen, 2,737; Bombay, 993; Christiania, 1,335; Copenhagen, 145; Cronstadt, 14,791; Dalsbruk, 1,575; Danzig, 419; Drontheim, 161; Ghent, 982; Gothenburg, 579; Halmstad, 396; Harburg, 2,080; Harlingen, 1,929; Hamburg, 719; Husum, 536; Karachi, 146; Kiel, 1,649; Lulea, 503; Libau, 391; Malmo, 2,361; Nakskov, 1,094; Oporto, 1,344; Oxelosund, 359; Rouen, 2,770; Riga, 2,544; Rotterdam, 5,583; Stockholm, 1,433; St. Petersburg, 4,130; Stettin, 751; Sarpsborg, 702; St. Brieux, 167; Trieste, 212; Venice, 639; total, 66,325 tons; corresponding period September 1911, total, 106,329 tons.

COAL AND IRON TRADES.

THURSDAY, OCTOBER 3.

erland, Durham and Cleveland.

n-Tyne.

COAL.

week 158,608 tons of coal and 1,217 tons of
atched from Tyne Dock, an increase of 13,466
d 377 tons of coke when compared with the
the corresponding week of last year. The
ences totalled 57,572 tons of coal and 4,866
decrease of 9,439 tons of coal and an increase
of coke. The Blyth shipments amounted to
f coal and coke, an increase of 5,290 tons.
ek, a cargo of 10,000 tons (including bunkers)
have been shipped from the Tyne to Sydney
for the use of the Dominion Iron and Steel
e. The destination is a very unusual one for
smuch as Sydney is itself a coal-exporting
ne importance for the Canadian product.
continue in brisk demand. The following
es are recorded this week :—90,000 tons best
eened for delivery over next year at 13s. per
00 tons of similar for like shipment at 13s.
000 tons of unscreened Durhams for delivery
r to the Midi Railways of France at from
9d. f.o b. It is understood that the merchants
en the Midi contract still have their coals
dition, it is announced that the total contract
e Paris-Orleans Railways amount to 250,000
m coking unscreened. The qualities taken
ariation, and prices range from 12s. to 12s. 9d.
Shipment is to be over next year. Several
y sales recently announced are understood to
this contract. The Portuguese Railways are
rs, to reach them by the 14th inst., of 32,000
unscreened Durham coking coals for delivery
r. Other interesting sales are reported as
0 tons best Blyth steams for October-January
s. 8d, f.o b.; 10,000 tons of best Blyth steam
ment over next year at 8s. 4½d., f.o.b.; 6,000
ordinary unscreened Durham bunkers for
y at 13s.; Tyne prime gas coals for October
s. 3d. and a cargo for Naples at 26s. 6d., c.i.f.
quantity of best Blyth steams was stated to
ld for the requirements of the Russian
shipment over the remainder of the Baltic
s. 3d., f.o.b. This sale is now authori-
radicted, however. It is reported this
enoa that a cargo of Durham gas bests has
26s. c.i.f. for November shipment. For
ember shipment, merchants are asking 13s.
9d. for 1913 delivery, but buyers prefer to
f. basis. A quantity of 2,000 tons has, how-
ld for March shipment at 12s. 9d. f.o.b.,
n dues. Second-class gas coals on passage
ealise from 25s. 9d. to 26s. per ton c.i.f., and
been sold for October shipment at 25s. 6d.
goes for November-December are quoted at
e following enquiries are in circulation :—
German briquette coal or Lambton, Walls-
etton, Shireoaks or Kiveton Park briquettes,
gian Main Railways; 10,000 tons of Holmside,
Easington or Walker gas coal, for delivery
to August next, for the Bergen Gasworks;
best Blyth steams, for this season's delivery
h State Railways; and 100,000 tons of good
oal, for the Berlin Gasworks. There is stated
ry for a quantity of coking coals for next year's
ntwerp, but details are lacking. In view of the
d for this kind of fuel, collieries are now
14s. f.o.b. for supplies for next year's ship-
is stated to have been refused for a special
tly screened Durham bunkers. Coal quota-
rally firmer to dearer this week. Tonnage
ly—some of the collieries, indeed, are having
rage, although arrivals have been slightly
y recent stormy weather. F.o.b. quotations
hipment are as follow (steady where not
tioned) :—Best steams, Blyths (D.C.B.),
13s. per ton, easier; Tynes (Bowers, &c.),
., 3d. dearer; seconds, Blyths, 11s. 6d. to
s (Hastings or West Hartleys), 11s. 9d. to
ed, 11s. 3d. to 11s. 9d, 3d. advanced; smalls,
, stronger; Tynes, 9s. to 9s. 3d., 3d. higher;
to 10s. 6d., 6d. dearer; smithies, 13s. to
bests (New Pelton or Holmside), 13s. 3d. to
ncreased; seconds (Pelaw Main or similar),
gher; specials, 13s. 6d., 6d. up; unscreened
ams, 13s. to 13s. 6d.; Northumbrians, 11s. 6d.
; coals, 13s. to 13s. 6d.; smalls, 12s. 6d. to
3d. to 6d. cheaper; households, 14s. 6d.;
24s. to 25s.; blastfurnace, 22s.; and gas

COAL.

from Sunderland last week amounted to
oal and 1,610 tons of coke, as compared with
coal and 1,525 tons of coke for the corre-

sponding period of 1911, being an increase of 4,360 tons of coal and 85 tons of coke. The coal market has a steady tone for prompt loadings, and the enquiry is good for forward shipment. Collieries have as much prompt trade as they can manage, though the stormy weather has caused delay in the arrivals of coasting tonnage, and for this reason prompt bunkers are somewhat easier. There is a good enquiry for both best and second gas coals, whilst unscreened coking coals and smalls are still in fair demand. Foundry coke is steady, with a better export enquiry. Furnace coke is also in request, with a heavy consumption locally. Further sales of 90,000 tons of coking unscreened have been made for delivery over next year at 13s. f.o.b. The Paris-Orleans Railway have also arranged for 250,000 tons of coking unscreened at from 12s. to 12s. 9d. f.o.b. according to quality. The Portuguese Railway invite offers of 32,000 tons unscreened, delivery February to December next year. The Norwegian Main Railway invite offers of 12,000 tons of coking smalls, and the Bergen Gasworks require 10,000 tons of best gas, delivery between March and August next year. Quotations are as follow:—Special Wear gas, 14s.; best gas, round about 13s. 3d.; seconds, 12s. 9d. to 13s.; household ordinaries, 14s.; bests, 15s.; coking unscreened, 13s. to 13s. 3d.; smalls, 12s. 9d.; smithies, 13s. 6d. to 14s.; peas and nuts, 14s. to 15s.; foundry coke, 24s. to 24s. 6d.; blastfurnace coke, 23s. to 24s.; gashouse coke, 21s. 6d. to 22s. Bunker prices are:—Ordinary kinds, 12s. 9d. to 13s.; bests, 13s. 3d. to 13s. 9d; superiors, 14s. to 14s. 6d., free on board South Dock. The outward freight market is not so buoyant. Chartering has been somewhat less brisk, while lower rates have been accepted to the Mediterranean; the tendency all round is on the easy side. Fixtures reported are:—Coasting: London 3s. 10½d., Hamburg 4s. 9d., Havre 6s. 1½d. Baywards: Bilbao 9s. 3d., St. Nazaire 7s. 10½d., Oporto 13s. Baltic: Malmo 7s. 9d., Fairwater 6s. 6d., Swinemunde 6s. 6d., Cronstadt 7s. 6d. Mediterranean: Genoa 12s. 9d., Port Said 12s. 7½d., and Las Palmas 12s.

Middlesbrough-on-Tees.

COAL.

The fuel trade is fairly steady. A good prompt business is doing, and there is an increasing demand on forward account. Gas coal is in satisfactory request, with the usual increasing deliveries at this season of the year. Best gas coal runs from 13s. 3d. to 13s. 6d., and seconds are from 12s. 9d. to 13s., whilst Wear specials realise 14s. The gasworks of Berlin and Bergen are in the market for their annual requirements and are inviting tenders. Bunker coal shows little change. There has been a slight ease owing to the displacement of tonnage, but bunkers are still firm over the month. Ordinary Durhams are 12s. 10½d. to 13s. f.o.b., best kinds 13s. 3d. to 13s. 9d., and specials 14s. to 14s. 6d. Coking coal is in good request. Unscreened kinds run from 13s. to 13s. 3d., and coking smalls are worth nearly as much as unscreened kinds. Coke continues in strong demand both for home consumption and for shipment. Good Durham blastfurnace coke is quoted up to 23s. 6d. delivered at Teesside works. Foundry coke for shipment is 24s. to 24s. 6d. f.o.b.

IRON.

Shipments from the Tees last month were satisfactory. Those of pig iron reached 118,079 tons, 109,284 tons of which went from Middlesbrough, and 8,795 tons from the neighbouring port of Skinningrove. For the previous month the total clearances of pig amounted to 115,323 tons, and for September last year the loadings were returned at 106,693 tons. All the pig iron shipped at Skinningrove last month went to Scotland. Of the pig cleared at Middlesbrough last month 73,481 tons went abroad, and 35,803 tons coastwise. Scotland was again the largest receiver, taking—including iron from Skinningrove—25,370 tons, whilst Germany was a customer to the extent of 11,414 tons; Sweden received 8,576 tons, Belgium 7,550 tons, Italy 7,450 tons, Japan 6,746 tons, Canada 6,336 tons, France 6,005 tons, and Denmark 4,614 tons. Of the 18,718 tons of manufactured iron shipped at Middlesbrough during September, 10,084 tons went to foreign countries and 8,634 tons to coastwise customers, India being the largest buyer with an import of 3,919 tons, and the Argentine second with 3,405 tons. Of the 52,918 tons of steel despatched from Middlesbrough last month, 45,279 tons went to foreign buyers and 7,639 tons to coastwise purchasers. The principal receivers of steel were the Argentine, 10,244 tons; India, 7,678 tons; Japan, 3,714 tons; South Australia, 3,561 tons; British East Africa, 3,012 tons; Natal, 2,906 tons; and New South Wales, 2,431 tons. The iron market is somewhat depressed so far as Cleveland pig is concerned. This is due to a slump in warrants, for which the situation in the Balkans is largely blamed. There are merchants ready enough to accept 66s. 6d. for No. 3 g.m.b. Cleveland pig, and foundry 4, which is said to be very scarce, is about the same price as No. 3, whilst No. 1 is 71s., No. 4 forge 66s. 3d., and mottled and white iron each 65s. 9d. The foregoing quotations are for prompt delivery, higher rates being asked on forward account. East coast hæmatite pig is steady, mixed numbers standing at 80s. for this year's delivery. Foreign ore maintains its value on the basis of 23s. ex-ship Tees for best rubio. Manufactured iron and steel prices are very strong, but the only quotable change is a 5s. advance in ship rivets, which are now £9 15s.

South-West Lancashire.

COAL.

As was generally anticipated, the usual winter advance of 10d. per ton was put on inland house fuel prices on the 1st instant. This branch of the trade at the moment is progressing on somewhat quieter lines than previous to the advance. This is no doubt accounted for by customers having purchased extra in view of the anticipated alteration in prices. There is little change in regard to shipping. The demand for bunker coals under contract is not lessened, and as supplies do little more than meet day-to-day requirements, prices still tend to harden. This, however, does not apply to slack for export, which, owing to the heavy production, has somewhat weakened of late. Present quotations for screened Lancashire steam coals are 12s. 3d. to 12s. 6d. f.o.b. for ordinary qualities, and up to 13s. 6d. or 13s. 9d. f.o.b. for the very best. The coastwise and cross-Channel shipments of household fuel continue satisfactory. Best coals for open sale rule at up to 16s. 6d, with good medium grades about 15s.—both f.o.b. Garston and net. Slack at the moment is perhaps a little easier to obtain, and no doubt will be until the mills get on to their full winter consumption. Prices for open sale are firm at 9s. 9d. to 10s. for the best rough qualities, with good medium sorts at 9s. to 9s. 3d, and the commoner qualities about 8s. 6d.—all into wagons at the pit.

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South Lancashire and Cheshire.

COAL.

The Coal Exchange was well attended on Tuesday last. There is still a good demand for all classes of household fuel and at the advanced prices which became operative on the 1st inst. List prices are now from about 16s. 9d. to 17s. 6d. for the best house grades, with good medium qualities at 15s. 3d. to 16s. 3d., and the commoner sorts from 12s. 6d. to 13s. 3d.—all net at the pit. There continues a steady enquiry for both furnace coal and coke, the former at about 12s. 6d. per ton at the pit. Shipping is fairly brisk with prices at from 12s. to 14s. f.o.b. Partington. The usual good demand is maintained for slack; open-sale prices for this rule at from 9s. to 9s. 9d. for the best qualities, and the commoner qualities at from 8s. to 8s. 6d.—all into wagons at the pit.

IRON.

The iron trade continues satisfactory and prices inclined to advance still further. Many consumers whose contracts are falling out show their faith in the future by seeking to cover their requirements over the whole of 1913. Good foundry pig iron cannot now be purchased under 72s. 6d. The forges are very busy at £8 and £8 10s. for second quality and Crown iron bars, hoops £8 12s. 6d., sheets £9 5s. Steelworks are also very busy with bars at £8 6s. and billets £6 5s. to £6 10s. Wagon-builders are very full of work and asking high prices for new wagons. Heavy engineers are doing better. Boilermakers are not so busy, and new work is hardly profitable. Textile makers are full of work. Foundries are better off.

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Yorkshire and Derbyshire.

Leeds.

COAL.

The number of traders present at Tuesday's market was scarcely up to the average of the past few weeks, but all sections of the industry were represented. There was no special feature of interest, and the market closed early with only a moderate turnover. The regular work of the pits has not been possible in many cases owing to the scarcity of empty wagons. Traffic difficulties have again begun to interfere with business, and merchants are complaining about the serious delays to rolling stock. The house coal trade has been quiet since the turn of the month, the higher prices having checked orders from the public. There are no stocks, however, in colliery sidings, and prices generally are firmly held. Business with London and the eastern and southern counties has been fairly good, the demand having run chiefly on the cheaper grades. Reports from the London depots indicate a quieter state of things, but merchants' stocks on the whole not being large, a brisk demand is expected with the first spell of cold weather. There is no weakness about pit prices, the standard qualities realising about as under:—Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. 6d. to 14s.; Silkstone best, 13s. 6d. to 14s. (special qualities, 14s. to 14s. 6d.); Silkstone house, 12s. 6d. to 13s.; house nuts, 11s 6d. to 12s. A fair business is passing with south coast merchants, but the very high freights and the scarcity of suitable tonnage is still a serious handicap to the coastwise trade. Second-class qualities are mainly in request. For prompt shipment the following f.o.b. Hull figures are quoted:—Haigh Moor best, 16s. 6d. to 17s. 3d.; Silkstone best, 15s. 6d. to 16s. 6d.; Silkstone house, 14s. 9d. to 15s. 6d.; house nuts, 13s. 6d. to 14s. At the West Riding depots, merchants are not fully employed, as the retail trade is quieter. The revised price-lists are being strictly adhered to, and the following figures represent current pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. 6d. to 17s.; ordinary house coal, 15s. to 16s.; secondary qualities, 13s. to 14s. 6d. With regard to manufacturing fuel, washed small nuts and coking slacks are very scarce, the latter quality being appreciably dearer on the week. Current quotations:—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small engine nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slack, 8s. to 9s.; small slack, 7s. to 8s.; coking smalls, 7s. 3d. to 7s. 9d. Furnace coke is very firm, average qualities of washed patent oven coke realising 18s. per ton at the ovens. The pressure for supplies is so great that it is quite likely prices may go up still higher. There are no stocks anywhere, and the output is much below market needs, especially for the Frodingham district. Contract deliveries of gas coal are now on a winter basis, schedules for October specifying largely increased deliveries. The pits are fully occupied, and have little to offer in the open market. It is reported that the Halifax Corporation have bought only about half their usual tonnage, and have paid an average advance of 2s. per ton. The new season's sales are now practically completed. Current pit prices:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal, 9s. to 10s. Not a great deal of gas coal is being exported, but the following f.o.b. Hull quotations are steady:—Screened gas coal, 12s. 6d. to 13s. 6d.; gas nuts, 12s. 3d. to 12s. 9d.; unscreened gas coal, 11s. 9d. to 12s. 6d.

Barnsley.

COAL.

Excepting a weakness in the export demand for steam coal, there has been nothing to effect the general firmness which was apparent a week ago for all classes of fuel. Generally speaking the collieries, though hardly producing the maximum output owing to a variety of causes, have been able to deal with the production readily. There are little stocks on hand, and with a plentiful supply of wagons business continues to be expedited in every possible way. Though the demand from abroad for large steams has, as stated, fallen away considerably, it is not maintained that it should begin to flag at this period of the year, but the causes for these are not yet regarded as of a strongly permanent character. Shippers are endeavouring to delay operations owing to the large increase in freights and the attendant scarcity of shipping tonnage, and it is expected with a recovery in that direction business will be revived, for the opinion is held that a good bulk of tonnage has yet to be dealt with both for the Baltic ports and the Continental markets. Sellers are therefore operating from this point of view, and with the active demand on home account so well sustained, are looking forward to a substantial recovery in prices. For the present, however, the price of the best class of hards has dropped to 11s. 6d. per ton on current account, and secondary descriptions are now quoted at from 10s. to 10s. 6d. per ton. The latter quotations will no doubt lead to a more active buying on home account, though buyers are not likely to precipitate an undue rush with the market showing so sensitive a tendency to advance. Buyers in the home markets are, however, chiefly seeking the smaller grades of steam fuel for industrial purposes, and the remarkable active demand in this respect continues with a strong tone forwards. With the present high range of values apparently established, advantages through contracts are difficult to obtain, and consequently there is a far greater demand on the open market. Best washed nuts are making from 10s to 11s. per ton, with secondary qualities from 9s. to 9s. 9d. per ton. Slacks are also in very strong demand, best washed descriptions selling up to 8s. 3d. per ton, with secondary qualities from 7s. to 7s. 6d. per ton, the demand on account of coke manufacture being large, and consequently there is not a great deal on offer on the market. Gas coal collieries are finding the output well taken on contract account, but with the upward tendency in prices there is a stronger demand in the open market, chiefly for shipment, and prices are about 10s. per ton for the best screened sorts. The business done for house coal is a particularly active one, and especially so with regard to the best qualities of fuel, which are more difficult to obtain from collieries. The demand is particularly good, having regard to the fact that several weeks ago a decided advance was inspired by collieries, and undoubtedly the public are showing a greater preference for the better class of fuel than secondary sorts. A limited quantity of the Haigh Moor seam produced in the district is quoted at 16s. per ton pit, whilst Silkstone best are listed at about 15s. per ton. Best Barnsley bed softs are making from 14s. to 14s. 6d. per ton and secondary qualities 12s. 6d. to 13s. per ton. Best house nuts are selling at about 12s. per ton. The demand for coke continues to be of a vigorous character, and the output is well cleared, with a strong enquiry forward. Ordinary washed sorts are now firm at 17s., though special sorts are quoted up to 18s. per ton.

Hull.

COAL.

The Humber coal trade has been quiet during the week, foreign business being almost at a standstill owing to the difficulty, which seems to increase, of getting tonnage. Unable to get ships, exporters declined to buy, and the consequence has been a very sharp fall in prices for the best Yorkshire steam hards, which to-day were quoted on the Exchange at 14s. f.o.b. selling value. Secondary sorts and smalls generally required for industrial purposes, however, continue in brisk demand, and prices are well maintained, and the same applies to gas coal, which is in good request and dearer. House coal is active, and a large quantity is now being absorbed. Forward business is somewhat restricted, terms being difficult to arrange, although it is reported that a contract has been placed for delivery next year of 15,000 tons of best South Yorkshire steam hards, the price mentioned being 14s. 6d. f.o.b. at Hull. The appliances at the docks are busy, and in the last ten days or so very large quantities of coal have been shipped. Loading conditions, however, are good, and turns easy, and will continue so when the vessels at present loading and to load have been cleared off. Coal is coming along from the collieries freely, and large stocks are now in the sidings awaiting shipment. The end of the Baltic season is now in sight, but a considerable quantity yet remains to be shipped under contract to Swedish and other ports ere the navigation closes. The freight market has been very quiet owing to the limited amount of available tonnage. The Baltic rate remains about 7s. 6d. Cronstadt, and is a little easier on the week. The near Continental ports are on about the same basis as last week, while Mediterranean business is on the basis of Hull to Genoa 13s. 3d. The following are the approximate prices for prompt shipment f.o.b. Hull:—South Yorkshire: Best steam hards, 14s. to 14s. 3d.; washed double-screened nuts, 13s. 3d. to 13s. 6d.; unwashed double-screened nuts, 12s. 6d.; washed single-screened nuts, 12s. 6d. to 13s.; unwashed single-screened nuts, 12s. 3d. to 12s. 6d.; washed smalls, 11s. 6d. to 11s. 9d.; unwashed smalls, 10s. 6d. to 10s. 9d. West Yorkshire: Hartleys, 13s. to 13s. 3d.; rough slack, 10s. 3d. to 10s. 6d.; pea slack, 8s. 3d. to 8s. 6d.; best Silkstone screened gas coal, 12s. 9d. to 13s.; best Silkstone unscreened gas coal, 12s. to 12s. 6d. Derbyshire and Notts: Best steam hards at Hull, 14s. 3d. to 14s. 6d.; best steam hards at Grimsby, 14s. to 14s. 3d.; Derbyshire nuts (doubles) at Hull, 12s. 9d. to 13s.; Derbyshire nuts (doubles) at Grimsby, 12s. 6d. to 12s. 9d.; Derbyshire large nuts at Hull, 12s. 9d.; Derbyshire large nuts at Grimsby, 12s. 6d.; Nottinghamshire hards at Hull, 14s. 6d. to 14s. 9d.; Nottinghamshire hards at Grimsby, 14s. 3d. to 14s. 6d.

Chesterfield.

COAL.

The demand for house coal is of a steady character and sufficiently great to enable the pits to work full time. Prices were advanced 1s. per ton on the 1st of this month. With a spell of cold weather it is not improbable that there will be a sharp rise in prices, especially as stocks are lower than they usually are in October. There is no change in the position with regard to fuel for manufacturing purposes. All qualities are in great request and prices remain very firm. Contracts which expired at the end of September for cobbles and nuts for steelmaking have been renewed at e. per ton advance. Most collieries have now disposed of the whole of their estimated production over the next six or nine months. Slack for steam-raising purposes is in stronger demand than ever, and in many cases collieries are unable to accept any more orders beyond their commitments against contracts. Stocks are completely exhausted at the pits, and consumers do not hold much reserve fuel. There is an active demand for steam coal for locomotive purposes, and heavy deliveries continue to be made daily. Nothing is yet known with regard to the tenders that have been sent in to two or three of the railway companies for a renewal of contracts, which expired at the end of September. There is an active business being done in the export branch of the trade, and this state of things will continue, so far as North Derbyshire is concerned, until the end of the year. Prices for any lots of Top Hards that are available for prompt shipment are firm at 11s. 3d. to 11s. 6d. per ton at the pit. There is still a scarcity of steamers, which is causing much anxiety to exporters, who have considerable quantities to ship before the close of the season. Nothing has been done in the way of fixing up contracts for next season. Up to now no enquiries of importance have come on to the market. There is a large demand for nuts for near Continental ports, but the supply is not by any means plentiful. Prices of this class of fuel have a hardening tendency. Slack for shipment also finds a ready sale. Washed nuts and washed slack are in active request, and there are numerous enquiries for these qualities for shipment over next year. Prices are steadily moving upwards. The coke trade is again firmer on the week. Prices are fully a shilling per ton higher. There is a large demand for coke of all qualities for blastfurnace use and for steel smelting, and the output of the ovens is scarcely sufficient to meet the needs of the market. Coking fuel continues scarce and dear. Prices are as follow:—Best 14s., seconds 12s. 6d., cobbles 12s., nuts 11s., slack 8s.

IRON.

The condition of the iron trade of this district remains satisfactory. Work is plentiful and orders on hand are sufficient to find full employment for many months to come. It is many years since trade was so brisk as it is in the last quarter of 1912. Every industry is sharing in the prosperity, and the prospects are very encouraging.

Nottingham.

COAL.

Much the same tone as a week ago dominates the coal trade in this county, and good time is being made at both the hard and soft coal pits. If anything, business has been a little brisker in regard to sales of household fuel by local merchants and at landsale depots, the expected increase in prices having caused the public to purchase more freely. The consignments to the metropolis and southern counties have been weightier. Whilst the demand for better quality fuel has increased, the cheaper kinds are not selling very actively. Notwithstanding, values all round are displaying an upward tendency, hand-picked brights making 13s. to 14s. per ton, good households 12s. to 13s., seconds 10s. 6d. to 11s. 6d., nuts 9s. to 10s. 6d., cheap kitchens 8s. to 8s. 6d. The output in the steam coal section is large, the demand being such that there is little need to put much in stock. For industrial purposes good orders are coming to hand, and a heavy tonnage is being sent away for export. Railway companies, too, are taking fair supplies. Prices remain firm, best steams realising 11s. 6d. to 12s. per ton, seconds 10s. to 10s. 6d., and nuts 9s. 6d. to 10s. 6d. In regard to slacks, there is a brisk demand for most qualities, and late prices are being obtained, whilst gas fuel is in increased request, there being a desire on the part of buyers to lay in stock for the winter.

Leicestershire.

COAL.

There has been but little alteration in the condition of business in this district in the past week. There is a very large amount of orders on hand. The issuing of a new list has somewhat affected the operations of buyers, but it has not materially influenced the lately prevailing activity. The output is heavy, and so much is sent away as is possible; but the means of railway conveyance are at times somewhat short. The amount of business placed is maintaining practically a full week at the collieries, and stocks are small. The demand is an all-round one. All descriptions of household coal are in good request. Steam coal also are in good demand, and all sorts are sharing in the activity. Local merchants are generally fairly busy, but not so busy as they have been. Many consumers have taken their supplies early. The increased prices are from 1s. to 2s. on household coals, mostly the higher rate, and on steam coals about 1s. This is on the late high rates, and makes the prices very considerably heavier than last year.

South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL.

The general condition of the coal trade throughout the Cannock Chase district continues satisfactory. Orders are plentiful for nearly all qualities of coal, and prices are moving upward. There is very little coal in stock, and the collieries are working full time. A good business is being done in the various qualities of household coal, and the demand for coal for manufacturing purposes continues brisk. The demand for slack is fairly well maintained. There is very little change in railway or canal sales.

Birmingham.

COAL.

The advance in prices, which took effect at the beginning of the month, has not made much difference in the demand for house coal. It may be a shade less pronounced, but it is still sufficiently brisk to keep the pits going full time. Large contracts have been arranged for works fuel, and the call for it looks like being maintained for several months. Slacks are also in active sale at prices ranging from 6s. to 9s.

IRON.

The market was somewhat of the nature of a preliminary to next week's quarterly meeting. Enquiries concerning new business were numerous; actual transactions were few. There was still a hardening tendency about prices. The Wages Board return for July and August, issued a few days ago, announced another advance in ironworkers' wages of 2½ per cent., though the tonnage output was smaller, amounting to 41,226 tons, compared with 43,494 tons in the preceding two months. The intervention of Bank Holiday accounted, of course, for the decline. The average net selling price jumped from £7 4s. 9d. in May and June to £7 10s. 3d., and coming on the top of an advance of 4s. 4d. over March and April, it shows the upward trend of values. Meantime, manufacturers have booked as many orders as they can execute for the next three months, and negotiations relate to business for the early months of next year. No trace of weakness was discernible in the pig iron market. The high price of coke is a factor in maintaining values, apart altogether from the fact that there are no stocks accumulating. Northamptonshire forge touched 64s. 6d., and people who could buy at 63s. 6d. or 63s. 9d. were considered fortunate. Even higher prices were quoted, but mainly with the idea of staving off orders which smelters cannot conveniently execute. Quotations for Derbyshire iron were from 65s. to 66s., and for Staffordshire common 60s. In the finished departments makers of standard bars are offered heavy lines. The basis price is maintained at £9 10s., and it is not expected that the advance in wages will bring about any immediate alteration. Merchant qualities sell freely at £8 7s. 6d., and in a few special cases at £8 10s. delivered Birmingham. Galvanised sheets have again rders being negotiated on the basis of £13 a f driving force is the higher price of spelter. et mills are working regularly, and values m £8 2s. 6d. to £8 5s. for doubles. For the the bulk of the orders go to South Wales, ils are better adapted for that class of work. rought tubes have notified customers that e been reduced to the extent of 1½ per cent. gas tube and 2½ per cent. on water and steam flanged tubes and fittings. Gas-strip makers o further revision of prices. Although no een announced in steel sections, most makers rs than the association basis, which is £7 15s. for angles. Steelmakers are called upon to pay for their ferro, the price of which is £11 10s. highest since 1907.

Forest of Dean.

COAL.

able to report a further improvement in the de of this district, but it is satisfactory to note eady business is being maintained. The pits very good time, but it will be probably two ks yet before the full autumn demand is Stocks are very low at most of the pits. Prices llow:—Block 16s. 6d., rubble 15s. 9d., nuts 14s., ck 6s. 6d. at pit, and 1s. 9d. per ton extra f.o.b. harpness. Steam coal continues in heavy ll the pits are working at full pressure. There on hand. Prices show a tendency to stiffen.

ershire, Somersetshire and Wilts.

COAL.

Wade and Son report that the advanced prices eights have secured very little support from ast coal importers. The wholesale rates now sely approach the retail prices, so that retail o be supplied from contract quantities. Many importers have contracted this season for ht rather more largely than usual.

COTCH COAL AND IRON TRADES.

Thursday, October 3.

lasgow and Lanarkshire.

COAL.

arge business doing in the coal trade, although s have not come up to those of the preceding compare very favourably with the quantities n the corresponding week of 1911. High tended to restrict shipping business, and some liate falling away in the shipments is due to f stormy weather, and are therefore only The aggregate clearances from Scotch ports eek amounted to 362,934 tons, being 12 312 tons he preceding week, but 35,455 tons more than ponding week of last year. The Glasgow mounted to 84,286 tons, compared with 79,046 ing week, and 73,366 in the same week of 1911. has been in fair demand. The business in or export has not been so good as in some eks, and prices have had an easier tendency, howing an advance, as had been anticipated place with the beginning of October. The the collieries is very heavy, and this has led petition among salesmen that it has been ficult to maintain prices, not to speak of a ase. An excellent business has so far been eason in nuts, but the demand for these ed to some extent, and prices are not Splint coal is almost the only quality firm, owing to the many uses to which general increase in demand that invariably this season of the year, when so much splint or gas making and other special purposes. tations at Glasgow are for steam coal 11s. 6d. al 11s. 9d. to 12s. 3d., splint 13s. 6d. to 14s., 3s. to 13s. 6d., doubles 12s. 6d. to 13s., and to 12s. 6d. per ton. Colder weather has e demand for house coal for home use, and mperatively firm. In Glasgow the retail prices 1s. per 1 cwt. bag delivered, which are just tes current at the beginning of last month. ry strong demand for coal for manufacturing teady prices.

IRON.

a fair recovery in pig iron prices towards the week. Reports came strong regarding foreign these have tended to encourage speculators. o appears to be a large demand on the part of ome consumers are not purchasing so freely as e time ago, and this is set down to the fact ey are in most cases quite well supplied with new work coming to hand has become of less ce last report, Cleveland warrants have been s. 7½d. to 66s. cash, 67s. to 67s. 8d. and down ne month and 67s. 5d. to 68s. three months. has been depressed in consequence of the state of affairs between Turkey and the tries. Purchases have also been noted at elivery in 27 days, 67s. 9½d. two months, and nber 19. The consumption of Cleveland iron must be large, and yet the imports are only he arrivals at Grangemouth of pig iron from gh and district amounted to 7,945 tons, being s than in the corresponding week, and there is a total decrease in the arrivals since the beginning of the year amounting to 13,653 tons. Hæmatite pig iron has moved upwards in price very considerably, and merchants now quote Scotch hæmatite 84s. 6d. per ton for delivery at West of Scotland steelworks. Ordinary and special brands of Scotch pig iron are generally quite firm, and in some cases 6d. to 1s. higher on the week. Free at ship at Glasgow, Govan and Monkland Nos. 1, are quoted 74s. 6d., Nos. 3, 73s.; Carnbroe, No. 1, 79s., No. 3, 75s.; Calder, No. 1, 79s., No. 3, 74s.; Clyde, No. 1, 80s. 6d., No. 3, 75s. 6d.; Summerlee, No. 1, 81s., No. 3, 76s.; Gartsherrie No. 1, 81s. 6d., No. 3, 76s. 6d.; Langloan, No. 1, 82s. 6d., No. 3, 77s. 6d.; Coltness, No. 1, 97s 6d., No. 3, 79s. 6d.; Eglinton at Ardrossan or Troon, No. 1, 74s. 6d., No. 3, 73s. 6d.; Glengarnock at Ardrossan, No. 1, 82s. 6d., No. 3, 77s. 6d.; Dalmellington at Ayr, No. 1, 75s. 6d., No. 3, 73s. 6d.; Shotts at Leith, No. 1, 81s., No. 3, 76s.; Carron at Grangemouth, No. 1, 81s., No. 3, 76s. per ton. The finished iron and steel works continue fully employed and there is great pressure for delivery of steel for shipbuilding purposes, but only a moderate amount of fresh business is reported.

Renfrew, Ayr and Dumbarton.

COAL.

The foreign shipments in this district have been larger than usual, amounting to nearly 10,000 tons, but there has been a considerable decline in coastwise business, due to special causes, among these being the stormy weather that has prevailed in the Firth of Clyde. The shipments have been at Bowling 145 tons, Greenock 668, Ardrossan 6,843, Troon 10,935, Irvine 914, and Ayr 8,265—total 27,770 tons, compared with 36,976 in the preceding week, and 29,027 in the corresponding week of last year. Supplies of coal are ample for all purposes, but there is a large and increasing home consumption, and prices are steady.

Stirling, the Lothians and Fife.

COAL.

At Firth of Forth ports there has been a good export business doing, although from various causes the total shipments are not quite so large as in the preceding week. At Granton 6,680 tons were cleared, Bo'ness 22,409, Grangemouth 43,422, and Leith 52,523—total 127,034 tons, compared with 131,455 in the preceding week, and 102,178 in the corresponding week of last year. The collieries in the Lothians are very busy, and coal prices are maintained. Best screened steam coal is quoted at Leith 12s. 9d. to 13s., secondary qualities 11s. 6d. to 12s., treble nuts 13s. 6d. to 14s., doubles 12s. 9d. to 13s., and singles 12s. 3d. to 12s. 9d. At the principal Fife ports the supplies of vessels for loading has been larger than usual; but as a large proportion of them have been fixed for coal at a few collieries, which are thus over burdened with work, there has been considerable delay in despatch. The clearances have been at Methil 62,436 tons, Burntisland 54,650, Dysart 2,432, Alloa 1,896, Wemyss 1,513, Tayport 599, and Charleston 318—total 123,844 tons, compared with 127,769 in the preceding week, and 122,903 in the corresponding week of 1911. First-class screened navigation coal is quoted at Methil and Burntisland 16s. to 16s. 6d., unscreened 14s. to 14s. 6d., first-class steam coal 13s. 6d., secondary qualities 11s. 6d. to 12s., treble nuts 14s. to 14s. 6d., doubles 13s. 6d. to 14s., and singles 12s. to 12s. 6d. per ton. Both the export and inland trades are very fully employed.

THE IRISH COAL TRADE.

Thursday, October 3.

Dublin.

There has been no falling off in demand during the week, business in nearly all branches showing uninterrupted activity, and although house coals are advanced 1s. per ton in some of the colliery districts across the water, prices at this side are unchanged up to the present. It is stated that contracts for works fuel have been completed at 2s. and 2s. 6d. per ton above last year's rates, and when the expected advance is made in house coal, consumers will be paying 3s. or 4s. a ton more than at the corresponding period 12 months ago. City prices stand as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; "bell" coal, 1s. 5d. per sack; best coke, 23s. per ton, or 18s. per chaldron; steam coals, from 20s. per ton upwards. The coaling vessels arriving amounted to 52 as compared with 77 the week previously, chiefly from Liverpool, Garston, West Bank Dock, Llanelly, Burryport, Saundersfoot, Newport, Workington, Ayr, Troon, Glasgow, Preston, Campbeltown, Whitehaven, Manchester, Irvine, and Swansea. The total quantity of coal discharged upon the quays was 23,563 tons.

Belfast.

Prices are keeping firm, but there is no further change to report, business in all qualities being quite up to a seasonable average. Rates in the city stand as follow:—Giant's Hall Arley coal, 26s. 6d. per ton; Hartley, 25s. 6d.; Wigan, 24s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 22s. 6d.; Orrell slack, 22s. 6d. The recent advance of 6d. per ton in best classes of steam coals now extends to all qualities, current quotations ex-quay being 16s. 6d. to 17s. 6d. per ton for Scotch steam coal: Navigation steam, 16s. 6d. to 17s. 6d.; Welsh steam coal, 17s. to 18s. per ton; best Arley house coal, 22s. 8d. per ton; Scotch house, 19s. 6d. per ton. Cargoes arriving during the week were chiefly from Neath Abbey, Maryport, Whitehaven, Barry, Garston, Ayr, Burryport, Ellesmere Port, Manchester, Greenock, Partington, Port Talbot, Girvan, Glasgow, Workington, Ardrossan, and Troon.

Changes in the Inspectorate.—As we recently announced, the Home Secretary has been pleased to appoint Mr. T. H. Mottram to take charge of the York and North Midland Mines Inspection Division, in succession to the late Mr. W. H. Pickering. Mr. Mottram took up his duties on September 9, and will be stationed at Doncaster. Mr J. R. R. Wilson, who succeeded Mr. Mottram in charge of the Liverpool and North Wales District from the same date, will reside at Elmsley-road, Mossley Hill, Liverpool.

THE LONDON COAL TRADE.

Thursday, October 3.

The London coal trade for the past week has fully maintained its firm position. The opening markets were somewhat listless on account of the warmer weather, and at the end of the month merchants are often loth to buy unless for absolute necessities, but with the turn into October the weather was much colder, and a disposition to buy was distinctly apparent. Even now, however, the flow of orders is not so keen as the commencement of the winter months very often warrants, simply because, as a rule, colliery prices are ruling much higher than in former years. A good deal of business, however, has been done at the higher prices, and the market continues firm. Collieries all report a fair number of orders on the books, and no sign of weakened prices is at present seen. Seaborne house coal was also in good demand, but no cargoes are offering either for Durham or Yorkshire qualities. Twenty-three cargoes are reported as arriving in the Thames by Monday and six on Wednesday's market, but all sold. Quotations remain as before, 21s. 6d. for best Wallsend, 20s. 6d. for seconds. The closing of the Baltic ports is now fast approaching, but all classes of shipping trade continues brisk, and special attention is now being given to the Mediterranean ports. The public demand was on Monday reported to be somewhat slack, and householders generally are said to be well supplied, but so many of the London houses are dependent upon a weekly or fortnightly supply, that much depends upon the weather at this season of the year. Stocks at the various wharves and depots are fully up to the average, and, as a whole, the metropolis may fairly be considered well prepared for the winter trade. Manufacturing coal is still selling freely and prices are firm. The Leicester collieries, who have accepted the lower prices for the renewal of the yearly contracts (and who undoubtedly profited largely by the increased tonnage and regular working during the summer) now find themselves inundated with orders, and proportionally are quoting much higher prices for the current sales than many of their neighbours. The difficulty of railway transit is still very much to the front, and the delay in the return of empties is causing a good deal of anxiety in some quarters. A few of the Yorkshire collieries advanced their prices on October 1, but only to a very trifling extent, and for a time there was a disposition on the part of some of the London merchants to advocate an advance in the advertised prices. The prevailing weather, however, and the somewhat restricted amount of business delayed the settlement, but it is felt by all that the advance has only been temporarily delayed, and that in the near future a further advance in public prices will take place. The attendance on market has not been as large as usual, but many of the principal buyers are still finishing their holidays, and others are fully occupied in finding storage accommodation for the coal coming forward, so that the necessity for attendance on the days the market is held is not necessary. Small nuts and slacks have been more abundant during the week, and prices have slightly weakened. The demand, however, continues fairly good, but the steady working in all directions at the collieries has led to an overplus for the time being. Kitchen coal continues selling freely, and the demand is strong, so also are the various qualities of gas and foundry coke. Any alteration in the price of house coal does not necessarily mean that hard steam coal also will advance. This market is under very different conditions to the household qualities, for not only is the coal sold largely under contract at fixed prices, but the shipping season, which is now rapidly drawing to a less busy period, has a great influence upon the steam coal prices. With reduced requirements for shipment more coal will be available for the home markets, and already, in some cases, a reduction has been made to secure the orders. No definite steps, however, have yet been reported, as some have reduced, whilst others have advanced. Buyers, however, are waiting, as the prevailing opinion is that the wholesale quotation must come lower, and that very shortly; meanwhile prices are very uncertain.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, September 27.—The seaborne house coal market was steady to-day, but no cargoes of either Durham or Yorkshire available. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 18.

Monday, September 30.—There was a good demand for seaborne house coal at to-day's market, but no cargoes of either Durham or Yorkshire on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 22.

Wednesday, October 2.—The seaborne house coal market was without alteration to-day, with a fair demand, but no cargoes available. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 6.

THE TIN-PLATE TRADE

Liverpool.

The tone of the market rules exceedingly firm. Enquiries are good, and a steady business is reported for delivery over the first half of next year. Several works, however, are as fully booked up as they care to be, and are declining to sell ahead unless at their own figures, which are prohibitive. Quotations vary a good deal, but the following may be taken as about the figures generally quoted for delivery to suit the works over a few months.—Coke tins, in approved quantities: I C 14 × 20 (112 sh. 108 lb.), 15s. 6d. per box; I C 28 × 20 (112 sh. 216 lb.), 31s. to 31s. 3d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 10½d. to 16s. 1½d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 16s. per box; I C 14 × 19¾ (120 sh. 110 lb.), 16s. per box; I C 20 × 10 (225 sh. 156 lb.), 22s. 9d. to 23s. per box; I C squares and odd sizes, 15s. 10½d. to 16s. 3d. basis. Terne plates stand firm at 26s. 6d for I C 28 × 20, 112 sheets unassorted. Charcoal tins run 18s. basis and upwards according to tinning. Coke wasters are in good request, and prices are very firm as follow:—C W 14 × 20, 14s. 3d. per box; C W 28 × 20, 28s. 9d. to 29s. per box; C W 14 × 18¾, 14s. 6d. per box; C W 14 × 19¾, 14s. 9d. per box; C W 20 × 10, 20s. 9d. to 21s. per box—all f.o.b. Wales, less 4 per cent.

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Forthcoming Annual Meetings.

Manchester Geological and Mining Society,	Oct. 8, 1912
North Staffordshire Institute of Mining and Mechanical Engineers ...	October 14, 1912
South Staffordshire and Warwickshire Institute of Mining Engineers ..	October 1912 (2nd week)
Institution of Mining and Metallurgy,	March 13, 1913
International Geological Congress—	August 21, 1913 (Toronto)
Geological Society ..	Feb. 21, 1913

The Colliery Guardian.

LONDON, FRIDAY, OCTOBER 4, 1912.

The autumn meeting of the Iron and Steel Institute has been held during the present week at Leeds.

The Second Report of the Explosions in Mines Committee has been issued [Cd. 6431]. The report, which deals with the relative inflammability of coaldusts, is referred to in our leader columns this week, and will be dealt with at greater length in our next issue.

The annual conference of the Miners' Federation of Great Britain was opened at Swansea on Tuesday, when Mr. Smillie delivered his

s. The Nationalisation Bill drafted
l committee appointed by the
: the purpose was approved at
sion.

f the Midland Institute of Mining,
chanical Engineers was held at
uesday, a discussion taking place
n the prevention of explosions in
r. John Harger recently read at
A report will appear next week.

cite district of the South Wales
tion, which has a membership of
and is the largest district in the
s decided to break away from the
d conduct its own affairs. The
trict is strongly opposed to the
scheme.

ts have been made for establishing
n in Rotherham.

meeting of the Association of
cal Engineers was held in Sheffield
r. W. C. Mountain, of Newcastle,
esident for the year, with Mr. A.
Motherwell, and Dr. W. M.
ewcastle, as vice-presidents. The
e course of his address, said it was
know that the total membership
ion was now over 1,000.

on the remaining 15 bodies of
ns of the Cadeby Mine disaster
the 27th ult., when a verdict was
the men were accidentally killed
mine on July 9 last. The inquest
luded on James Burns, a member
ers Main rescue team, who was
on August 18 whilst removing
the Cadeby mine. The jury
rdict of "Death from suffocation."
ffice enquiry was resumed on
again adjourned.

THE publication of the Second
rt Report of the Explosions in
Mines Committee, the text of
which will be given next week,
marks a further stage in the
important investigation on coal-
dust explosions now in progress.
done at Eskmeals, although not
spectacular as the Altofts experi-
vertheless been extremely interest-
led to valuable scientific results,
arly in connection with the reasons
differences in inflammability ex-
arious coaldusts. Assuming that
and inflammability are definitely
actical result in view has been the
of some standard by which this
y may be measured. The advantage
to classify coaldusts according to
ur under explosive conditions is
in the absence of adequate know-
principles upon which explosibility
hould be driven to have recourse
t in the testing gallery before any
nple of coaldust could be properly
o its explosive properties. This
ever decisive, would be imprac-
y on the score of expense, to carry
rehensive manner. An endeavour
, been made to discover what is
tal reason why some coaldusts are
ighly inflammable than others.

experiments have led M. TAFFANEL
on that the order of inflammability
the same as that of their content
atter, but this view cannot be
tisfactory, although it has been
y previous authorities. As long
MM. MALLARD and LE CHATELIER were led to the opinion that content of volatile matter is not the only factor determining the inflammability of coaldust. Its character and the ease of expulsion of the gases would also have to be considered. It must also be remembered that the term volatile matter, as generally used, includes all that can be expelled from coal by the action of heat, and amongst the products thus evolved are some of an incombustible nature.

One of the results of the British experiments has been to show conclusively that the relative ignition temperatures of a series of coaldusts show no fixed relationship to the percentage of volatile matter as usually determined. There is thus an apparently serious discrepancy between the two conclusions.

The reason for the long prevalence of a belief in the theory that the relative inflammability of coaldusts can be measured by the proportion of volatile matter that is contained in them may be sought in the fact that, in a crude sense, it is true. Thus, as BEDSON and WIDDAS pointed out in 1907, dust from bituminous coals is more inflammable than anthracite dust; but when this theory is applied to a series of coals of a similar class it entirely breaks down, and we have to look further for a trustworthy basis of discrimination.

In so doing it is necessary to refer to that difficult problem—the chemical constitution of coal. Although there is an almost complete agreement as to the initial vegetable origin of coal, the view once held as to the progressive transformation of cellulose into coal substance is not now greatly favoured. The "peat-to-anthracite" theory, which has adorned geological text-books for many generations, seems, as in other cases, to be too simple to be true. As a result of modern research, it is the present tendency to believe that by no process of metamorphism can cannel coal become anthracite. The degradation of cellulose by the bio-chemical action of *amylobacterium* is no doubt a fact, but this action must result in different final degradation products, according, perhaps, to the proportion of ligno-cellulose, gums and resins in the original plant substance.

In solving the riddle of the chemical nature of coal we have an initial difficulty in much ignorance of the real nature of the original plant substance, which may have consisted of ferns, sedges, mosses, seed plants, gelatinous algæ, or even, in some cases, of that mysterious plankton slime, called by POTONIE *sapropele*, in which animal and vegetable matter are intermingled.

The problem has been attacked in several ways with varying success. For the present we may dismiss recent advances in the microscopic examination of thin slices of coal, although that method gives undoubted help to the elucidation of structural differences. The chemist has hitherto relied upon two different modes of procedure, viz.—(1) the action of solvents, and (2) fractional distillation. The action of solvents is being investigated by the United States Bureau of Mines, and a report upon the phenol extract, by Messrs. FRAZER and HOFFMAN, has been published, and throws but little additional light upon the matter. The nature of the pyridine extract is now under examination, and something of interest may be anticipated from the result, especially in view of the Eskmeals report, in which, as will be seen, the pyridine extract is endowed with a new and practical importance with respect to the question of the inflammability of coaldust.

The method of fractional distillation, as recently applied by Messrs. BURGESS and WHEELER, has afforded valuable results, which have led those authors to a definite conclusion as to the nature of coal. They maintain that all coals contain at least two different types of compounds of different degrees of ease of decomposition. They regard coal as a conglomerate consisting of cellulose degradation products embedded in a cement of altered resins and gums. It is, in their view, the latter which first distils by heat, yielding mainly the paraffin hydrocarbons. The cellulose products are decomposed later, and, at a higher temperature, yield proportionally large quantities of hydrogen.

In the Eskmeals report strong evidence is adduced to show that the paraffin-yielding constituents referred to above are identical with Dr. BEDSON's pyridine extract, for it is proved that in the series investigated there is a marked, although not rigid, relation between the ignition temperature of coaldusts and the percentage that can be extracted by pyridine.

In a recent work by Messrs. TAFFANEL, FLOCH and DURR, describing certain investigations undertaken at Liévin upon the oxidation and distillation of coaldusts, there is, on the whole, striking confirmation of BURGESS and WHEELER's work on the *Volatile Constituents of Coal*, where it is shown that in the course of the fractional distillation of coal the early products consist mainly of the paraffin hydrocarbons. Thus at Liévin it was found that at 700 degs. Cent. all the ethylene and four-fifths of the methane had already been expelled. These gases are also those which possess the greater heat of combustion, that for ethylene being given by M. TAFFANEL as 341 calories, methane 213, hydrogen 58, and carbon 68. It is interesting, also, to note that these same gases which are most readily distilled from coaldust have the lowest "limit" value for inflammability in air. As in other distillations the *produits de tête* differ markedly from the *produits de queue*, and the danger of coaldust is vastly enhanced by the fact that the early distillates are the more readily inflammable.

Perhaps we may be able to find in these researches some explanation of the curious fact observed by Messrs. PORTER and OVITZ with regard to the difference in the nature of the volatile constituents of the geologically older Appalachian coals as compared with the younger coals of the Western States. The older coals are said to contain a larger amount of bitumen or substances which readily liberate methane and ethane hydrocarbons and hydrogen, while the younger coals produce larger amounts of carbon monoxide and dioxide, pointing to the presence of a C – O linking, possibly in the form of complex alcohols, aldehydes or acids.

The Eskmeals report deals also with the influence of ash upon inflammability. Added ash raises the ignition temperature, but natural ash does not seem always to have this result, as was suggested by the experiments on South African coal carried out at Altofts. Natural ash content, of course, depends upon the primary origin of the coal substance. It is noteworthy that the true anthracites are remarkably free from ash, while this constituent varies greatly in bituminous coals and lignites. In the Eskmeals researches it was found that often a high percentage of ash in the coal was counterbalanced by a high percentage of pyridine extract. Thus if two coaldusts with the same ignition temperature differed in the percentage dissolved in pyridine, the higher pyridine percentage was accompanied by the higher ash content. This may be an accidental coincidence, or it may be proved to possess some significance with regard to the nature of the coal substance.

So far as this report goes, only the question of relative inflammability of coaldusts has yet been fully considered. There is, however, a word of caution against the danger of confusion between initial inflammation and the propagation of an explosion wave. Coaldust, once ignited, usually develops enough heat to distil inflammable gases from adjacent layers, and inflammation thus spreads from the source. Different dusts propagate the flame in different ways. Generally, the flame travels most quickly with those dusts giving the shortest flames, but it must not be assumed that ease of ignition is any criterion of the rate of propagation. Upon this point knowledge is yet incomplete, but the Altofts experiments have already shown that such dusts as those of anthracite or wood charcoal, difficult as they may be to ignite, are capable of developing explosion waves of the greatest intensity.

This Second Report of the Explosions in Mines Committee seems to bring us sensibly nearer the end in view. Although, to some extent, it is of a somewhat abstruse character, it can scarcely be regarded as academic. The research appears to be proceeding upon sound lines. The conclusions seem to hang well together, and we may confidently look forward to fruitful and beneficial results as the tangle is gradually unravelled.

Forthcoming Mining Exhibition.

A strong consultative committee has been formed in connection with the Great Mining Machinery Exhibition which Messrs. Montgomery are holding at the Royal Agricultural Hall, Islington, from May 29 to June 7 next. Five years will thus have elapsed since the last exhibition of this series took place at Olympia. Up-to-date mining machinery and plant are, of course, again to be the main exhibits, but on this occasion especial attention to life-saving and rescue work is secured by the consultative committee, the members of which are Sir Ralph P. Ashton; Mr. W. E. Garforth, LL.D.; Prof. J. S. Haldane, F.R.S.; Sir Henry Hall, I.S.O; Sir Thomas H. Holland, K.C.I.E. F.R.S.; Mr. A. M. Lamb, M.Inst.M.E.; Mr. H. C. Peake, past president Inst.M.E.; Mr. H. L. Sulman, past president I.M. and M.

The first meeting of the committee was held on Thursday last at the offices of the Exhibition, 43, Essex-street, Strand, W.C. There were present Sir Thomas Holland (in the chair), Prof. Haldane, Mr. Lamb, Mr. Sulman, and Mr. H. G. Montgomery. It was decided to invite all the chief institutions connected with mining in this country, the colonies and abroad, and also the students of all technical mining schools in Great Britain to the Exhibition, to see not only the latest plant and appliances, but also a most instructive series of what, in a non-technical exhibition, might be called "side-shows." The valuable suggestions made by the committee in regard to the latter include a competition for lamps and other apparatus for testing gas; apparatus for testing the explosibility of coaldust; rooms to illustrate the difference between a dry and a moist heat of some 90 degs. Fahr., with still or moving air; a room with air vitiated to about the maximum extent permitted by the Mines Act, showing its effect on lamps, &c.; arrangements for preventing miner's phthisis; demonstrations of the causes and prevention of miner's nystagmus; arrangements for preventing coaldust explosions; photometers for use in the mine; and rescue apparatus and ambulance appliances for use underground. A series of lectures is being arranged on these and other subjects of importance to the mining industry. It is hoped that the Home Office, which has taken so much interest of recent years in the safety of mining operations, will have an official exhibit.

Trade Summary.

The London coal trade for the past week has continued firm. The milder weather early in the week lessened the demand, but colliery representatives were all full of orders, so that all wholesale prices were firmly maintained. Seaborne prices are unchanged, but although a fair number of steamers are arriving in the Thames, no cargoes are offering for sale. The public demand has slightly lessened, and householders are said to be well stocked, but the return to colder weather will immediately improve the demand. Manufacturing coals are selling freely. Shipping (especially to the Baltic ports) is rapidly drawing to less busy season, and prices are very uncertain. All kitchen qualities are firm, but smalls are somewhat weaker, owing to the plentiful supply. Both gas and foundry cokes are in strong demand.

Prices at Newcastle are firmer, there being an especially strong forward demand for coking coals and bunkers. Tonnage is more plentiful.

The Durham coal trade is steady for prompt loading, and the enquiry for forward shipment is good.

The inland demand for Lancashire house coals, which have been advanced, is rather quieter. Shipping and manufacturing sorts are strong, but slacks are rather more easy to procure.

In West Yorkshire the rise in house coal prices has checked the demand to some extent, and traffic difficulties have again arisen. Manufacturing coals are very scarce.

The South Yorkshire steam coal trade is scarcely so strong as regards the export branch, otherwise the general firmness of the market is unaffected. House coal is very firm.

The demand for Derbyshire house coal is steady, notwithstanding the advance in prices, and stocks are low. Steam and manufacturing coals continue in urgent request.

The market at Cardiff is somewhat uncertain owing to the tonnage situation, but sellers are generally optimistic as regards the future, and contractors are showing some anxiety to cover their requirements. Monmouthshire coals are steady. Bituminous coals are unchanged. The demand for patent fuel is quiet.

The Scottish coal trade is active in all branches.

LABOUR AND WAGES.

Miners' Federation of Great Britain.

The annual conference of the Miners' Federation of Great Britain was opened at Swansea on Tuesday. There were present 150 delegates as representatives of the 1,600,000 members of the Federation. Mr. Robert Smillie (Scottish Federation) presided.

The president, in his inaugural address, said that the past year had been the most momentous in the history of their movement, not even excepting that terrible year 1893. Even now it was not too early to learn some lessons from the strike. One was that whoever might have suffered from that strike, the coalowners certainly did not suffer. In this case not only did the colliery owners not reach the point of hunger, but he was inclined to think that, financially, they were considerably better off than they would have been but for the strike. There was another lesson they ought to have learnt from the strike. They had been passing resolutions for many years in their annual meetings, saying the time had come when the mining industry should be in the hands of the Government and should be worked by the Government on behalf of the whole nation. He thought the dispute must have brought the nation a little bit nearer to the State ownership of the mines. The mineowners did not show any great concern for the industries or prestige of the nation during that dispute, and resented quite as much as some of the miners' leaders the entrance of the Government. The mining industry was of far too great importance for the nation, as well as the million workers in and about the mines, to leave it any longer in the hands of private individuals, whose chief interest was earning profits and making fortunes out of it. The conference would be asked to consider the provisions of a Bill for the nationalisation of mines. They had already affirmed the principle. They would now be asked to consider and approve the details so that they might set on foot a vigorous agitation for the State ownership of the coalmines of Great Britain. If that were accomplished the strike would have had its useful side. He would like to say to the general public that the price of coal had gone up, and and he would like them to know that the price would continue to be up. The coalowners said that for every piece of legislation which placed any burden on the mines an additional burden must be added to the price of coal and the general public must pay. He sincerely hoped the employers would stick to that. There was a tendency to make the wages of the men suffer from any additional cost from legislation. If there was any additional cost from legislation designed to promote safety or improve social conditions, then the commodity should bear it, but no person need suggest that the addition of 2d. or 3d. per ton which had been placed on coal by recent legislation made it necessary that there should be a permanent rise of 1s. 6d. or 2s. The public would find, at the end of the financial year, where that additional burden had gone. The possibility was that enormous dividends would be paid for the next year or two by the colliery companies of this country. They did not wish to see the price of coal lowered to a point that would not allow the employers to go on and pay reasonable wages to the underground workers, but they did say that the public had a right to be protected against mere dividend hunting. A short time ago a new Mines Regulation Bill was passed. It was too early yet to know whether that would lessen to any great degree the number of fatal and non-fatal accidents underground. If there was not a change, then that legislation was not sufficiently drastic, because anyone who had given this subject the study it deserved knew that with proper legislation adequately carried out the accident rate could be reduced. During the past year a good deal had been said about Syndicalism. Syndicalism was not going to ruin the trade union movement. He wanted to advise that conference and the trade union movement not to condemn a thing merely by its name. He remembered the time in the early days of their movement when the proposal that there ought to be a fixed minimum wage for miners and that wages ought to be the first charge on a ton of coal was referred to as a conspiracy to destroy the employing class. He remembered when, even in that conference, many of their comrades who were not Socialists looked upon a Socialist agitator like himself as a thief and robber. He must admit he did not understand Syndicalism. Yet Syndicalism, according to some, was a means by which the workers in the different industries were to take over those industries and work them for the benefit of the workers, reducing the production as far as possible and increase wages to the highest point; to make it impossible to continue the industry at a profit, and then take over and work the industries for themselves, independent of the workers in other industries. That, in his opinion, would be Individualism run mad. He understood that was not Syndicalism in the form in which it was advocated by those who understood. Syndicalism was an organisation of each industry into a trade union common to that class, and the combination of that union with the unions of other trades until, as far as possible, a common trade union of all workers should be formed, not only of this country, but internationally. If that was Syndicalism, he did not think that many of them need object to it. Personally, he felt that the time had come when a forward movement should be made to widen the influence of their trade unions. He was one of those who believed that the power for improving the condition of the people by the trade union movement was only starting, but he believed it must be from a closer connection of all the trade unions together. While their power to produce wealth was increasing by leaps and bounds, the living condition of the people was not increasing to any extent. If the people's position was not being improved relatively to the progress of wealth, then the money was going into the pockets of the capitalist class and would be used in the further enslavement of labour. Whatever they might say, there was a war between the producers and non-producers, and the producers could not secure benefits in the shape of higher wages, shorter hours and better housing conditions except at the expense of the other people. There was a war being waged by the advanced labour movement against poverty, and there was another war which was moving forward in the direction of eliminating those who lived on land and capital without having toiled for their living. That movement was going on, and they would ultimately have to accept it.

Mr. Locke (Northumberland) proposed that the Federation help the Northumberland Miners' Association to secure the abolition of the three-shift system. The resolution was carried unanimously. The Durham miners then proposed that steps be taken to have the three-shift system abolished where the third shift had been introduced as a result of the Eight Hours Act. Opposition was offered to the reference to the Eight Hours Act, and on a vote the resolution was defeated by a small majority.

The conference then adjourned.

The conference was resumed on Wednesday, and in the first place decided in favour of an amendment of the

pensation Act providing that, while the
esponsible for the payment of the com-
workmen injured and incapacitated by
ollowing their employment, such pay-
recoverable by the Government from
d that should the employer fail or go
and the estate when realised fail to
nt required, the balance should be
State. Further suggested amendments
also approved. Mr. Weir (Northumber-
motion asking the Federation to try
h legislation State insurance for miners
nfirmity may debar them from work
mum Wage Act by means of a special
a special tax on profits derived from
industry. The resolution was carried

mith (Yorkshire) submitted a motion in
nationalisation, in the interests of the
ty, of all lands, minerals, mines, and
was unanimously adopted.

field (Bristol) proposed that the execu.
he Labour Party to bring in a Bill with
blishing uniformity of wages consistent
of employment. He said the Govern-
the Minimum Wage Act, had declared
and boy should have a minimum wage,
ion must see that it was a living wage.
of the hewers in his district did
l. a day. Mr. Whitehead (Somerset)
motion as impracticable to a degree.
want the conference to raise false
d not be realised. On a division there
oting on either side, and a card vote
rther tie, 278,000 voting on each side.
tives of the Midland Federation, who
n the vote was taken, arrived while the
proceeding, and announced that they
esolution. Mr. Whitefield protested
ptance of the Midland vote at this stage,
an overruled the objection and declared
by 314,000 against 278,000.

e sitting the conference unanimously
steps to secure for all surface workers
e of not less than 5s. a day.

ationalisation Bill drafted by the com-
ederation was presented to the delegates
morning. The Bill, which contains
ides for the creation of a Minister of
lary of £2,000 per annum; Clause 2
transference of coalmines and minerals
nd is as follows: "Every colliery and
nor in actual work or discontinued or
bandoned, and every shaft, pit, level,
laue in course of being made or
nencing or opening any such colliery or
ding every patent fuel plant, coke oven,
railway rolling stock, and all other
g to or connected with such colliery or
very house belonging to the owners of
ry or coalmine which is occupied by
oyed at such coalmine shall be vested in
e Minister of Mines in his corporate
s successors. Clause 3 determining the
purchase, provides that the Minister
purchase the coalmines of the United
than those which are the property of
the time of passing of the Act, at the
manner provided by the Act, provided
value of any minerals or right to work
ineral wayleaves other than a surface
not be taken into account in computing
all of which no compensation shall be
e Bill provides for payment of equip-
on, but no payment is to be made for

s unanimously approved by the con-

. House (Durham) proposed that the
pt a five days working week for all
ountry. Incidentally, it would follow
n of a five days working week would
on the output of coal; and in so far as it
put of coal it would assist them in main-
selling prices and enable them to
ner rate of wages.—Provost R. Brown
no seconded, said if this matter was left
it would be put into practice in one
n Scotland the men had voted time after
of a five days week.—Mr. Albert Stanley,
Chase) said that they were opposed to this
their vote would be cast against it. In
land districts they had a purely seasonal
e would be a very real difficulty when
ply this proposal. The Midland Federation tried this policy years ago, and it was an absolute failure. It was the most unpopular policy they ever had. There was no evil the men suffered from which they did not attribute to the five-days policy.

Mr. Levi Lovett (Leicestershire) said they were in exactly the same position as Cannock Chase. Personally he thought four days a week was long enough to work underground, but where men could only work two days a week in summer he thought they should be allowed to work the full six days in winter. Mr. W. Brace, M.P. (South Wales) also opposed the resolution. "You cannot," he said, "give power to the executive of the Federation to declare that, upon a given day, a five days' week is to be the period worked in all the coalfields of Britain unless, at the same time, you can give an assurance that the men will earn as much wages in five days as they now earned in six." To carry this resolution was to destroy any possibility of settling the surface-men's question. If it was to be a five days' week the minimum wage would have to be raised very substantially, because the demand for the necessities of life would compel them to ask for more than 5s. a day which the conference asked for. Speaking for the South Wales coalfield at a large number of their collieries those who worked the night shift got paid for six shifts when they worked five. If the collieries lost one shift the owners would make that an excuse for not working five shifts, but would work four and the men would only be paid for four shifts. Before any serious step was taken there ought to be a ballot of the whole of the men employed in the coalfield.

Mr. W. Straker (Northumberland) contended that as a federation they had committed themselves to the five days' week. The British miners had also sent it to the International Congress, where it was carried with their approval and support. Mr. Stanley had said they had tried this principle in the Midlands and failed. Why did they fail? Because there was no uniform system, and what they were giving up another district took from them by longer hours. That was what happened to them in Northumberland in the seventies. They had a five days' week, and the owners said to them—"All the other districts are working while our boats are lying idle in the Tyne. If you can establish a five days' week in other districts we don't mind."

Mr. W. E. Harvey, M.P. (Derbyshire) said this resolution was fraught with very serious consequences—consequences once accepted without the full consent of the men would go a long way to break up the federation. In the Federated area they had tried this five day's working policy, and they found that the employers were not their greatest foes, but that their men were against it.

Mr. J. Robertson (Hamilton) said anyone who had followed the industrial history of this country knew that the argument used by Mr. Bruce was always the argument of the employers to any demand for improved conditions, and Mr. Brace had that day provided the employers with one of the most powerful arguments they could possibly have.

Mr. W. Carter (Nottingham) said the County of Nottingham had not only adopted the principle of a five days' week, but had put the principle into practice. He was pleased to say that one-third of the pits in the county had been working five days a week for twenty-five years. The owners had always fought them because Derbyshire and the neighbouring counties were working six days a week, and they had the same competition to meet. That was the reason why they had been unsuccessful in getting five days a week at every pit in the county. As far as national legislation was concerned, when introduced it did have an adverse effect in some districts and to some of the men, but they had to look at what it was going to do for the whole, and it was because they as a county were convinced that the principle was right that they were supporting it. They were not afraid in Nottinghamshire to submit to a ballot.

Mr. Warne (Northumberland) stated that on the Wage Board for Northumberland Lord Mersey asked the number of days worked by the men before making his award. When he found some of the men were working six days a week he fixed the minimum wage at a lower rate than it would have been with a five day week.

The President mentioned that he moved a similar resolution in the conference some years ago in the interest of districts with a seasonal trade. He felt it to be the duty of the Federation to so equalise the output as to equalise the labour among the men employed in the pits. Unless they adopted some such policy as this they would find with the enormous development of the Yorkshire coalfield they would be rushing their surplus coal to other coal-producing districts.

On a card vote the resolution was carried by 306,000 to 283,000 against. Among the districts who voted for the resolution were Lancashire, Nottingham, South Wales, North Wales, Forest of Dean, Northumberland and Durham. Among the districts against were Yorkshire, Midland Federation, Derbyshire, South Derbyshire, Leicestershire, South Wales, Bristol, Somerset and Cumberland.

The President said he should advise the conference in view of the closeness of the vote to take a ballot of the men. It would be absolutely impossible to put it in force on figures such as those. It was then unanimously decided to take a ballot of the men as to whether they are in favour of a five days week.

Mr. Oates (Yorkshire) proposed that the executive committee, along with the Labour Party, press for the passing of a measure to prevent employers of labour evicting workmen from their homes during any trade dispute.

The resolution was carried unanimously.

The President said they should not be satisfied with bringing in a private Bill, but rather try to get the Government to make it a Government measure.

Mr. Robert Smillie, Lanarkshire, Vice-President, was the only nomination for the Presidency, and was unanimously elected.

There were several nominations for the office of Vice-president, and the voting resulted in the election of Mr. W. E. Harvey, M.P., Derbyshire.

Mr. Thomas Ashton, Manchester, was re-elected secretary, and Mr. W. Abraham, M.P., treasurer.

The following were elected the executive committee for the year:—Messrs. J. Wilson, M.P., and J. Robson, Durham; W. Brace, M.P., V. Hartshorn, and G. Barker, South Wales; H. Smith and S. Roebuck, Yorkshire; H. Murnin and J. Robertson, Scotland; A. Stanley, M.P., Midlands; A. Sharpe, Cumberland; S. H. Whitehouse, Somerset; J. McGurk, Lancashire; J. G. Hancock, M.P., Nottingham; B. Kenyon, Derbyshire; and W. Straker, Northumberland.

THE WELSH COAL AND IRON TRADES.

Thursday, October 3.

North Wales.

Ruabon.

COAL.

The coal trade in this locality, during the past week, has remained quite as brisk as the week previous; at the present time there is no lack of orders, and, as a result, all the collieries are able to work full time, and there is every appearance that this good state of affairs is likely to continue for some time to come. On Tuesday last, October 1, there was a general advance of 1s. per ton on all classes of coal sold outside of contracts made previously, and even with this advance, salesmen have found no difficulty in booking orders during the past week. It is generally assumed that another advance in the immediate future will be an inevitable result of the present demand, and the extent of this advance will be affected by the fact of whether the miners obtain the advance of 5 per cent. in their wages, which is now under the consideration of the Conciliation Board of the Federated area. The continued good weather and good trade had enabled all the various works of the neighbourhood, such as brickworks, ironworks, etc., to work full time, and these works have taken a considerable amount of the cheaper class of steam fuel. Steam coal for locomotive purposes is in good demand, and railway companies are taking their full contract quantities. The output of gas coal has been a little restricted, but not to any appreciable extent, and there is a great demand for nuts, and also for slack, of good quality, and small gas coke. The following represent the ruling prices at the time of writing:—Best large household coal 16s. and 17s. per ton f.o.r., large seconds and best smalls 1s. per ton less; steam coal 13s. and 14s. per ton, nuts 12s. per ton, slack up to 8s. and 8s. 6d. for roughest quality, and there is a good landsale business, all the school contracts now commencing to take deliveries, and the average price obtained for this class of fuel is from 16s. 6d. to 17s. 6d. per ton, delivered at the schools within a mile of the coal wharf. Gas coke still continues in good demand at from 16s. 6d. to 17s. per ton at works.

Monmouthshire, South Wales, &c.

Newport.

COAL

The strength of the local coal trade is evenly maintained for all grades of large, with smalls scarcely so firm, as supplies gradually increase. Tonnage is in fair supply, while there is enough chartered for early dates to ensure shipments for some little time. With rather more business passing and a good enquiry maintained, sellers are quoting firm alike for prompt and future dates. The house coal trade shows a steady increase in turnover, with no great change in values. Patent fuel and coke continue an even flow of business, the latter especially meeting with a brisk demand. Pitwood is rather more abundant, although sellers have had no difficulty up to the present in clearing away consignments as they arrive. Values rule a shade easier around 22s. for good wood ex-ship. The freight market, disturbed by the Oriental war-fever, shows nothing doing for Black Sea ports, while rates for other destinations are, if anything, a shade easier in consequence of extra tonnage available. Latest approximate quotations are as follow, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 3d. to

15s. 9d.; western-valleys, ordinaries, 14s. 6d. to 14s. 9d.; eastern-valleys, best, 14s. to 14s. 6d.; other sorts, 13s. 6d. to 13s. 9d.; colliery smalls, best, 9s. to 9s. 3d.; seconds, 8s. 6d. to 8s. 9d.; inferiors, 8s. to 8s. 3d.; screenings, 9s. 3d.; through coals, 10s. 9d. to 11s.; nuts, best washed, 11s. 3d. to 11s. 6d.; house coals, best, 18s. to 18s. 6d.; seconds, 16s. to 17s. 6d.; patent fuel, 17s. 6d. to 18s. 6d. Coke: Furnace, 22s. to 25s.; foundry, 26s. to 30s.

IRON.

Whilst all departments of the local iron and steel trades continue busily employed, there is not a large amount of fresh business passing at the moment. The tone generally is exceedingly strong, and makers are quoting increased prices for any enquiries coming on the market now. Mills are running at full pressure to execute current specifications for tinplate bars and sheet bars, for which quotations are somewhat firmer at £5 17s. 6d. Bessemer, and £5 17s. 6d. to £6 Siemens for Welsh bars. At local rail mills continued activity is reported, and values have hardened 2s. 6d. on the week, latest values being based upon £6 12s. 6d. to £6 15s. Bessemer, and £6 15s. to £6 17s. 6d. Siemens for heavy sections. At blast furnaces the output is fully up to the heavy average of the past few weeks. Enquiry continues satisfactory, and quotations are firmer. Latest ruling prices are 86s. to 87s. for Welsh hæmatite delivered in the district. Iron ore is a better market, 22s. to 22s. 6d. being now quoted for best Rubio c.i.f. Newport. Tinplates show some slight improvement. Enquiries are principally for forward delivery, and writing generally, makers are able to book at their own prices. Latest official values are based upon 15s. 6d. to 15s. 7½d. Bessemer, and 15s. 7½d. to 15s. 9d. Siemens for 20 × 14 × 112.

Cardiff.

COAL.

Although there are indications that the quantity of tonnage offering is on the increase, it is still insufficient to meet the requirements of shippers. Last week the charterings represented a total tonnage of 385,700 tons—an increase of over 22,000 tons as compared with the previous six days—but so enormous is the output of coal that considerably more vessels must enter the Channel ere the market can be described as in a healthy condition. The shipments for the week amounted to over 360,000 tons, but in the opinion of colliery sales agents there should be at least 400,000 tons loaded every week in order to prevent the accumulation of stocks. Unfortunately a vast quantity of tonnage is abroad. When the great strike occurred a large number of steamers were diverted to other parts of the world, where labour troubles were non-existent. The closing of the Dardanelles resulted in the locking up of some 250 vessels, while an almost equal number were hampered in their movements by the dock labourers' dispute in London. Naturally a considerable proportion of the vessels, as soon as the owners saw there was but little probability of employment being found for them in this country, were sent to the United States, to South America, to the Far East, and other parts of the globe, where very remunerative rates were offering. Until something like a normal state of things pertains in the Bristol Channel not much improvement can be looked forward to in the coal trade. Freights still rule very high, though it is satisfactory to note that since last week there has been a slight lull in the market, of which many buyers seemed inclined to take advantage. But how long the lower rates will continue it is difficult to say. With the more active chartering, however, that is going on, sellers appear to be a little more disinclined to make concessions than they were a week ago, although in some cases, where stems are low, or ready tonnage is imperative in order to enable collieries to clear their wagons and find work for the miners, reductions can still be obtained from the quoted prices. Within the last few days, for instance, as low as 16s. 6d. to 16s. 9d. has been accepted for best steam coals for immediate shipment, but the general opinion on 'Change is that prices will improve in the near future; in fact, for next week's loading 17s is being demanded. A good many contractors are in the market, and it is reported that one of the best collieries on the Admiralty list has recently sold 300,000 tons for delivery over next year at 17s. 6d per ton. This is 6d. less than was obtained by the Ferndale collieries some weeks ago, but considering the uncertainty of the market, the price cannot be said to be unsatisfactory, though many of the best informed agents refuse to follow this lead. In the event of any further labour troubles, which, though improbable at the moment, are by no means impossible, it is believed there would soon be such a rush for supplies that prices would be bound to go up. Many contractors are showing unusual eagerness to cover their requirements. In addition to the Orient Steamship Company, who are seeking quotations for 60,000 to 100,000 tons for delivery over next year, the Booth Steamship Company are also in the market. In this case collieries are asked to give a price for 30,000 to 40,000 tons for delivery over six months, and also a price for 60,000 to 80,000 tons over the whole year. There has been a big enquiry for second-class coals, and one or two collieries on the Admiralty list are reported to have disposed of all the output they can spare for next year at a price which shows an advance of 1s. 6d. per ton above the current year's prices. The Paris, Lyons and Mediterranean Railways have also been in the market for about 57,000 tons of Cardiff and Newport large steam coals for delivery at Marseilles between January 1 and August 31; 85,000 tons of small steam coal for delivery over the whole of the year; and 55,000 tons of patent fuel for delivery before the end of August. Tenders went in on Tuesday, but the result will probably not be known for a week or two. The North of Spain Railways are also asking for tenders for 48,000 tons each of Monmouthshire large coals, small coal, and Cardiff or Swansea patent fuel, for delivery over the first 10 months of next year. These tenders have to be in by the 10th inst. It is reported that one Cardiff firm has contracted to supply 66 000 tons of coal for the Midi Railways at 18 fr. to 18¼ fr c.i f. Bordeaux. There is still a good deal of grumbling about the tipping accommodation at the Bute Docks. The Great Western Company say that though they had a steamer of 5,300 tons ready to load a cargo of coal on Tuesday of last week, they were not provided with tipping accommodation until Saturday, when a berth of two tips was given to them of so antiquated a nature that they were only able to load 774 tons in 9½ consecutive hours, or, roughly, 40 tons per tip per hour. The delays that take place are held to be responsible, to a very large extent, for the dearth of tonnage, shipowners not caring to bring their vessels to Cardiff unless they can be guaranteed prompt loading. The small coal market is slightly easier. Best bunkerings do not command more than 10s. 3d. to 10s. 6d., whilst first ordinaries have been sold at 10s. per ton. Best cargo sorts are quoted at from 9s. to 9s. 3d., though here again, in a good many instances, less than these figures have been accepted, in order to clear wagons. There are still a very large number of wagons under load, and until the number has been considerably decreased, prices will in all probability continue without much alteration. Washed nuts are round about 15s. 6d., and washed peas 13s. The market for Monmouthshire coals is steady, Black Veins selling at from 15s. 3d. to 15s. 6d., western-valleys 14s. 9d. to 15s., and eastern-valleys (best) 14s. to 14s. 3d. f.o.b. Cardiff. Bituminous coals are without appreciable change. No. 3 Rhondda large is about 17s., through-and-through 14s. 3d., and small 11s. 9d. to 12s.; No. 2 large is 12s. 3d. to 12s. 6d., through-and-through 10s. 6d, and small round about 9s. There seems to be more disposition on the part of buyers to cover their requirements for small coal than for large, and they are readily paying 10s. 3d. for next year. Some sellers ask 10s. 6d. No improvement is noticeable in the patent fuel trade. Shipments by the Crown company amounted during the week to 6,474 tons, other local companies 1,500, and Swansea 19,778 tons. For prompt shipment best brands are being quoted at 19s., but for delivery over next year 18s. 9d. is being accepted. The demand is very quiet, and is likely to be until steam coals go up in price Pitch is very dear, being 56s. per ton prompt, and 52s. over the year, or an advance of 15s. per ton as compared with the price formerly ruling. In addition to the buyers in the market mentioned above, the Algerian State Railways are enquiring for prices for 54,000 tons for delivery over next year. There is no alteration in the coke market Ordinary foundry is 25s., special 27s. 6d., and furnace coke 20s. to 21s. per ton. Pitwood is 21s. 6d., or 9d. less than last week. The following table shows the principal exports both in August last and in August of last year:—

	August 1911. Tons.	August 1912. Tons.
Russia	66,408	53,502
Sweden	16,477	30,974
Norway	12,896	11,797
Denmark	—	2,427
Germany	7,870	20,511
Netherlands	9,350	13,767
Java	5,932	4,589
Belgium	24,005	21,133
France	424,004	494,681
Algeria	40,508	50,370
French Somaliland	6,444	—
Madagascar	—	5,992
Portugal	39,962	54,869
Azores	3,449	1,426
Madeira	9,336	13,280
Spain	64,649	88,284
Canary Islands	35,607	31,021
Italy	394,896	490,145
Italian East Africa	4 977	—
Austria-Hungary	9,823	16,739
Greece	21,332	50,319
Roumania	11,852	13,185
Turkey (European)	14,211	14,760
,, (Asiatic)	4,039	13,636
Egypt	156,064	225,399
Tripoli	—	1,594
Tunis	11,267	20,668
Japan	8,252	—
Cuba	—	3,305
Chili	30,643	35,050
Brazil	105,785	120,783
Uruguay	54,170	76,853
Argentine Republic	143,086	242,651
Channel Islands	6,044	7,294
Gibraltar	9,147	17,108
Malta	30,319	34,863
Cape of Good Hope	4,594	—
Mauritius	—	3,506
Aden	20,546	30,491
British India	—	6,102
Ceylon	16,021	12,795
Canada	6,029	4,050
West Africa (French)	2,911	9,770
,, (Portuguese)	17,240	17,177
,, (British)	2,014	14,147

The *Cardiff Journal of Commerce* has received from the Customs House a table giving the average declared price per ton of coal exported from the different ports of the kingdom in August last, from which we extract the following relating to the chief Welsh ports:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	16	0	15	0	14	9	15	3
Through-and-through	11	3	11	2	10	7	10	4
Small	9	1	10	4	8	6	8	6
Large anthracite	24	7	—		16	4	17	5
Household	12	5	—		—		—	

In August of last year, the prices were:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	15	7	14	4	15	3	14	0
Through-and-through	10	10	11	6	9	8	9	10
Small	8	5	9	8	7	2	7	6
Large anthracite	—		28	4	13	1	16	1
Household	18	1	—		—		—	

IRON.

The difference between the shipments of tinplates and the receipts from works is without material change. For the past week the loadings totalled 145,000 boxes, or 13,000 boxes in excess of the receipts from works, and stocks now stand at 197,506 boxes. Although plates have a decided upward tendency, they do not keep pace with the rapid advance in the cost of production. Considering the extraordinary activity in the iron trade throughout the country, steel bars in South Wales are at a low figure. Siemens qualities still sell at £5 17s. 6d to £6, and Bessemer 2s. 6d. less. With tin at £230 per ton, the prices at which tinplates have recently been sold leave but a bare margin of profit for the manufacturer, but makers to-day are asking 15s. 9d. per box of 14 × 20 cokes and 16s. and 23s. for oil sizes. There are some second-hand sellers at lower prices, but tinplate works are so well supplied with specifications that most of them prefer waiting before entering further large quantities, and thus may cause merchants to revise their prices. The market for galvanised sheets continues very firm, and in sympathy with the upward tendency of steel, and spelter prices have a strong upward tendency. The leading makers still ask £13 for 24-gauge corrugateds, though there are other makers who will accept £12 5s. The pig iron market is very strong, and Welsh hæmatite is quoted at 83s. 6d. f.o.b. Iron ore is now firmer, best rubio being 22s. 6d, and second qualities 20s. 9d. to 21s. 3d. per ton. Scrap metals are in good demand, and new steel crop ends range from 67s. to 70s. f.o.b., according to dates of delivery. Old steel rails (mixed sections) are 57s. 6d., and double-headed 62s. 6d. to 65s. Heavy wrought is 54s., and cast 55s. With such strong iron and steel markets, it has come rather as a surprise that the workmen in this district under the sliding scale should have to accept a reduction of 2½ per cent. in their wages.

Swansea.

COAL

During the past week the trade of the port showed exceptional activity. Both the coal and patent fuel trades were unusually brisk; the shipments together totalled 131,439 tons. There was a capital attendance on 'Change this morning, and the undertone of the anthracite coal market was firmer. This to a considerable extent was due to the better supply of tonnage. There was a better demand for Swansea Valley large, and prices were firmer. Red Vein large also maintained its steady position. Machine-made nuts and cobbles were slow. Beans and peas were very strong. Rubbly culm was steady, whilst duff continued in good demand. The conditions prevailing on the steam coal market were unchanged; large continued slow. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 17s. to 19s., less 2½ per cent.; Red Vein large, 13s. 6d. to 14s. 6d., less 2½ per cent.; machine-made cobbles, 22s. to 24s.; Paris, French, and German nuts, 23s. 6d. to 26s.; beans, 21s. to 23s. 9d.; machine-made large peas, 13s. to 14s. 6d.; ditto fine peas, 11s. 6d. to 13s., all net; rubbly culm, 7s. to 7s. 6d., less 2½ per cent; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 18s. to 19s.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s. 9d. to 11s. 6d.; smalls, 9s. 3d. to 10s. 9d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 18s. 6d.; through-and-through, 15s. to 16s. 6d.; small, 12s. 6d. to 13s. 3d.; No. 2 Rhondda large, 14s. to 15s. 6d.; through-and-through, 10s. 9d. to 11s. 6d.; smalls, 9s. 3d. to 10s. 6d., all less 2½ per cent. Patent fuel, 17s. 6d. to 18s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

The iron and steel trades continued in a satisfactory state last week. The yield of pig iron compared most favourably with any similar period of the month now ended, whilst the steelworks in this district were fully operating. The tin-plate industry continues brisk; all the tin-plate and sheet mills were actively engaged. Engineering firms were busy, but some of the foundries could have done with additional orders. Shipments of tin-plates last week were 145,062 boxes, receipts from works 131,931 boxes, and stocks in the dock warehouses and vans 197,506 boxes.

Llanelly.

COAL.

All the collieries in this district have more than sufficient orders to keep at full work, notwithstanding the scarcity of tonnage. Boats have been coming on a little faster, but not fast enough to clear away the stocks. There is a very good demand from Continental buyers and it is expected that very shortly there will be an advance in prices of most coals. Those in most demand just now are anthracite large kinds, and several of the collieries are fully sold for months to come. Should we experience a hard winter there is bound to be a strong enquiry for every kind. Prices, except for large sorts, are keeping the same and are likely to remain so for the next couple of weeks. For hothouse coals there is a big enquiry and prices are advancing. All the machine-made kinds are going strong, but rubbly culm and duff are slightly easier. Steam and bituminous smalls are getting quite scarce and prices ruling are very firm. Large and through are going none too well. This week's figures are:—Best malting large, 23s. to 25s.; second malting large, 21s. to 23s.; Big Vein large, 17s. 6d. to 19s. 6d.; Red Vein large, 14s. to 15s.; machine-made large cobbles, 22s. to 23s. 6d.; German nuts, 24s. to 25s. 9d.; French nuts, 24s. to 25s. 6d.; Paris nuts, 24s. 6d. to 25s. 6d.; machine-made large beans, 22s. to 24s.; ditto, second quality, 20s. to 22s.; machine-made large peas, 14s. to 15s.; rubbly culm, 8s.; duff, 5s.; large steam, 16s. to 16s. 6d.; through-and-through, 10s. 6d. to 11s.; small steam, 9s. 6d. to 10s. 6d.; bituminous small, 10s. 6d. to 11s. 6d.—all f.o.b.

THE BY-PRODUCTS TRADE.

Tar products:—The market as a whole is quiet, but for the most part prices are well maintained. The two weakest products are crude carbolic acid and pitch. Benzols are firm, while naphthas and creosote keep very steady. Nearest prices are:—

Benzols, 90's, 1s. 1d.; ditto 50's, 11d.; toluol, 11½d.; carbolic acid, crude (60 per cent.), 2s. 5d. to 2s. 7d.; ditto crystals (40 per cent.), 7¼d.; solvent naphtha, 1s. 1¼d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 3d. for ordinary qualities; pitch, 48s. 6d. to 49s. f.o.b. east coast; ditto, 48s. 6d. to 49s. f.a.s. west coast.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—While the anticipations of the hyper-optimistic have not been justified by movement of prices as a whole, the market is really very steady, and where lower quotations are current it is necessary to ascertain the exact origin of the parcels offered. Forward quotations, though more or less nominal, are firm. Closing prompt prices are:—

London (ordinary makes), £13 16s. 3d.; Beckton, £14 1s. 3d. to £14 2s. 6d.; Liverpool, £14 10s.; Hull, £14 8s. 9d.; Scotch ports, £14 12s. 6d. to £14 13s. 9d.; nitrate of soda (ordinary), per cwt., 11s. 6d.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

rs to the Editor.

ot responsible either for the statements
opinions expressed by correspondents.
ions must be authenticated by the name
of the sender, whether for publication or
ice can be taken of anonymous communi-

stions are only given by way of published
rrespondents, and not by letter, stamped
velopes are not required to be sent.

PIT-HEAP FIRE.

has lately broken out on a heap of pit
causing some nuisance to the people
e vicinity. Can any of your readers
is fire can be extinguished and at the

Burning Heap.

, 1912.

LLIERY ASSESSMENT.

ny of your readers kindly advise me on
ints *re* assessment of collieries:—
hich was rented at £2 per acre as
d is taken over by a company for the
liery site, and they agree to pay, say, £4
e company liable for an increased assess-
d?
which is being sunk has erected several
ding workshops and offices Are those
for assessment before the sinking is
coal produced?

, 1912. Colliery Manager.

NATIONS FOR MANAGERS' CERTIFICATES.

doubtless be of interest to, and tend to
of many of your readers, to know that
etter has been sent to the Home

H. W. Halbaum.

, 1912.

[copy.]

7, Mafeking-road, Roath, Cardiff.
September 25, 1912.

cKenna,
retary of State,
e Office, Whitehall,
London, S.W.

ard for Mining Examinations appointed
ines Act of 1911 have now issued their
he examinations for colliery managers'
gers' certificates of competency. I wish
call your attention to one of the con-
upon candidates for first-class certi-
gulation will be found in Form No. 8,
he head of Surveying, Levelling and

h candidate will be required to produce
e survey and levelling made and drawn
th the original notes from which the
been made, and these must be certified
r of the colliery to have been the work
te."

submit that this condition, however
appears most unfair to candidates who
mselves up from the ranks by their own
and fitted themselves for colliery
cause this regulation places every
first-class certificate entirely at the
liery manager under whom he may be
e no hesitation in predicting that any
members who represent the mining
me out in this statement. Before any
n make a survey, as required, he must
on of the colliery manager to enter the
pose. He will also require to have the
e colliery manager to use the instru-
for such a survey and levelling.
dent that very few candidates, in the
med, will be able to find instruments of
good theodolite, for instance, may
even a vernier dial will cost
5 to 25 guineas, whilst the price of a
usually about £14. Even should the
s instruments of his own, which is
s of reason to expect, he will have to
assistants to enable him to make the
if he is able and willing to do all this,
ger can put his veto on the whole
e is no possible court of appeal.
premium pupils who are indentured to
gent the case is quite different. The
as a general rule, act as surveyors whilst serving their time, and consequently they have every opportunity of complying with the condition required by the Board for Mining Examinations; and in this respect the regulation referred to is no hardship whatever to *that* class of candidate. The candidate of the working-class, however, is practically barred by this regulation from ever obtaining his first-class certificate.

I would also respectfully submit that this regulation is not what one can fairly consider a reasonable one. There is no sense of proportion about it, because for every one accident which occurs in coalmines owing to faulty surveying there are thousands which occur owing to inefficient timbering. All the reports of H.M. inspectors of mines show that accidents from falls of roof and sides account for practically one-half of all the accidents in mines; so that one would consider that, if a candidate for a colliery manager's certificate is required to give a *practical* demonstration at all, it should rather be a demonstration of his ability to erect and construct, with his own hands, an efficient system of *timbering*. There is, however, no requirement of this kind, from which I judge that the Board for Mining Examinations considers that there is no necessity for such a requirement; but, if this be so, how much less necessity is there for the requirement relating to actual experience in *surveying*, especially when it is clearly evident that, whilst any requirement of demonstration of practical timbering ability would hit all candidates alike, the other regulation, which requires the candidate to demonstrate his practical ability in surveying, hits one class of candidate so severely as to practically exclude him from examination, and yet constitutes no hardship at all to the other class of candidate who happens to be in a position to pay the premium required from an articled pupil.

Therefore, looking first at the unfairness of the surveying requirement, and secondly at its comparative unimportance, I submit that this forms a good case for your consideration, and that you will take such steps as will safeguard the comparative interests of all classes alike.

I may add that no one would object to such a regulation if the Government would *also provide facilities* for such outside students to make an underground survey. Further, no one would raise much objection if the plan of survey required were that of a surface survey, because, in that case, a candidate could hire the instruments and make the survey required, and would not be dependent upon the permission of any colliery manager to go underground for the purpose. As the case stands, however, this new regulation practically *places the nomination* of first-class candidates in the hands of the colliery managers. The colliery manager is invested with full power to prevent any candidate sitting for a first-class certificate of competency. All the colliery manager has to do in order to place an impassable obstacle in the way is to simply refuse the candidate permission to go underground to make the survey or to refuse him permission to use the colliery instruments. The situation is therefore quite clear; it is this—that the new regulation leaves every candidate for a first-class certificate entirely at the mercy of the colliery manager under whom he may happen to be employed.

H. W. Halbaum.

TESTING FOR GAS IN MINES.

Sir,—We beg to draw the attention of "Deputies' Friend," *re* his enquiry for a safety lamp provided with relighter, to our system of self-contained relighters, which has been adopted throughout the world where coalmining is going on, and which has also found numerous friends in British mines, although the Home Office authorities have provided severe restrictions to the use of these relighters.

The statements of "Deputies' Friend" again confirm the experience of many thousands of his colleagues—namely, that of permitting the deputies to make more careful and reliable examination in testing for gas when using a lamp with self-contained relighter, since by lowering the flame not unfrequently the light is lost.

The Royal Commission on Mines, in their second report (1909), also refer to this subject, acknowledging the advantages of internal relighters by stating:

> "In lowering the flame for the purpose of seeing a firedamp cap, the person testing may easily lose his light altogether, and the advantages of an internal igniter in such cases are evident."

The Wolf Safety Lamp Company Limited,
37, York-place, Leeds.
Leeds, September 25, 1912.

["Deputy" (Leeds) writes under the same date to the same effect.—Ed. *C. G.*]

RESCUE WORK AND VENTILATION.

Sir,—In view of the costly and elaborate provisions and regulations now being enforced under the Rescue and Aid Order, a few words of warning appear necessary.

When an explosion occurred in a colliery previous to the invention of the now numerous artificial breathing apparatus, all haste was made to restore the normal ventilation and secure fresh air for those who might still survive in the inner workings. As a rule this was not a difficult matter, and although it required time to renew temporarily the stoppings and crossings, this work, once accomplished, had the important merit of being absolutely effective.

In quite recent explosions, rescue brigades wearing the so-called safety dress have been quickly on the spot and attempts have been made to utilise them, but it is well known that those attempts have been attended with very little success, and in somewhat frequent instances members of the brigades have sacrificed their own lives. This will always be the case so long as these brave men are allowed, and perhaps encouraged, to penetrate long distances into a poisonous atmosphere, in the hope that they may reach survivors needing their assistance. Assume for a moment that they did succeed in reaching unfortunate men in such a position, they could not bring them out *alive* through such an atmosphere, and it is more than likely that they themselves would be imprisoned. Theoretically, they might be expected to take in compressed oxygen or spare headdresses, but in practice this is found to be out of the question. Whilst these hopeless attempts are being made, precious time is being wasted which might have been devoted to the restoration of the ventilation. Rescue brigades can be of great assistance in facilitating this work, and this is their proper province and the only hopeful direction in which their efforts can be utilised.

It has frequently been stated that 75 per cent. of those who lose their lives in colliery explosions die from carbon-monoxide poisoning, and not from the explosions themselves. This is a misleading statement, although it is true in a sense, and has given the impression that the field for rescue operations is almost unlimited, whereas the contrary is really the case. A very large proportion of the 75 per cent. are beyond human aid within a few seconds of the explosion happening. The resultant gas (carbon monoxide) is as much a part of the explosion as the resulting flame is a part.

Brookside, Chester. Henry Hall.

MINING AND OTHER NOTES.

At the annual meeting of Palmer's Shipbuilding and Iron Company, a letter was read from Lord Furness stating that he confessed to a feeling of disappointment at the meagre response by the shareholders to the appeal he made for capital to carry out the policy adopted and recommended by the board for extensions and the consolidation of the whole concern. Although he would no longer have any active participation in the affairs of the company, he retained his holding as a shareholder. Mr. A. B. Gowan was appointed managing director of the company, and Lord Aberconway and Admiral Sir Archibald Douglas were re-elected directors.

Aged mineworkers' homes of a new type were opened at East Murton, Durham, on Saturday afternoon, by Mr. F. Berkley Matthews, who gave £1,000 that Murton and South Hetton lodges might have at their disposal for the benefit of their aged members a dozen homes within the precincts of the village. Hitherto centralisation of such homes at Haswell Moor, where there are 113 such homes, has been the scheme of the Durham Aged Mineworkers' Homes Association. Twelve homes are to be erected to the memory of the late Mr. Richard F. Matthews, and ten were opened on Saturday, and of the other two foundation stones were laid by Mr. Johnson Smithson and Mr. John W. Kirkup. In each are two large rooms, besides scullery and pantry, and, while the lawns of the front and sides are practically common to all, each has a self-contained yard and outhouses. Towards the £700, the workmen of the two collieries contribute weekly.

The Home Secretary has appointed Mr. George Cook to be a junior inspector of mines under the Coal Mines Regulation Acts, 1887 to 1911, and has directed him to act as an inspector for the purposes of the Metalliferous Mines Regulation Acts, 1872 to 1875, and the Quarries Act, 1894, and the Factory and Workshop Act, 1901. Mr. Cook has been manager at the Hunwick and Newfield collieries of Messrs. Bolckow, Vaughan and Co. Limited for the past eight and a-half years.

Awards from the Carnegie Hero Fund have been made to William Wilkinson, manager, Venturefair Avenue, Dunfermline; James Grieg, oversman, Wellwood; John Gibbons, miner, Allan Lee Terrace, High Beveridgewell; and Alexander Morris, miner, Woodend Place, Townhill, for bravery on August 6, 1912, in the Arthur Pit of Messrs. Thomas Spowart and Co.'s collieries.

Mr. Joseph Cheatter, of the Croft, Monk Bretton, Barnsley, managing director of the Monk Bretton Colliery Company, left estate of the gross value of £29,624, including net personalty £26,355. He bequeathed to Mr. John Henry Jones, "in consideration of his faithful assistance for so many years at the Monk Bretton Colliery," £3,000 and a number of pictures; and he gave to him also the option to the purchase of his shares in the Monk Bretton Colliery Company at £1 per share. Testator also left to John William Shaw, colliery manager, of Monk Bretton, £300, and other gifts and bequests of from £10 to £50 to employees.

The thousand guinea cup at the Crystal Palace, on Saturday, was gained by the St. Hilda Colliery Band, of South Shields. The South Moor Colliery band was placed sixth. Prizes in other events were won by Rotherham and Masborough, Bentley Colliery, Woodlands Village, Harton Colliery, Hetton, and Hemsworth Colliery. The St. Hilda band has won many trophies, including the championship of the Durham Brass Band Association in 1911.

Dr. W. E. Garforth has presented to the University of Leeds and placed in the geological department a large case containing specimens which show the structures of numerous seams of coal from Yorkshire, Lancashire, Staffordshire, and Australia. The lower part of the case contains coal-balls or bullions, which are found in the Halifax Hard Bed of Yorkshire, and its equivalent, the bullion mine, in Lancashire. The centre of the case is occupied by a series of models illustrating the structure of Lepidostrobus. Perhaps the most interesting sections are those from coal seams in which explosions have occurred, such as those from No. 3 Bank Pit, Atherton, near Bolton. Photo-micrographs on autochrome plates accompany all the coal sections.

As a result of the recent miners' strike, 356 men in the Hemsworth district have lost their votes. This decision was made by Mr. S. H. West, Revising Barrister for the Barnsley Parliamentary Division. The names of the voters had been left off the list because they had received from the Board of Guardians during the strike relief on loan. The law seemed to be, said Mr. West, that unless the loans were repaid within the qualifying period the voters who had obtained relief in that manner were not entitled to be put on the register. There would be no disqualification if the loans had been repaid.

At the Brodsworth Colliery offices last week, Mr. B. Cook, the late secretary, who is taking up the joint position of secretary and commercial manager at Yorkshire Main Colliery, was presented with a silver cigar case, suitably inscribed, and a pair of bronzes, by the members of the clerical and sales staffs. Mr. Gatley, Mr. Cook's successor at Brodsworth, made the presentation.

At a meeting of the Middlesbrough Chamber of Commerce on the 26th ult. a letter was read from the Cargo Fleet Iron Company, complaining of the shortage of wagons on the North-Eastern Railway. The letter suggested that the Chamber should bring strong pressure to bear on the railway company to provide adequate provision for the district. It was decided to appoint a deputation representing the Cargo Fleet Iron Company, Messrs. Bolckow, Vaughan and Co., and Messrs. Bell Brothers and others to wait on the North-Eastern Railway Company with reference to the subject, and to report to a special meeting.

At a meeting last week of the Northumberland Education Committee, Alderman Jobling made a statement with reference to the examination of deputies under the Coal Mines Act, 1911. He stated that on September 24 a conference was held of representatives of the Northumberland Coalowners' Association, the Northumberland Deputies' Mutual Aid Association, and the County Education Committee—four of each—together with H.M. Inspector of Mines. This conference, which was called for the purpose of considering the best course to be adopted in order to secure the formation of an authority for the purpose of granting certificates in Northumberland, came unanimously to certain conclusions, the first of which was that the Education Committee should apply to the Secretary of State for recognition as the authority to arrange examinations and issue the certificates. The conference passed another resolution that the appointment of examiners and the question of arrangements for examination should be referred to a joint board consisting of four representatives of the Education Authority, four of the Coalowners' Association, and four of the Deputies' Mutual Aid Association, together with the Government Inspector of Mines, if possible. Another resolution passed was that, according to the number of candidates, examination centres should be selected from among the following places:—Ashington, Backworth, Bedlington, Blyth, Broomhill, Newcastle, and Prudhoe. The report and recommendations presented by Alderman Jobling were adopted unanimously.

At a meeting of the East of Scotland branch of the Association of Mining Electrical Engineers, held in the Royal Hotel, Dunfermline, on Friday, September 27, the president (Mr. C. A. Carlow, Leven) congratulated the members on the large accession to the membership. He was anxious this session to have two papers read and discussed at each meeting, and to stimulate the members, he announced his intention of awarding a handsome prize for the best paper received. He would probably ask Mr. W. C. Mountain to officiate as judge in the competition

Mr. Charles Bury, of the Red House, Denaby Main, Rotherham, Yorks, mining engineer, manager of the Cadeby Colliery, and prior to that for some years manager of the Denaby Main Colliery, who died July 15 last from injuries received whilst working with the rescue party during the recent explosions at the Cadeby Colliery, left estate of the gross value of £916 3s. 6d., of which the net personalty has been sworn at £870 10s. 1d.

At Haltwhistle, on the 26th ult., the Blackett and South Tyne Collieries Limited, Newcastle-on-Tyne, were charged at the instance of the Haltwhistle Rural District Council with disobeying an order of the Court made on July 25 last to abate a nuisance caused by the burning of the slag heap at South Tyne Colliery, Haltwhistle, and fined 10s. and costs, including advocate's fee of £3 3s.

A separate department for geology has been created at the University College, Nottingham, under the charge of Dr. Swinnerton. Prof. Robinson has been appointed head of the department of Technology, and Mr. C. H. Bulleid professor of engineering. In the Mining Department, under Prof. W. H. McMillan, B.Sc., all the courses have been considerably developed and improved. A new two years' course for a diploma in mine surveying has been instituted, and, in co-operation with the Notts County Council, a fourth year has been added to the Saturday afternoon mining courses. The increased pressure of work has necessitated the appointment of an assistant, and Mr. F. Hancock, son of Mr. J. G. Hancock, M.P., has been appointed lecturer in mining.

Mr. W. O. Wood, chief agent and joint managing director of the South Hetton Coal Company, was on the 19th ult. presented with a number of handsome gifts, subscribed for by nearly 800 friends, including the directors, officials, workmen, and shareholders, to mark his completion of 25 years' service with the company. The presentation, owing to Mr. Wood's state of health, took place at his residence at Sunderland. There were present Mr. Thomas Jones, joint managing director of the company, who made the presentation, Mr. J. J. Candlish, of Shotton Hall, who presided, Mr. Daniel Huntley, and many officials of the company. The presentation consisted of a chest of antique silver, a writing desk, a study chair, three valuable watercolours, and an illuminated album, containing the signatures of the subscribers.

At the half-yearly meeting of the North British Railway Company, the chairman, Mr. William Whitelaw, stated that £355,300 was to be spent in the current half-year, a considerable portion in the Lothian district for facilitating coal traffic. They anticipated that the new Methil Dock would be in partial use some time before the end of this year. The total cost will be £750,000. During the half-year they had carried 1,200,000 tons less mineral traffic. For demurrage and siding rent incurred prior to August 1911, a sum of £8,111 had been received. To a suggestion that they ought not to wait for the increase of rates for the Government carrying out their pledge, he had to say that until the law was altered, it would be utterly futile for them to appear before the Railway Commission on a rate-raising campaign.

Mr. Wm. Clarkson, of Lesmahagow, is believed to have devised a new and effective method of treating coaldust so as to render it inexplosive. Acting on the advice of Scottish experts, who have seen his idea in operation at Auchenbegg Colliery, Lanarkshire, Mr. Clarkson is to submit his method to a test at the new Government testing station at Eskmeals, in Cumberland.

Since the Barnsley bed was reached at the Askern Main Colliery, there have been no end of rumours discrediting the statement that it was the Barnsley bed. It need scarcely be stated, says our correspondent, the colliery officials deny these rumours emphatically, and declare positively, as previously stated in our columns, that it is the Barnsley seam and none other which has been reached. The No. 2 shaft is to be carried below the depth of the No. 1, in order to reach the Dunsil and Haigh Moor seams, both of which the Askern Main Colliery Company intend to work, as well as the Barnsley. These plans were made 18 months ago. The Barnsley seam will be worked from the No. 1 shaft, No. 2 being carried down to the other seams. The Dunsil lies at a depth of about 24 yards below the Barnsley, and the Haigh Moor seam is expected to be reached in about 100 yards from the depth of the No. 1 shaft. Where the No. 1 shaft came out into the Barnsley seam the ground has proved to be faulted, but this was no surprise to the Colliery Company, who have only to strike out of the fault for the coal to be all right. The bottom seam is not so thick here as it will be when worked out a little. It has been stated the Askern coal is disappointing on account of the seam being split by dirt. It is true, say the colliery officials, that there is a black patch which ought not to be there, but at Bentley and other collieries around the seam is split in the same way. They state there are no difficulties at Askern they have not fully prepared for, and none which they will not be able to overcome quite satisfactorily.

Messrs. Yeadon, Son and Co., Leeds, have recently erected for the Heto Briquette Company Limited, Sheffield, one of their latest patented complete briquette plants, which has been specially designed and constructed for producing briquettes suitable for domestic consumption, for which there is a rapidly increasing demand.

A correspondent says that the work of sinking the new Hatfield Main Colliery is proceeding slowly, but satisfactorily. The two shafts have so far reached a depth of about 40 yards. They have now penetrated the most difficult and most treacherous part of the strata, and it is expected progress will be much more rapid in the firmer measures.

At a meeting of the East of Scotland branch of the Association of Mining Electrical Engineers, Mr. C. A. Carlow, Fife Coal Company, delivered an interesting presidential address, on Friday evening, in the Royal Hotel, Dunfermline. In the course of his address he outlined reasons for the increased price of coal since 1896. The three most important reasons he adduced were:—(1) More complete organisation of labour; (2) the carrying on of mining operations at greater depths and in less advantageous circumstances; and (3) the effect of recent legislation. Under the third heading the speaker observed that if the Explosives Order was a sample of what the new Mines Act was going to lead to, the effect would be much greater than anyone anticipated. The Minimum Wage Act again was the product of this year, and this would fall more heavily on the coal trade in periods of depression when relief was most needed. Mr. Carlow was cordially thanked for his address, on the call of Mr. R. G. M. Prichard, H.M. inspector of mines.

Mr. James Wolstencroft, manager of the Wet Earth Colliery, belonging to the Clifton and Kersley Coal Co. Limited, has been presented with a handsome gold watch and barometer subscribed to by the officials and workmen at the Wet Earth pit. Mr. Wolstencroft, who has been 11 years at the Wet Earth Colliery, has been transferred to the Trencherbone Colliery, at Kersley.

Messrs. Bolckow, Vaughan and Co.—Presiding at the annual meeting of Bolckow, Vaughan and Co. Limited, Sir J. E. Johnson-Ferguson, Bart., said the gross profit for the year, after allowing for depreciation, was £209,894, as compared with £286,599 the year before and £286,135 two years ago. This diminution was wholly due to the coal and railway strikes. During the year they had expended £144,776 on capital account. Included in this were the sums spent during the year on the new open-hearth furnaces at the steelworks, an extension of their turbo blowing and generating plant at Eston, and additional benzol plants at the coke ovens; but the principal item contained in it was the purchase of the freehold of the whole of their works at Eston. The reason why their general depreciation was not as large as it was in the previous year was that the amount of minerals, coal, and ironstone which they had extracted during the year had, owing to the strike, been much below the normal. The stocks were £584,255, as compared with £723,325 the year before. This, again, was mainly due to the strike. The special items of expenditure stood at £50,919, as compared with £56,407 last year. The principal part of this last item consisted of work at the steelworks in connection with two of their blastfurnaces, the provision of an exhaust steam turbine at the collieries for the generation of electricity, and the substitution of sloping hearths in place of flat hearths at two of their oldest batteries of coke ovens. The production of ironstone during the year had been 1,583,615 tons, as compared with 2,078,185 tons. The production of coal had fallen from 2,343,101 tons in 1911 to 2,078 924 tons in 1912. The production of coke had been 575,028 tons, as compared with 743,839 tons, and the production of limestone was 156,538 tons, as compared with 183,575 tons the previous year. The make of all classes of iron, including ferro-manganese and spiegel, has been 555,415 tons, as compared with 751,652 tons the year before. On the other hand, the make of steel was 175,683 tons, or practically the same as the year before. Had it not been for the strike the production of steel would have been largely in excess of what it was the previous year. The whole of the concern was stopped for a week owing to the strike on the railways, and it was a full month before the blastfurnaces recovered from the effect of the stoppage. The national coal strike commenced on March 1 of this year, and work was not resumed at the pits until the middle of April, while the iron mines were not got to work again until the early part of May. In consequence of the approaching strike many of the furnaces had to go on slack blast at the end of February, while with the exception of four all the furnaces were damped down on March 2. It was not until the middle of May that they had all resumed work. The steelworks were entirely stopped until the middle of April. The actual expense, out-of-pocket loss, to which the company were put through the railway and coal strikes of last year was between £61,000 and £62 000, while the contingent loss amounted to between £45,000 and £46,000, thus bringing the total loss to the company alone from those two strikes to between £107,000 and £108,000. During the year they had at their collieries or coke ovens eight other minor strikes, by which serious loss and dislocation of their plant were caused, but by which the men themselves gained absolutely nothing. As a result of their action the company had permanently closed and dismantled the Brusselton pit and had no intention ever again to open it, throwing a considerable number of men out of employment. The Invalidity Insurance Act was now in operation, and they found that the cost would be some £13,000 to £14,000 a year. The expense of the valuation under the Finance Act, 1910, which was now being made, would also be very considerable.

OLLIERY ACCIDENTS.

Cadeby.

y Main Hotel, Denaby, on Friday morning
Allen, coroner for the Doncaster district,
uiry into the deaths of the 15 men whose
recovered from the Cadeby Colliery,
the disastrous explosion of July 9 last
ery of these 15 bodies James Burne (45), of
Wath, lost his life through losing the
breathing apparatus.
es, road layer, of Denaby, and Percy
tby-street, Denaby, filler, also confirmed
ven at the previous enquiry.
Lime-grove, Conisborough, electrician at
d he supervised the removal of the bodies
y and the identification of the dead.
ty, manager of the Cadeby Colliery, also
identification.
id he did not propose to call any further
jury found the deceased men met their
explosions in the Cadeby mine on July 9.

James Burns (45), late of 63, Avenue-road,
r of the Manvers Main rescue party who
he pit on Sunday, August 18, was then

plained that this was an entirely different
was a miner from Wath, and a member of
cue teams that had rendered invaluable
recovery of the bodies since these two
d. After the work of unsealing commenced
put in a kind of air lock by the erection
oors. From the first of these doors the
orked, wearing apparatus, advancing by
sections of the roadway while proceeding
gth of road until the whole work was
lst this work was in progress and the
rty were carrying out bodies from the
part of the mine which was sealed up and
gas, which contained no oxygen, and in
the breathing apparatus had to be used,
slip the mouthpiece of his apparatus out
mosphere in which no human being could
as being pumped into these workings from
idea of stifling the fire and stopping its
elieved it had been very successful. The
f the rescue party were very lucky to
lives. There was an expert commission
he express view of investigating the whole
ought it was only right and proper they
duty thrown upon them of dealing with
death of Burns other than the mere fact

, Beech-road, Wath-on-Dearne, a member
Main rescue party, stated he had been
work since the disaster. On Sunday,
s on duty with the deceased man, Ben
. Mansbridge, and Davidson. They went
ate carrying a corpse, and were in the act
relieving each other when he heard a cry
rns, and, looking to see what was the
lifting his hands up to his mouth as if he
Witness sent Davidson for assistance,
f running towards the pit bottom or the
llowed and got hold of him by the arm,
alongside of him because the place was
rrow. When they got to the crossgate
anaged to get him over a fall in 19 cross-
he got over this he collapsed. One of the
God's sake keep those tubes in!" Witness
Burns' air bag was in full working order,
he lost his air. Witness thought the
body unnerved him. When Burns saw it
s if he was startled. Witness forced his
first joint between deceased's teeth, and
mouth open, but could not, his mouth
tightly. Witness added that he had no
hing, but he collapsed afterwards. He
earing Draeger apparatus. He had tried
other types, but preferred the mouth
f the party, he believed, had mouthpieces
lid not. His own mouthpiece was not
simply retained by keeping it in the
d stated that he had never been used to
eping the mouthpiece in place. The
ought, a safeguard, and the mouthpieces
ned. They ought to be fastened more
ere was a possibility yet of their slipping
ed that they were able to talk to each
oving the mouthpiece by dropping the

vidence Hill said they all went together
in 19 crossgate. Mansbridge stopped
l out, but Mansbridge held them there.
s not aware of any rule which said these
be fastened on. He could not say if
scious when he set off to run, but he
was wild and out of control.
, captain of the Manvers Main rescue team, said so far as the apparatus was concerned everything was working smoothly, and they were all right before they started on the return journey; they had ample oxygen, and no man seemed to be exhausted in any way. He added that he lost his mouthpiece for a moment when one of them fell, but had the presence of mind to put it back without breathing. None of them were wearing straps to their mouthpieces. The reason was they did not think it necessary. There was not sufficient for all the lot—some cared to have them, others did not, it had not become a general rule that they should. In his judgment some form of fastening was desirable after this experience.

The coroner said the witnesses seem to be agreed as to the necessity for fastenings for the mouthpieces. There was nothing like experience to teach. He had no doubt the result of this accident would direct further thought of scientific men to improving this apparatus, which was so absolutely invaluable in a case like this.

The jury found that Burns died from suffocation through breathing inert gas.

The coroner thanked the jury for their services, and exempted them from further service for four years.

At the Guildhall, Doncaster, on Tuesday, Mr. R. A. S. Redmayne, H.M. Chief Inspector of Mines, reopened the Home Office enquiry into the disaster.

Mr. Redmayne said he had hoped that at that enquiry they would have been able to proceed to a conclusion, that the inspectors and the representatives of the men would have been able at the date at which they had assembled to have got right round the face of the coal and made a lengthy examination. Unfortunately, after he had fixed the resumption of the enquiry he had a telegram showing that their object could not be carried into effect because the work of recovery of the mine had not been as quick as had been anticipated. He made a partial inspection of the pit the previous day, but, of course, could not get into the part which had not been recovered, and which was full of inert gas. They would be able to dispose of certain evidence, which would hasten the proceedings for the next few weeks. He could not give the exact date when the resumption would be; he did not anticipate they would be able to resume for five weeks yet, by which time he trusted they would be able to get round the whole workings. When they resumed he hoped they would be able to conclude with the next sitting. It might take more than a day, or might not, but any way they would have to adjourn further. He had received a second list of bodies recovered from the mine—name, address, description, cause of death, and so on. He proposed to accept this as evidence.

The inspector then recalled Percy Murgatroyd, filler, of Denaby.—I want to ask you, said Mr. Redmayne, when you, Mr. Pickering, and his party came down from 19 landing into the 19 crossgate, did you have or hear any conversation?—I heard Mr. Bury remark to Mr. Pickering he thought there was some fire.

What made you think there was some fire?—There was evidence of smoke in the air.

Was there any evidence of smoke up to 64 crossgate?—I could not say. I had been in the district three hours or more. It was only by the eyes you could tell. Our eyes were so sore by that time we should not notice it. I didn't smell any gob stink. It was a sulphur kind of smell affecting the eyes.

Mr. Wallace was the next witness. He gave the points at which he took samples of the air in the mine between the first and second explosions.

Birch, the assistant deputy, next gave evidence, but was unable to recall the whole of his experiences. He remembered a rush of air along 14s level at the bottom, and the dust coming on them, but he did not remember anything else. He could not remember going to the face, or being taken to the hospital. He saw some flame.

Mr. Redmayne said he would get information from the hospital as to the nature of the witness's injuries.

The next witness was a young man named Farmery, another of the party who descended after the first explosion. His mind was a perfect blank, and he only remembered his elbows being burnt. The nurse said she thought they were burns, and she treated them for burns.

Mr. Redmayne, at this point, intimated he proposed taking evidence in regard to the death of James Burns, of the Manvers Main rescue party, who died through losing the mouth of his breathing apparatus.

Mr. B. L. Smith, captain of the rescue party, repeated the evidence which he gave before the coroner last Friday. He said, in addition, that they had not received any instructions from Mr. Bridges, the under-manager, as to what distance they were to go. They were not told not to go more than 200 yards. Before they went in they had an understanding that if anyone of the party felt as he ought not to feel he should give a sign, and that all of them should come out. An alarm was given in regard to Burns, and witness followed the rest. "When a man has lost his mouthpiece it is not a matter of asking questions," said the witness, you have to get out for safety. After losing his mouthpiece Burns put it in his mouth again.

Mr. Redmayne: What was done with the stretcher?—We had put it down.

Why not have taken the body off and put Burns on?—It was impossible.

Why?—We did not think it necessary at that time.

But here was a man breathing poisonous gas. Why not put him on?—He could walk at that time, sir.

Yes, but every step he takes is making his position more dangerous. Exertion is fatal in a poisonous atmosphere. The quieter a man is kept the better; he should have been carried out.

Witness: He walked between 100 and 200 yards, sir; we did our best for him. He had his mouthpiece in up till then, but in falling he lost it again; his jaws became locked. He was only a minute before he recovered his mouthpiece.

What was the cause of his mouthpiece coming out?—He had been bending, and crushed his breathing bag a little.

Bernard Hill, who was with the rescue party, said Burns got completely out of control; he went completely out of his mind, and became irresponsible.

Mr. H. S. Witty, manager of the colliery, was then called. He said the arrangements made in respect of exploring parties were that they were to go to a mark arranged by the under-manager. The latter went in with them and gave instructions to get out certain bodies. He (witness) now thought it would have been as well if there had been written instructions given to the captain of each rescue brigade. He did not consider 400 yards a long distance for the rescue party to go.

Levi Smith, recalled, said the only instructions Mr. Bridges gave was to get as many bodies down that night as they could. He would like half a-dozen if they could possibly get them. The body they were carrying when Burns met with his accident was one of those specified by Mr. Bridges.

The inspector intimated that this concluded the evidence.

Mr. Herbert Smith asked when the Yorkshire Miners. Association were going to have an opportunity of seeing this pit. They had not had it yet. He had got across with the management, and he appeared to have got across with Mr. Redmayne, because Mr. Redmayne agreed with the policy of the management. He believed Mr. Redmayne was anxious to do everything he could for them, but he was not in agreement with them this time, or else he (Mr. Smith) would have been down the pit before now.

Mr. Redmayne said it was a question of what the Act permitted or did not permit. If Cadeby Colliery were his mine he should tell Mr. Smith to go down at once. The Act gave him the power to visit the scene of the accident once.

Mr. Smith said they thought they were within the four corners of the Act in asking to be allowed to go to the place where the accident happened.

Mr. Redmayne: Short of wearing apparatus you cannot go.

Mr. Smith: I have had fair experience with breathing apparatus on. I can take care of myself. We are anxious to see every movement.

Mr. Redmayne said if they visited the scene of the accident once they could not go again unless they got permission. All they could go upon was the Act.

Mr. Smith said when he did go down this place was fenced off. He had not seen it, so that it was not a question of asking privileges from these people. All he wanted was his right under the Act of Parliament.

Mr. Redmayne: You want to do what the Act permits, no more no less. You cannot get in; it is shut off; barred off, and until it is recovered one can't get in. You can get along 19 crossgate all the way into 33, that is all you can do. The men had been up to the far end of 19 and all the bodies were out; five bodies were got out of 64. This process was being carried on. There was the stage of advancing the stoppings, and the scouts were in advance of this, securing about to see if it was safe. It was a slow process of recovery. Nobody was more desirous than himself to get in, but he could not do it. Ventilation was right through 33, now they wanted to get on and recover the other portions. If Mr. Smith asked his advice he would say wait until they open the ventilation and walk right through.

Mr. Smith: These people take advantage of everything.

Mr. Redmayne. May I say you are quite safe in my hands.

The inspector added he hoped they would meet again and conclude at their next sitting, which might be reckoned to be in about six weeks. He would give both the owners and the representatives of the men as ample notice as he could; more he could not say.

Mr. Herbert Smith: It is our intention to take expert evidence on behalf of the men.

A well-attended meeting was held recently at Whitehaven of the officials from William, Wellington, and Ladysmith pits, Whitehaven, and No. 10 New Pit, Harrington, at which it was decided to form a colliery officials' association for Cumberland, to be known as the Cumberland Colliery Officials' Association. A committee was appointed to draw out rules. It is intended that the association shall be a benefit society as well as a protective association (under the new Act, 1911). Mr. Jas. Rothery, Drift Yard, Parton, has been appointed secretary *pro tem.*

COAL, IRON AND ENGINEERING COMPANIES.

A Development Syndicate Limited.—This private company has been registered, with a capital of £1,050 (1,000 ordinary shares of £1 each, and 1,000 B shares of 1s each), to carry on the business of colliery proprietors, patent fuel manufacturers, ironmasters, steelmakers and converters, miners, smelters, &c. Qualification of first directors, who are to be appointed, 50 shares. Registered office, Parliament-chambers, Great Smith-street, Westminster, S.W.

Allen and Timmins Limited. This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of metal manufacturers, electric and general engineers, &c. First directors, A. Timmins and H. V. Allen.

Anglo-Colonial Engineering Company Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of mechanical, electrical and general engineers. First directors, Col. E. S. Vaughan Grimshaw, H. Brittain and A. J. Smith. Registered office, 13, City-road, E.C.

Anglo-Engineering Company Limited.—This private company has been registered, with a capital of £3,000 (1,000 cumulative preference shares of 10s. each and 2,500 ordinary shares of £1 each), to carry on the business of electricians, mechanical and general engineers and manufacturers, workers and dealers in electricity or electrical appliances, motive power and light, &c. First directors, F. P. Wilson (chairman), E. B. Hartel, H. G. Hartel and H. Shakel. Registered office, 33, Kirby-street, Hatton Garden, E.C.

Apex Steel Company Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to take over the business of a steel manufacturer and merchant formerly carried on by T. Inman as the Apex Steel Company. Registered office, 17, Attercliffe-road, Sheffield.

Babcock and Wilcox Limited.—The directors have declared an interim dividend of 7 per cent. (actual) on the ordinary shares.

Chinese Engineering and Mining Company Limited.—The statutory meeting was held on the 30th ult., Mr. W. F. Turner presiding. The company was registered on June 27 to take over the undertaking of the old company of the same name. No general allotment of shares has yet taken place.

Clydesdale (Transvaal) Collieries Limited.—The report for the year ended June 30, 1912, states that bonds to the value of £5,000 were redeemed on December 31 last, and the debenture debt now stands at £15,000, bearing interest at the rate of 7 per cent. per annum. The financial position of the company as at June 30, 1912, showed a balance of cash assets in excess of cash liabilities of £29,634. The gross working profits for the two collieries was £30,625. Revenue from other sources amounted to £2,864, and on the other hand there were general administration charges over the year of £4,398. The net profit on working carried to appropriation account is £29,091. This gave a total at credit of the latter account of £89,993, and the directors have declared a dividend of 5 per cent. payable to shareholders registered on June 30, 1912, £9,000, leaving a balance of £51,468 to be carried forward to next year. During the year the unworked portions of the property at Springs were tested by drilling with a view to ascertaining the available coal reserve; good coal was found in two of the boreholes put down, thus adding to the life of the mine. The acting manager estimates the life of the colliery at about three years from date. This colliery, referred to in previous years as Taaiboschspruit mine or Orange Free State Colliery, will in future be known as Coalbrook Colliery.

Cory (William) and Son Limited.—The warrants for the half-yearly interest to September 30, 1912, on the 4 per cent. first mortgage debenture stock and 4½ per cent. debentures have been posted.

Dominion Steel Corporation Limited.—The directors have declared a dividend (No. 6) at the rate of 1 per cent. upon the common stock, payable on October 1.

Duffryn Amman Colliery Company (1912) Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of colliery proprietors, &c., and to adopt an agreement between D. Roberts, of the one part, and T. P. R. Richards and G. de Grouchy Warren, of the other part. The first directors are T. P. R. Richards and G. de Grouchy Warren. Solicitors, W. Robinson Smith and Co., Swansea.

Duram Limited.—This private company has been registered, with a capital of £25,000 (24,000 ordinary shares of £1 and 20,000 deferred shares of 1s. each), to carry on the business of mechanical engineers and manufacturers, workers and dealers in electricity and electrical appliances, machinery manufacturers, &c., and to adopt an agreement with C. Gladitz. Qualification of first directors, who are to be appointed, 100 shares. Registered office, 1, Broad-street-place, E.C.

Frodnir Iron and Steel Company Limited.—The capital is to be increased to £150,000 by the creation of 75,000 6 per cent. preference shares.

Howard and Bullough Limited.—The directors have declared a quarterly interim dividend of 9d. per share on the ordinary shares.

Morley Coal Consumers' Association Limited.—This private company has been registered, with a capital of £2,500 in £1 shares, to carry on the business of coal merchants and agents, dealers in patent and other fuels, and heating and lighting apparatus, colliery proprietors, &c. First directors: H. Rhodes, B. B. Parker, and B. P. Hepworth. Registered office, Union Bank-chambers, Queen-street, Morley, Leeds.

Oil and Gas Turbine Syndicate Limited.—This private company has been registered, with a capital of £15,000 (14,750 shares of £1 each, and 5,000 founders' shares of 1s. each), to purchase or otherwise acquire any interest in any patents, *brevets d'invention*, licences, concessions and the like relating to the combustion, treatment, storage, application, distribution and use of fuel, and to carry on the business indicated by the title. First directors: J. McCanna, R. F. Wheeler, D. O. Robertson, F. H. Bennett, S. E. Glisbey, B. Hunter and W. H. Rose (provisional).

Parkes (G. B.) Limited.—This private company has been registered, with a capital of £20,000 in £1 shares, to take over the business of a manufacturer of crown nails and malleable castings, &c., carried on by G. B. Parkes, sen., at Crown Works, Haywood, Halesowen, Worcs., as G. B. Parkes. First directors, G. B. Parkes, sen. (permanent director and chairman), G. B. Parkes, jun., and Fanny Parkes. Qualification of permanent director, £100 ordinary shares; of ordinary directors, £50. Registered office, Crown Works, Haywood, Halesowen, Worcs.

Pearson Garforth Limited.—This private company has been registered, with a capital of £2,500 in £1 shares, to carry on the business of general ironfounders, engineers, brassfounders, machinery and metal merchants, and to acquire the business carried on at Bradford as Jonas, Pearson and Co. First directors, J. Garforth, E. P. Garforth, Mrs. A. Garforth and Jonas Pearson (all permanent).

Procter (W.) and Ratcliffe Limited.—This private company has been registered, with a capital of £500 in £1 shares, to take over the business of a gas, oil and gas plant engineer, carried on by W. Procter at Cardiff (Glam.) as W. Procter and Co. First managing director, W. Procter. Registered office, 75, Wyverne-road, Cardiff.

Radnorshire Coal Company Limited.—The accounts for the past year show, after providing for all charges, a balance on profit and loss account of £3,567. A dividend of 7 per cent. is recommended on the ordinary shares, carrying £2,867 forward.

Smith and McLean Limited.—Dividend for the year of 4s. per share on the ordinary shares (£10), £9,000 to the ordinary reserve, and after providing for depreciation £7,300 carried forward.

Sneyd Collieries Limited.—The accounts for the year ended June 30 show a net profit, after providing for debenture interest, &c., and writing off £5,045 for special expenditure and depreciation of investments of £45,420, including £20,450 brought forward. The directors recommend a further dividend of 5 per cent., making 7½ per cent. for the year, placing £10,000 to reserve (increasing it to £66,965), leaving £19,669 to be carried forward.

Steel Company of Canada Limited.—The directors have declared the usual quarterly dividend at the rate of 7 per cent. per annum on the preference stock, payable November 1.

Widnes (James) Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to carry on the business of miners. The first directors are: Mr. J. C. Archer, Ealing, W.; Mr. J. F. Archer, Doncaster; Mr. C. McNeal, Fenton; Mr. S. E. Somerville, Doncaster; and Mr. A. Stott, Liverpool.

THE FREIGHT MARKET.

There is a much improved supply of tonnage on the north-east coast, and outward freights have eased somewhat. Chartering has been moderately active at the following typical rates from the Tyne:—Amsterdam, 4s. 6d.; Havre, 6s. 1½d.; Rochefort, 6s. 9d.; and Genoa, 12s. 9d. to 13s. 1½d. Practically nothing has been done for the Thames. At South Wales, business has been moderate in dimensions. Rates for most directions are rather firmer at the time of writing. The Humber market is generally steady. The Clyde is practically unchanged. Homewards, Black Sea rates are well maintained. Charterers, however, are not eager to operate, owing to the easier feeling in grain-consuming markets. At the Azof and Danube, there is a fair demand and some scarcity of tonnage. Eastern markets are quiet, shippers holding off. Tonnage, however, is not too plentiful, and rates are upheld. The Mediterranean and ore trades are dull and unaltered, as is also the Baltic. American business is slow. The River Plate shows an improved demand, and figures are unchanged.

Tyne to Aalborg, 2,100, 8s. 10½d.; Amsterdam, 1,850, 4s. 6d.; Bilbao, 2,100, 9s. 3d.; Genoa, 3,800, 13s. 1½d., reported; 5,000, 13s.; 4,000, 12s. 9d., river loading; 5,500, 12s. 9d., 500, 12s. 6d. if 800; Havre, 1,400, 6s. 1½d.; Las Palmas, 3,500, 12s., from Dunston; Malaga, 1,650, d.w., lump sum, £1,100; Oran, 2,800, 11s. 8d., 400; Oporto, 1,500, 13s.; Pozzuoli, 3,400, 14s. 3d. coals, 15s. 3d. goods; Port Said, 3,800, 12s. 7½d.; Port Mahon, 1,000, 15s.; Pillau, 1,700, 6s. 6d., 600; Rochefort, 1,600, 8s. 9d., voyages, October-March; Rotterdam, 1,500, 4s. 4½d.; 1,650, 4s. 8d.; Santander, 2,000, 7s. 3d., from Dunston; Schiedam, 1,650, 4s. 6d.; 1,500, 4s. 4½d.; St. Nazaire, 3,000, 7s., voyages over next year; 6s., voyages; Savona, 5,000, 13s.; St. Petersburg, 3,300, 7s. 6d.; 3,300, 7s.; Ymuiden, 1,500, 4s. 4½d.

Cardiff to Alexandria, 4,700, 12s. 6d., 500, October 7; 3,500, 12s. 6d., October 5; Algiers, 3,000, 13¾ fr.; Barcelona, 2,700, 13s. 3d., 400; Bombay, 15s. 6d., October; Bordeaux, 3,000, 9 fr.; ppt.; Chantenay, 2,300, 9 fr., ppt.; Constantinople, 4,000, 13s.; Civita Vecchia, 3,100, 13s. 8d., 500, October 8; Cronstadt, 3,900, 7s. 9d.; 3,400, 7s. 9d., October 10, Russian Marine; Campana, 3,900 max., 24s. 6d., October; Colombo, 15s. 9d., ppt.; Devonport, 850, 4s. 6d., Admiralty; 1,000, 4s. 3d., Admiralty; Dover, 1,000, 4s. 6d., Admiralty; Genoa, 2,400, 13s. 6d., ppt.; 3,600, 12s. 6d., ppt.; 4,200, 12s. 7½d., spot; 3,300, 12s. 9d., ppt.; Havre, 1,150, 7s.; Islands, 4,000, 11s. 9d., October 7; Lamlash, 2,000, 4s., Admiralty; Las Palmas, 4,500, 11s. 9d., early October; 5,000, 12s., ppt.; La Rochelle, 1,700, 9¼ fr., ppt.; Monte Video, 4,000, 23s. 8d., ppt.; Madeira, 2,000, 12s., ppt.; Naples, 4,800, 12s. 4d., 800, ppt.; Port Nolloth, sail, 31s., coke, October; Plymouth, 450, 5s. 6d.; River Plate, 5,000, 24s., October 8; 5,000, 24s. 6d., October 4; 4,400, 23s. 9d., November 10 cancelling; 24s. 3d., October 5; Rio de Janeiro, 6,000, 23s. 6d., ppt.; Rosario, 3,400, 25s. 6d., October 10; 25s., mid-October; Rouen, 750, 7s. 9d.; Scapa Flow, 1,500, 6s. 3d., Admiralty; St. Petersburg, 3,400, 8s., October 10, Russian Marine; Santos, 28s., October; Sables, 1,250, 9 fr.; Teneriffe, 4,500, 11s. 9d., early October; Venice, 3,800, 14s. 6d., October; 3,000, 14s. 6d.; 4,800, 14s.; Valencia, 1,250, 13s. 6d.; 1,600, 13s. 3d., ppt.; Villa Constitucion, 3,900 max., 24s. 6d., October.

Grangemouth to Rio de Janeiro, 4,500, 24s. 9d., October 1-12.

Garston to South Australia, sail, basis 16s. 6d., superphosphates.

Newport to Constantinople, 4,000, 13s., ppt.; Bahia Blanca, about 23s. 9d., October; 24s. 6d., October; sail, 18s. 9d., with 60, November; River Plate, 5,000, 23s. 6d., ppt.; St. Nazaire, 1,300, 9 fr.; Terneuzen, 1,000, 7s. 6d.; Algiers, 3,000, 13¾ fr.; Buenos Ayres, 24s. 3d., October; Cape Verds, 12s. 3d., October.

Port Talbot to St. Nazaire, 1,200, 9 fr., ppt.; 3,000 ditto.

Swansea to Marseilles, 3,400, 15½ fr.; Rouen, 1,700, 7s. 9d. ppt.; 1,100, ditto; 1,000, 7s. 10½d., spot; 650, 8s., spot; Naples, 3,000, 13s. 3d.; 3,600, 13s.; 3,600, 13s. coal, 13s. 9d. fuel; Volo, 2,200, 15s. coal, 15s. 9d. fuel; Venice, 4,500, 14s. 9d.; 4,000, 14s. 9d. coal, 15s. 6d. fuel, ppt.; Ancona, 3,600, 14s. 6d. coal, 15s. 3d. fuel, October 14; Barcelona, 3,600, 12s. 9d.; Savona, 2,100, 13s. 6d., Genoa terms; 2,800, 13s. 6d.; 13s.; Leghorn, 1,400, 13s. 6d.; Honfleur, 700, 7s.; Stettin, 1,300, 7s. 9d.; La Pallice, 2,200, 9 fr. coal, 9½ fr. fuel; Sables, 1,400, 9½ fr.; St. Nazaire, 1,700, 9 fr.; Brest, 1,150, 7s. 3d.; 950, 6s. 9d.

Blyth to Valencia, 2,500, 13s., 350; Guernsey, 600, 7s. 8d.; Cronstadt, 3,800, 6s. 6d., discharge 24 hours arrival; Genoa, 3,800, 13s. 1½d.; Helsingfors, 1,750, 8s.; 1,350, 8s. 6d.; Abo, 1,350, 8s. 6d.; Malmo, 3,700, 7s.; Aalborg, 2,100, 7s.; Devonport, 800, 7s.

Wear to Swinemunde, 2,000, 6s. 8d.; 1,400, 6s. 3d.

Hartlepool to Venice, 5,200, 14s. 9d., 500; Leghorn, 3,300, 13s., Genoa terms.

Hull to Genoa, 4,000, 13s. 4½d.; 2,700, 13s. 3d.; 5,000, 13s. 8d., early October; Cronstadt, 15,000, 5s. 4½d., contract; 1,900, 7s. 3d., October 5; 2,000, 7s. 6d.; 3,800, 7s. 6d., Reval, 2,100, 7s.; Ostend, 1,200, 5s. 7½d., mid-October; Pernau, 1,800, 7s. 6d.; Hamburg, 5s. 3d.; St. Petersburg, 2,000, 7s. 8d., ppt.

Partington to Riga, 2,500 max., 8s. 6d., October.

Immingham to Genoa, 2,250, 13s. 6d., October; Savona, 2,250, 13s. 8d., October.

Seaham Harbour to Rotterdam, 1,500, 4s. 4½d.; Malmo, 1,500, 7s. 9d.

Goole to Fécamp, 360, 8s. 3d., ppt.

Burntisland to Fredericia, 18s. 1½d.

Glasgow to Genoa, 13s.; Buenos Ayres, 26s. 8d., ppt.

Forth to Hamburg, 2,000, 5s. 6d.; Sundswall, 1,600, 8s.

Rotterdam to Bordeaux, 3,500, 7s. 3d.; Buenos Ayres, 5,000, 25s.

Middlesbrough to Hamburg, 1,400, 7s.

Barry to Santos, 28s.

Homeward charters:—Kherson, Nicolaieff or Odessa, 4,500, London or Rotterdam, 16s. 9d., Emden or Weser, 17s., Hamburg 17s. 3d., on d.w., grain only, ppt.; 4,000-4,400, Bergen-Christiania, 18s. 6d. one port, 18s. 9d. two ports discharge, ppt.; 4,000, 10 per cent., 16s. 9d. n.c. or any, 17s. 3d. Hamburg, ppt.; 3,300, 17s. 3d. n.c. or any, 17s. 9d. Hamburg, option Lisbon and or Oporto, 17s. 9d. one port, 18s. 3d. both ports, ppt.; Vladivostock, 2,217 net, United Kingdom-Continent, Copenhagen, Stettin, 37s. 6d., November; Kurrachee, 4,100, p.p., United Kingdom-Continent, 24s. 8d., with Danish and Swedish options, October; 2,531 net, p.p., United Kingdom-Continent, 23s. 3d., October; 2,908 net, 22s. 9d. one port, 23s. 3d. two ports, October; 8,700, Hull, 23s., October; Danube, 3,800, 18s. any direct, 18s. 6d. Hamburg, with French options, option Sulina loading 1s. less, ppt.; Delagoa Bay, 2,799 net, Kurrachee, 8s. 8d., ppt.; 8s. 3d., Bombay; New York, 16,000 qrs., 10 per cent.; Algeria, 5s. 9d. one port, 5s. 10½d. two ports, heavy grain, October; 12,000 qrs., 10 per cent., Algiers, Oran or Tunis, 5s. 9d., October; Pensacola, 700 stds., 10 per cent., West Italy-Sicily, 157s. 6d. one port, 180s. two ports, January; 1,713 net, Liverpool or Bremen, 63s. 9d., cotton, October; 157s. 6d. one p.p., 180s. two p.p. West Italy-Sicily, January; San Lorenzo, 4,400, 10 per cent., United Kingdom-Continent, 32s. 9d. o.c., less 8d., spot; 5,300, 10 per cent., 31s. o.c., less 8d., cancelling October 15; 8,000, 10 per cent., 31s. o.c., less 8d., ppt.; 4,750, 10 per cent., 30s. 6d. o.c., less 8d., cancelling October 25; 3,700, 10 per cent., 27s. 3d. o.c., less 6d., November 1-30; 4,700, 10 per cent., 25s. 6d. o.c., less 6d., November 10-December 10; Alexandria, 1,868 net, Avonmouth, 18s., end October; 2,300, Hull 14s. 6d., London 15s., spot; Algiers, 5,400, Rotterdam, 9s. 6d., f.t., October; Bilbao, 2,500, Middlesbrough, 7s. 3d., ppt.; 1,800, Grangemouth, 7s. 3d., ppt.; Huelva, 2,290 net, Northern States, 10s. 1½d., Tinto terms, early October; 10s. 1½d., New York, Philadelphia or Baltimore, Tinto terms; 2,000 net, Charleston or Savannah, 12s. 3d., f.d., October; time charter, States and West Indies, 8s., six months; time charter, European and Mediterranean trades, 3,000, £780; Cadiz, 26s. 9d., Buenos Ayres, salt; Calcutta, 36s. 3d., Boulogne, jute, November; Poti, 2,364 net, Rotterdam, 18s. 9d., October; 4,400, Middlesbrough, 16s. 9d., ore, ppt.; Torrevieja, 3,200, Santos, 30s., salt, October; Riga, 1,000 stds., London, 40s., d.b., one-eighth bds., October; 650 stds., ditto; Azof, 5,100, Marseilles or Genoa, 17½ fr., ppt.; 6,200, ditto; 8,800, Rotterdam 18s. 3d., Antwerp, Emden or Weser 16s. 6d., Hamburg 16s. 9d., with 3d. less barley, ppt.; 2,900, 18s. n.c. or any, 18s. 8d. Hamburg, ppt.; 3,400, 17s. 8d. n.c. or any, 18s. Hamburg, ppt.; 4,400 max., Rotterdam, 16s. 3d., no reduction, ppt.; 3,000, Tunis, one port, 18¼ fr., option one port Tunis and one port Algeria 18¾ fr., ppt.; Sulina, 4,800, Rotterdam 15s. 3d., Antwerp 15s. 6d., Hamburg 15s. 9d., ppt.; 3,450 max., London or Rotterdam 15s. 3d., Antwerp 15s. 8d., 3d. less barley, option 16s. 3d. n.c. or any, 16s. 9d. Hamburg, ppt.; Portland (Mo.), 20,000 qrs., 10 per cent., Algiers, Oran or Tunis, 5s. 9d. one port, 5s. 10½d. two ports, October; Charleston, 2,281 n.r., 159 ft., Liverpool or Bremen, 60s., cotton, October 15-25; Mobile and (or) Pensacola, 1,400 stds., 10 per cent., Genoa, 160s., option 2s. 6d. extra if two ports West Italy; Bordeaux, 8s. 3d., Swansea, pitwood, ppt.; Kallero-Oregrund, 38s., London, d.b. and b.; Marguerita Island, 1,700, New York, 2.80 dols., magnesite rock; time charter, European trade, £580, eight months, October; Pugwash, 72s. 6d., Manchester, October; nitrate ports, 7,009 tons cargo, United Kingdom-Continent, 32s. 6d., 1s., extra France, November 15-December 15, sail, 27s. 9d. United Kingdom-Continent, less 9d., season 1913; time charter, Eastern trade, delivery Glasgow, re-delivery Calcutta, 2,802 net, trip out, 4s. 9d.; Vivero, 3,000, Rotterdam, 7s., ppt.; Dioido, 2,900, Rotterdam, 6s. 9d., ppt.; St. Petersburg, 2s. 4½d., London or Rotterdam, wheat basis, October; North Pacific, 9,000, United Kingdom-Continent, 50s. 6d., November; time charter, 10s. 6d., one trip Gulf to River Plate; time charter, Brazil trade, 7,500, 6s. 10½d., one round trip, delivery Swansea, re-delivery United Kingdom-Continent.

Arrangements have been made for establishing a rescue station in connection with mining in the Rotherham district. A site for the necessary buildings has been selected near the junction of Effingham-street and St. Ann's-road, Rotherham.

HE COLLIERY GUARDIAN

NTHLY LIST OF RECENT COAL LITERATURE

is a list of abbreviations used below :—
. Eng = American Institute of Mining

nnales des Mines.
denreform.
= Canadian Mining Journal.
= Cassier's Magazine.
News = Cement Engineering News.
Coal Merchant and Shipper.
st. America = Coalmining Institute of

= Colliery Guardian.
= Compressed Air Magazine
= Electrical Review and Western Elec-

Penna. = Engineering Society of Western

Engin. Min. Jl. = Engineering and Mining Journal.
Geol. Mag. = Geological Magazine.
Gewerksch. Rdsch. = Gewerkschaft Rundschau.
Ind. Eng. = Indian and Eastern Engineer
Jl. Gas Light. = Journal of Gas Lighting.
Kohle Erz = Kohle und Erz.
Mech. Eng. = Mechanical Engineer.
Min. Eng. World = Mining and Engineering World.
Mines Minerals = Mines and Minerals.
Min. Scient. Press = Mining and Scientific Press.
Mitt. D. Landw. Gesellsch. = Mitteilungen der Deutschen Landwirtschafts-Gesellschaft.
Montan. Rdsch. = Montanistiche Rundschau.
Preuss. Gesetzsamml. = Preussischen Gesetzsammlungen.
Railw. Engin. Rev. = Railway and Engineering Review.
S. Afric. Engin. = South African Engineer.

S. Afric. Min. Jl. = South African Mining Journal.
San. Rec. = Sanitary Record.
Socialist Rev. = Socialist Review.
Soz. Prax. = Soziale Praxis.
Stahl Eisen = Stahl und Eisen.
Techn. Bl. (Bergwerks-Ztg.). = Technische Blatter (Bergwerks-Zeitung).
Technik Wirtsch. = Technik und Wirtschaft.
Tijdschr Nijverheid = Tijdschrift der Maatschappij van Nijverheid.
Trans. Inst. Min. Eng. = Transactions of the Institution of Mining Engineers.
V.J.H. Stat. D.R. – Vierteljahrshefte zur Statistik des Deutschen Reichs.
Z. Kompr. Gase = Zeitschrift für Komprimierte und Fluessige Gase.
Z. Soz. Wiss. = Zeitschrift für Sozialwissenschaft.

⁂ We shall be glad to obtain for readers, where possible, copies of the papers referred to at the prices named, which are inclusive of postage.

I.—General.

in Coalmining. "Canad. Min. Jl.,"
63. 1s. 6d.
e Netherlands, with Special Reference
Pits. (De Kolenmijnbouw in Neder-
bijzonder het Staatsmijnbedrijf.)
verheid," 1912, 5, p. 225-38.
a Chinese Coalfield. G. S. Caldwell.
Min. Eng.," vol. 43, 3, p. 361-72; 3 tab.

l and Cost of Raising. (Kohlenpreise
skosten.) Seidl. "Technik Wirtsch.,"
9. 2s.
A Study of his Struggle to Secure
ges in the Hocking Valley. E. A.
8vo., 65 p. Wash. Libr. of Congress,

e. (Histoire d'une Mine.) Adf. Môny.
aris: Hachette. 1912.
Prussian Mining in the Progress of
e during the last 50 Years. (Ueber den
preussischen Bergbaues und seiner
den Fortschritten der Bergtechnik in
Jahren.) G. Franke. (Speech held at
occasion of the Kaiser's birthday at
gakademie, Berlin, 1911). 8vo., 34 p.
. 1912.
of Mineral Resources in the United
ica. (Die Erhaltung der Bodenschaetze
en Staaten von Nordamerika.) "Mitt.
sellsch.," 1912, 9, p. 131-4; 10, p. 152.

regards Coal in Saxony. (Sächsische
K. Schatter. "Bodenref.," 1912, 12,

l Problems. H. F. Bain. "Am. Inst.
ll. 68, p. 811, 42. 3s. 6d.
Export Trade. "S. Afric. Min. Jl.,"
813-4, 491, p. 859. 2s.
of Japan's Mining and Metallurgical
e Entwicklung der Berg- und Huetten-
apan.) Herm. Grossmann, 8vo., 18 p.
Mining and Metallurgical Treatises.)
2.
Metallurgical Industry in the Alsace
the Annexation. (L'Industrie Minière
e en Alsace 40 Ans après l'Annexion.
de Considérations sur l'Industrie
Général.) Eug. Ackermann. 8vo.,
: Sutter.
rown Coal Industry. (Die deutsche
ndustrie.) 2nd ed., vol. 1, pt. 1, 4to.
app.
s of British Columbia. J. S. Fraser.
l.," vol. 33, 16, p. 553-6. 1s. 6d.

Mining and Metallurgical Products in 1911: Preliminary Report. (Die Erzeugnisse der Bergwerke, Salinen und Huetten, 1911: Vorlaeufige Mitteilung). "V J H. Stat. D. R.," 1912, 2, p. 79-86.

Early Mining of Coal in Glace Bay District, B.C. J. C. Mitchell. "Canad. Min. Jl.," vol. 33, 16, p. 547-51; 2 maps, 1 fig., 1 ill. 1s. 6d.

The English Miners' General Strike. (Conclusion.) (Der Generalstreik der englischen Bergleute.) "Gewerksch.-Rdsch.," 1912, p. 69-73.

Prussian Law Concerning Miners' Unions. (Preussisches Knappschaftsgesetz.) "Preuss. Gesetzsamml.," 1912, 16.

The Supplementary Law Concerning the Prussian Miners' Unions. (Die preussische Knappschaftsnovelle.) Brust. "Soz. Prax.," 1912, vol. 31, 35, p. 1109-11. 1s. 3d.

Miners' Union and German Insurance Law of July 19, 1911. (Die Knappschaftsvereine und die Reichversicherungsordnung vom 19 Juli, 1911.) 8vo, 90 p. (Collection of mining and metallurgical treatises.) Kattowitz, 1912.

The Situation of Miners Employed in the State Mines of Germany during 1910. (Verhaeltnisse der Arbeiter der staatlichen Bergwerke, Huetten und Salinen im Etatsjahre 1910.) "Glückauf," 1912, 11, p. 438-40. 2s. 9d.

State-owned and Private Mines. (Staatsmijnen en particulieren.) D. van Blom. "Economist," 1912, 6, p. 441-50.

Statistical Data of the Miners' Strike in the Ruhr District. (Der Ausstand der Ruhrbergarbeiter vom Maerz 1912 in statistischer Darstellung.) Ernst Jüngst. "Glückauf," 1912, 26, p. 1044-55. (Complete survey of the strike from the statistical point of view.) 2s. 9d.

Miners' Wages in Germany during the First Quarter of 1912. (Die Bergarbeiterloehne in Deutschland im 1. Vierteljahr 1912.) "Glückauf," 1912, 28, p. 1126-9. 2s. 9d.

Report of Section 2 of the Miners' Union for 1911. (Geschaeftsbericht des Vorstandes der Sektion 2 der Knappschafts-Berufsgenossenschaft ueber das Jahr 1911.) "Glückauf" 1912, 27, p. 1084-8. (Statistical abstract concerning accidents.) 2s. 9d.

The Economy of Working State-owned Mines in Prussia. (Die Wirtschaftlichkeit des Staatebetriebes im preussischen Bergbau.) "Z. Soz. wiss.," 1912, 7, 8, p. 546-55. 2s.

On the Concentration Movement in German Coalmining: An Economic Study. (Ueber die Konzentration im deutschen Kohlenbergbau: Eine oekonom. Studie.) Curt Goldschmidt. 8vo, 122 p. (Economic dissertations of the high schools of Baden.) Karlsruhe, Braun. 1912.

The German Coal Trade in 1911. Koenig. "Colliery Guard.," No. 2697, p. 496. (Br. Consular Report.) 6d.

The Coalmining Industry in the Hokkaido. H. Wrenacre. "Colliery Guard.," No. 2698, p. 535. (Br. Consular Report.) 6d.

II.—Education.

The Advantages of Continuation Schools for Miners which are under Control of Practical Miners. (Betrachtungen ueber die Vorzuege von Fortbildungsschulen auf Bergwerken unter spezieller bergmaennischer Leitung. R. Penkert. "Kohle Erz," 1912, 12, p. 275-9. 2s.

Regulations for Mining Examinations. "Colliery Guard.," No. 2698, p. 546. 6d.

Examination for Junior Inspectors of Mines and Quarries. "Colliery Guard.," No. 2700, p. 638; 2 fig. 6d.

III.—Geology.

Geology Applied to Mine Examination. J. B. Joralemon. "Eng. Min. Jl.," vol. 94, 6, p. 247-9. 1s. 6d.

Carboniferous Succession in the Forest of Dean Coalfield. J. F. Sibley. "Geol. Mag.," vol. 9, 9, p. 417-22. (The unconformity with the carboniferous limestone and the Drybrook sandstone.)

The Loss of Mineral Areas in South Staffordshire. L. Holland and others. "Trans. Inst. Min. Eng.," vol. 43, 4, p. 384-90. (Discussion.) 8s.

The Coalfields of Kent, their Stratigraphic and Tectonic Conditions as Compared with those of Westphalia. (Das Kent-Kohlenfeld, seine stratographischen und tektonischen Verhaeltnisse im Vergleich mit denen des westfaelischen Steinkohlengebietes.) P. Krusch. "Glueckauf," 1912, 27, p. 1069-78; 6 fig. 2s. 9d.

Stratification and Grouping of Seams in the Saarbrück Carboniferous Formation. (Die Schichtenreihen und Floezgruppen des Saarbruecker Steinkohlengebirges.) 8vo. 16p. Kattowitz, 1912.

The Terra del Fuego Coalfield. H. W. Edwards. "Coal Age," vol. 2, 7, p. 222-3; 2 tab. 1s. 3d.

Fossil Plants from Ayrshire Coal Measures. R. Kidston. "Colliery Guard.," No. 2700, p. 610. (From the "Summary of Progress.") 6d.

IV.—Mine Surveying.

Introduction to Surveying with Special Reference to Coalmining. (Einfuehrung in die Markscheidekunde m. besond. Beruecksicht des Steinkohlenbergbaus.) L. Mintrop. 8vo., 216 p.; 191 ill., 5 plates. Berlin: J. Springer, 1912. 8s. 6d.

V.—Mining Technology.

Mining Machinery. A Collection of Handbooks for Mining Officials. (Die Bergwerksmaschinen. Eine Sammlung von Handbuechern f. Betriebsbeamte.) Vol. 1, 8vo. Berlin: Julius Springer, 1912.

VI.—Working of Minerals.

Power Consumption of Coal-cutters. G. W. Thomas. "Mines Minerals," vol. 33, 1, p. 8; 4 tab. 2s. 2d.

Coal-getting Machines. (Gewinnungsmaschinen.) Leo Herwegen, Otto Pfuetz, Karl Teiwes. 8vo., 452 p.; 393 ill. (Mining Machines, vol. 2.) Berlin: J. Springer, 1912. 20s.

Mining a Thick Vertical Coalseam. J. W. Powell. "Coal Age," vol. 2, 7, p. 220-1; 6 fig. (Two methods of working a mine are described. The inclined and the vertical methods are compared after the mine is opened by driving a rock tunnel from the surface to intersect the seam at the bottom of the basin, say, 1,000 ft.) 1s. 3d.

European Mine Practice as it Compares with America. E. Ramsay. "Min. Eng. World," vol. 39, 8, p. 349-51. 1s. 3d.

Accidents in Transvaal Mines, Falls of Ground, &c. "S. Afric. Min. Jl.," vol. 10, 490, p. 820, 491, p. 860. 2s.

Coal-getting by Machinery, with Special Consideration of the Conditions Prevailing in the Pits of South Wales. (Die maschinelle Kohlengewinnung m. beson. Beruecksicht. der Grubenverhaeltnisse in Sued Wales.) Sam. Mavor. Translated by Alois Holan. 8vo., 88 pp.; 1 ill. Witkowitz: Amende and Holan, 1912. 7s. 6d.

Derringer Anthracite Stripping. "Mines Minerals," vol. 33, 1, p. 5-6; 4 fig. (The Black Creek Coal Pockets in Pennsylvania, and the methods of working.) 2s. 2d.

Coalmining in Northern China. J. L. Dobbins. "Mines Minerals," vol. 33, 1, p. 29-32; 7 fig. (Shallow shafts are sunk without explosives and operated entirely by hand, the coal and water being carried out on men's backs.) 2s. 2d.

Coal Stripping in Alberta. D. B. Dowling. "Canad. Min. Jl.," vol. 33, 16, p. 543-4; 4 ill. 1s. 6d.

A New Coal-cutter. "Colliery Guard.," No. 2698, p. 531; 1 fig. (Hoadley-Knight coal-cutter.) 6d.

Baggeridge Colliery. "Colliery Guard.," No. 2700, p. 633. 6d.

VII.—Boring, Shaft Sinking, and Tunnelling.

Easington Colliery. "Trans. Inst. Min. Eng.," vol. 43, 4, p. 379-83. (Details of equipment and the sinking operations.) 8s.

Shaft Sinking from Below. H. Correll. "Min. Scient. Press," vol. 105, 7, p. 211. (A shaft driven upwards from below by utilising a borehole and a cable to support the staging below.) 1s. 4d.

Output and Costs of Shaft Sinking by the Freezing Method. (Leistungen und Kosten beim Schachtabteufen nach dem Gefrierverfahren.) Stegemann. "Glückauf," 1912, 11, p. 417-24. (A full discussion of output and costs of this method for various depths and shaft diameters.) 2s. 9d.

Sinking a Shaft by the Stockfisch Process at the Diergardt Colliery. (Das Schachtabbohrverfahren von Stockfisch und seine Anwendung auf Schacht II. der Gewerkschaft Diergardt.) Krecke. "Glückauf," 1912, 14, p. 552-9; 8 fig. (Description of this water-flush, percussion system, and the appliances used for same.) 2s. 9d.

Recent Systems of Automatic Feeding Devices for Pneumatic Percussion Drill. (Neuere Systeme Selbsttaetiger Vorschubeinrichtungen fuer Druckluftbohrhaemmer.) Clemens Menskens. "Kali," 1912, 6, p. 131-5; 7 fig. 1s. 3d.

Design and Maintenance of Rock-drill Bits. W. Blackburn. "Comp. Air Mag.," vol. 17, 6, p. 6451-4; 2 fig. 1s.

A Water-tight Timber Shaft. R. G. Johnson. "Coal Age," vol. 2, 6, p. 178-9; 4 fig. (Cement grout was forced into the water-carrying fissures, and the timber shaft rendered comparatively dry.) 1s. 3d.

Pit Sinking Rules. F. Piggott. "Colliery Guard.," No. 2697, p. 482. (Evidence before Royal Commission on Metalliferous Mines and Quarries.) 6d.

The Freezing Process in the Campine Coalfield. "Colliery Guard.," No. 2699, p. 599; 1 fig. 6d.

VIII.—Explosives, Blasting.

How Explosives Act. O. Snelling. "Coal Age," vol. 2, 5, p. 145. 1s. 3d.

The Danger of Accidents in Firing with Electric Ignition or with Fuse Ignition. (Die Unfallgefahr bei der Schiessarbeit mit elektrischer Gruendung u. mit Zuendschnurzuendung.) Dobbelstein. "Glückauf," 1912, 15, p. 594-6. (Results of an enquiry in the Dortmund district on the accidents during 1908-11. The number of accidents underground per 1,000 men was not smaller, at times even larger, with electric than with fuse ignition.) 2s. 9d.

Portable Ignition Switch with Watertight case. (Tragbarer Schiesschalter mit wasserdichtem Gehaeuse.) Sanzen. "Kali," 1912, 5, p. 104-7; 3 ill., 2 fig. (Made by Siemens-Schuckert.) 1s. 3d.

IX.—Timbering, Packing, &c.

Caving System of Mining in America. J. B. Wilson. "Eng. Min. Jl.," vol. 94, 6, p. 245-6. 1s. 6d.

Mining by Timbering and Filling. A. L. Toenges. "Mines Minerals," vol. 33, 1, p. 36-8; 6 fig. 2s. 2d.

XI.—Winding and Haulage.

Power Consumption of Hoisting Plants. S. W. Sykes. "Mines Minerals," vol. 33, 1, p. 49-52; 7 fig. 2s. 2d.

Hoisting on Inclines. A. O. Gates. "Eng. Min. Jl.," vol. 94, 7, p. 290-1; 1 chart, 1 fig. (The solution of forces in hoisting on inclines.) 1s. 6d.

Engine Calculations for Main Winding Engines. (Die Berechnung der Hauptfoerderungsmaschinen.) A. Wallichs. Lex 8vo., 15 p.; 14 ill. Wittenberg: A. Ziemsen. 1912. 2s. 3d.

The Speed Regulators of Steam Winding Engines with Special Consideration of Schoenfeld's System. (Die Fahrtregler der Dampffoerdermaschinen mit besonderer Beruecksichtigung des Systems Schoenfeld.) Gentebrueck. "Techn. Bl. (Bergwerks-Ztg.)," 1912, 11, p. 81-4; 3 fig.

Mine Cages, Inclined Shaft Trolleys and Hanging Chutes. C. T. Rice. "Eng. Min. Jl.," vol. 94, 8, p. 347-9; 17 fig. 1s. 6d.

A Method of Capping Winding Ropes. D. Jackson. "Trans. Inst. Min. Eng.," vol. 43, 3, p. 331-4; 6 fig. 8s.

Largest Electrical Mine Hoist in America. "El. Rev. (Chic.)," vol. 61, 5, p. 227-8. (The Christopher Coal-Mining Company's hoist, Franklin County, Ill. The hoist takes half the capacity of a plant of two 750 kw., 3 phase, 60 cycle, 2,300 volt Curtis turbo-generators.) 1s. 9d.

The Question of the Economy of Electric Main Hauling Plants. (Zur Frage der Wirtschaftlichkeit elektrischer Hauptfoerdermaschinen.) W. Philippi. "Glückauf," 1912, 28, p. 1109-19; 6 fig. (The author shows how to determine the economy of electric hauling machines, and arrives at the conclusion that exact comparisons between their economy and that of steam hauling machines can be arrived at in special cases only, and that, for the purpose of comparison, tests extending over long periods are essential.) 2s. 9d.

Storage Battery Haulage at Idaho Springs, Col. H. B. Barnes. "Min. Scient. Press," vol. 66, 1699, p. 100-2; 1 fig. (Experience of service and cost at Big Five Tunnel.) 1s. 4d.

Comparative Tests of Mining Locomotives. (Vergleichende Untersuchungen an Grubenlokomotiven.) Buetow und Dobbelstein. "Glückauf," 1912, 12, p. 461-8; 13, p. 501-11. 2s. 9d.

"New Century" Mine Locomotive. "Colliery Guard.," No. 2697, p. 485; 1 fig. 6d.

A New Overwinding Gear. "Colliery Guard.," No. 2700, p. 634; 4 fig. (Jackson and Staley's overwinder at the Exhall Colliery.) 6d.

XII.—Signalling

The Use of Telephones in Mines. G. Brown. "Coal Age," vol. 2, 6, p. 179-81; 2 fig. (Practical suggestion on the best methods of wiring and maintenance underground.) 1s. 3d.

XIII.—Lighting.

The Ignition Properties of Electric Glow Lamps. "Gas World," vol. 57, 1467, p. 257; 2 tab. (The power of ignition of broken glow lamps in mixtures of gases and air.) 10d.

Testing of Safety Lamps. "Colliery Guard.," No. 2698, p. 531; 1 fig. (Report of Committee.) 6d.

Testing of Safety Lamps. "Colliery Guard.," No. 2699, p. 582. (Official Memorandum.) 6d.

XIV.—Ventilation.

Modern Mine Ventilating Machines. W. Charlton. "Trans. Inst. Min. Eng.," vol. 43, 3, p. 338-60; 2 fig., 1 plate. 8s.

Coalmine Ventilating Equipment. W. M. Weigel. "Coal Age," vol. 2, 6, p. 182-4. (Notes on the effect of the shape of fan blades, the design of casing and stack, and their effect on the performance of the fan; measuring the volume and pressure of the air and power; testing the fan and faults of anemometers.) 1s. 3d.

Methods of Ventilating R.R. Tunnels. "Coal Age," vol. 2, 9, p. 289-91; 4 fig. (A system of large capacity described, with a number of novel features unfamiliar to the colliery engineer.) 1s. 3d.

XV.—Mine Gases, Testing.

Spontaneous Gas Blowers. (Ploetzlische Gasausbrueche.) V. Rosen. "Bergbau," 1912, 9, p. 121-3. 2s.

Testing for Firedamp and Blackdamp by means of a Safety Lamp. J. Black and others. "Trans. Inst. Min. Eng.," vol. 43, 3, p. 305-30; 1 diagr. (Discussion on safety lamps and the president's address.) 8s.

Exploring Mines containg Poisonous Gases, Smoke and Suffocating Fumes. "S. Afric. Min. Jl.," vol. 10, 489, p. 774-5. (Marsh gas in Kimberley mines and the Bureau of Mines Reports.) 2s.

Refraction of Light in Firedamp. O. H. Hahn. "Colliery Guard.," No. 2697, p. 485; 3 figs. (From "Coal Age.") 6d.

The New Haldane Portable Apparatus for Firedamp Estimations. "Colliery Guard.," No. 2700, p. 636; 2 fig. 6d.

An Improved Apparatus for the Examination of Flame Caps. "Colliery Guard.," No. 2700, p. 635; 2 fig. (Baird and Tatlock apparatus.) 6d.

Further Notes on the Analyses of Mine Air Conducted at the Lewis Merthyr Consolidated Collieries Limited, Trehafod. J. W. Hutchinson and E. G. Evans. "Colliery Guard.," No. 2699, p. 587; 1 fig. (Paper read before S. Wales Inst. Engin.) 6d.

XVI.—Coaldust.

Dressing Mine Workings with Stonedust. W. E. Garforth. "Trans. Inst. Min. Engin.," vol. 43, 4, p. 406-26. 8s.

Dust, Gases and Humidity in Mine Air. K. F. Schoew. "Comp. Air Mag.," vol. 17, 8, p. 6526-8. (Temperature and moisture and the dangers of tornado ventilation.) 1s.

New Experiments on Coaldust in Mines and on Preventing the Dangers arising from Same. (Nouvelles Expériences sur les Poussières de Houille et sur les Moyens de Combattre leurs Dangers.) J. Taffanel. "Ann. Mines," 1912, vol. 1, 4, p. 259-376, 25 fig.; 5, p. 379-456, 18 fig.; 6, p. 469-664. (Experimental equipment; preparation and performance of the tests; measuring apparatus; development and arrest of coaldust explosions; theory of explosions and its application in practice.)

Experiments at Liévin on the Classification of Coaldust Deposits. J. Taffanel. "Colliery Guard.," No. 2697, p. 483; 2 figs. (Report to the Comité Central des Houillères de France.) 6d.

Testing by Gas: A Popular Fallacy. M. E. "Colliery Guard.," No. 2697, p. 486; 1 fig. 6d.

XVII.—Explosions.

The Prevention of Explosions in Mines. J. Dickinson and others. "Trans. Inst. Min. Eng.," vol. 43, 3 p. 263-94. (Close of the discussion of the subject.) 8s.

Did the Bignall Hill Mine Explode? J. Ashworth. "Coal Age," vol. 2, 7, p. 217-8; 1 map. (The writer thinks that the so-called explosions at the Bignall Hill, Talk-o'-th'-Hill, and Wellington collieries were caused by a blast of heated afterdamp from the gob fire, which was expelled by a roof fall. Gas burns on a red-hot porous surface without flame.) 1s. 3d.

Explosions and Accidents in Coalmines. "Socialist Rev.," 1912, 6, p. 297-301. (Protection of labour.)

The Hastings Coalmine Disaster. "Mines Minerals," vol. 33, 1, p. 9-11; 3 fig. (The probable cause being that the asbestos gasket upon which the glass globe of the lamp rests had in some manner become folded over, leaving a small air gap, through which it is thought a volume of gas was ignited.) 2s. 2d.

The Bellevue Explosions, Alberta, Canada. J. T. Stirling and J. Cadman. "Colliery Guard.," No. 2698, p. 534. (Paper read before Inst. Min. Engin.) 6d.

Radbod Colliery Disaster. Hollender. "Colliery Guard.," No. 2698, p. 548. (Abstract Official Report.) 6d.

XVIII.—Mine Fires.

Mine Fire Protection. I. H. Woolson and others. "Min. Scient. Press," vol. 105, 6, p. 171-2. 1s. 4d.

XIX.—Rescue and Ambulance.

Life Saving in Mines. Its Technical Features and Legal Regulation at Home and Abroad. (Das Rettungswesen im Bergbau. Seine Technik und gesetzl. Regelung im In- u. Auslande.) O. Pfuetz. 8vo., 175 p.; 150 ill. Freiberg: Craz and Gerlach, 1912. 5s. 6d.

XX.—Drainage, Pumping, &c.

The Hydropulsor. (Der Hydropulsor.) Ernst Preger. "Glückauf," 1912, 28, p. 1119-24; 12 fig. (Description of several types of pressure and suction hydropulsors.) 2s. 9d.

XXI.—Preparation.

Lamb Colliery Washing Plant. "Coal Age," vol. 2, 6, p. 185-6; 2 ill. 1s. 3d.

The New Harleigh Coal Breaker. F. B. Davenport. "Coal Age," vol. 2, 8, p. 250-4; 9 fig. (The structure is relieved of considerable weight by a rigid examination of the coal and a separation of the rock and slate before it enters the breaker. The preparing house, screen floor, dumper, main conveyor, and construction of building are described.) 1s. 3d.

Coal Washing and Pollution of Streams. H. M. Wilson "San. Rec.," vol. 50, 1184, p. 131.

XXII.—Briquettes.

cification for Refractory Materials. ard.," No. 2700, p. 651. (Report of Inst. ommittee.) 6d.

XXIII—Coke Ovens

on a Coke Basis. J. W. Napier. "Coal 25, 621, p. 153. 10d.

ion by Coke. "Jl. Gas Light.," vol. 119, . 1s.

sorbing Power of Coke. (Wasserauf- egen des Koks.) "Stahl Eisen," 1912, (Report on laboratory tests concerning n of the hygroscopicity of various coke ied out under different conditions; tables 2s. 9d.

of Coke Gas for its Contents of By- eber die Pruefung des Kokerei-Rohgases ehalt an Nebenerzeugnissen.) E. Jenkner. ," 1912, 28, p. 1129-33. 2s. 9d.

creening and Loading Machines. C. Otto. ht.," vol. 119, 2570, p. 451; 2 fig. 1s.

re in the South Wales District. R. H. Mech. Eng.," vol. 30, 762, p. 265-8; 3 fig.,

ng and Loading Devices. "Coal Age," 46. (Devices to overcome the difficulties extreme contraction and expansion, the chain conveyor of machines.) 1s. 3d.

y-product Coke Oven. E. B. Wilson. erals," vol. 33, 1, p. 12-4; 4 fig. 2s. 2d.

egenerative Coke Oven. A. Gobiet uard.," No. 2697, p. 486; 3 fig. (From dsch.") 6d.

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XXIV.—Fuels, Testing, &c.

Nature of Coal. M. Wahl. "Gas World," p. 251. (Investigations into stone coal tes.) 10d.

ng of Coal. "Coal Age," vol. 2, 9, p. 287-8. d by submergence, and salt water improves s. 3d.

ation of Coal. Dr. Bergius. "Jl. Gas 119, 2572, p. 571. 1s.

Rays in the Examination of Coal. F. C. R. C. Burton. "Trans. Inst. Min. Eng.," 295-304; 1 plate. 8s.

Experiences or Results of Tests Regarding ration of Coal under Water? (Liegen n oder Versuchsresultate ueber Konser- Kohlen unter Wasser vor.) Heidepriem. 1912, 12, p. 472-4. (Paper road before of the International Union of Boiler nd Insurance Companies.) 2s. 9d.

oration and Spontaneous Combustion of Gas Light.," vol. 119, 2573, p. 616-8; 2 fig.,

the Storage of Coal. H. C. Porter. Mag.," vol. 42, 2, p. 150-6. (Observations from weathering and heating of coal.)

XXV—Steam Engines and Boilers.

Coal Smoke and its Practical Abatement. J. M. Searle "Eng. Soc. West. Penna.," vol. 28, 6, p. 459-98; 1 fig. (The economy of light smoke and what the engineer can do to ensure it.)

Steam Boiler Efficiency and the Most Economical Method for Absorbing Heat from Gases of Combustion. "Ind. Eng.," vol. 12, 1, p. 17-20; 6 fig.

The Development of the Steam Engine and the Railway through Mining. (Die Entwickelung der Dampfmaschine und der Eisenbahnen durch den Bergbau.) Th. Wolff, "Kohle Erz.', 1912, 11, p. 242-51; 4 fig. 2s.

Utilisation of Low-grade Fuels at Collieries in the Dortmund District. Betow und Dobgelstein. (Ausnutzung minderwertiger Brennstoffe auf Zechen des Oberbergamtsbezirks Dortmund.) "Glueckauf," 1912, 28, p. 1124-6. (Results of trials with Herman grate, cross firebars and coke breeze.) 2s. 9d.

XXVI—Compressed Air.

The Turbo-Compressor. (Der Turbokompressor.) "Z. kompr. Gase," vol. 14, 1912, 8, p. 135-7; 5 fig. (Advantages over piston engines; discussion of various types; cooling and regulation). 2s.

Losses in Pneumatic Plants. (Mengenverluste in Druckluftanlagen.) K. Schultze. "Glückauf," 1912, 27, p. 1078-82. (Results of researches on mining machinery. The author comes to the conclusion that the application of compressed air for working machine tools underground is very uneconomical.) 2s. 9d.

XXVII.—Electricity.

Electricity in Brown Coal Mines. "Coal Age," vol. 2, 5, p. 142-5; 8 fig. 1s. 3d.

Electric Power at Scottish Collieries. "Electricity," vol. 27, 1135, p. 526-6. (Notes on recent up-to-date installations.) 5d.

Electric Mining Appliances. E. A Lof. "Canad. Min. Jl.," vol. 33, 15, p. 513-9. (Almost all new mines are being equipped with electric drive; notes on installations.) 1s. 6d.

Electric Motors for Mines. "Coal Age," vol. 2, 9, p. 283-7; 7 fig. (A comprehensive review of the current practice in the use of electricity in British mines. The danger in gaseous mines is met by special ventilation of motors of large capacity.) 1s. 3d.

Motor Troubles in Colliery Plants. "Coal Age," vol. 2, 8, p. 256-7. 1s. 3d.

XXVIII.—Surface Transport.

Notes on the Campbeltown and Machrihanish Light Railway and the Campbeltown Coalfield. T. L. Galloway. "Trans. Inst. Min. Eng.," vol. 43, 3, p. 335-7. 8s.

The Hetzel Coaling Station. "Railw. Engin. Rev.," vol. 52, 30, p. 705; 1 fig. (A 50-ton drop bottom car serves as storage for the coal, under the coal siding is a steel track hopper, a reciprocating feeder delivers the coal at a uniform rate to a line of chain and buckets, which elevates it in an apparatus 6 ft. by 16 ft. and delivers to the locomotive.) 1s. 9d.

10,000-Ton Reinforced Concrete Coal Pocket. "Cement Engin. News," vol. 124, 8, p. 242-3; 1 fig. (Storage bin for the Pacific Mills Print Works, S. Lawrence, Mass.

Fleet of 10-Tonner Coal Trucks. "Power Wagon," 91, p. 17-22, 9 fig (Coal delivery, trucks for the domestic supply, crane loading, dump unloading, and delivery to the domestic coal-cellar through a chute under the wagon body to the plate-hole in cellar.) 9d.

XXIX.—Sanitation, Diseases.

Germicidal Mine Water. "Coal Age," vol 2, 6, p. 201-2; 2 tab. (Tests of Pennsylvania mine waters show them to be able to prevent the growth of typhoid bacilli.) 1s. 3d.

Miners' Phthisis Act. "S. Afric. Min. Jl.," vol. 10, 490, p. 857, 492, p. 890. 2s.

South African Miners' Phthisis Bill. "S. Afric. Engin.," vol. 18, 1, p. 4. (The Government contribute £100,000 towards a compensation fund, the balance to be made up by the mineowners.) 2s.

Health Campaign on Rand Mines. "S. Afric. Min. Jl.," vol. 10, 490, p. 815-6. 2s.

Miners' Resistance to Tuberculosis. J. M. Wainwright and H. A. Nichols. "Coal Age," vol. 2, 8, p. 269-70; 4 tab. 1s. 3d.

Mining and the Respiratory Organs. "Coal Age," vol. 2, 9, p. 293-4; 2 tab. (Comments on the British and American Census Reports.) 1s. 3d.

Standard Fireproof Mine Stables. E. L. Cole. "Coal Age," vol. 2, 7, p. 215-7; 9 fig. 1s. 3d.

Physiological Effects of Carbon Monoxide. H. S. Munroe. "Engin. Min. Jl.," vol. 94, 5, p. 221-2. 1s. 6d.

Underground Temperatures. "S. Afric. Min. Jl.," vol. 10, 488, p. 736; 2 tab. (Some Rand and Australian statistics.) 2s.

South Yorkshire Coalfield and the Housing Problem A. Dunne. "Builder," vol. 103, 3627, p. 171-2. 9d.

XXX—Mining Laws, Royalties.

Australian Mining Laws. A. Montgomery. "Min. Scient. Press," vol. 105, 5, p. 141-2. 1s. 4d.

Valuation of Mineral Properties. C. S. Morris and others. "Trans. Inst. Min. Eng.," vol. 43, 4, p. 391-4 2 tab. (Close of discussion.) 8s.

On the Question of Writing Off Capital on Account of Depletion. (Zur Frage der Abschreibungen wegen Substanzverminderung.) Bluemel. "Glueckauf," 1912, 15, p. 596-602. (Deals with the new law concerning taxation and the considerations involved in connection with losses of coal on account of haulage.) 2s. 9d.

Mining Laws in German Protectorates. (Das Bergrecht der deutschen Schutzgebiete.) Carl Liesegang "Techn. Bl. (Bergwerks-Ztg.)," 1912, 12, p. 89-91.

Hours of Employment of Winding Enginemen. "Colliery Guard.," No. 2698, p. 530. (New draft regulations). 6d.

Recent Legislation in Relation to Land and Mines. A. Smith. "Colliery Guard.," 2698, p. 529. (Paper read before Inst. Min. Engin.). 6d.

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October 8.—For coal, for the District Educa-

x, October 16.—For hard cobble coal, for y Group of Council Schools.

tober 12.—For coal, for the Bedfordshire Committee.

. October 8.—For coke, for the Broadstairs Urban District Council (Waterworks Depart-

or coal, for the Tarvin Guardians.

h (Hants), October 7.—For 90 tons of best coal from the Griffin Nantyglo Colliery, for

er 8.—For about 18 tons of coal, 25 chaldrons rewood per 100 bundles, for the Education

, October 10.—For 30 tons of coal, for the on Committee.

October 8.—For coal, for the Inverness Board.

Egypt), October 14.—Tenders are invited s Department of the Sudan Government for 12,200 tons of Crown brand patent fuel

tober 15.—The London County Council for the supply and delivery from November 1, 0, 1913, of about 110,000 tons of coal for the tion (Tramways Department), East Green-

October 17.—For coal, for the Corporation

Milborne St. Andrew (Dorset), October 10.—For 30 tons of coal, for the Dorset County Boys' Home, Milborne St. Andrew.

Mountain Ash, October 14.—For coal and coke, for the Governors of the Gelligaer County Schools.

Nuneaton, October 16.—For coal, for the Education Committee.

Ponkey, &c (Denbigh), October 11.—For coal, for the Denbighshire Education Authority.

Rochdale, October 9—For steam coal, for the Electricity Committee.

Thurso (Scotland), October 7.—For 30 tons of best English coals (equal to Harton coals), for the Combination Poorhouse Committee.

Wakefield, October 19.—For (1) coal and (2) coke, for the Education Committee.

Walsall, October 7.—For deep and shallow nuts and coke, for the Managers of tho Rushall Council Schools.

Wolverhampton, October 7.—For fuel, for the Corporation.

. he date given is the latest upon which tenders can be received

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Colombo (Ceylon), October 23.—*Steel Pipes.*—For about 23 miles of 30 in. internal diameter lap-welded steel pipes, for the Municipality (Contract No. 1).

Crossness (near Abbey Wood, Kent), October 22.—*Pumps, &c.*—For four 38 in. centrifugal pumps, together with four 38 in. hydraulically worked sluice valves and a 10 in. centrifugal drainage pump and steam engine, for the London County Council.

Dublin, October 14.—*Steel Rails, &c.*—For steel rails, fishplates, cast iron chairs and permanent way fastenings, for the directors of the Great Northern Railway Company (Ireland).

London, October 8.—*Girders.*—For about 260 tons of steel bridge girders and other iron and steel work, for the directors of the Great Western Railway Company.

London, October 8.—*Steel Rails, &c.*—For the following, for the directors of the Madras and Southern Mahratta Railway Company Limited: (1) About 830 tons steel rails, 80 lb. section; (2) about 41 tons steel fishplates, in accordance with the specifications, which can be seen at the offices of the company, 91, York-street, Westminster, S.W.

London, October 8.—*Wheels and Axles.*—For wheels and axles, for the directors of the Bombay, Baroda and Central India Railway Company Tenders must be sent to Mr. C. Crommelin, secretary, Gloucester House, 110, Bishopsgate, London, E.C.

London, October 15.—*Steel Tires.*—For 6,000 steel tires for driving wheels, and 5,000 steel tires for pony wheels for electric tramcars, for the London County Council.

Rio de Janeiro (Brazil), October 31.—*Steel Bridges* —Tenders will be received at the offices of the "Estrada de Ferro Oeste de Minas, Rua da Alfandega 130," Rio de Janeiro, for the supply during 1913 of 25 steel bridges having spans varying from 5 to 34 metres, in accordance with the specifications.

Rotherham, October 12.—*Cast Iron Pipes.*—For 1,330 tons or thereabouts of cast iron spigot and socket pipes, with such special castings as may be necessary, the sizes ranging from 8 in. to 3 in., for the Rural District Council.

Walthamstow, October 11.—*Petrol Motor, &c.*—For one Fire Brigade petrol motor, combining pump, fire escape, tender and first-aid machine, for the Urban District Council.

Watford, October 16.—*Steam Alternator, &c.*—For (1) 500 kw. steam alternator; (2) switchboard machine panel, for the Urban District Council.

Wombwell (Yorks), October 8.—*Cast Iron Pipes, &c.* —For about 50 lineal yards of 15 in. diameter vertically cast iron pipes, bank pipes, or steel tubes, for the Urban District Council.

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Registered No. Please quote when ordering		
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C.G., 69	The same (without Schedules). Pamphlet Form	4d. each. By post 5d.
H.O., 34	The same (without Schedules). In Sheet Form for posting	1d. each. By post 1½d.
H.O., 1149	Mining Examinations. Order Fixing Times and Places	1d. each. By post 1½d.
H.O., 1150	Rules for the Conduct of Examinations	1d. each. By post 1½d.
H.O., 1151	Rules as to the Qualifications of Applicants for First and Second-class Certificates of Competency	1d. each. By post 1½d.
C.G., E.	Special Rules for the Installation and Use of Electricity in Mines. Sheet Form (H.O., 12)	3d. each. By post 3½d.
C.G., K.	Pamphlet Form (H.O., 11)	2d. each. By post 3d.
C.G., L.	Coal Mines Act, 1911. Pamphlet Form	9d. By post 11d.
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	Test of Safety Lamps. Memorandum dated September, 1912	
	List of Mines in the United Kingdom for 1911	4s. each. By post 4s. 4d.
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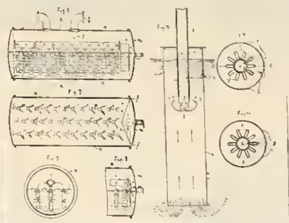
Continued on Page 707.

THE COLLIERY GUARDIAN COMPANY LIMITED,

30 & 31, Furnival Street, Holborn, London, E.C.

S OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

. *Improvements in Steam Regenerative d Water Heaters.* D. B. Morrison, of Hartle- orks, Hartlepool, Durham.—The object of is apparatus whereby the float oil is collected in one or more desired parts of a steam ccumulator or water heater by surface flow, be readily removed. In carrying out the ding to one arrangement the velocity of the water, which results from the discharge of plied to the accumulator or water heater or the like, is utilised for establishing a water in a required direction towards and in which the float oil is retained and from ow of water is at a lower level, the retained ved continuously as by a float-controlled cally as by a cock. The discharge from each valent is so arranged that the flow is approxi- irection, and when large numbers of these s are employed the issuing streams are so create surface flow in one direction, the may be, at a lower level being in the reverse direction. At the part where it is desired to concentrate the oil, as for example at one end of a vessel forming the accumulator or water heater, an oil collecting receiver is provided which may be formed by an angle plate so arranged hat the surface flow passes through openings between the ends of the plate and the sides of the vessel into a space between the plate and the end of the vessel, or there may be two directing plates and a central opening, or the surface flow may be over a weir formed by an inclined plate extending from side to side of the vessel. The plate or plates extend upwardly above the normal water level or into the steam space, and downwardly into the water, the return flow of water being between the bottom of the plate and the bottom of the vessel. It is preferable to place the oil collector at one end so as to establish a regular surface flow in one direction from one end of the accumulator or water heater to the other end, which besides concentrating the oil has a favourable effect in causing an increased circulation of water. In another arrangement the accumulator or water heater may be of circular form in horizontal cross section and the steam discharge nozzle or nozzles, or other steam condensing and water circulating devices, may be situated centrally and arranged to cause a surface flow of water radially outwards to the sides of the apparatus which may be fitted with a trough for the collection of the float oil, or other suitable means may be provided for the reception of the surface flow of oil and water, the float oil being retained for removal and the water circulated downwardly to the bottom of the apparatus. Figs. 1, 2 and 3 represent applications of the invention to a steam regenera-



LLIERY REPORT BOOKS and FORMS.

ew Forms, &c., recently issued under the Coal Mines Acts.

This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c.

Continued from Page 706.

NEW FORMS, &c., RECENTLY ISSUED.

No. ote ring.			
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2	Form of Book for Daily Record of Shots Fired—Explosives in Coal Mines Order	9d. each	do.
	UNOFFICIAL FORMS		
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0	Overman's Daily Report. Books of 200 pages	4s. each.	By post 4s. 5d.
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7	Foreman Enginewright's Daily Report to Manager. Books of 200 pages ..	4s. each.	By post 4s. 5d.
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1*	The same as C.G. 31, but without rules on back	4s. each.	By post 4s. 5d.
1A	Authority to Carry a Lamp Key. Books of 100 Forms	4s. each.	By post 4s. 5d.
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5A	Workmen's Contracts. Books of 200 pages..	4s. each.	By post 4s. 5d.
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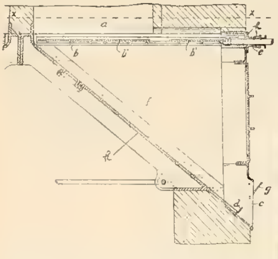
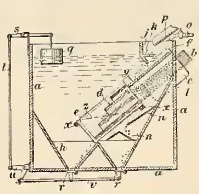
tive accumulator or heater in which steam passes into a body of water; and figs. 9, 10 and 11 represent convenient forms of steam condensing and water circulating devices. (Eleven claims.)

19556 (1911). *An Improved Means for the Withdrawal of Coke from Vertical Retorts used in the Distillation of Gas Coal.* A. Waddell, Dunfermline, Fifeshire.—This invention relates to vertical retorts used in the distillation of coal and of the type in which the discharge of the coke produced is controlled by a single plate horizontally adjustable beneath the retort; and the invention has for its object to provide an improved construction of such adjustable plate. According to the invention the horizontally adjustable plate is so limited in area that it cannot cover more than two-thirds of the area of the bottom of the retort in any one position. There is thus left at will a varying-sized opening at either end of the plate, or varying-sized openings at both ends according to the position of the plate beneath the retort to permit varying-sized pieces of coke to descend into a usual coke chamber beneath according to the varying rates of carbonisation which experience shows the attendant is taking place at different portions of the cross-section of the retort. The plate is operated as usual by a connecting rod extending through a stuffing box in the front plate of the coke chamber and the plate may be withdrawn entirely, as usual, from beneath the retort. The accompanying drawing is a sectional elevation, showing the bottom of a vertical retort, and the slidable grating or plating in one piece, but in three separate positions, also the chamber to receive the coke and the grating or plating, and the shoot, stopper and exit door. (One claim.)



19577 (1911). *Improvements in and Relating to Explosives.* W. Fairweather, C.E., of 65-66 Chancery-lane, London, W.C., and 62, St. Vincent-street, Glasgow (a communication from the Dynamit-Actien-Gesellschaft, vormals Alfred Nobel and Co., Europa Haus, Alsterdamm 39, Hamburg, Germany).—In connection with a number of blasting operations in the open, receptacles containing fillings of shattering explosive, either cast or considerably compressed, have hitherto been frequently used. Such fillings have also been used in connection with land mines, submarine mines, and for the filling of torpedo heads. This form of filling has a considerably high density, and permits of much larger quantities of explosive being brought near the object to be blasted than is possible where the explosive to be used is in crystalline form—for example, crystalline trinitrotoluol. The present process consists in mixing suitable quantities of an explosive which has been melted, solidified in thin layers free from air bubbles, and ground in the dry state and of the same explosive in crystalline form, and loosely packing or pressing, or compressing the mixture to form a composite explosive. The individual particles of the molten, solidified and ground explosive remain unchanged during the packing or pressing or compressing operation, and are clearly distinguishable from the somewhat differently coloured crystals, the composite explosive thus acquiring a mottled appearance. The process is applicable to all explosives which can be detonated and which can be brought by melting and grinding into the desired form. Where trinitrotoluol is used, the proportions selected are usually one-third to one-half of crystalline trinitrotoluol and two-thirds to one-half of melted, solidified and ground trinitrotoluol, but it is to be understood that the proportions may be widely varied without departing from the spirit of the invention. As a large portion of the mixture consists of molten trinitrotoluol, the density of the mixture is considerably higher than that of loose crystalline trinitrotoluol. The crystalline trinitrotoluol which is distributed throughout the mixture ensures certain transmission of the detonation. (Two claims.)

19678 (1911). *Improvements in and Relating to the Magnetic Separation of Ores.* I. S. Dalgleish, of 26, Drayton-court, Drayton-gardens, London, S.W.—According to this invention, the alternating or pulsating field is set up between fixed pole pieces or tips, so arranged that the particles are alternately attracted to a pole and released, and, when released, fall a little until re-attracted to another and lower part of the pole, the particles thereby performing a gradual descent without the aid of any mechanical device. In one arrangement there is a gap between poles which are inclined or whose faces are inclined to the vertical, and which provide, as it were, a magnetic stratum of considerable magnetic concentration or strength. If desired, the magnet may be energised by a constant and direct current, and the pulsation may be obtained by revolving a piece of iron in an air gap in the magnetic path—for example, the piece of iron may be in the form of a cross or other suitable figure, revoluble in a gap formed in the yoke connecting the two poles, the gap being slightly longer than the distance between any two opposing points on the revoluble piece of iron, so that the magnetic flux would be continually broken and restored as the piece of iron revolved. The accompanying drawing is a central vertical section of one construction of magnetic separator, according to these improvements, parts being seen in elevation. (Eleven claims.)



20281 (1911). *Improvements in or relating to Couplings for Haulage Wagons.* H. F. Atkins, of 194, Maldon-road, Colchester, Essex, and A. Adams, of St. Michael's House, Old Fletton, Peterborough, Huntingdon.—The purpose of this invention is to obtain a coupling for automatically attaching and detaching haulage wagons to and from a travelling rope or chain, the said rope or chain being situated beneath the wagon. A frame is provided attached or pivoted to the understructure of the wagon, also two fingers so attached to the said frame that a part of each said finger passes through a portion of the frame. The rope is introduced between these two said fingers and is gripped by them under certain conditions to be described later. Fig. 1 is a front sectional elevation; fig. 2 is a side sectional elevation on the line XX of fig. 3; fig. 3 is a sectional plan on the line Y Y of figs. 1 and 2. When it is desired to automatically couple the wagon on to the rope, which is travelling beneath it, the said rope *f* is made to pass over a pulley or an inclined plane which raises the rope to about the height of the underside of the frame *a*, and as the wagon passes over this said pulley or plane the fingers *c* and *d* pass one on either side of the rope and are raised into the position 1, where the said fingers *c* and *d* are free to open and admit the rope. After the wagon has passed the said pulley or plane the fingers *c* and *d* drop into position 2 with the rope between the fingers and the friction between the rope *f* and the fingers *c* and *d* pulls the fingers into position 3 or 4, and by the action of the wedge shape of the box and fingers causes the fingers *c* and *d* to grip the rope *f*. When it is desired to automatically release the wagon, the rope *f* is made to pass over another similar pulley or inclined plane which forces the fingers *c* and *d* up into position 1 and allows the rope *f* to drop from between the fingers *c* and *d*, and the rope then immediately is caused to drop out of reach of the fingers *c* and *d*, and the wagon is released. (One claim.)

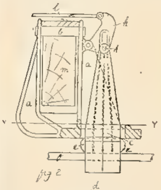


fig 2

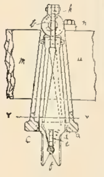


fig 1

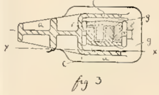


fig 3

23434 (1911). *Improved Means for Lubricating the Axles of Colliery Tubs.* W. Medd, Fir Tree, Harperley, co. Durham.—This invention has particular reference to apparatus of a type in which a curved guide bar is adapted to be depressed by the passages over it of the axles of the tub and thereby operating a vertical pump which pumps oil from an oil tank into a grooved channel in the curved bar and by that means to impart the necessary lubrication to the axles of the tubs or wagons. The invention comprises mainly an improved construction for permitting a slight end movement as well as a slight oscillation in a vertical plane of the said curved guide bar when so depressed. Fig. 1 is a plan and fig. 2 a sectional elevation. The curved guide bar or oil distributor *o* which surmounts the receptacle and by which the axles of the colliery tubs or the like are lubricated in their passage over it, is formed with small lugs *p* p^1 to which is connected a pair of links *q* slotted at their outer ends which engage with studs b^1 fixed to supporting brackets *r* secured to the top plate or cover by bolts r^1 which are passed through tapped holes in the bases of the brackets. Such link connections permit of a slight end movement of the guide bar when depressed in the manner hereinafter described and prevent the curved bar or oiler from being disabled by the impact of the axle of the moving wagon. The curved bar o is mounted upon the spiral springs *s* s^1 or other elastic or resilient means so as to regain the normal position after being released, and thereby through the action of the pump causing a fresh supply of oil to be distributed over the grooved surface of the curved bar or oiler. The upper end of the tubular plunger *l* is surrounded by a spiral spring t^1 which enters a recess in the flange h^1 supporting the pump barrel *h*. The oval or oblong hole *g* in the top plate or cover is for the purpose of allowing a certain amount of play of the pump barrel *h* to permit of its partial participation in the rocking movement of the curved bar or oiler in action. Within the interior of the mouth *d* of the tank which extends above the main body of the receptacle is placed cover plate d^1 which carries the whole of the internal and external fittings of the lubricator, so as to permit of ready access for repairs without the necessity of displacing the tank. Such cover plate is fixed by bolts *e* to the seating *f* formed a few inches down inside the mouth of the receptacle. The tank or receptacle *a* is furnished with a charging aperture *u* for the fresh supply of oil thereto and also with a grid *v* to allow the return of superfluous oil which may fall from the oiler into the mouth of the tank or receptacle. Adapted to slide within the interior of the pump barrel is a tubular plunger *l* also provided with a ball valve *m* to rest upon valve seating *n*. The upper end of the tubular plunger *l* screws into the curved bar or oil distributor *o* which surmounts the receptacle. The ball valves *k* and *m* are prevented from rising too far by the stop pins *t*. The oil tank or receptacle *a* is formed with end flanges *b* provided with holes *c* by which it may be bolted to the sleepers of the tramway. (Three claims.)

Fig.2.

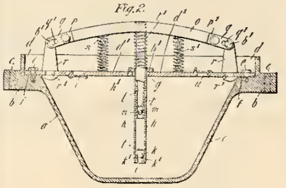
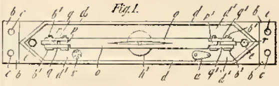


Fig.1.



23671 (1911). *Dustproof Colliery Tub.* G. G. Atkinson 56, Monmouth-street, Sheffield, Yorkshire.—This invention relates to a dustproof joint for wagons, colliery pit tubs, corves, trams, hutches, formed of ⊢⊣ section of iron or steel and placed horizontally between the joints of side and end boards, also bottom boards where wagon, tub, corve, tram, or hutch bottoms are formed of wood, the boards being machined or rabbetted to form a tongue fitting into the ⊢⊣ section, which section shall be flush with boards, thus preventing escape of dust through joints. Fig. 1 is a side elevation of a typical pit tub in part section showing dustproof joint when in position; fig. 2 is an enlarged section of ⊢⊣ joint. (One claim.)

FIG 1.

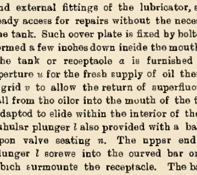
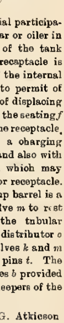


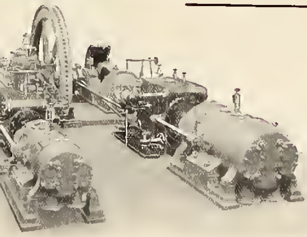
FIG.2.



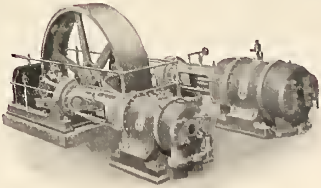
25371 (1911). *Improvements in Appliances for Miner's, Fireman's and other Lamps.* J. Mercer, 24, Park-street, Haydock, Lancashire.—According to this invention a supporting device for miners', firemen's and other lamps.

ALKER BROS. (WIGAN) L^{TD}

gefield Ironworks, WIGAN. New Broad Street House, LONDON.



Pair Compound Corliss Steam Two Stage Air Compressing Engines.

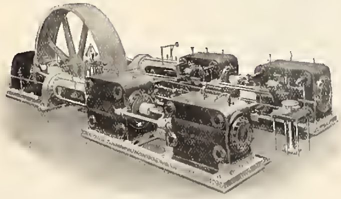


Pair Two Stage Air Compressing Engines for Belt Drive.

PATENT DISC VALVES FOR AIR COMPRESSING & BLOWING ENGINES.

GH EFFICIENCY AND LARGE OUTPUT.

Applicable to existing Installations.

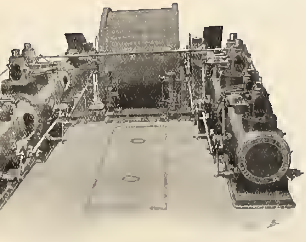


Triple Expansion Driving Engine with Corliss Valve Gear.

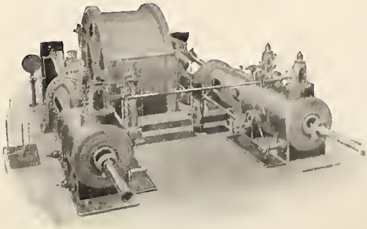
NDESTRUCTIBLE" TYPE VENTILATING FANS

FOR STEAM OR MOTOR DRIVING.

EASY MEANS FOR REVERSING AIR CURRENT.



Twin Tandem Compound Winding Engines.

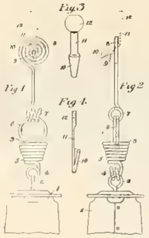


Horizontal Winding Engines with Two Non-Compound Cylinders.

WINDING, HAULING AND GENERAL MINING MACHINERY.

& Petries' Patent Overwind and Overspeed Device.

consists of a spring-connecting member adapted to be attached to the top of the lamp and provided at its top with a spike which points downwards to some extent and may be covered with a shield having an attachment which is non-injurious to the teeth. Preferably the spring-connecting member consists of a lower wire attached to the lamp hook and coiled into a volute spring and an upper wire fastened to this lower wire and coiled into a vertical spiral spring provided with a spike projecting at its centre. The bottom spring itself may be used as a simple spring handle for carrying the lamps under ordinary circumstances. If it is fitted with a large plain ring at its top it prevents the miner from carrying it by attaching it to his belt. Also the spring prevents sudden jolts in walking from being transmitted to the lamp, and therefore lessens the risk of the lamp being extinguished when the miner stumbles. A suitable guard for the spike consists of a piece of leather with a pocket shaped to take the spike and having a knob at the top of its narrowed-neck portion. Fig. 1 is an elevation of the device attached to the top of a lamp, fig. 2 is a second elevation at right-angles to fig. 1, fig. 3 is an elevation, and fig. 4 a vertical cross-section of a preferred form of guard. (Five claims.)



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Registry of Ships, August 1912, 3½d.

Inland Revenue Report for 1911-12, 1s. 9d.

Colonial Reports: Malta, 6d.; Reports of Surveys of British Africa, Ceylon, Cyprus, &c., 1911-12, 2s. 1d.; Fiji, 3d.; Southern Nigeria (Report on Mineral Survey, 1910), 1½d.

South Staffordshire Mines Drainage.—The annual reports of the South Staffordshire Mines Drainage Commissioners were issued last week. Mr. E. Howl, general manager, states that the mineral raised in the district and assessed for general district rate during the year ended December 31 last was 2,225,627, representing a revenue to the Commission of £9,274 5s. 7d. This is a decrease in output of 36,466 tons, equal to £151 18s. 10d. in revenue. There have been increases of output to the amount of 16,437 tons in Oldbury and 30,321 in Old Hill, and decreases of 56,027 in Tipton, and of 27,200 in Kingswinford. The outlay upon the maintenance of drainage works and steam and electrical pumping was £1,681 14s. 7d., as compared with £1,685 16s. 2d. in 1910. The provisional arrangement made in 1909 under which the interest upon the general district loans was paid, and the surplus of revenue distributed in reduction of principal, came to an end last December, and no further interest nor principal has been paid pending an arrangement between the several mortgagees of the general district rate as to future distribution. For the half-year ended December last the full instalment in repayment of the £15,000 loan of 1899 was paid, and £420 8s. 2d. was repaid in respect of the previous loan, the total repayment being £788 16s. 11d. The general drainage loan now stands at £64,622 14s. 1d. In Tipton district the output for the year ended June last, on the basis of the arbitrators' award, gives a rate of £10,257 11s. 6d. Amended by the allowance for pumping given by the Court of Chancery, this makes a net rate of £10,069 2s. 6d., being a decrease of £1,379 3s. 9d. There has been a deficiency of revenue to meet working expenses of £3,668 7s. 5d. The chief cause of the deficiency was the coal strike, which lasted from February 29 till April 5, and not only caused a diminution in the income from output, but entailed a heavy expenditure in fuel for working the engines. In the Old Hill district the working expenses were £4,954, as compared with £5,296 last year. Interest on the loan of £16,345, amounting to £905, had been paid, and the amount of £1,100 had been paid into court by the receiver.

PUBLICATIONS RECEIVED.

High Explosives. By W. R. Quinan. Melbourne: Critchley Parker. London: Sir Isaac Pitman and Sons Limited. 21s. net.

Canada, Department of Mines. Catalogue of Publications of the Mines Branch (1907-1911). Ottawa: Government Printing Bureau.

Annual Report of the Secretary for Mines, Victoria, 1911. Melbourne: A. J. Mullett, acting Government printer.

Company Management. By H. C. Emery. Second edition (revised). London: Effingham Wilson. 5s. net.

[This second edition of Mr. Emery's well-known work has been necessitated by the exhaustion of the first edition. The opportunity has been taken to revise the work and bring it up to date. It can now claim to take its place as a standard work of legal reference, and at the same time is an invaluable guide for directors, secretaries and others who have neither the time nor the inclination to fathom all the intricacies of the Companies Act and its congeners.]

Company Transfer Work. By J. A. White. London: Effingham Wilson. Price 2s. 6d. net.

[This little book essays to give a practical guide to the work of a share registration and transfer department of a limited liability company's office. It will be clear, moreover, that it treats of matters which are of vital interest to shareholders in general, and a neglect of which frequently entails considerable expense and trouble. The author is clear and concise, and numerous specimen forms and rulings are given in the appendix.]

"Minutes of Proceedings of the Institution of Civil Engineers" (Vol. 188); "Reinforced Concrete Wharves and Warehouses at Lower Pootung, Shanghai," by Somers Howe Ellis; "The Direct Experimental Determination of the Stresses in the Steel and in the Concrete of Reinforced Concrete Columns," by W. H. Burr; "The Central Heating and Power Plant of McGill University, Montreal," by R. J. Durley; "Experiments on the Strength and Fatigue Properties of Welded Joints in Iron and Steel," by T. E. Stanton and J. R. Pannell; "The Bear Creek Hydrographic Survey, British Columbia," by F. R. Johnson; "The Accelerometer and its Application to Railway Traction Problems," by H. E. Wimperis; "Extension of the Old Pier at Hartlepool," by J. D. Howkins; "The Water Supply of the Witwatersrand," by D. C. Leitch; "Investigations Relating to the Yield of a Catchment Area in Cape Colony," by E. C. Bartlett; "The Concorde Tunnel of the Paris Metropolitan Railway," by Paul Seurot; "Abstracts of Papers in Scientific Transactions and Periodicals"; "Publications de l'Association des Ingénieurs de l'Ecole des Mines de Mons" (tome fi); "The Journal of the Monmouthshire Colliery Officials' Association" (Vol. 2, No. 3), September; "State of Tennessee State Geological Survey" (Bulletin 14)"; "The Zinc Deposits of North Eastern Tennessee," by A. H. Purdue.

Home Office Prosecution in Cumberland.—At Cleator Moor Police Court, on September 20, Mr. William Thomas, colliery manager, Moorside, Arlecdon, was charged, at the instance of Mr. J. B. Atkinson, H.M. inspector of mines, with contravening and with not complying with Rule 13 of General Rules contained in section 49 of the Coal Mines Regulation Act, 1887, at Dean Moor Colliery on June 8. A technical offence was admitted. Mr. Atkinson said the men were working the coal when they knew that water was near. In order to deal with the water they sank a shaft at the dip, and they then drove a stone drift. A borehole 15 ft. ahead of the drift would not have tapped the water. If flankholes had been put out horizontally he did not think it would have been in compliance with the Act. He thought it was possible to have flank boreholes and miss the water, but he did not think it had been so in this case. There were four boreholes put in. The first reached the coal, and he was informed that the third and fourth passed through the coal. He did not think that the managers would be justified in continuing the boring if the boreholes were dry. The complainant knew that there was water near. He presumed that the managers did not think they were so near the water as they were. The word "working" in Rule 13 meant a place driven in metal, and not necessarily coal.—For the defence it was contended that Mr. Thomas had been under the impression that the word "working" meant where coal was being worked. He knew there were old workings in the seam, and he was driving the drift above the water. He found that the coal was perfectly dry. The last hole where the water came in was perfectly dry. The water which came from the working and caused the accident was not known of by Mr. Thomas. The latter was about to put in a machine for the purpose of putting in boreholes in the advance and flank. Mr. Thomas, giving evidence, said the meaning of the word "working" in his estimation was working in coal. At the time of the accident the men were making a hole to fix a machine to bore holes at the flank and advance. They were engaged in doing that when the accident occurred. He had no evidence of the old workings except by the plans as put in by the prosecution. The distance they were working from the water was about 35 ft., and the place where the water came from was not shown on the old plan. If he had put in flankholes he would in all probability have missed the water. He was in about 1 ft. of coal, and the water was always below the seam. The Bench considered that, owing to the extenuating circumstances, the case would be met by payment of costs. They allowed an advocate's fee of £1 1s.

NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

21560. Smelting furnaces. T. H. Holroyd.

21574. Furnace bridges. J. M. Neil.

21649. Machine for bundling wood. A. E. d'Israel Standale-Heelolme.

21656. Centrifugal pumps. G. Fletcher and Co. Limited, and F. P. Rudder.

21671. Machines for sharpening the bits of rock drills and the like. W. E. Kimber.

21676. Chill moulds. G. A. Phillips.

21694. Compressed-air driven winding haulage and like motors. E. Leroyer.

21706. Process of reduction upon steel or other metal for the manufacture of stamps and dies. L. Ferrari.

21730. Alloy. A. Hutchinson and W. E. Watson.

21738. Method of and apparatus for solidifying molten steel or other metals in casting the same into ingots or the like. B. Gerdau.

21810. Gas and coal fires. H. J. Yates and J. F. Davy.

21615. Hoists or lifts for conveying loads of all kinds. G. Schlösser.

21626. Process for the decomposition of complex ores or concentrates. W. A. Hall.

21842. Steam generators. Chantiers et Ateliers Augustin Normand.

21860. Bucket conveyors. W. G. Read.

21923. Furnaces. J. A. Hill.

21934. Oxidation or reduction of metallic ore or the like. A. E. Bourcond.

21955. Rotary compressors. British Thomson-Houston Company Limited.

21956. Chutes for the delivery of material carried by an endless conveyor. W. G. Read.

21962. Bilge pumps. A. G. Langdon.

21965. Centrifugal liquid pumps. F. K. Woodroffe and H. C. Hodgson.

21979. Ventilating mines. W. Hartmann.

21990. Controlling apparatus for air-compressors. S. E. Alley and G. Barr.

21991. Process and apparatus for the treatment of coal, shale or the like in vertical retorts. A. Waddell.

22037. Mechanical fuel-charging apparatus. Société Anonyme des Etablissements Delaunay-Belleville.

22061. Preparation of artificial fuel. S. S. Baxter.

22073. Puddling furnaces. F. J. Millard and R. J. Hadlington.

22076. Process for treating certain sulphide ores. J. W French.

22077. Process for the treatment of refractory complex zinc lead ores. A. G. French.

22076. Treatment of zinc and manganese solutions in the hydrometallurgical working of zinc lead ores, and production of manganese sulphate from manganese dioxide and sulphurous acid. A. G French.

22098. Steam-generators. Babcock and Wilcox Limited.

22128. Automatic fire-extinguishers. H. W. Doughty.

Complete Specifications Accepted.

To be published on October 17.

1911.

14624. Fuel-briquetting plants and the like. Rigby and Testrup.

17662. Arrangement in connection with drilling and boring machines for mining, quarrying, and like operations of a nut cross-bar or clamp on the feed or driving screw, to effect the withdrawal of the drill from a hole. Teakel.

20303. Reversible rolling mills. Gatta.

20798. Preparation and use of solutions for the treatment of iron or steel for the prevention of oxidation or rust. Rudge-Whitworth Limited and Heathcote.

20971. Rolling mills. Gatta.

21066. Process of applying deposits of metal or metallic compounds to surfaces. Schoop.

21154. Rolling-mills for rolling sheets of metal. Gerrard.

21344. Process for the detonation of explosive bodies. Fairweather.

21363. Production of gaseous fuel. Southey.

21582. Pumps. Pierpont, and Lanston Monotype Corporation Limited.

24659. Steam superheaters for use in connection with locomotive and like boilers. Robinson.

27273. Pneumatic stamps for crushing ore and the like. Holmen and Holmen.

27672. Apparatus for burning finely-divided fuel. Babcock and Wilcox Limited.

27673. Apparatus for burning finely-divided fuel. Babcock and Wilcox Limited.

27674. Apparatus for burning finely-divided fuel. Babcock and Wilcox Limited.

1912.

7267. Gas-producers. Klusmeyer and Meyer.

7535. Rotary engines, pumps, and compressors. Champeney.

10926. Methods of remedying faults in boreholes. Pauli.

13453. Protectors for the points of miners' picks and the like. Griffiths and Thomas.

17616. Discharge of coke from vertical gas retorts. Toogood and Robert Dempster and Sons Limited.

Complete Specifications open to Public Inspection before Acceptance.

1912.

6202. Rock-drilling and the like apparatus. Kubát.

12675. Retort for the manufacture of coal gas. Hunt and Tipper.

19574. Process for the removal of zinc from materials containing zinc. Beringer.

20952. Manufacture of briquettes from ore or blast-furnace dust and organic binding substances soluble in water. Gewerkschaft Pionier.

Work at the Welbeck Colliery, which is being sunk on the outskirts of the Abbey plantations, near Warsop, is proceeding satisfactorily. Sinking operations at No. 1 shaft are in full swing, and a depth of over 40 ft. has been reached in No. 2 shaft. Messrs. Baldry, Yerburgh and Hutchinson, at present engaged constructing the new Mansfield railway, will shortly commence connecting the site with the Great Central system.

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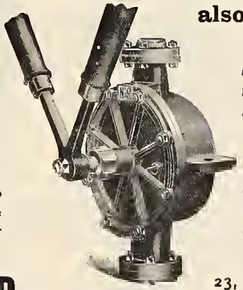

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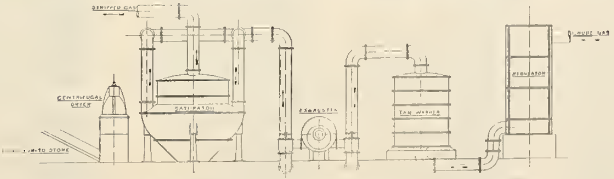

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Purchasers' Guide to Advertisers' Specialities.

Further information can be obtained on reference to the Weekly Alphabetical Index to Advertisers.

Acetylene Lamps
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Accumulators
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent

Acid Plant
Daglish, Robert, and Co. Ld., St. Helens, Lancs.

Air Analysis Apparatus
Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

Air Compressors
Bailey, W. H., and Co. Ld., Salford, Manchester
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co., St. Helens, Lancashire
Davis, John, and Son (Derby) Ld., Derby
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
International Channelling Machines Ld., Sheffield
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Mining Engineering Co. Ld., (The), Sheffield
Nuneaton Engineering Co. Ld., Nuneaton
Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., F. Department, Ipswich
Robey and Co. Ld., Globe Works, Lincoln
United States Metallic Packing Co. Ld., Bradford
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Air Pipes
Allan, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Son, Thompson-street, Bilston
British Mannesmann Tube Co. Ld., London Wall
Lewis, William, and Son, Bilston
Mining Engineering Co. Ld., Sheffield
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C., Ld., Dudley

Air Pumps.
Bailey, W. H., and Co. Ld., Salford, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Wood, John, and Sons Ld., Wigan

Alternators
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Mavor & Coulson Ld., 47, Broad-street, Glasgow

Ambulance Carriages, Stretchers, &c.
County Ambulance Carriage Works, Mill-street, Pontypridd
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Theedam, E. C., Ld., Dudley

Anchors
Wright, Joseph, and Co., Tipton

Anemometers
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Humble, Stephen, 9, Victoria-st., London, S.W.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Angles and Sections (Steel)
Firth, Wm., Ld., Water-lane, Leeds

Anthracite Breaking, Sizing and Washing Plant
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Sheppard and Sons Ld., Bridgend
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Anti-Corrosive Compositions
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

Anti-Friction Metal
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Anvils
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Asbestos
Asbestos and General Paint Co. Ld., Birmingham

Axle Greasers
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Barrows (Ore)
Bagnall, W. G., Ld., Stafford
Haslam and Schontheil Ld., Cardiff
Heenan and Froude Ld., Worcester
Theedam, E. C., Ld., Dudley

Bars (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mining Engineering Co. Ld., Sheffield

Bars (Screen)
Firth, Wm., Ld., Water-lane, Leeds
Head, Wrightson and Co. Ld., Stockton-on-Tees
Renton, B. M., and Co., Sheffield
Wood, John, and Sons Ld., Wigan

Bearings
Bridge, David, & Co. Ld., Castleton, Manchester
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham

Bellows
Hardy Patent Pick Co. Ld., Sheffield
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Bells (Signal)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Humble, Stephen, 9, Victoria-st., London, S.W.
Theedam, E. C., Ld., Dudley

Belt Fasteners
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Belt Food

Belting
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Frost, Albert, and Co., Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Sutcliffe, B., Horbury, near Wakefield
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

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Benzol Plants
Coke Oven Construction Co. Ld., Sheffield
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Bitumastic Solution
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Blasting Apparatus
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Reavell and Co. Ld., Ipswich
Theedam, E. C., Ld., Dudley

Blowers
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Tickle Brothers, Vulcan Ironworks, Wigan

Boiler (Cleaning Apparatus)
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Boiler and Steam Pipe Covering
Asbestos and General Paint Co. Ld., Birmingham
Kenyon, W., & Sons Ld., Dukinfield, Manchester

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Foot, B. G., & Co., 11, Queen Victoria-street, E.C.
Tangyes Ld., Cornwall Works, Birmingham

Boiler Merchants
Stringer, John, and Son, Blackburn

Boiler Mountings
Bailey, W. H., and Co. Ld., Salford, Manchester
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 26, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Stringer, John, and Son, Dept. 11, Blackburn
Wellington Tube Works Ld., Great Bridge, Tipton

Boiler Removers
Stringer, John, and Son, Blackburn

Boiler Tubes
Lewis, Edwin, and Sons, Wolverhampton
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Gt. Bridge, Tipton

Boilers
Avonside Engine Co. Ld., Bristol
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs, E.C.
Heenan and Froude Ld., Worcester
Horsfield, J. and J., Ld., Dewsbury
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Peckett & Sons, Atlas Locomotive Works, Bristol
Robey and Co. Ld., Globe Works, Lincoln
Spurr, Inman and Co. Ld., Wakefield
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Uskside Engineering Co. Ld., Newport, Mon.
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Boiler Co. Ld., Bradford

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British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Bute Docks, Cardiff
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Jardine, John, Deering-street, Nottingham
Mining Engineering Co. Ld. (The), Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, & Sons Ld., Darlington
Theedam, E. C., Ld., Dudley
Ward, Thos. W., Ld., Albion Works, Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Books on Mining
Colliery Guardian Co. Ld., 30 & 31, Furnival-st., Holborn, E.C.
Griffin, Charles, and Co. Ld., Exeter-st., Strand
South Wales Institute of Engineers, Cardiff
Southern, T. A., Universal Mining School, Cardiff

Boring Contractors
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-rd., Lambeth, S.E.
Davidson, J. S., & Son, St. Bees, Cumberland
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Lancaster and Tonge Ld., Pendleton, Manchester.
New Calyx Drill and Boring Co. Ld., Millwall, E.
Thomson Bros. (Dunfermline) Ld., Glasgow
Trefor Boring and Mining Co. Ld., 41, rue Royale, Brussels
Vivian's Boring & Exploration Co. Ld., Parkside, Cleator Moor, Cumberland

Boring Machines
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln

Boring (Prospecting) Plants and Tools
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Hardy Patent Pick Co. Ld., Sheffield
New Calyx Drill and Boring Co. Ld., 120, East Ferry-rd., Millwall, E.

Brake (Winding Engine)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Thornewill and Warham Ld., Burton-on-Trent
Wood, John, and Sons Ld., Wigan

Brassfounders
British Wagon Co. Ld., Rotherham
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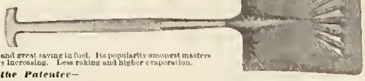

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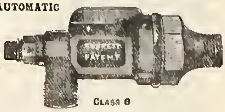

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Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, H. H., and Co. Ld., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld. 47, Broad-street, Glasgow
Mining Engineering Co. Ld., (The), Sheffield
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Pillatt & Co. Ld., Stapleford, Nottingham
Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
Railway and General Engineering Co. Ld., Notts
Reavell and Co. Ld., Ipswich.
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Waddle Patent Fan & Engineering Co., Llanelly
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton
Yeadon, Son and Co., Albion-place, Leeds
Yorkshire Engine Co. Ld., Sheffield

Condensers & Condensing Plant
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Constructional Steel and Iron Work
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Cantrell, W. E., and Co. Ld., Beeston, Notts
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Newton Heath, Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Norton's (Tividale) Ld., Tipton
Longbotham, H. H., and Co. Ld., Wakefield
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Wood, John & Sons Ld. Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Conveyor Belts
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, R., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Conveyors and Elevators
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Cantrell, W. E., and Co. Ld., Beeston, Notts
Chain Belt Engineering Co., Derby, England
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Diamond Coal-Cutter Co. Stennard Wks. Wakefield
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Improved Coal Mining Co., Sacriston, nr. Durham
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Mather and Platt Ld., Manchester
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Primus Patents Co., Falcon-street, Oldham
Reddaway, F., & Co. Ld., Pendleton, Manchester
Sheppard and Sons Ld., Bridgend, South Wales
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts.
Sutcliffe, R., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Yorkshire Engine Co. Ld., Sheffield
Wright, Joseph, and Co., Tipton

Corner Plates
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

Couplings
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Crab Winches
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

Crane Makers
Middleton, Robert, Sheepscar Foundry, Leeds
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Cranes
Appleby, E. G., and Co., 10, Victoria-street, Westminster
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Ryland-street Works, Birmingham

Creepers
Tickle Bros., Vulcan Ironworks, Wigan

Cut-off Gear
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Thornewill and Warham Ld., Burton-on-Trent
Wood, John, and Sons Ld., Wigan

Detonators
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Disintegrators
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Middleton, Robert, Sheepscar Foundry, Leeds
Simon-Carves Ld., 20, Mount-street, Manchester
Yeadon, Son and Co., Albion-place, Leeds

Diving Apparatus
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Pulsometer Engineering Co. Ld., Reading
Siebe, Gorman and Co. Ld., Westminster S.W.

Dog Spikes
Frost, Albert, and Co., Sheffield
Renton, B. M., & Co., Midland Works, Sheffield

Double Helical Gears (Machine Cut)
Brown, David, and Sons (H'f'd) Ld., Huddersfield
Citroen, Andre, and Co., 27, Queen Victoria-street, London

Drain Cocks
Appleton and Howard, St. Helens, Lancs.
Hopkinson, J., and Co. Ld., Huddersfield

Drawing Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drawing Office Stationery
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drills (Electric)
United States Metallic Packing Co. Ld., Soho Works, Bradford

Driving Pulleys
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Duplex Pumping Engines
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Evans, Joseph, and Sons Ld., Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Pearn, F., and Co. Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Dustbins (Sanitary)
Baker, John, and Son, Bilston, Staffs
Harvey, G. A., and Co., Lewisham, London, S.E.
Lewis, Wm., and Son, Bilston
Theedam, E. C., Ld., Dudley

Dynamite, &c.
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Nobel's Explosives Co. Ld., Glasgow

Dynamos
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Sutcliffe, Richard, Horbury, near Wakefield

Ebonite and Vulcanite
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Electric Detonators and Fuses
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Electrical Earthing Clips
Ingle, Albert E., 13, Albert-place, Bridge street, Manchester

Electrical Engineers
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mather and Platt Ld., Manchester
Theedam, E. C., Ld., Dudley

Electrical Fault Indicators
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield

Electric Haulage
Avonside Engine Co. Ld., Bristol
Bridge, David, & Co. Ld., Castleton, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davis John, and Son (Derby) Ld., Derby
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, H. H., and Co. Ld., Wakefield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Electric Meters
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Electrical Plant
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Ward, Thos. W., Limited, Albion Works, Sheffield

Electrical Pumps
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Electrical Stores
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C., Ld., Dudley

Emery Wheels

Enamelled Plates for Notices for Mines
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Theedam, E.C., Ld., Dudley

Enamel Manufacturers (for all Metals)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalbitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Engineers (Consulting)
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Fell, C. A., Dronfield, near Sheffield
Radford, R. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

Engines (Blowing)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Gas-Compressing)
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Hauling and Winding)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, H. H., and Co. Ld., Wakefield

Engines (Hauling and Winding)—continued.
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, R., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

Engines (Locomotive)
Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)
Mather and Platt Ld., Manchester

Engine Merchants
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

Engines (Oil)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping) (See Pumps)

Engines (Rolling Mill)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.

Engines (Steam)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Exhaust Turbine Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allan, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Files
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

Fire Appliances
Fell, C. A., Dronfield, near Sheffield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Purchasers' Guide to Advertisers' Specialities.—(continued).

Firelighter Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Fishplates
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

Fittings (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

Forced Draught
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

Forges
Hardy Patent Pick Co. Ld., Sheffield

Forgings
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld., Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Fuel Economisers
Fell, C. A., Dronfield, near Sheffield
Pillatt and Co., Stapleford, Nottingham
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld., Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Pillatt and Co. Ld., Stapleford, Nottingham
Proctor, James, Ld., Hammerton-st., Burnley
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall

Fuses (Safety)
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Bricks

Gas Engines
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Glover, M., and Co., Holbeck-lane, Leeds
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Gas Exhausters
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Gas Plant
British Westinghouse Electric and Manufacturin Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
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Analyses of British Coals and Coke.

A Guide to the Purchase of Coal.

Compiled by ALLAN GREENWELL, F.G.S., A.M.Inst.C.E., M.Inst.M.E.,

and J. V. ELSDEN, F.G.S., B.Sc.(Lond.)

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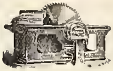

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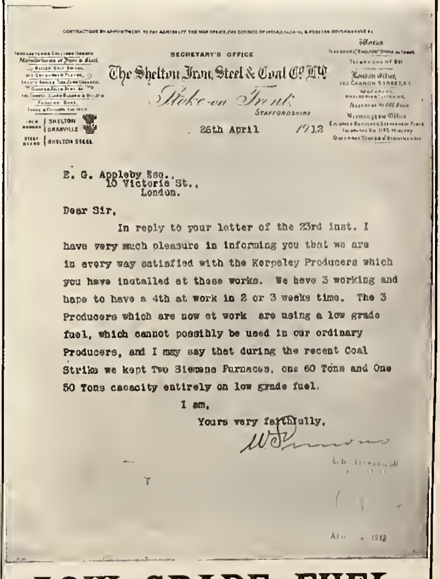

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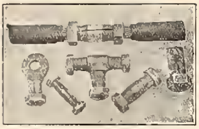

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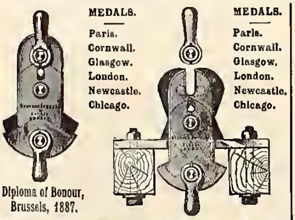

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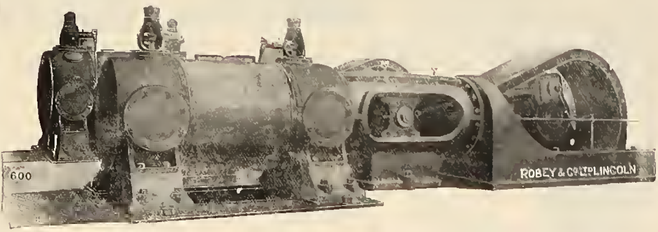

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2. Comparative Sections of the Lower Measures in the following areas —
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   (D) Amman Valley. (H) Gwendraeth District.
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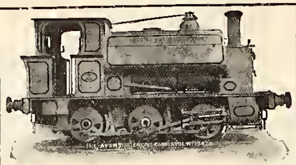

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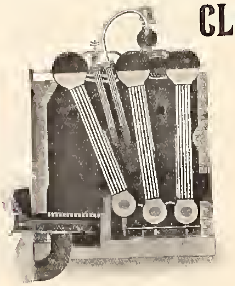

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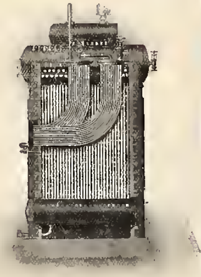

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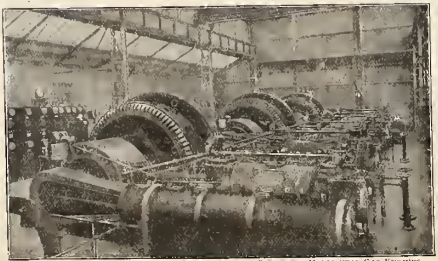

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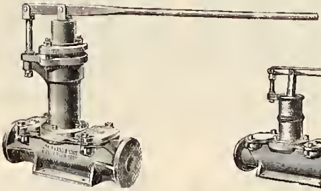
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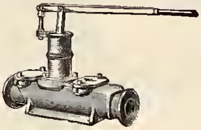
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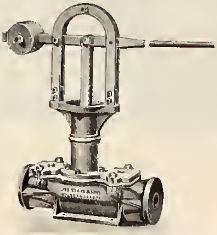
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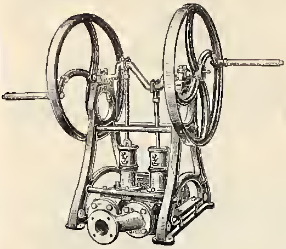
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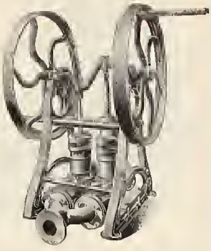
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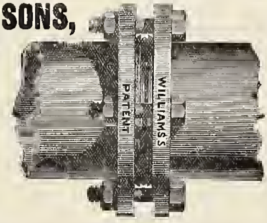

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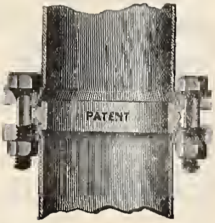

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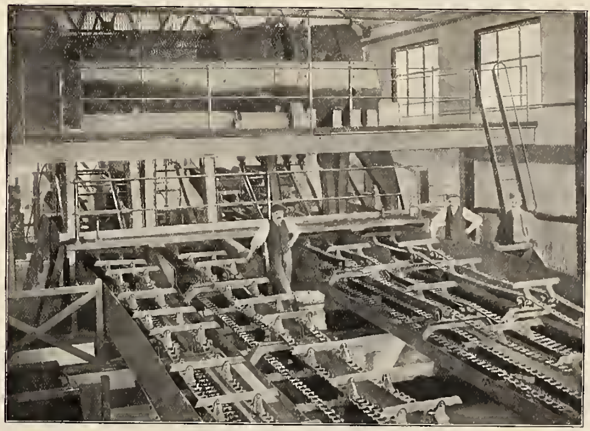

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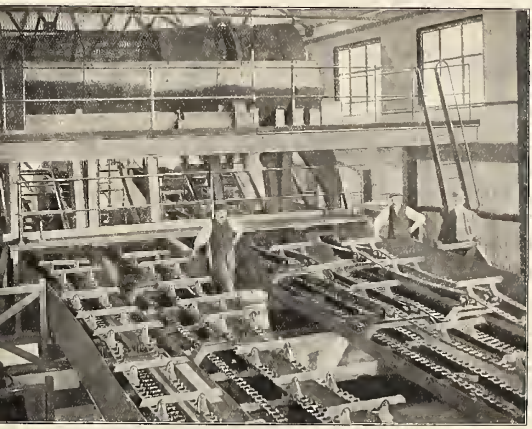

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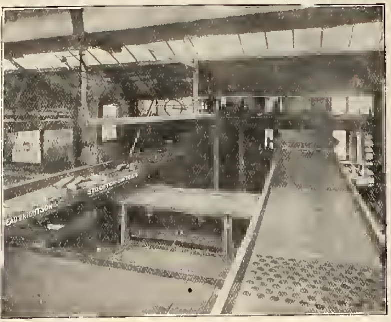

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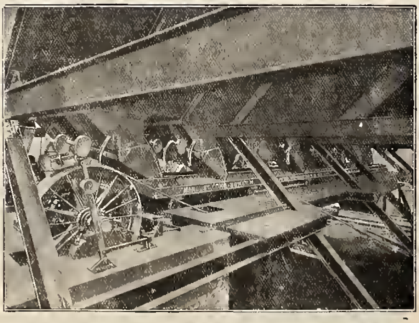

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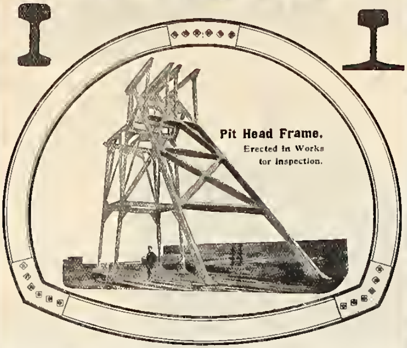

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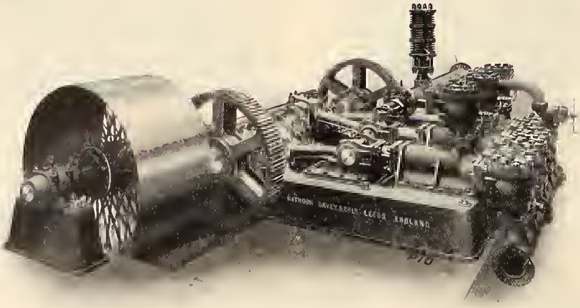

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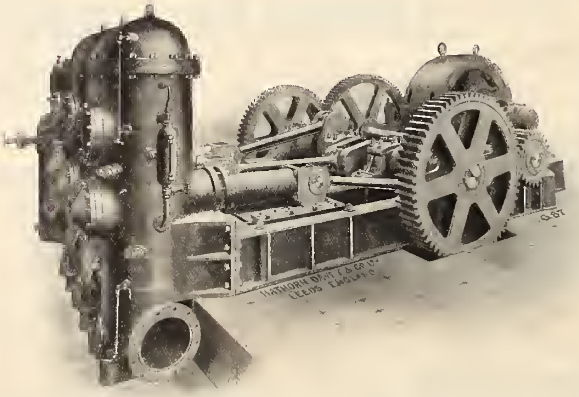

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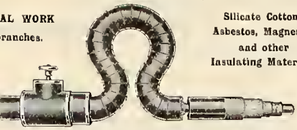

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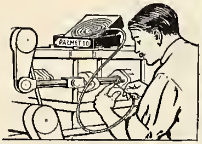

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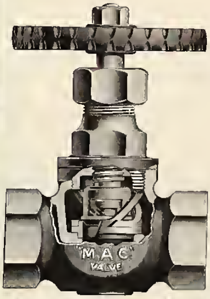

Figure 8200—Inside Screw
Figure 8205—Outside Screw

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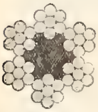
Fig. 2. HAULING



Lang's Lay Ropes.

Fig. 20. WINDING.

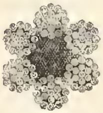
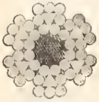


Fig. 1. HAULING.



Patent Flattened Strand Ropes.

Fig. 4. WINDING.

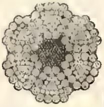


Fig. 13a. SINKING.

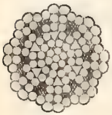


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Fig. 13a for Sinking and Fig. 11b for Cranes, &c., are non-twisting.

Fig. 11b. CRANE, &c

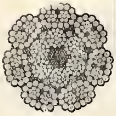

Fig. 15a.

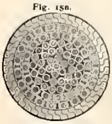

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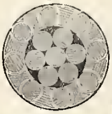
Fig. 20.



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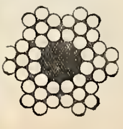

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CIV. FRIDAY, OCTOBER 11, 1912 No. 2702.

IVE INFLAMMABILITY OF COAL-DUSTS.

rt of the Explosions in Mines Committee.

e of the Explosions in Mines Committee—ynghame, Mr. R. A. S. Redmayne, Capt. , Prof. Harold B. Dixon, and Mr. W. C. e submitted their second report to the ry. At the outset they state that the es found in the inflammability of different the importance of establishing some which this inflammability might be to the institution of special experiments t being deemed desirable that the results ld be made available as soon as possible, he work done is given in the report under

g is the report:—

elative Inflammability of Coal Dusts.

of "inflammability" of any combustible e defined as the degree of ease with which an be effected so as to produce flame. It om this definition, that the inflammability tible material depends essentially on its nity" for oxygen. The inflammability ever, be affected to a large extent by the ion of the combustible material, whereby nore or less open to attack by the oxygen. dering the relative degrees of inflammauet, it can be accepted as an axiom that uet from any particular coal the greater ity. This has been put to experimental P. P. Bedson,* and his results have been a great number of experiments both at nd. No further proof is required, and a of the more important, and more comm of the influence of the chemical nature the inflammability of the dust from it, proceeded with.

mical nature of coal is not yet properly d our researches into this question are Some insight, however, has been he general character of the compounds coal substance," and a relationship has tween the proportions in which these unds exist in any particular sample of flammability of its dust.†. The methods n applied as a general rule towards elucidate the question of the chemical coal, have been either—(1) to treat the ent solvents or reagents, in the hope of tract some simple substance therefrom definite chemical compound therewith; he coal destructively and to examine the omposition.

med method has shown that certain soluble in such liquids as chloroform e contained in certain coals in small their identity has not been definitely they do not form an important part of ance. A discovery by Bedson‡ that es a considerable proportion of many le, promises, however, to yield more

f investigation followed by us has chiefly the destructive distillation of different under different conditions. The results are given in an appendix to the Report) nsion that all coals contain at least two f compounds of different degrees of ease ; and that coal must be regarded as a which the degradation products of the the base, and the changed resins and l plants the cement. The latter bodies e most readily decomposed by heat, and they yield as gases mainly the paraffin hydrocarbons. It seems probable, also, that the substances which Bedson has shown to be extractable in considerable quantity from coal by the action of pyridine, are mainly these "paraffin-yielding" constituents that are so readily decomposed. If coal be regarded in this way, as being a mixture of two types of compounds, the one readily yielding inflammable gases on heating to a comparatively low temperature, and the other requiring a higher and a more prolonged duration of temperature before it can be decomposed, it can be understood that its inflammability when in the form of dust will depend largely upon the proportion in which the readily-decomposed constituents are present. That is to say, it will depend to a greater extent upon the percentage of "paraffin-yielding" constituents that it contains than upon its total content of "volatile matter" as determined by the usual methods.

This seems to us to promise an explanation of some of the anomalous results that have been obtained by different investigators who have tried to establish a relationship between the inflammable nature of coaldusts

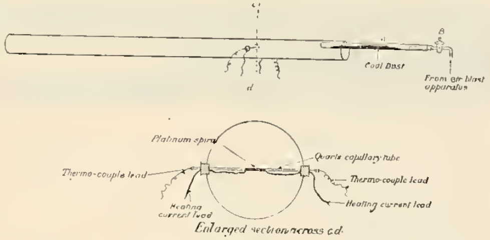


Fig. 1.

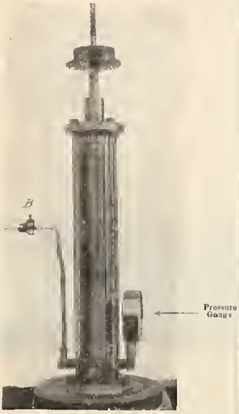


Fig. 2.—Apparatus for Giving a Constant Puff of Air.

A brass cylinder 65 cm. long and 11 cm. internal diameter, is fitted with a weighted piston. For the experiments, the weight employed is such as to give a pressure of 2 lb. per sq. in.

and their chemical composition. It is an explanation which was foreshadowed by the Prussian Firedamp Commission,* who, arguing upon Muck's work, in which he showed that it is not always the coals containing the highest percentage of volatile matter that evolve their gas most rapidly when heated, but very often those of mean percentage, advanced the suggestion that it might not be the *percentage* of volatile matter present, but rather the rapidity with which it was disengaged by heat, that determined the inflammability of the dust.

The question now arises—can this hypothesis be utilised to afford a criterion of "inflammability" that can be practically applied to coaldusts? Bedson, following the method suggested by the work of Holtzwart and von Meyer,‡ has elaborated two different forms of test. The first method was to blow a given quantity of the particular dust to be tested upon a platinum spiral heated to different temperatures by the passage of an electric current, and to determine the least quantity of current that would heat the wire sufficiently to ignite the dust cloud. In the second method accurately weighed quantities of the dusts were blown upon a platinum spiral maintained at the same temperature in each case, and their relative inflammabilities judged by the impulses given to a ballistic pendulum by the sudden expansion consequent on the inflammation of the dust clouds.

In place of the spherical vessel used by Bedson we employ a glass cylinder 8 cm. in diameter and 140 cm. long, open at both ends (fig. 1). A platinum coil of 32 gauge wire, closely wound on to a tube of thin-walled quartz of capillary bore, passes horizontally across a diameter of the cylinder at a point 40 cm. from one end. Through the bore of the quartz tube a platinum and platinum-rhodium thermo-couple passes, and is connected to a mille-voltmeter calibrated so as to read temperatures on the Centigrade scale. By means of suitable connections, an electric current can be passed through the spiral, so that it can be heated to any temperature up to about 1,400 degs. Cent., and maintained at a constant temperature by the adjustment of an external resistance. The length of the heated spiral is 17 mm. and its diameter 1·5 mm. The coaldust to be tested is blown across the heated spiral as a cloud of fairly uniform density, successive trials being made until a temperature is found at which general inflammation of the dust cloud takes place. To obtain the dust cloud about 2 grammes of the sieved and dried dust is placed in a glass tube of 2·5 cm. internal diameter and 45 cm. long. This tube is closed at one end by a rubber stopper carrying a glass tap of 1 cm. bore. It is supported in the position shown in fig. 1, the open end being at a distance of 30 cm. from the platinum spiral. The tap is connected with an arrangement for giving a constant puff of air, shown in fig. 2.

The method of making the determinations is as

Min. Eng., vol. 34, 1907.

Burgess. *Journ.* Chem. Soc. Vols. 97 11).

gland Mining Engineers, 1899, p. 82, and l., 1908, 17, 147.

* "Anlagen zur Haupt-Berichte der Preussischen Schlagwetter-Commission." Band IV.

‡ *Dingl. Polyt. Jl.*, 1891, 280, 185.

follows:—The dried and sieved dust is introduced into the tube A so that it lies evenly over its whole length, and the tube is then closed by the rubber stopper and tap and clamped in position. The platinum coil is then raised to such a temperature as previous trials may have indicated to be about that required. The dust cloud is then produced by suddenly opening the tap B. The air blast passing over the surface of the dust raises the top layer and carries it into the larger tube and over the heated coil in a cloud that remains uniform during the stroke of the piston. If ignition takes place, the temperature of the platinum coil is lowered 10 or 20 degrees Cent., and a fresh trial made; and so on, until two temperatures are obtained, differing by 10 degs. Cent., at one of which inflammation takes place, whilst at the other the dust cloud passes over uninflamed. The mean temperature is then taken to be the ignition temperature of the dust under the conditions of the experiments.

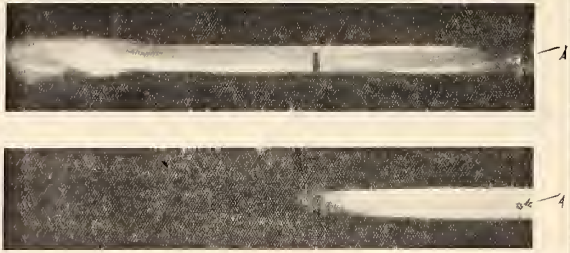


Fig. 3.—Typical Photographs of the Flames Produced on the Ignition of Coaldust Clouds. The igniting coil is at A.

As an example, to render the operation clear, we may quote the details of a test made with coal No. 224 N.

Ignition Temperature of Dust from Coal No. 224 N.—The dust, which was obtained by pulverising the nut coal, was sieved through a 240-mesh sieve and dried during one hour at 107 degs. Cent.

Temperature of platinum coil. Degs. Cent.		Result.
1,080	...	Ignition. Flame propagated rapidly to end of tube.
1,060	...	Ignition. Flame propagated rapidly to end of tube.
1,040	...	Ignition. Flame propagated rapidly to end of tube.
1,020	...	Ignition. Slow propagation of flame.
1,000	...	No ignition.
1,010	...	No ignition. A few sparks round coil.

Ignition temperature = 1,015 degs.

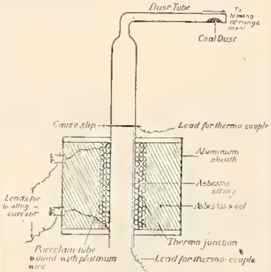
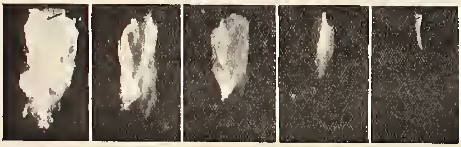


Fig. 4.

The dividing-line between temperatures at which general inflammation of the dust clouds takes place, and temperatures at which a merely local ignition of individual dust particles in contact with the igniting coil occurs is strongly marked, and there is no difficulty in determining the relative inflammation temperatures of different dusts within 5 degs. Cent.



Coal No. 230 N. 240 N. 209 N. 211 N. 221 N.

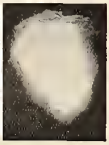


Fig. 6.

Fig. 5.—Flames Produced by Inflammation of Different Coaldusts.

Fig. 6.—Flash Produced by the Inflammation of Purified Charcoal Dust in Oxygen.

When ignition occurs, flame is propagated both with and against the direction of travel of the dust cloud, and issues in some cases from the open end of the cylinder at a distance of 100 cm. from the igniting coil. In other cases the flame travels only about 60 or 80 centimetres along the cylinder. There is, in fact, a marked difference in the manner of propagation of the flame with different dusts; and it is noticeable that, as a general rule, the flame travels most quickly with those dusts that give the shortest flames, and that the flame is brighter in those cases. In fig. 3 are shown two typical photographs of the flames obtained.

It might perhaps be expected that those dusts that have the lowest ignition temperatures would give the shortest flames, inasmuch as subsequent combustion would be more rapid in those cases. Such was not always found to be the case, however; and it would appear that ease of ignition is not necessarily a criterion of the ease of *propagation* of inflammation. This forms the subject of a separate investigation, details of which will be given in a subsequent report.

Before examining in detail the results obtained, it is well to consider what is the exact significance of these "ignition temperatures," and how far their determination affords a measure of the "inflammability" of the dust. According to our definition, the inflammability of combustible substances in general depends upon "the ease with which their oxidation can be effected so as to produce flame." In the case of coal, inflammable gases can be evolved at quite low temperatures. With most varieties of bituminous coal, for example, gases are evolved on heating to a temperature well below 600 degs. Cent. The gases thus evolved at low temperatures consist chiefly of the paraffin hydrocarbons. The ignition temperatures of most of the paraffin hydrocarbons lie between 500 and 750 degrees Cent. If, therefore, coaldust were allowed to remain in contact with a surface heated to, say, 750 degs. for a length of time sufficient to evolve a volume of paraffin hydrocarbons in excess of that required to form a "lower-limit mixture" with the surrounding air, this mixture of *gas and air* should ignite, and it might, by its combustion, produce sufficient heat to cause the inflammation of an adjoining layer of dust and air by a similar process of gasmaking. In this manner, propagation of inflammation should take place throughout the extent of the dust cloud. In practice it is, however, not easy to ignite these gases at so low a temperature except under carefully-regulated conditions, and it is more convenient to use a higher temperature.

If air, carrying a uniform cloud of dust, is projected along a tube across which a heated coil is fixed, the general inflammation of the dust cloud has its origin in an ignitible mixture of *gas* and air formed near the source of heat. The formation of this ignitible mixture depends upon (i.) the temperature of the source of heat; (ii.) the amount of dust heated up in any small column of the cloud which traverses the coil in unit time, and therefore upon the density of the dust cloud, and upon the diameter of the coil, and not upon its length; and (iii.) upon the readiness with which the inflammable gas is evolved from the dust.

The particles of dust which strike a hot surface *and stick there* yield all their volatile matter whether this comes off with "ease" or with "difficulty," since there is ample time for their complete destructive distillation during the passage of the dust cloud. A large hot surface, set at right angles to the dust stream, to which many particles would adhere, would therefore discriminate poorly between dusts containing the same total weight of volatile matter. A *long* length of heated surface, of thin cross-section like a knife-blade, turned edgeways to the stream so that the particles of dust striking it at a high angle would glance off, would still effect the complete distillation of the volatile matter from the dust particles travelling close along its surface, and fail to discriminate between the rapidly and the more slowly decomposible dusts—just as a long heated tube through which the dust cloud is slowly blown appears to fail. But if the length of heated surface (or of tube) is so adjusted to the rate of flow that time is given for the more easily evolved gases to come off, but not for total distillation, then such heated surface may discriminate between dusts in the desired manner, as is shown by the photographs reproduced in fig. 5. A thin *narrow* strip of platinum (turned edgeways to the stream) would have the required shape, but the measurement of its temperature is not so easy as that of the fine coil adopted. As a matter of experience, only a few of the tests made had to be rejected by reason of dust sticking to the coil we used. It is easy to keep constant the amount and fineness of the dust, and the duration and intensity of the air-current, and it is, of course, very easy to see whether the dust inflames in the glass tube or not. The measurement of the temperature of the coil necessary to fire the cloud is therefore a ready means of measuring the relative ease with which a particular dust evolves inflammable gas, and therefore its *sensitiveness* to inflammation—a quality which constitutes the chief difference in danger between one dust and another.

Over 50 different coaldusts have been tested, together with dusts from such varied substances as sugar, starch, lycopodium, flour, gunpowder and sulphur. We will consider first the results obtained with the coaldusts. The coaldusts, all of which were obtained by pulverising nut coal, varied in their ash content between 2 and 10 per cent. As will be shown later, the presence of varying quantities of incombustible dust added to pure coaldust alters its ignition temperature to an appreciable extent. Although it may be that *natural* ash does not exert the same influence as *added* ash, it will be best, for the purpose of eliminating the influence of this factor as far as possible, to confine our attention to the results obtained with those dusts that contained less than 5 per cent. of natural ash. In recording the results in Table A (page 735), the coals are placed in descending order according to their *total contents* of "volatile matter" as determined in the usual manner. Each dust was sieved through a 240-mesh sieve and dried during one hour at 107 degs. Cent.

It is impossible to trace any relationship in the above table between the percentages of "volatile matter" in the coals and the relative ignition temperatures of their dust clouds. This result does not appear to us surprising. For the determinaion of the total volatile matter simply consists in heating the coal to a high temperature and driving off all the gases that can be driven off at that temperature. Such a process can make no distinction between substances of different ease of decomposition that may be present in the coal, for it decomposes them all. Nor can it afford any information regarding the proportions in which such substances may exist in different coals. We have already seen that we must regard coal as a conglomerate containing substances that can be decomposed and yield inflammable gases at quite low temperatures, and substances that require a higher temperature to effect their decomposition. Now, Bedson, as previously stated, has shown that a considerable proportion of many coals can be separated from the main bulk by the solvent action of

TABLE A.

-content er cent. undried coal.	Total volatile matter, per cent. on ash-free dry coal.	Relative ignition-temperature. Degs. Cent.
3·24	41·77	1065
4·70	38·34	995
2·20	37·31	1015
3·08	37·02	1080
4·14	36 76	1075
3·29	36·30	1090
1·25	36 07	1035
4·60	35·96	1055
3 52	35·50	1055
2 84	35·14	1035
4·30	35·01	1020
4·54	35·01	995
2·59	35·00	1065
1·90	34 90	1005
2·08	34·63	1105
4·16	34·50	1045
2·25	34·18	1045
2 63	34·16	1045
2·51	33 88	1045
4·78	33 55	1020
1·33	33·40	1015
3 91	33·24	1055
3·03	33·11	1045
2 77	32·82	1025
4·10	32·28	1065
4 08	32·14	1005
3 28	30·48	1065
4 84	27·96	1055
3·25	27·26	1080
3·58	26 02	1095

ract thus obtained is very inflammable
y, it readily decomposes at low
yields inflammable gases (mainly the
bons); the portion of the coal that
ed by the solvent is a cuke-like mass
high temperature to decompose it
relative inflammabilities of different
pend upon the proportions of the most
ed constituents that they contain, it
that some relationship might exist
entages of the coals extractable by
ignition-temperatures of their dust
erefore determined the percentages
yridine of each of the coals tested.*
ven below, the coals being arranged in
ng temperatures of ignition of their
a separate column are given the
atile matter recorded in the preceding

tive ion- ers- e. Cent.	Total volatile matter per cent. on ash-free dry coal.	Percentage (on ash-free dry coal) extracted by pyridine.	Ash, per cent. on undried coal.
5	35·01	38·8	4 54
5	38·34	37 8	4 70
5	32·14	37·9	4·08
5	34 90	38·2	1 90
5	37·31	36 2	2 20
5	33 30	35·1	1 33
0	33 55	34 9	4 78
0	35 01	34·4	4 30
5	32 82	34·7	2 77
5	35·14	28 1	2·84
5	36·07	29·7	1 25
5	34 50	34 4	4·16
5	33·11	31·6	3·03
5	34·16	29·2	2·83
5	33 68	27 9	2·51
5	34 18	27 2	2 25
5	35·96	28 0	4·60
5	33 24	26·0	3 91
5	35.50	24·8	3·52
5	27·96	24 7	4·84
5	32·28	28 1	4·10
5	30·48	26·0	3 28
5	41·77	27·5	3·24
5	35·00	28 7	2·59
5	36 76	26·4	4·14
0	27 26	26·2	3·25
0	37·02	23·1	3·08
0	36 30	22 1	3 29
5	26·02	18 0	3 58
5	34·63	20 7	2 06

hat the relative ignition temperatures
increase with decreasing percentages
yridine—that is to say, the smaller the
readily decomposed constituents of
r the ignition temperature of the dust

xpected that this relationship between
ure and percentage extractable by
old rigidly; for, as Messrs. Wheeler
pointed out, the portion of the coal
dine cannot be identified absolutely
n-yielding constituents that are so
ed. It certainly cannot be supposed
dissolved out of coal by pyridine is
position whatever the coal from which
at is to say, the portion extracted by
fferent coals must be regarded as
in amount but in character; and it
it is itself compounded of different

bodies of different degrees of inflammability. However, as a first step towards tracing a relationship between the chemical composition of different coals and their degrees of inflammability, the results are encouraging. The investigation is being continued on the lines indicated.

There is a point in connection with the results given in the last table which is of interest as showing, possibly, the effects of the presence of natural ash. The ash content of each coal is given in the last column of the table. It will be seen that, in general, for dusts having the same ignition temperature, a high percentage of ash in the coal is counterbalanced by a high percentage extractable by pyridine. Take, for example, those coal-dusts that have an ignition temperature of 1,045 degs. Cent. They are five in number. If the relationship between ignition temperature and percentage extractable by pyridine held rigidly, and no other factor were considered, they should, of course (having the same ignition temperature), yield the same percentage to the solvent action of pyridine. This is not the case, but the percentages are 34·4, 31·6, 29·2, 27·9 and 27·2, showing differences which are outside the limits of experimental error. The coal (No. 240 N.) which yielded 34·4 per cent. to pyridine contained, however, 4·16 per cent. of ash; whilst coal No. 209 N., which yielded 27·2 per cent. to pyridine contained only 2 25 per cent. It will be shown below that the addition of only 4 per cent. of incombustible dust to a pure coaldust is sufficient to raise its ignition temperature 20 degs. Cent.; so that one is justified in assuming that had coal No. 240 N. contained only 2 per cent. of ash instead of 4·16, its ignition temperature would have been lower. Its position relative to the four other coals which were found to have an ignition temperature of 1,045 degs. is therefore probably correct.

(*To be continued.*)

Mining Education in Cannock Chase.—Eighteen months have passed since the plans were finally sanctioned for the new Technical and Mining Institute at Hednesford. For several years it had been felt that increased accommodation was needed, and, thanks to the generosity of Mr. F. D. Bumsted, an excellent site was obtained in Anglesey-street. The Marquis of Anglesey was good enough to grant the freehold of the land. A handsome and commodious building has now been completed. The total cost is about £3,100, towards which sum the County Council contributes one-quarter of the cost of the building and one-half of the cost of the apparatus. The building is a double-storey, square, substantially built one. Situated on the ground floor, the physics and chemistry laboratory, 20 ft. by 44 ft., is splendidly equipped. There are four laboratory tables, double-sided, with accommodation for 24 students. One portion of the laboratory will be reserved for the use of the science master, where experiments in mine air analysis will be carried out. The chemistry lecture room, which adjoins the laboratory, is 20 ft. by 26 ft. 9 in., and will accommodate 50 students. On the second floor, over the laboratory, there is a students' common room. Facilities for writing and reading are provided, and stands are fixed upon which will be exhibited geological specimens, &c. Specimens of the various types of miners' safety lamps will also be exhibited. Immediately adjoining is the machine construction room. Lecture room No. 2, the same size as the one on the ground floor, will be used for mining lectures. A private room equipped with the necessary office furniture is provided for the teachers. There are cloak rooms and lavatories for the students. A model mine is located at the rear of the institute. A comprehensive list of subjects will be taught at the institute. There will be a preparatory course of four hours per week for boys; an officials' mining course for adult miners desirous of obtaining the lower certificates of competency of the Coal Mines Act, 1911; a full mining course spread over four or five years; a surveying course of three or four years, and mechanical engineering, electrical engineering, and matriculation courses. Mr. William Charlton, who has been so closely identified with Cannock Chase mining classes for some years past, will be the principal of the institute, and he will have a popular and capable assistant in Mr. F. C. Short, B.Sc. Mr. R. A. Passimore, M.Inst.M.E., will be in charge of the surveying and plan-making course. —Sir Oliver Lodge, principal of Birmingham University, opened the new Technical Institute on the 30th ult. Sir Oliver said the object of such institutions was to train all the workers in the use of safety appliances and in the method of testing the impurities of mine air. Their efforts ought to be directed more and more towards removing the causes of mine disasters and making the work safer. Every student at Birmingham University was taught to use the safety appliances. It was highly desirable to test such appliances under observation where they could be checked and safety could be properly supervised, instead of leaving them to be tested in the pit, where anything going wrong with the apparatus might mean death. The starting of such an institute in a district like that would do a good deal for the district, not only in technical education relating to mines, the staple industry of the district, but also towards educating and opening the minds of those who frequented its classes.

A NEW TYPE AND METHOD OF CONSTRUCTION OF LARGE GAS ENGINES.*

By Alan E. L. Chorlton, M.I.Mech.E., A.I.M.E.E.

The theoretical economical advantages of large gas engines as prime movers are so well known in this country, particularly when using the waste gases from either blastfurnace or coke ovens, that some explanation must be sought to explain the relatively slow progress which has taken place in their use when compared with that on the Continent, especially in Germany. The importance of these economies, as affecting cost of production, is probably greater for the iron, steel and coal industries than for any other, and is of such obvious moment that the disadvantages of the gas engine that are held to exist in this country, as compared with Germany, must be of very real significance indeed to in anywise account for the relative small extent of their usage in these industries. This situation may have been brought about by one or other of two quite different causes, or a combination of the two.

(*a*) The usually credited disadvantageous characteristics of the gas engine itself; or

(*b*) The reduced first cost and peculiar applicability to existing installations of its most formidable competitor, usually the steam turbine of the mixed-pressure type.

The limitations which have prevented the progress of the large gas engine will be seen to be primarily due to—

(*a*) The prevalence of the belief of unreliability.

(*b*) The comparatively high total first cost of installation.

Unreliability.

This view of unreliability has of, course, been formed from the troubles experienced in the past, though it has been actively combated by various engineers when referred to present types. It may be said constructionally to refer to the cracks and breakages of important parts of the engine (undoubtedly a too common occurrence in the past). Generally those troubles sprang from initial foundry strains set up between the inner and outer walls of the casting when these were cast in one piece, as was the original practice. These initial strains, augmented by those set up through the different temperatures of the parts when working, eventually caused cracks and failures. This more than ordinary occurrence of cracks compelled makers first to discover the reason and then to amend their designs to prevent them; and the final forms of all types had the inner and outer skins of metal connected only as far as possible in one place, the other ends being left free to allow all the differential expansion and contraction set up in the foundry and in working to take place freely. A flexible connecting membrane completed the jacket to retain the cooling water in place. Figs. 1 and 2 show cylinders and cylinder heads of the later designs, in which it can be seen how greater freedom was allowed. If possible, still further improvement was desirable to dispose of the awkward shapes round the valve pockets, &c., and to do away with the connection between the jacket and the inner wall at A, where cracks also had occurred, quite apart from any troubles which might occur with the valves themselves; in fact, it was preferable that the jacket should be entirely dissociated from the cylinder in casting, a further reason being that different mixtures of cast iron were required for the conditions which the parts had to meet during service. From the practical point of view, it appears that the cylinder should have no valve pockets—that is, it should approximate to a simple pipe, and that the jacket should be a separate casting.

The next source of unreliability is in the valves and valve gears, subject to the heat and stress of the explosion. Obviously, therefore, an improved engine should, if possible—(1) be valveless, (2) have cylinders of simple pipe form, (3) have separate jackets. The only large engine with cylinders of pipe form without valve pockets, &c., and where the two pistons performed the various valve functions successfully, was the Oechelhäuser; the disadvantages of this type, which have restricted its use, although its thermal economy is well known, spring from other causes, as high first cost, large floor area covered (horizontal type), &c. The success of a valveless action was confirmed by the author's English experience with the working of the central exhaust ports by the piston in the Körting type engine—an experience which clearly indicated that there was no apparent reason why the air and gas inlet to the cylinder should not be controlled by a similar method

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* f the method employed in making these
ven in an Appendix.

* From a paper read before the Iron and Steel Institute. The "Duplex" engine described by Mr. Chorlton, who is the inventor, is being made by Messrs. Mather and Platt Limited, of the Salford Ironworks, and three of them are now running in a large works in the neighbourhood, whilst another is in course of erection at a local colliery.

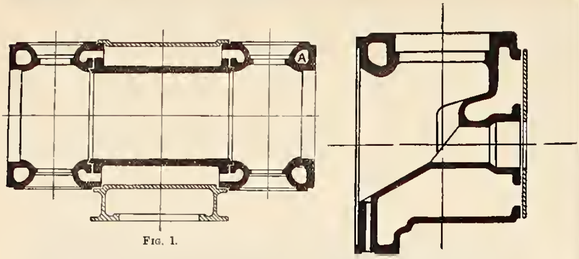

Fig. 1.

Fig. 2.

Figs. 1 and 2.—Present Design of Cylinders and Heads.

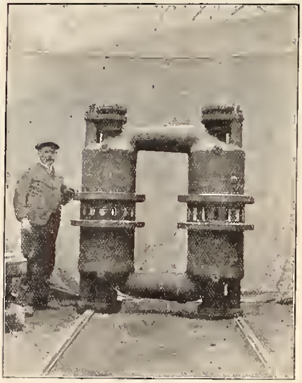

Fig. 3.—"Duplex" Cylinder.

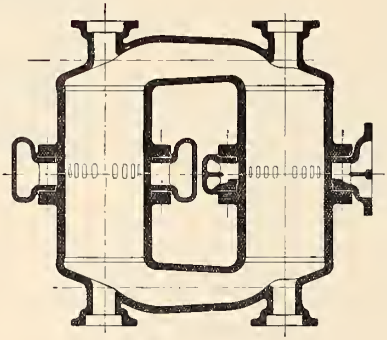

Fig. 4.—"Duplex" Engine (Section).

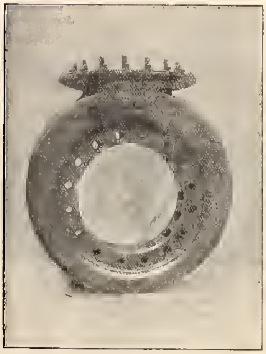

Fig. 5.—Inlet and Exhaust Boxes.

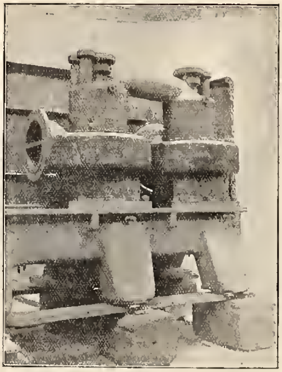

Fig. 6.—Inlet and Exhaust Boxes put together in Place on Engine.

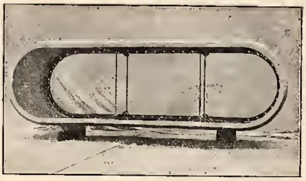

Fig. 7.—View of Tank from above.

n an adjacent cylinder. The outcome of this was the adoption of two parallel cylinders with ports about the middle, connected by specially shaped passages at their ends; one piston thus controlling the inlet through the ports in one cylinder, and its fellow expelling the exhaust through a similar set of ports in the other cylinder. This design was more or less bound to be of the two-cycle type, and he naturally leaned to such a principle, seeing that his experience had convinced him that by retaining, amongst other things, small cylinder diameters, it was the most suitable form for large powers.

From fig. 3 and section fig. 4 of the cylinder it will be seen that it consists of two single-walled U tubes placed end to end, the inlet and exhaust ports being about the joint; flanges on the cylinders—set back somewhat from this juncture—hold in between them the exhaust and inlet boxes (fig. 5) as shown in figs. 4 and 6. The whole cylinder unit presents extremely simple forms of single-walled castings, particularly suitable for successful and economical foundry work without setting up casting or expansion strains, and also for use in internal combustion work itself, as there are no pockets or irregular shapes; all sections are more or less cylindrical, including the connecting passages. No heavy flanges or joints occur about the points of maximum pressures and temperatures as in the ordinary type of engine. This form gives most effective cooling to all parts, as, being inherently of a strong section, they can be made with comparatively thin walls. The efficiency of the cooling is further increased by the accessibility of the water to all parts of the combustion chamber, the usual thick flanges and joints there being avoided. Thus, the engine may run at a higher temperature than is usual in the present large sizes. In fact, on test, full load has been maintained continuously with the jacket water boiling, and under such conditions the amount used can be considerably reduced (allowing in some cases the motor-car type of cooler to be used with its advantages of small space occupied, &c.). Further, the absence of joints and cavities in the combustion chamber reduces the risks of pre-ignition, and improves the efficiency of scavenging. High compression can be used without the disadvantages of water injection.

All the cylinder, &c., walls being single, the jacket must be provided in a suitable manner to retain the necessary water, and this is most readily done by dropping the whole duplex cylinder into a simple tank, as shown in figs. 6 and 7, the cylinders resting by their central flanges on stools on the tank bottom or engine entablature. By this construction is secured at once complete allowance for tamperature expansion without restraint; the exhaust outlet, the only connection to the outside, passes through the tank wall by a stuffing box, or a flexible membrane is used, the connection to the charging pumps being within the jacket tank. It will further be seen from this design that in casting, complete expansion is allowed in all directions, and no strains are set up, all the cylinders, &c., being single walled. Difficulties with valves are done away with, for though these are now much rarer than in the past, still the exhaust valve of all four-cycle engines remains a part, requiring considerable attention. No doubt the present large horizontal gas engines with their simplified valve-gear are a great improvement over the previous types: still, the further great advantage of an engine with no valve-gear must be apparent, particularly when taken into account with the possibilities of higher rotational speed.

There still remains the disadvantage of heavy capital outlay when the present large engine of the horizontal type is considered.

High First Cost.

It having now been shown how in the duplex design the unreliable parts of the gas engine are effectively dealt with, it remains to meet the other objection to horizontal type gas engines of large power, *i.e.*, high first cost of installation. The cost of installation of a gas central station primarily consists of :—

1. Engines.
2. Flywheels.
3. Electric generator.
4. Foundations.
5. Buildings.
6. Crane.
7. Switchboard and cables.
8. Auxiliaries, &c.

The first six items are probably the possible variables, and so will be considered in order :—

1. Engines.—For large powers the present comparatively slow-speed horizontal is the only one in the field, and the large amount of room taken up by this type, with its expensive foundations, &c., is well known. The cheaper prospect, judging from steam usage, and some work already done in medium-powered gas engines, is in the vertical design. Again, judging from steam practice, a high-speed forced lubrication closed-in type, particularly for electrical work, is the most successful ; incidentally the oil from the same system may be used for piston cooling as is now standard practice in Diesel engines. It seems necessary, therefore, that the engine should be vertical high-speed enclosed with forced lubrication, for by it—

2. Flywheels are greatly reduced in size, weight and price.

3. Generators are less by about 50 per cent.

4. Foundations being a simple block are cheaper by a like ratio.

5. Buildings, owing to the small floor space taken up, are greatly decreased in size , and

6. The crane is of less span, and probably has to lift a much less maximum weight.

As the vertical duplex type runs at twice the speed of the present horizontal, and if the cost of the engine itself is not taken at a lower rate, although it seems reasonable to suppose that it might be, we get a comparative table of costs per brake horse-power as follows :

	Horizontal.		Duplex.
	£		£
Engine	5	...	5
Flywheel	0 5	...	0·2
Generators	2	...	1
Foundations.....................	0·35	...	0·175
Buildings Crane ...	1	...	0 675
Total	£8 85	...	£7·05

These figures are comparative only, and might be taken on a lower basis. The reduction in cost, however, effected by installing the large vertical " Duplex " type as against the present horizontal engine is 20 per cent. If the engine is taken at £4·5 per brake horse-power the gain is 26 per cent.

A brief general description of the improved type of gas engine derived from the foregoing would be : The engine is of the vertical type, very similar in a general way to those steam engines now so much in favour in this country. It works on the two-stroke cycle. All working parts are enclosed, and the lubrication is by oil under pressure from a direct-coupled rotary pump. The engine may thus run at considerably increased rotational speed, and from the fact that there is a compression on each stroke of the two-cycle engine balancing the inertia of the reciprocating parts, a higher piston speed than is usual can thus be adopted with the attendant thermo-dynamic gain. The cylinders are of the " Duplex " valveless type, supported about their centres and free to follow the various temperature expansions in every direction. The necessary water-cooling jacket is provided by the cylinder being placed within an ordinary cast iron tank, and where the exhaust branch passes through the tank side a flexible connection is provided.

Ordinary air and gas charging pumps driven by an auxiliary eccentric are provided at one end, within or alongside the tank, and connect direct to the inlet valve box of one cylinder. The " Duplex " power cylinder is so arranged that the exhaust piston has a lead over the inlet piston. The governor is gear-driven, and acts on a simple control valve on the pumps. The ignition is of the rotary magnetic high-tension type in duplicate. The other details of the engine construction are similar to standard high-speed steam-engine practice.

In order to indicate the large powers for which these engines can be built, the cylinder dimensions of a vertical twin " Duplex " of 6,000 brake horse-power may be noted. These cylinders are but 36 in. diameter by 43 in. stroke, and the speed of revolution 140 per minute. The flywheel is 12 ft. 3 in. diameter and 60 tons in weight, and the floor space taken up by the engine is 475 square feet.

It must be obvious that these sizes are by no means the limit. The author sees no reason from his experience, and what has already been done in other engines, why cylinders of 48 in. diameter should not be successfully used. It is interesting to note that a triple " Duplex," with 48 in. diameter cylinders and 4 ft. stroke, running at 125 revolutions per minute, would give about 16,000 brake horse-power at quite a moderate mean pressure.

The results obtained in the way of evaporation with this type, where the proportion of heat discharged by exhaust to jacket is greater than that of four-cycle engines, have been as high as 3 lb. per brake horse-power hour, the boiler being fed with hot feed from the jackets and economiser pipes. The steam generated in these boilers can be used in various ways. When the source of the gas is an ammonia recovery producer plant, all that is evaporated will be required for the producers to keep the temperature down. The value of the steam generated, 0·02d. per brake horse-power hour, is equivalent to the value of the gas taken by the engine with the present price of by-products ; thus the gas-engine need not be debited with the gas used, and consequently the cost per brake horse-power hour generated is extremely low. On electro-chemical work, with 100 per cent. load factor, the net cost of energy for a 3,000 brake horse-power plant is 0·047d. per brake horse-power hour, assuming interest and depreciation at 10 per cent. In other cases the steam can be used for power purposes, driving a steam auxiliary cylinder on the main engine ; or it may be used for any auxiliary plant, as water pumps or charging pumps, when these may be separately driven. These exhaust boilers act as very effective silencers. A standard high-speed engine of the vertical " Duplex " type, upon which very exhaustive tests have been made on the shop test plate, gave the following figures :—

Mechanical efficiency	85 per cent.
Heat consumption per brake horse-power	10,500 British thermal units.
Water consumption per brake horse-power	4 gallons.
Oil consumption per brake horse-power	0·0004 gallon.
Governing	1½ per cent. rise full load on and off—steady afterwards.

These results are from cylinders 15½ in. diameter by 18 in. stroke, and will doubtless be improved upon with larger cylinders and further refinements.

Mining Institute of Scotland.—A general meeting will be held in Heriot-Watt College, Edinburgh, to-morrow (Saturday), at three o'clock Mr. James Dlack's paper on " The Inglis Engine Controller " will be discussed, as will Mr. D. M. Mowat's paper on " Facts and Theories relating to Fans." Mr. John M'Luckie will read a paper on " Experience of the Use of Old Wire Ropes in Timbering Roadways."

Orders for Koppers Ovens.—Messrs. the Koppers Coke Oven and By-product Company Limited, of 301, Glossop-road, Sheffield, have supplied us with the following interesting list of orders booked since June 1911 :—England: Oughterside Coal Company, Cumberland (40 ovens) ; Harrington Coke Ovens Limited, Cumberland (repeat order) (50) ; Cargo Fleet Iron Company Limited (second repeat order) (50) ; Tinsley Park Colliery Company Limited (40) ; Ebbw Vale Steel, Iron and Coal Company Limited, Mon. (100) ; Hordsn Collieries Limited, Castle Eden (60). Wales : Glamorgan Coal Company Limited (50) ; Germany : Neumuhl Colliery Company (52) ; Arenberg Company, Essen, Prosper Pit (60) ; Messrs. Francois de Wendel and Co., Gross-Moyeuvre (45) ; Kraft Ironworks Company, Stettin (110) ; Unser Fritz Company, Carnap, Westphalia (60) ; Dillengen Ironworks, Dillingen (50) ; Deutsch Luxemberg Coal and Iron Company, Friedrich Wilhelm Colliery, Mulheim (35) ; Ewald Colliery Company, Herten (60) ; Concordia Colliery, Engers (41) ; Helene and Amalie Colliery Company, Bergeborbek (82) ; Hallberg Works, Brebach, Saar (16) , Deutsch Luxemberg Coal and Iron Company, Glückauf, Tiefbau (30) ; Deutsch Luxemberg Coal and Iron Company, Mulheim (30) ; Messrs. Rudolph Bocking and Co., Halbergerhutte (16) ; Rybniker Colliery (45) ; Zollverein Colliery, Katernberg (60) ; Orlau-Lazy Colliery Company, Dombrau (50) ; Consolidated Fuchs Colliery Company, Neuweisstein (30). Austria : Austrian Coal and Iron Company, Vienna (30) ; ditto (repeat) (56) ; Ostraner Bergb. Company, Furst Salm, Vienna (30) ; Witkowitzer Bergbau, Witkowitz (40). Belgium : Société Métallurgique de Sambre et Moselle, Montigny, Belgium (70). Russia : Société des Sels Gemmes et Houilles, Paris for Stcherbinovka Colliery, Russia (38). France : Société Anonyme des Usines de la Loire, St. Etienne (18). Spain : Sociedad Anonima Fabrica de San Francisco del Desierto, Bilbao (40). United States : Woodward Iron Company, Alabama, U.S.A. (70) ; United States Steel Corporation, Duluth (90). We may also add that the Koppers process for the direct recovery of ammonia has been adopted in preference to all other systems for the new installation of Koppers chamber ovens at the City Gasworks in Buda Pesth.

MIDLAND INSTITUTE OF MINING, CIVIL AND MECHANICAL ENGINEERS.

Meeting at Doncaster.

At a general meeting of the Midland Institute of Mining, Civil and Mechanical Engineers, held at the Danum Hotel, Doncaster, on October 1, discussion took place on Dr. John Harger's recent paper on "The Prevention of Explosions in Mines." Other papers brought forward for discussion were " Some Experiences with Winding Ropes and Capels " (presented by Mr. W. D. Lloyd at a meeting of the Midland Institute on July 30) ; and " Maltby Main Colliery " (read by Mr. A. Thompson at a joint excursion meeting of the institute and the Midland Counties Institution of Engineers on May 9.) The chair was occupied by the president, Prof. F. W. Hardwick.

Before the discussions were proceeded with the following elections took place :—Member, Mr. William Mullins, Indwe, Cape Colony, proposed by Mr. J. Newbould, seconded by Mr. G. H. Barraclough ; associate, Mr. Ernest Harold Bates, 12, Glen-terrace, Stainforth, Doncaster, proposed by Prof. Hardwick, seconded by Mr. R. B. Wood.

Prof. Hardwick expressed regret at the fact that there was no paper to lay before the members at that meeting. They were promised one on the subject of " Electric Sinking Pumps," by Dr. Herzfeld, which he thought would have been peculiarly applicable to the conditions of that particular district ; but about a fortnight ago—just about the time of the Birmingham meeting—Dr. Horzfeld wrote to say that he was called away to the Continent, and could not read his paper. Fortunately, they had before the institute several valuable papers, on which they could have a very interesting discussion.

Dr. Harger's Proposals.

The first one which they would take, said Prof. Hardwick, was that of Dr. Hurger on the prevention of explosions in mines. Speaking personally, he had been a good deal interested in this paper, not only on account of the suggestions which were made for preventing explosions, but also because he thought it threw a good deal of light upon what seemed to have been very obscure in the phenomena of coaldust explosions. The paper, showing that the oxygen in the atmosphere had so much to do with the propagation of the explosion, threw considerable light upon the fact that, while ventilation had improved considerably, unfortunately there had been little or no diminution in the number and magnitude of the explosions that had taken place. It also helped to explain—what, of course, had been explained on other grounds as well—why such explosions affected the intakes almost entirely. The points that Dr. Harger raised were distinctly interesting, showing—in the particular instances of the analyses, of course—what high proportions of ash there were in the screen dust and in the dust from the main haulage roads, while an apparently similar dust from coal, the dust being made in the laboratory, contained a very much lower percentage of ash. The point as to the quantity of oxygen in the atmosphere which was necessary for work was an interesting matter. It seemed to him that the tendency of the physiologist now was rather to lower the percentage. Whereas in his young days he was taught that 21 per cent. was necessary, apparently they seemed to be getting down to something like 17½, or less. He should like to draw attention to the remark about the possibility of an explosion in an intake haulage road. Why Dr. Harger singled out the Barnsley bed particularly, he did not know. He supposed that an upset had been occasioned in a haulage, and that a lamp had been broken, and he seemed to think that under those circumstances an explosion might take place. He (the president) thought that was certainly a point to discuss. He doubted very much if Dr. Harger's attention could have been drawn to a very interesting paper given them by Mr. John Neal upon an experience of his at Middleton Colliery. Of course, he admitted that it was not the same seam there. But in that case the dust in the haulage road, which had been raised by the passage of a train of corves drawn by a pony, was ignited by the snuff of a safety lamp, and no explosion took place. He thought it would have been interesting if Dr. Harger could have included some analyses, or results of experiments with his apparatus, on seams such as those in Somersetshire and the Forest of Dean, which seemed to occupy a sort of intermediate position. In the discussion on Dr. Hargor's paper, one point which was particularly raised was the possibility of reducing the quantity of oxygen in the atmosphere of the mine and increasing the quantity of carbon dioxide—what effect that would have upon the workers in the mine. Mr. G. H. Winstanley was particularly strong on that subject, and pointed out that in the case of a sudden outburst of gas (at least that was what the speaker imagined from the point he raised) the atmosphere in the mine, if polluted intentionally with a certain quantity of carbon dioxide, might render the condition of the worker more serious than would otherwise be the case.

Prof. L. T. O'Shea (Sheffield) thought they must all agree that the subject which Dr. Harger had treated of was one in which they were all interested, and further, that he had put forward somewhat bold suggestions with considerable confidence. He thought the subject was not one which they could dismiss lightly, although perhaps his proposals were somewhat startling. It seemed to him that the subject should be looked upon from two or three different points of view: first, as to whether Dr. Harger's suggestions were theoretically sound; secondly, whether they were likely to be injurious to health; and thirdly, whether they could see any practical method of following them out. If the suggestions were not sound, then he thought time would be wasted in considering whether there was a practical solution. If they looked at the matter from another point of view, in which he himself was particularly interested, it divided itself into two points: first with regard to ordinary combustion, and secondly with regard to explosions. With regard to the matter of ordinary combustion, he did not think anyone would deny that the question of the quantity of oxygen present in the atmosphere was of importance, and that if they could reduce the oxygen to below a certain amount ordinary combustion would cease. This was a point of view which, it seemed to him, should appeal to them particularly in districts which were subject to gob fires, because if they could so control the quantity of oxygen in the atmosphere, and bring it down to a reasonable amount, then perhaps they would be able to control the spontaneous ignition of coal, and so render the occurrence of these fires less frequent. This was a point of view which he had come to not from reading Dr. Harger's paper, but one which he had thought over for a considerable time, especially with regard to a remark that was made to him some years ago by an under-manager in a district particularly subject to spontaneous ignition. Discussing the question of gob-fires, the under-manager said, "We used to have a large number in our pit, but now we hardly ever have one, but," he said, "I can always bring about heating of the coal whenever I want to." Asked what he did, he said "We ventilate on a very shallow water-gauge, but if that water-gauge increases I could take you to certain parts of the pit where I should be perfectly certain to find that the coal was heating." It struck him then that there was something to be said, perhaps, for reducing the ventilation, because if they were ventilating with a shallow water-gauge there was less likely to be a leakage of air, or short circuiting of air, through the gob from the intakes to the return than if the water-gauge was steeper. If they could control the amount of oxygen which was going up into the workings, then, where the coalseams were liable to spontaneous combustion, he thought there was very little doubt that they would be able to control gob-fires. Then the question was whether the increased ventilation which had taken place during the last decade or more was not to some extent responsible for an increase in spontaneous ignition that they heard of taking place in some districts.

When, however, they came to the question of explosions, he thought it was not on all fours with ordinary combustion. They wanted to know more about the relation between the quantity of oxygen present in the air and ignition under pressure, and he would suggest that Dr. Harger should investigate the subject from that point of view. Prof. Dixon, in the discussion, pointed out that he had, under certain circumstances, been able to bring about ignition of coaldust with only 13 to 14 per cent. of oxygen present. Ignition by means of electric sparks and the apparatus which Dr. Harger used was not quite the same as ignition under the influences of a hot flame from a blown-out shot. Therefore he thought further investigation was required upon a point like that.

With regard to the question of effect upon health, he thought that was a subject for the physiologist. If the physiologists could show that a man could do hard work, as he had to do at the coal face, with 19, 18 or 17 per cent. of oxygen just as well as he could do now with 20 per cent., then, if they could control the quantity of oxygen and keep it within the reasonable amounts that Dr. Harger said were necessary, he thought they would be on the safe side. But there was one point that they had to consider when they were talking about altering the percentage of oxygen. It had been pointed out that in a large number of mines there was only, perhaps, 19 per cent. of oxygen at the coal face. But they had to remember that the air which went into the mine contained 21 per cent. of oxygen, and the loss had taken place during its passage from the pit bottom to the coal face. If they were going to start with air containing 19 per cent. of oxygen, and carry that to the face, what was going to be the quantity of oxygen when it got there? That was a practical point which had to be very carefully considered before they began to play with the quantity of oxygen that was going down the downcast shaft. Dr. Harger said: "I am not going to ask you to reduce your air to 17 per cent. of oxygen, but if you have 20 per cent., with ½ per cent. of carbon dioxide in, that will act almost as well." In mines which were specially dangerous, he went to 19 per cent. with ¾ per cent. of carbon dioxide. But he (the speaker) pointed out that it was difficult to control the quantity of carbon dioxide when there was a removal of oxygen by a process of conversion into carbon dioxide when the air went through the mine.

As to the practicability of the suggestions, he wished to lay stress on one thing, and that was Dr. Harger's suggestion that flue gases should be used. Dr. Harger stated that care should be taken to wash the flue gases, to see that they were free from smoke, dust and sulphur dioxide, with a special immunity from carbon monoxide. But carbon monoxide appeared to the speaker to be an exceedingly difficult thing to get rid of. Once they had got carbon monoxide in the atmosphere, as far as he knew the only way to get rid of it was to burn it. He did not know how to get rid of it in a simple manner without going to some process of that kind. It was a very stable gas, and once formed was very difficult to get rid of. He did not know any process of washing which would be practicable to remove it, so that he thought that flue gas would have to be very carefully used if it was to be of any value at all. Although he had offered certain criticisms on Dr. Harger's proposals, he still maintained that the members should discuss them seriously. It was, he thought, Mr. Blackett who said that one method of preventing explosions of coaldust would probably not be applicable in every case. It seemed to him (the speaker) that the more methods they could get of bringing about this most desirable condition of affairs, the more likely they were to come to a right solution of the question.

Mr. W. D. Lloyd (Altofts) thought they must all agree that Dr. Harger's suggestions should certainly have due discussion. He did not feel in a position to discuss the soundness of Dr. Harger's conclusions; but there were one or two points that he would like to enlarge on. One of these was the fact that Dr. Harger seemed to found his conclusions to rather a large extent on the fact that an explosion, as a rule, did not travel the coal face or the return airways. The reason he gave for that was that he supposed—and no doubt correctly—that the air on the faces and the returns was more deficient in oxygen than the air on the intakes. But Dr. Harger did not seem to give full weight to the other fact—which was undoubtedly a fact—that there was not, as a general rule, on the faces and in the return airways the quantity of coaldust that there was on the intake. Dr. Harger alluded, he thought, to an explosion in the Silkstone seam at Altofts. There was no doubt at all, in that case, that the intake haulage roads were very dusty indeed; but at the same time there was no doubt that the faces were not dusty, neither were the returns. The faces were practically longwall, with a thick amount of holing dirt, and all the gate roads and returns were distinctly covered with stonedust to a very large extent. He should like to emphasise the suggestion that had been made by Prof. Dixon, and also by Prof. O'Shea, as to the possibility of igniting coaldust under pressure, even in a deficiency of oxygen. He thought there were several points with regard to ignition under pressure about which very little was really known. He thought Prof. Dixon put it fairly clearly when he said that the question was whether, in the case of a blown-out shot causing concussion and pressure, coaldust which would not ignite with a deficiency of oxygen in the ordinary way, would ignite then. An instance within his own experience was rather interesting in that connection. It occurred not with coaldust, but with ordinary gas, at the Whitwood Collieries. Undoubtedly, gas was ignited in a break by a shot containing about 12 oz. of carbonite. According to all the Belgian tests, especially, the charge limit of carbonite was 900 grammes. But in this case undoubtedly ignition was caused with about one-third of what would be otherwise the limit of the charge, and he took it that this was simply due to the fact that the gas was under pressure at the back of the shot-hole. He should, perhaps, explain that the shot blew through into a break. As regarded the injuriousness to health of Dr. Harger's suggestions, he thought they had a good deal to learn on that matter. It might be interesting to point out that, from analyses which he had seen, there was no doubt that a man with a breathing apparatus on could breathe, and did continue to breathe, quite comfortably, with only 12 per cent. of oxygen. In that particular case the man was not doing any work. Whether he could do work without distress was another question. As to practicability, Dr. Harger suggested what he called a simple plant for dealing with the necessary quantity of flue gas, which, from the figures he gave, would have to be 1 in 15 of flue gas in dangerous mines. So that, in a mine which ventilated with 200,000 cubic feet a minute, that would mean dealing with something like 13,000 cubic feet of flue gas a minute. Apart from the difficulty of dealing with the carbon monoxide, he thought it would probably be anything but a simple plant that would deal with a quantity like 13,000 cubic feet a minute, wash it thoroughly from smoke and sulphur dioxide, and get it clean from dust and everything else. Another way of carrying out Dr. Harger's suggestion had been put forward, he thought, namely, that of circulating the air time after time—that was to say, after it went up the packs, turning it down the downcast again. He thought the practicability of that was hardly worth discussing, but incidentally Dr. Harger might consider the matter, and might perhaps show them how they could use commercially the large quantities of marsh gas that would have to be purified out before the air was used again. Supposing there was ½ per cent. of gas in the return air from a pit that was ventilated with 200,000 cubic feet a minute, there would be over 1,000,000 cubic feet of gas turned out during the 24 hours, and if that could be utilised it would certainly increase the commercial value of most collieries. But in addition to purifying the gas, of course the water vapour would have to be purified out, and that again, he should think, would be a very difficult process. So that, failing flue gas or circulating the air time after time, what would Dr. Harger's suggestion be as regarded the way of reducing the percentage of oxygen?

Mr. Charles Snow (South Kirkby) referred to the suggestion of the under-manager mentioned by Prof. O'Shea, that high-water gauges had something to do with spontaneous combustion underground. He could hardly agree with that, inasmuch as all the gob-fires that he had had experience of had occurred in goaves in a longwall face, and he should say that there was absolutely no difference in pressure between the gates on each side of the goaf where the fire occurred. Touching on the suggestion of Dr. Harger to reduce the quantity of oxygen below 19 per cent., he pointed out that the new Mines Act prescribed that 19 per cent. should be present. It would almost appear that the physiologists referred to, who held that a far less percentage than 19 was ample for supporting life, were wrong, or that the people who drafted the Act were. He would leave it to others to decide, but he thought, judging from other parts of the Act and its absurdities, that probably the physiologists were right.

Winding Ropes and Capels

The discussion of Mr. Lloyd's paper was then proceeded with.

Mr. J. Elce referred to Mr. Lloyd's remark as to "whether it is advisable in the interests of safety to have a capel which will break the rope before it draws even a fraction of an inch." He quite agreed with Mr. Lloyd. He did not think they ought to have a capel that was stronger than the rope, and he had never attempted it. In another part of his paper Mr. Lloyd said "the reason why the rope broke was undoubtedly that all vibration was arrested at the end of the white metal." He did not quite follow Mr. Lloyd in his reasoning there. He thought that, whatever form of cap was used, there must be a point where all vibration was arrested. He thought the chief point in the failure of any white metal cap that he had heard or read about was the point that Mr. Lloyd referred to a little lower down on the same page—that he had a lot of slack rope on the top of his cage owing to special arrangements for changing decks at the pit top. He (Mr. Elce) thought that and the fact that they were unable to fill in the white metal right to the top of the cap were the chief factors in the failure. Another point mentioned was that "there was some difficulty with the heavier capel in driving the hoops down, although the bow was, as is usual with this type of capel, made hot before driving down the hoops." No doubt most of the members would remember that they had a serious accident at Silverwood through the drawing of a capel which was not a white metal capel. He was quite sure that in that case they had been so anxious to make the bow of the cap sufficiently strong that they had overdone it, and made it so strong that it had been impossible to drive the hoops down fast enough to make the wedges grip the rope. He was confirmed in that opinion because, after the disaster, they recovered the cap and had it tested at Lloyds' testing-house. In

before the failure, the hoops were
ng hammers in the ordinary way.
l the cap, and before it was tested,
ed on by hydraulic pressure, and the
l with them broke a steel bar of 180
uld see no reason at all, except that
ed the jaws of the cap so much that
mmers would not drive the hoops
sked him whether they used clay.
lit the whole length, and they did
id the cap on its side, for running the
ad small relief holes to allow the
In the discussion, Mr. Winstanley
f getting rid of the air as the white
riven in, if all the openings were
ay. They had these small relief
d the clay on the head of the cap—
n between the cap and the rope. He
last six years they had made from
cappings, and, thanks to having the
the white metal had cooled they
ops off, take the capping off, and
d in every case they had always
came right to the end of the cap.
the cap back, and put the hoops on

lying to the discussion, thanked Mr.
ing his attention to Mr. Gerrard's
e had not seen that point before,
d he had, because he must agree
y that Mr. Gerrard's suggestions
ground, to a certain extent, of the
e failure of the cap. Seeing that
tion of the use of white metal caps
ns why they adopted them, it was
y that, he took it, the effect of his
ared the ground as regarded the
them. Of course, clay was used
el under discussion, and no arrange-
suggested by Mr. Elce, for giving
e top of the cap, and he thought it
at that fact alone accounted for the
ning up to the end of the cap. It
n added to by the clay having been
o the end of the capel too far, but,
paper, it was done under skilled
ht not to have occurred. Possibly
ggestion of using asbestos yarn
ment. Mr. Winstanley also asked
of the electrolytic action of copper
d been considered. As he pointed
er wire had been used for a great
to the best of his knowledge no
k place, but it was in view of the
tion that they gave up the use of
soft iron wire, which had been used
Winstanley drew attention to a
n use at some of the ropemakers'
e known as a fatigue machine, he
ker) had heard of it, but had not had
ng it. Mr. Winstanley claimed that
y gave the working conditions of
ine consisted of a series of pulleys.
of the rope were driven at a high
r of revolutions was counted; and
s obtained of the amount of fatigue
capable of sustaining. But he
to discussion as to whether this
he true working conditions. As
e used, it must be so much harder
than small size that, although
results might be obtained, he did
to give the actual working con-
the rope was used. Mr. Elce
a definite point of arrestation of
t know whether he had followed
ly, but his (Mr. Lloyd's) point was
etal there was a definite point of
took a section across the rope at
metal all vibration must stop at
ith a capel constructed in the old
gradually lost through the whole
as no absolute definite point. It
where, but he thought in the old
ested partially and in different
the white metal it was at one
e wires of the rope. But the point
o bring out as much as possible
here was by which a colliery
himself as to how far a rope had
course, somebody suggested that
, as they had now got a definite
half years, but he thought all of
been called upon to take the
ling whether a rope—perhaps a valuable rope—was in a sufficient condition to go on working, and, as far as his experience went, there was no definite test, that could be made on the ground, by which one could ascertain how much the wires were fatigued, unless they were very much fatigued indeed. Of course, if they were very much fatigued, the bending test would show it fairly well; but apart from that there was not, to his knowledge, any definite way in which a test could be made on the ground, so to speak. As he tried to point out in his paper, the testing of a rope by tensile tests, torsion tests, and bending tests, after an accident, to see why it broke was in most cases no use at all. They could get a rope which was absolutely fatigued and ready for breaking, and which would yet comply with nearly all those tests almost as well as the new wire. That was the point he wished to bring out, and on which he thought it would be very desirable to have more information. He did not know whether it was in the powers of the institute, or a matter worth considering, but he should like to suggest the possibility of getting the National Physical Laboratory to take up the question in some way, and to see whether any further information could be brought to bear on the question of fatigue of wire ropes. He knew that the laboratory had been doing a good deal of work on the fatigue of iron and steel, but so far they had not touched the question of ropes, which was of great interest to all of them in that institute.

The PRESIDENT said they were very much obliged to Mr. Lloyd for having written such a valuable paper and having brought so many interesting facts before the institute.

The consideration of Mr. ALFRED THOMPSON's paper was then taken. Mr. Thompson exhibited a number of plans of the Maltby Main Colliery, and gave explanations and answered several questions with regard to the equipment.

The PRESIDENT expressed the thanks of the institute to Mr. Thompson for his paper, which, he said, contained a number of very valuable facts. A paper of that kind was of very great utility.

It was announced that the next meeting of the institute would be the dinner meeting at Sheffield on December 3.

Grimsby Coal Exports.—Foreign: Gothenburg, 4,234 tons; Trelleborg, 2,462; Bremen, 381; Restad, 275; Hoganas, 473; Rotterdam, 412; Esbjerg, 317; Skien, 774; Antwerp, 297; Wyborg, 1,298; Dieppe, 677; Hasle, 425; Ystad, 1,676; Helsingfors, 697; Gefle, 3,419; Hamburg, 435; Aalborg, 2,000 tons; total, 20,250 tons. Coastwise: Lowestoft, 1,313 tons; London, 82; Yarmouth (Isle of Wight), 195; Whitstable, 262; total, 1,852 tons. The foreign export figures show a slight decrease on those of the corresponding week last year, being 20,250, against 22,270 last year; whilst there was no coal exported to coastwise destinations during the corresponding week of last year. Exports from Immingham were as under—Copenhagen, 1,710 tons; Genoa, 3,288; Helsingfors, 1,804; Hamburg, 4,005; Holtenau, 1,930; Rotterdam, 5,169; Oxelosund, 6,717; Landscrona, 3,670 tons; making a total for the week of 28,293 tons. There were also 510 tons of coke shipped to Copenhagen.

Liverpool Council and Coal Contracts.—At the monthly meeting of the Liverpool City Council last week, there was an animated discussion in regard to the period for which contracts for the supply of fuel to the Corporation should be made. Mr. Max Muspratt, a prominent member of the Council, moved an amendment to the minutes of several committees that contracts should only be entered into for a short period, having in view the recent great advance in prices of fuel which had taken place. It was a singular fact that the late coal strike had in no way damaged trade; but, on the other hand, they were at present in the midst of an unparalleled trade boom, the result being that coal was now at an artificial price. Should war occur between the Balkan States and Turkey, or a cotton strike — which he hoped would not be the case — this trade boom might cease, a time of depression set in, and then down would come the price of fuel. He stated that he only knew of one large concern—apart from gas and other such like companies, who had contracted for next year, and, therefore, he asked the Council not to surrender in the matter. — Mr. Harmood-Banner, M.P., replied to Mr Muspratt, and stated that his experience, as one of the extortionate coalowners, proved that what had been stated was not the case. In regard to the short periods for contracts, this had been tried previously and had ended in a loss, and he failed to see why they should do the same thing again. With regard to the contracts which had been made, he said that so far as he knew all the large manufacturers had renewed their contracts over the next 12 months, and the firms who had not done this were afraid lest they should not be able to get the fuel they required, as collieries would supply contracts first. Eventually, after several other members had contributed to the discussion, the mover of the amendment said he would not press for a division on the question.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

A Week of Interesting Discussions on Important Matters—Delays in Shipments: Lively Discussions: Suggested Remedies—Double Charges for Coal-Mixing: Conference with Railway and Dock Managers—Additional Facilities at Barry: One Million Tons More Per Annum—Housing Provision and Heavier Rates on Collieries.

The president of Cardiff Chamber of Commerce (Mr. North Lewis) has continued his efforts to secure better despatch at the local docks; and in so doing has brought upon himself no little antagonism—with the result, however, that he has answered his critics most effectively, and thereby made their intervention serve the purpose of much-needed reform. His chief point is that whereas the restrictive legislation and labour troubles of the past few years have hitherto made the export trade of the port more or less stationary, the great colliery developments now in progress must occasion in the near future a vast increase of output, with consequent need of fuller dock accommodation. "The experience of the past year or two has taught us that directly we have a supply of tonnage in any way adequate to keep our collieries fully employed, we are face to face with deplorable congestion and delay at the various docks."

Not ideal conditions, he argues, but those which are feasible and practicable should be taken into account in dealing with this matter; and, though the docks may theoretically be able to do much more than at the present time, they are practically "working up to very near the maximum." Such additional facilities as are indicated at Barry and at Cardiff can, he asserts, deal only with the expansion of trade to be anticipated immediately; and it is necessary to look further ahead.

Mr. J. T Duncan, shipowner, considers that if the present appliances were fully utilised, things would be very much better. The great trouble, he says, is the "nursing" of tips, which is "a curse to the port." In his opinion a lack of hydraulic power is responsible for much of the detention.

Another item of corroboration comes from one of the "coal foremen"—those who have the marshalling of traffic to the tips on behalf of the different shippers. He states that four or five firms have practically a monopoly of a number of tips, and that tips are nursed for tonnage coming on.

The difficulty appears to be that the company are not exercising control of the docks, and that when a tip is wanted in a hurry, the practice in many cases is to apply to the coal foreman of one of the privileged firms, who will, if convenient to his own employers, release a tip for 24 or 48 hours, a practice which may entail giving some consideration, perhaps the purchase of bunkers from his own firm. It is said that this practice of privileged firms lending tips has grown up within the past eight or ten years, but this is questionable.

In Newport, on the contrary, the tips are controlled by the dock company. It is not left to the individual shipper to release a tip in the way indicated; and what is aimed at in the three chief dock areas of "Cardiff port"—Barry, Penarth and Cardiff itself—is that the practice of "nursing" tips shall be put an end to by the dock company itself, and that there shall be no more borrowing or lending of tips. It is for the dock company to ensure that each tip is worked at its full capacity, and not that there shall be dilatory loading while waiting for fresh tonnage; or that anyone other than the dock management shall control the use of the appliances.

One allegation against the dock company which has direct relation to the rapidity of shipment, is that the company have not any more siding accommodation than they had 20 years ago (in respect of the docks then existing), and the result is a delay in getting roads cleared, and the empties marshalled for the railway companies to take them away.

Much credit is given to Mr. Macaulay, the present manager at Newport, because when he first took charge of those docks, he found the old system of "nursing" in progress, and, recognising at once that it reduced the earning power of the property, he established a close oversight. Tips may be allocated. As a matter of fact large shippers have always full provision made for them, yet the dock office keeps complete control of the tips, and themselves put the steamers under, not leaving it to the shippers. If it were found that there were any "nursing" or delay in shipments, the steamer would be moved.

Those who are advocating reform, seek to secure the establishment in Cardiff Port of a system such as that now prevailing at Newport.

Replying to criticism, Mr. C. Denniss, manager of the Cardiff (Bute) Docks, maintains that it is the delays by shippers which are responsible for the condition of things they complain of. He gives instances, some of them of a striking character, in confirmation of his assertion. One vessel occupied the staiths for 97 hours to load 3,852 tons of coal; for seven hours nothing was done, and consequently the average rate of shipment was only 39 tons per hour. In another case the delay was nearly 14 hours, and the average rate of shipment only 34 tons per hour. A third, owing to the loss of 12 hours, had an average of 33 tons per crane per hour; while a fourth, which had almost 12 hours' wait, averaged no more than 23 tons per crane per hour.

He states that stoppages for want of coal during August (at the very time when the dock company were being pressed with complaints by persons needing tips), amounted to 11·5 per cent. of the hours occupied, so that there was an actual loss in shipment of 108,000 tons of coal—equal to a rate of at least 2,000,000 tons per annum. During September, in cases where the tips were kept fully supplied with coal, the average shipments per crane or tip ranged from 77 to 53 tons, and Mr. Denniss argues that if the supplies of coal were kept up in proper measure—say, at an average of 60 tons per hour per appliance—there is shipping power of no less than 14 million tons per annum.

Mr. Denniss contends that under present circumstances—given ample storage accommodation by the railway companies and a regular supply of coal ensured for each ship while in berth—the present appliances of the Bute docks are equal to considerably more than 50 per cent. over the present quantity dealt with. Increase in the power of the appliances now being gradually made, adds another two million tons to the shipping power, and therefore he holds that ample provision for the coal shipment at the Bute Docks "for many years to come" is ensured. He declares "if the colliery owners and the railway companies supply sufficient and continuous coal while vessels are in berth, there is sufficient accommodation for dealing with nearly double the amount of present trade."

Here, however, he runs counter to the president of the Chamber of Commerce, who discounts the ideally possible, and argues that the trade shall be considered and dealt with on lines feasible and practicable.

The question of added dock accommodation provokes general discussion because of the long period which is necessary for constructing a modern dock, and the fact that the coal trade has prospects of immense development in the immediate future. For several reasons the normal development of South Wales during the past year or two has been retarded, but now that some degree of settlement in labour and legislative interferences has been arrived at, there is reason to believe that the steady growth which characterised earlier years will once again take place, and in this event, which is very probable, it is manifest that the dock companies should at once consider the question of increased accommodation.

The Barry Company have taken prompt steps to meet the demand for additional dock facilities. Already preliminary measures for the erection of five tips on the eastern side of No. 1 dock are reported, and it is estimated that these will afford facilities for shipment of nearly 1,000,000 tons additional per annum. The directors do not appear to have considered the question of additional dock accommodation, although in their timber pond on the eastern end of No. 2 dock they have a site naturally adaptable at a minimum cost, even nearer to their main lines from the valleys than are the existing docks. Ultimately, no doubt, and probably at an early date, this timber pond site will be utilised for construction of No. 3 dock.

Representatives of the chief railways and docks in South Wales had a conference on Tuesday with representatives of the South Wales Freighters' Association and the local Chambers of Commerce on the question of the increased charges for mixing coals at the time of shipment. Among those who attended on behalf of the traders were Mr. W. North Lewis (president, Cardiff Chamber), Mr. J. A. Jones (president, Freighters' Association), Mr. L. G. Jeffreys (Swansea Chamber), Messrs. G. S. Harries and J. G. Probert (Swansea Freighters), D. A. Thomas (Cambrian Combine), E. Lloyd (Powell Duffryn), and T. E. Watson (Pyman-Watsons). The conference lasted nearly two hours.

The arguments had relation only to the matter of coal mixing, no reference being made to the question of delays at the docks, although coal mixing is recognised as being, to no small extent, responsible for these delays. The representatives of the traders pointed out that these charges operated very unfairly upon those who had entered into contracts in the expectation that the old rates would prevail. They further suggested that the increased charges should not be levied until after January 1, even though they were persisted in; and it was desired by them that a joint committee of dockowners and freighters should be appointed in order that the whole subject could be thoroughly gone into.

On behalf of the dockowners, Mr. A. Beasley, of the Taff Vale Company (owners of Penarth Dock) stated that upon the old charges the dock companies were involved in a heavy loss; and even on the increased charges, they would not meet the expense which coal mixing entailed.

Mr. North Lewis, president of the Chamber, Mr. J. A. Jones, and Mr. T. E. Watson, set forth the case of the traders, one of their chief complaints being that the alteration had been made without any consultation with them, although the interests of the shippers and the dockowners were identical in respect of ensuring the utmost rapidity of despatch.

Ultimately, the dockowners promised to give consideration to the idea of a joint committee; and, as to the desire of postponement of the new charges, promised an early reply.

In respect of coal-mixing the dockowners allege that they are compelled, in self-protection, to raise the rates; that, whilst willing to afford facilities for mixing, the matter has become for them so serious that it would pay them better to lose the whole income from the charges even on the double rate, if they could only get a free run for the traffic and be relieved from the hindrances which mixing now occasions. It is alleged that, whereas in former days mixing was comparatively simple and easy, later years have seen an extension of the practice, and such complexity that traffic is very seriously hindered. Instead of mixing two coals, probably with five or ten wagon changes, there are mixtures of anywhere from four to ten sorts, sometimes of single wagons. Although such exceptional conditions are not common, the general practice of the trade at the present time is said to entail much greater variety of mixture and a consequent greater delay in handling trucks, with heavier demand upon siding accommodation—accommodation which it is very expensive to provide, the handling of traffic in the sidings being very costly to the railway companies and dockowners when orders for mixing are received. This is the dock and railway owners' side.

On the part of the traders and shippers, whilst there is a recognition that additional charge may be warranted in certain cases, the immediate application of doubled demand is not justified.

One of the most striking features at the miners' conference during its session at Swansea, last week, was the amount of attention given to social questions, and particularly that of housing, and Mr. James Winstone, vice-president of the South Wales Federation, made a speech which provoked general comment. Without going into the question of housing or criticising what was set forth, it may be noted here that as public opinion becomes more and more centred upon the housing question, there is a certainty of increased local rates having to be borne by colliery enterprises. Strong feeling exists amongst trade union leaders against the building and ownership of cottages by the colliery companies, their reason, of course, being that the occupant of a company's house is not so free as the tenants of houses owned independently.

The aim of advocates of reform is that the local authorities should provide the cottages, installing therein sufficient bath accommodation, which in its turn involves improved water supply, &c., and the almost inevitable outcome of such provision would be that the rents charged would have no due relation to the cost, but that any deficit should be borne by public funds. That is, the colliery company, as chief ratepayer, would have to "foot the bill."

There is a growing feeling of dissatisfaction in reference to the centralisation of the local Federation, and one of the latest expressions was made by Mr. Hubert Jenkins, agent of the Rhymney Valley miners, at a meeting on Monday. He said that unless the scheme could be amended so as to retain the present districts of the Federation, it had better be abandoned. Referring to the suggestion of a five-day week, he did not agree with the idea, nor would he advocate it, for it would mean an influx men from other trades, and the collieries would become so overcrowded that instead of six days' wages for five, they would get only five days' pay.

A veteran of 73, Mr. Thomas Edwards, overman, at the Bwllfa Colliery, Ton Pentre, has passed the fireman's examination, and thus qualified under the new Mines Act. He has worked underground for more than 60 years, the last 36 having been in the service of the Ocean Company.

THE NATIONALISATION OF COALMINES.

The Bill of the Miners' Federation.

The following is the text of the "Bill to nationalise the coalmines and minerals of the United Kingdom and to provide for the national distribution of coal" which was presented to the conference of the Miners' Federation of Great Britain at Swansea last week, and was unanimously agreed to:—

WHEREAS it is expedient that the coalmines and coal of the United Kingdom should be taken into the possession of the State.

Be it enacted by the King's Most Excellent Majesty, by and with the advice and consent of the Peers Spiritual and Temporal and Commons in his present Parliament assembled and by the authority of the same as follows:

1.—Minister for Mines.

(1) There shall be a Minister for Mines to be appointed by his Majesty and to hold office during the pleasure of his Majesty.

(2) The Minister for Mines shall at the same time be capable of being elected to and of sitting in the Commons House of Parliament, and his office shall be deemed to be an office included in Schedule H of the Representation of the People Act, 1867; Schedule H of the Representation of the People (Scotland) Act, 1868; and Schedule E of the Representation of the People (Ireland) Act, 1868.

(3) The Minister for Mines shall take the oath of allegiance and official oath, and shall be deemed to be included in the First part of the Schedule to the Promissory Oaths Act, 1868.

(4) The Minister for Mines shall appoint one secretary, such assistant secretaries, and such other officers and servants as the Minister for Mines may with the sanction of the Treasury determine.

(5) There shall be paid to the Minister for Mines, out of money provided by Parliament, a salary at the rate of two thousand pounds a year, and to the secretary, assistant secretaries, officers and servants such salaries or remuneration as the Treasury shall from time to time determine.

(6) All expenses incurred by the Minister for Mines under this Act, to such amount as may be sanctioned by the Treasury, shall be paid out of money provided by Parliament.

(7) The Minister for Mines shall have an official seal, which shall be officially and publicly noticed, and such seal shall be authenticated by the Minister or the secretary or one of the assistant secretaries, or some person authorised by the Minister for Mines to act on his behalf.

(8) Every document purporting to be an order, licence, or other instrument issued by the Minister for Mines, and to be sealed with his seal, authenticated in manner provided by this Act, or to be signed by the secretary or by one of the assistant secretaries, or any person authorised by the Minister for Mines to act on his behalf, shall be received in evidence and be deemed to be such order, licence, or other instrument without further proof, unless the contrary be shown.

(9) A certificate signed by the Minister for Mines that any order, licence, or other instrument, purporting to be made or issued by him is so made or issued shall be conclusive evidence of the fact so certified.

(10) There shall be transferred and attached to the Minister for Mines such of the persons employed under any Government department in or about the execution of the powers and duties transferred by or in pursuance of this Act to the Minister for Mines as the Government department may with the sanction of the Treasury determine.

2.—TRANSFERENCE OF COAL MINES AND MINERALS TO MINISTER FOR MINES.

On and after the appointed day:

(a) Every colliery and coalmine, whether in actual work or discontinued, or exhausted, or abandoned, and every shaft, pit, level, or inclined plane in course of being made or driven for commencing or opening any such colliery or coal mine, including every patent fuel plant, coke oven, coal washery, railway rolling stock and all other works belonging to or connected with such colliery or coal mine and every house belonging to the owners of any such colliery or coal mine which is occupied by workmen employed at such coal mine (all of which are herein included in the expression "coal mine"); and

(b) All coal, whether black or brown, anthracite, lignite or other mineral used for fuel whether at present being worked or not worked or connected or not connected with any coal mine (all of which are herein included in the expression "minerals")

shall be vested in and held by the Minister for Mines in his corporate capacity and his successors.

3.—PURCHASE OF COAL MINES.

The Minister for Mines shall purchase the coal mines of the United Kingdom (other than those which are the property of the Crown at the time of the passing of this Act) at the price and in the manner provided by this Act. Provided always that the value of any minerals or right to work minerals or mineral way leave, other than a surface way leave, shall not be taken into account in computing such price, for all of which no compensation shall be paid.

4.—MINES COMMISSIONERS.

(1) For the purposes of assessing the purchase price of coal mines it shall be lawful for His Majesty, by warrants under the signmanual, to appoint ten commissioners, to be styled the Mines Commissioners (better called the Commissioners) of whom one, appointed by His Majesty, shall be chairman.

(2) Three of the said Commissioners shall be nominated by the Mining Association of Great Britain, three of them shall be nominated by the Miners' Federation of Great Britain, and two of them shall be nominated by the British Trade Union Congress.

(3) At the expiration of twelve months from the passing of this Act, in the event of a majority of the Commissioners failing to agree as to the purchase price of a particular coal mine it shall be lawful for the Chairman himself to fix the purchase price of such coal mine, but, save as herein expressly provided, the finding of the Commissioners as to the purchase price of coal mines shall be final and conclusive and binding on all parties.

(4) It shall be lawful for the Minister for Mines to remove any Commissioner for inability or misbehaviour. Every order of removal shall state the reasons for which it is made, and no such order shall come into operation until it has lain before the Houses of Parliament for not less than thirty days while Parliament is sitting.

(5) The Commissioners may appoint and employ such assessors, surveyors, valuers, clerks, messengers and other persons required for the due performance of their duties as the Treasury on the recommendation of the Minister for Mines may sanction.

(6) There shall be paid to the Commissioners and to each of the persons appointed or employed under this section such salary or remuneration as the Treasury may sanction: and all such salaries and remuneration and the expenses of the commission incurred in the execution of their duties, to such amount as may be sanctioned by the Treasury, shall be paid out of moneys provided by Parliament.

5.—VALUATION OF COAL MINES.

(1) The Commissioners shall, as soon as may be after the passing of this Act, cause a valuation to be made of all coal mines in the United Kingdom showing respectively the total ascertained value of the coal mine and its ungotten minerals and other profitable rights and the total ascertained value of the coal mine exclusive of such minerals and rights and the owner of every coal mine and any person receiving any rents, interest or profit from any coal mine on being required by notice from the Commissioners shall furnish to the Commissioners a return containing such particulars as the Commissioners may require as to their property, rent, interest or profits in such coal mine.

(2) The Commissioners may likewise cause any coal mine to be inspected, require the production of documents, or do any other thing which may in their opinion be necessary to fix the purchase price of the coal mine.

6.—ASCERTAINMENT OF PURCHASE BY PRICE.

(1) The purchase price of the coal mine shall be computed by ascertaining, and on the basis of the average annual number of tons actually raised during the five preceding years, provided that in no case shall the maximum purchase price be taken to be more than the following:

	s.	d.
When 100,000 tons or less have been raised per annum on the average during the five preceding years ...	12	0 per ton
When more than 100,000 tons have been raised per annum on the average during the five preceding years ...	10	0 per ton

(2) Subject to the provisions of Sub-section (1) of this section, the Commissioners in arriving at such computation shall also have regard to the actual gross and net profits which have been made in the coal mine during such years and to the amounts which may have been set aside from time to time for depreciation, renewals or development, and to the probable duration of the life of the mine, and to the coke oven washeries and other works and houses which may for the purposes of this Act be deemed to be a part of the coal mine, and to the liabilities of any coal mine undertaking existing at the time of purchase which are transferable to the Minister for Mines under Section 11 of this Act.

(3) Provided further that where a coal mine in the opinion of the Commissioners has not been fully developed, the amount which would be raised under full development shall be taken as the amount for the purpose of ascertaining the maximum value per ton under sub-section (1) of this section.

7.—ISSUE OF COAL MINE STOCK

(1) The purchase price of coal mines as ascertained under the provisions of this Act shall be paid by the Minister for Mines in Coal-Mines purchase Stock to the persons who in the opinion of the Commissioners have established their title to such stock. Provided that an appeal shall lie to the High Court from the decision of the Commissioners as to the title of any such persons but for no other purpose.

(2) For the purpose of paying such purchase price the Treasury shall on the request of the Minister for Mines, by warrant addressed to the Bank of England direct the creation of a new capital stock (to be called "Guaranteed three per cent. Coal Mine Stock) and in this Act referred to as "the stock" consisting of perpetual annuities, yielding dividends at the rate of three per cent. per annum on the nominal amount of capital.

(3) The annuities shall be payable by equal half-yearly or quarterly dividends at such times in each year as may be fixed, by the warrant first creating the stock.

(4) The stock shall not be redeemable until after the expiration of twenty years from the commencement of this Act, but on and after that date shall be redeemable after three months notice at the rate of one hundred pounds sterling for every one hundred pounds of stock.

(5) The stock may be issued at such times and in such amounts and subject to such conditions as the Treasury may direct.

(6) The dividends on the stock shall be paid out of the income of the Coal Mines Fund, and if that is insufficient shall be charged on and paid out of the Consolidated Fund of the United Kingdom and the growing produce thereof.

(7) The stock shall be transferable in the books of the Bank of England in like manner as other stock is transferable under the National Debt Act, 1870.

8.—WORKING OF COAL MINES BY MINISTER FOR MINES.

(1) Subject to the provisions of this Act, it shall be lawful for the Minister for Mines, on behalf of His Majesty, to open and work coal mines and generally to carry on the business of coal mining in all its branches, together with all other industries usually carried on in connection therewith. Provided that it shall not be lawful for the Minister of Mines to lease any mine or mines to any person.

(2) The Minister for Mines may compulsorily purchase land or acquire such rights or easements over land as he may require for the purpose of this Act, and shall have, with regard to the compulsory purchase of land, rights or easements all the powers of purchasers acting under the Land Clauses Acts.

(3) For the purposes of this section the Minister for Mines may from time to time, in such manner and on such terms as he thinks fit:—

(a) Appoint managers, engineers, agents, workmen, and servants; and

(b) Construct, erect, or purchase, lease, or otherwise acquire, buildings, plant, machinery, railways, tramways, hulks, ships, and other fixed or movable appliances or works of any description, and sell or otherwise dispose of the same when no longer required; and

(c) Sell, supply, and deliver coal and other products the result of coal-mining operations; and

(d) Enter into and enforce contracts and engagements; and

(e) Generally do anything that the owner of a coal-mine might lawfully do in the working of the mine, or that is authorised by regulations under this Act.

(4) In addition to the powers conferred on the Minister for Mines by the last preceding sub-section he may, in such manner as he thinks fit, work any tramway, hulk, ship, or other moveable appliance acquired by him for the purpose of supplying and delivering coal.

9.—ACCOUNTS.

(1) The Minister for Mines shall cause full and faithful accounts to be kept of all moneys received and expended under this Act, and of all assets and liabilities, and of all profits and losses and shall annually lay such accounts before Parliament.

(2) The Minister for Mines shall annually cause a balance sheet of accounts to be made including a capital account and a profit and loss account for each mine worked under this Act.

(3) Such balance-sheet and statement shall be so prepared as to show fully and faithfully the financial position of each such mine, and the financial result of its operations for the year.

10.—COAL MINES ACCOUNT.

(1) All moneys raised under the authority of this Act shall, as and when raised, and all other moneys received hereunder shall, as and when received, be paid into a separate account called "the National Coal-Mines Account."

(2) All moneys withdrawn from the National Coal-mines Account constituted under this Act shall be withdrawn only by the order of the Minister for Mines or such other person as the Minister may from time to time appoint, countersigned by the Treasury.

(3) All moneys in the National Coal-Mines Account, or payable into that account by any person whomsoever, and also all moneys owing by any person, under this Act, are hereby declared to be the property of the Crown, and recoverable accordingly as from debtors to the Crown.

11.—TRANSFERENCE OF EXISTING ASSETS AND LIABILITIES.

(1) There shall be transferred to the Minister for Mines, all the existing assets and liabilities of coal mine undertakings, other than liabilities for royalty, rents, wayleave rents or any other underground rents or charges, payable or due at the passing of this Act to any person.

(2) On the passing of this Act, there shall be ascertained by the Commissioners the amount of all moneys due to or from all coal mine undertakings, and the finding of the Commissioners as to the amount of such moneys shall be binding and conclusive on all parties.

(3) The net amount of all moneys due to any coal mine undertaking, after all debts due from any such undertaking have been deducted, as ascertained under Sub-section (2) of this section, shall be paid by the Minister of Mines to the persons to whom in the opinion of the Commissioners such debts are due and shall be deemed to be expenses incurred under this Act. Provided that an appeal shall lie to the High Court from the decision of the Commissioners as to the title of any such persons but for no other purpose.

12.—PAYMENTS OUT OF MONIES PROVIDED BY PARLIAMENT.

(1) All sums expended or payable under this Act in the construction, erection, or acquisition of buildings, plant, machinery, railways, tramways, hulks, ships, or other appliances or works or for other expenses required for the working of any mine, shall be payable out of moneys provided by Parliament.

(2) Provided that moneys received under this Act in respect of the sale or supply of coal (including the moneys received from the Government Departments) may be directly expended in or towards carrying out the purposes of this Act.

13.—PAYMENT OUT OF CONSOLIDATED FUND.

(1) After full provision has been made for all outgoings, losses and liabilities for the year (including interest on securities created and issued in respect of moneys raised as aforesaid, and on moneys paid out of the Consolidated Fund, the net surplus profits then remaining shall be applied in establishing a sinking fund and, subject thereto, in establishing a depreciation fund in respect of capital expended.

14.—MANAGEMENT.

Every coal mine worked under this Act shall be managed and worked subject to the provisions of the Coal Mines Regulation Act, 1908, the Coal Mines Act, 1911, and any other Act regulating the hours, wages, or conditions of labour in coal mines.

15.—TRADE UNIONS. PARTICIPATION IN POLITICS.

Notwithstanding anything in any Act or Order any society of workers employed in a National coal mine may be registered or constitute themselves as a trade union. Provided further that notwithstanding any regulation to the contrary, it shall be lawful for any person employed under this Act to participate in any civil or political action in like manner as if such person were not employed by His Majesty.

16.—REGULATIONS

The Minister for Mines may from time to time, make such regulations as he thinks necessary for any of the following purposes.—

(a) The management of coal mines under this Act;

(b) The functions, duties, and powers of all persons acting in the management and working of coal mines under this Act.

(c) The form of the accounts to be kept and the balance-sheets to be prepared in respect of coal mines under this Act;

(d) The mode in which the sinking funds and other funds connected with coalmines under this Act shall be held and administered;

(e) Generally any other purpose for which, in the opinion of the Minister for Mines, regulations are contemplated or required.

17.—DUTY OF MINISTER OF MINES TO SUPPLY COAL. PRIVATE SALE OF COAL UNLAWFUL.

(1) It shall be the duty of the Minister for Mines to ensure that there is a sufficient supply of coal at reasonable prices throughout the United Kingdom, and for this purpose it shall be the duty of the Minister for Mines to establish stores and depots and to employ vehicles and to

use all other necessary means for the selling of coal within the area of every local authority, and for this purpose it shall be the duty of the Railway Companies of the United Kingdom to provide such facilities for the conveyance of coal as the Minister for Mines may deem necessary to enable him to carry out the duties imposed upon him by this section, at rates not greater than such railway companies are now entitled to charge for the conveyance of coal.

(2) It shall not be lawful for any person or body corporate or unincorporate to establish or maintain coal stores or depots for the purpose of sale or to sell or to facilitate the sale of coal, and every person so establishing stores, or depots or selling or facilitating the sale of coal shall be liable on summary conviction to a fine not exceeding twenty pounds for every ton of coal so stored or sold or attempted to be sold

16.—Transfer to Minister for Mines of Powers and Duties of Home Secretary.

There shall be transferred to and be vested in the Minister for Mines all the powers and duties of the Secretary of State imposed upon him by the Coal Mines Regulation Act, 1908, the Coal Mines Act, 1911, or any other Act regulating or affecting coal mines or the hours or conditions of labour therein.

19.—Title and Commencement.

This Act might be cited as the Nationalisation of Coal Mines and Minerals Act, 1912, and this Act, and the Coal Mines Regulation Act, 1908, and the Coal Mines Act, 1911, may be cited together as the Coal Mines Acts, 1908-12, and shall come into operation on the first day of the sixth month after the passing of this Act, and all valuations, purchase and transference of coal mines and minerals to the Minister for Mines and all other arrangements for the carrying out of this Act shall be concluded on or before the first day of the fifth year after the coming into operation of this Act.

"Death from shock" was the verdict returned at an inquest at Guisborough on the 4th inst. on the body of Thomas Welburn (16), a youth employed at Spswood Mine, who was electrocuted on the previous day through his hand coming in contact with a live wire. The evidence showed that the wire hung about six feet above the ground, and that there had not been a fall of roof or anything of that kind to interfere with it. Welburn was heard to shout, and some workers found him lying on the rails with the live wire in his hand It was broken. Artificial respiration was tried for two hours without effect. It was assumed that the youth took hold of the wire, and that it broke while he had hold of it.

COALMINING IN INDIA IN 1911.

The annual report of Mr. G. F. Adams, Chief Inspector of Mines in India, upon the inspection of mines in British India for the year ending December 31, 1911, has been issued.

Persons Employed

During the year 1911 the average number of persons working in and about the mines regulated by the Indian Mines Act was 146,336, of whom 93,656 worked underground and 52,680 on the surface. Ninety-two thousand and forty-eight of the persons were adult males; 48,971 were adult females, and 5,317 children under 12 years of age. This is an increase of 1,656 workers, or 1·14 per cent. There was a small increase in the number of those employed in coalmines, and this holds good also as regards the coalmines of Bengal, where the great majority of the workpeople were employed, and where, although labour was scarce and most managers could have employed more workpeople, had they been forthcoming, there was no acute "labour question," as in some previous years.

Generally speaking, there was an improvement in the condition of the mineral industry of India in 1911 as compared with 1910. At the coalmines of the Assam Railways and Trading Company, in addition to the labour which has been imported for many years from the Central Provinces and Chota Nagpur, the experiment has recently been tried of employing Chinese, Nepalese and Mekranis from Baluchistan. The two latter are the more satisfactory.

Output of Mineral.

There was an increase in the output of coal, which was 12,048,726 tons, and which, compared with 11,387,716 tons raised in 1910, is an increase of 5·80 per cent. In 1910 there was an increase of 0·83 per cent. Of the total, 11,468,904 tons, or 95·19 per cent., were raised in Bengal, the rate in the previous year being 94·64. In this province there was an increase of 691,598 tons, which exceeds the increase for the whole of India, which was 661,010 tons. The increase comes mainly from the Jharia coalfield, where there has been an increase of over half a million tons, or just 10 per cent. There were increases of 2·35 and 3·70 per cent. in the Raniganj and Giridih coalfields respectively, and a decrease—mainly from Palamau—of 13·22 per cent. in the smaller coalfields. In the North-West Frontier province, where the output is infinitesimal, there was an increase of 55 per cent. In the other provinces outside Bengal there were decreases as follow:—Assam 0·74 per cent., Baluchistan 2·29 per cent., the Central Provinces 4 per cent., and the Punjab 37·84 per cent. The coal trade generally was better than in 1910 and improved throughout the year. Owing to a late harvest and consequent scarcity of labour in Bengal during the autumn, the year closed without much accumulated stock at the collieries.

The output per person employed during the year was (*a*) below ground 174 tons, and (*b*) above and below ground 113 tons. The figures for the three years preceding were (*a*) 163 and (*b*) 104. Taking each group of coalfields separately, these figures were as follow:—Bengal (*a*) 178 and 165, (*b*) 114 and 105; the Central Provinces (*a*) 132 and 118, (*b*) 92 and 81; Assam (*a*) 243 and 255, (*b*) 150 and 162; Baluchistan (*a*) 79 and 67, (*b*) 50 and 45; and the Punjab and North-West (*a*) 32 and 44, (*b*) 20 and 27. It will be seen that, except in Assam and the Punjab, there is a marked improvement in this respect. The average in England for the 10 years ending in 1910 was 287 tons per person employed above and below ground.

The table appended shows the number of coalmines regulated by the Indian Mines Act, 1901, the number of workers, and the output of minerals during 1911.

Table showing the Number of Coalmines Regulated by the Indian Mines Act, 1901.

Province.	District and mineral field.	No. of mines under the scope of the Act.	Total output.	Average number of persons employed daily in and about the mines.		
				Below ground.	Above ground.	Grand total below and above ground.
Bengal	Hazaribagh—		Tons.			
	Bokaro-Ramgarh	3	468	22	3	25
	Jharia	2	55	—	11	11
	Giridih	6	704,443	4,304	2,595	6,899
	Manbhum—					
	Jharia	196	6,373,673	33,747	19,691	53,438
	Raniganj	55	451,273	3,288	1,441	4,729
	Bankura, Raniganj	2	7,057	53	13	66
	Sonthal Parganas—					
	Raniganj	2	2,109	17	9	26
	Rajmahal	2	1,976	11	6	17
	Palamau, Daltonganj	1	70,662	369	293	662
	Birbhum, Raniganj	1	1,258	12	9	21
	Burdwan, Raniganj	151	3,850,259	22,639	11,205	33,844
	Sambalpur, Hingir-Rampur	1	5,669	115	130	245
		422	11,468,904	64 577	35,406	99,983
Central Provinces	Chhindwara, Pench Valley	2	63,030	346	124	470
	Narsinghpur, Mohpani	1	51,983	672	415	1,087
	Chanda, Ballarpur	1	96,603	585	150	735
		4	211,616	1,603	689	2,292
Punjab	Jhelum	8	26 982	873	465	1,338
	Shahpur	1	1,071	20	15	35
	Mianwali	1	2,522	43	89	132
		10	30,575	936	569	1,505
Eastern Bengal and Assam	Lakhimpur	8	294,893	1,211	754	1,965
Baluchistan	Sibi	4	42,410	527	310	637
	Loralai	1	188	8	3	11
		5	42,598	535	313	848
North-West Frontier Province	Hazara	1	140	5	—	5
	Grand total for 1911	450*	12,048,726	68,867	37,731	106 598
	" " 1910	443	11,367,716	67,425	37,860	105,285

* Of the total number of mines, 276 were worked by mechanical power, as against 283 in 1910. According to district the numbers were as follow:—Bengal, 264; Central Provinces, 4; Punjab, 1; East Bengal and Assam, 6; Baluchistan, 1; North-West Frontier Province, *nil*.

(To be continued.)

OBITUARY.

Mr. James Lewis Thomas, Myrtle Cottage, Aberdare, the only surviving son of the late Mr. William Thomas, Brynawel, Aberdare, passed away on Saturday after a prolonged illness. The deceased gentleman, who was 51 years of age, was a mining and civil engineer, and although on the death of his father he resigned the position of agent of Locket's Merthyr Collieries at Mardy, he continued to take a keen interest in all questions connected with the coalmining industry. His bravery was especially conspicuous on the occasion of the disastrous colliery explosion at Mardy Colliery, in the Rhondda Fach Valley, in 1865. His wife, one son and three daughters, together with his aged mother, survive him.

Mr. Clement Macrow, the manager of the Shipping Department of the Thames Ironworks Company, was passing over the Great Eastern's Railway level crossing at Canning Town in his motor-car, when the car came into collision with a slow goods train engaged in shunting operations. Mr. Macrow was killed instantly, sustaining terrible injuries. He was fifty years of age.

A well-known ironmaster in the Midlands has passed away in the person of Mr. John Harris, of Apsley House, Wellington-road, Bilston. The deceased gentleman, who was in his 80th year, for many years successfully carried on the Britannia Ironworks, Bradley, a portion of which still belonged to him. In 1699 he leased it to Mr. E. Carter Lewis, and it afterwards became one of the concerns run by Messrs. Tupper and Co. At present it is being worked by an entirely new company, comprising several who held positions under Mr. Harris. He was a prominent member of the Birmingham Iron Exchange. He was a large shareholder in many companies, and was the owner of a good deal of land in Radnorshire. For a number of years he had led a retired life, his wife having predeceased him about 17 years ago.

The death is announced of Mr. John Wilson, coal merchant, of Stanningley, near Leeds. The deceased was in his 70th year, and died at his residence, Hazeldene Stanningley.

The death has occurred at Wolverhampton, at the age of 75, of Mr. Joseph Jones, one of the founders of what is now the Wolverhampton Corrugated Iron Company Limited, with works at Ellesmore Port, already immense and expanding rapidly, and a world-wide business. It was about 52 years ago that Mr. Joseph Jones and his brothers, John and William, started it in a humble way, and he saw it grow under his hand. Long a familiar figure at the Wolverhampton works, he won great respect by his consideration of the workers. Owing to the infirmities of age, he has for many years taken little part in the management, leaving it to his sons, Mr. Joseph Highfield Jones and Mr. William Llewellyn Jones, and his nephews, Mr. E. Peter Jones, J.P., and Mr. Harry Beresford Jones, J P. A widower, he left, besides his sons, two daughters.

We regret to announce that the death has taken place in Edinburgh, of Prof. Stanley Dunkerley. Prof. Dunkerley entered as a student of mathematics and engineering at the Owens College in 1886 He had a distinguished career. He obtained the degree of B.Sc. (first class mathematics) in 1689, a first class in engineering in 1690, the Derby prize in 1889, and the Bishop Berkeley Fellowship, Owens College, in 1691. He took the M.Sc. degree in 1692. In 1901 he was appointed an external examiner in engineering at Manchester University, a post which he held for several years. He obtained the degree of D.Sc. in 1905, and in that year received the appointment of professor of engineering at the university. In 1908, however, ill-health compelled him to resign his position, and he has since lived in retirement.

Mr. Oliver Bury has resigned the position of general manager of the Great Northern Railway, and the directors have invited him to join the board.

AL AND IRON TRADES.

HURSDAY, OCTOBER 10.

and, Durham and Cleveland.

yne.

COAL.

: 148,560 tons of coal and 841 tons of
d from Tyne Dock, an increase of 4,387
decrease of 1,620 tons of coke when com-
pments for the corresponding week of
ston clearances amounted to 59,555 tons
e of coke, a decrease of 5,726 tons of coal
oke. The Blyth shipments aggregated
and coke, an increase of 2,365 tons.
nue to sell well for forward delivery.
transactions are recorded this week:—
,000 tons of Durham unscreened and
t to the Continent over next year at
d. per ton f.o.b.; 6,000 to 10,000 tons
d for next year's shipment at 13s.; a
of unscreened for shipment to the near
same period at from 13s. to 13s. 3d.; a
of good sorts for forward delivery at
able quantity of smalls for shipment to
at 13s. 6d. Other fuel contracts are as
s of Easington gas coal for prompt
rgen Gasworks at from 12s. 6d. to 13s.
best Blyth steams for shipment to the
ways over the remainder of the season
Heleingfors; good ordinary unscreened
everal lots totalling about 50,000 tons—
ery at from 13s. to 14s. f.o.b.; a quantity
ehold coal for shipment over the winter
derable quantities of Broombill steam
r next year's delivery, prices not given;
ordinary Tyne bunkers for next year's
f.o.b.; and 10,000 tons similar coal for
rom 13s. to 13s. 3d. f.o.b. In addition to
arranged for, the Elba Ironworks, Porto
diate offers of 100,000 tons of Durham
year's shipment. The Finnish State Rail-
r lot of 11,000 tons of best Blyth steams
e rest of the season. Liben merchants
20,000 tons of best Blyth steams for
French Transatlantic Company is nego-
000 tons of unscreened Durham bunkers.
t has been gradually firming up during
w quiet, owing to incertitude as to the
There is a general disposition to defer
rs have cleared up in the Near East.
l continues good, however. Quotations
t are as follow:—Best steams, Blyths
on f.o.b., stronger on the week; Tynes
irmer; seconds, Blyths, 12s. to 12s. 3d.,
Tynes (Hastings or West Hartleys),
imilarly increased; unscreened, 11s. 6d.
malls, Blyths, 9s. 6d. to 10s., 3d. higher;
ler's favour; specials, 10s., a decline of
c 13s. 6d., no change; gas bests (New
, 13s. 6d., inclined to advance; seconds
ilar), 13s., 3d. up; specials, 13s. 6d.,
ed bunkers, Durhams, 13s. to 13s. 6d.,
ans, 11s. 6d. to 12s., firm; coking coals,
alteration; smalls, 13s., from 3d. to 6d.
de, 14s. 6d., steady; coke, foundry, 25s.,
astfurnace, 22s., well maintained; and
of 6d.

COAL.

Sunderland last week amounted to
nd 530 tons of coke, as compared with
nd 730 tons of coke for the corresponding
; a decrease of 6,715 tons of coal and
The coal market is firm, with a good
So far the outbreak of war has had very
ess. Collieries are well off for trade,
loading turns are difficult to arrange
s. There is a growing enquiry for gas
are firmer. Bunker coals are also in
many enquiries for shipment over next
are not keen on quoting for forward
ession being that better prices will be
. The Porto Ferric Ironworks are
r 100,000 tons of coking fuel. The
mship Company are enquiring for 50,000
and the Finnish Railways are asking
to 12,000 tons of steam coal. It is also
10,000 tons unscreened bunkers have
rly delivery at 13s. to 13s. 3d. per ton.
oal are firm. General quotations are as
ear gas, 14s.; seconds, 13s.; coking
to 13s. 9d.; smalls, 13s. to 13s. 6d.;
and nuts, 14s. to 15s.; households,
te, 15s.; foundry coke, 24s. to 25s.;
s. to 24s.; gashouse coke, 22s. Bunker
ry kinds, 13s. to 14s.; bests, 14s. 6d. to
sking up to 15s. 6d.—all delivered free
. Outward coal freights are stronger,
by the war news, Mediterranean being particularly firm as represented by Genoa 13s., Taranto 14s. 6d., Alexandria 13s., Port Said 12s. 6d., Malta 10s. 6d. Danube will pay anything from 15s. to 20s. Bay is steady. Bordeaux 7s. 9d., La Rochelle 7s 9d., Rochefort 8s., Bayonne 8s. 6d., and Lisbon 11s. Baltic is quiet, orders not being so numerous. Fixtures are:—Stockholm 7s., Libau 8s., Pillau 6s. 3d., Cronstadt 7s. 6d. Coasting is better, with London at 4s., Hamburg 4s. 9d., Rotterdam 4s. 6d. There has also been a fixture at 24s. 6d. to the River Plate.

Middlesbrough-on-Tees.

COAL.

Fuel continues firm. Up to the present the outbreak of war in the East has disturbed business very little, but the closing of the Dardanelles is a contingency that is being considered. Good enquiries are reported for all classes of coal and coke. Deliveries of gas coal are increasing. Best gas coal is realising 13s. 6d. for prompt delivery. A good supply meets the heavy demand for bunker coal. Ordinary Durham bunkers stand at 13s. f.o.b., whilst best kinds range from 13s. 3d. to 14s., and specials 14s. 6d. to 15s. Coking coal is in excellent request and prices are very strong. Unscreened sorts run from 13s. 6d. to 14s., and smalls from 13s. to 13s. 9d. Demand for coke both for home use and for shipment is heavy, and values show further marked upward tendency. Up to 25s. f.o.b. is named for foundry coke. Average quality of blastfurnace coke cannot well be bought under 24s. Gashouse coke is in the neighbourhood of 22s.

IRON.

To satisfy current demand for Cleveland pig iron stocks are being drawn upon. Practically the only stock of iron is the 267,901 tons of Cleveland pig in the public warrant stores, and that is close on 10,000 tons below the quantity held at the beginning of the month. It is estimated that during October the stock will be reduced by fully 30,000 tons. War news from the East has depressed the iron market and brought values of Cleveland iron down. Whilst the price of No. 3 g.m.b. has this week been as high as 67s. 6d. f.o.b., the quotation now is not above 66s. 6d. Foundry No. 4 and forge No. 4 are both very scarce, and are of about the same value as No. 3. As a matter of fact, some No. 3 has been delivered in place of foundry and forge irons. No. 1 Cleveland is 71s. All the foregoing quotations are for early delivery. East coast hæmatite pig is quiet but has not fallen in value, mixed numbers still standing at 80s. for this year's delivery. For spring business the price is 82s. 6d. Foreign ore is as strong as ever on the basis of 23s. ex-ship Tees for rubio of 50 per cent. quality. The manufactured iron and steel industries present no new features of moment. All the works are kept busily employed, but few new contracts are being made, the reason being that manufacturers are too busy to undertake new work and guarantee delivery soon enough to suit customers. Quotations all round are stationary.

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South-West Lancashire.

COAL.

The inland household coal trade at the moment is, as was expected after the heavy call of last month, on the quiet side, fuel being purchased then somewhat in advance of the immediate requirements. Prices are steady at the rates established at the beginning of this month, which rule about 16s. 3d. for the best qualities, 14s. 6d. to 14s. 9d. for medium grades and 12s. 3d. or thereabouts for kitchen coals—all per ton at the pit. Forges and users of screened coals continue to take full supplies. With regard to shipping, bunkering requirements under contract are well maintained. Supplies at the moment are, if anything, more readily available owing to the somewhat easier inland demand; and the market is hardly as firm as it was, though quotations for screened Lancashire steam coals are nominally unchanged—viz., 12s. 3d. to 12s. 6d. f.o.b. for the cheaper descriptions, and up to 13s. 6d. to 13s. 9d. for the best. Shipments on export account, as well as open sale bunkering, are still adversely affected by the scarcity of tonnage. The coastwise and cross-Channel shipments of household fuel continue at a fair average, with best coal ruling up to 16s. 6d. and good medium grades at about 15s.—both net f.o.b. Garston. Slack, as has been the case for a week or two, is a little bit easier to obtain; but there is no serious incubus on the market, and the winter supplies for electricity and gas works and mills, now coming on, will speedily restore the balance. Prices are firm at up to 10s. for the very best rough slacks, with good medium sorts at 9s. to 9s. 3d. and the common qualities about 8s. 6d. There is already a disposition on the part of the consumer to secure his fuel supply for the coming year.

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South Lancashire and Cheshire.

COAL.

There was a good attendance on the Manchester Coal Exchange on Tuesday. There is some little easing of the demand for house coal, but prices are fully maintained at the advance—*i.e.*, 16s. 6d. to 17s. for the best house grades, with good medium qualities 16s. 3d. to 16s., and the commoner sorts from 12s. 6d. to 13s.—all into wagons at the pit. Furnace coal continues in steady demand, the price being about 12s. 6d. per ton at the pit; while shipping coal is steady at about 14s. f.o.b. Partington. Slack is still in good call, and prices are steady at about 9s. to 9s. 6d. for the best qualities, with the commoner grades at from 8s. to 8s. 6d.—all into wagons at the pit.

IRON.

Everyone is still very busy, and there are many complaints of poor deliveries. Good No. 3 pig iron commands 72s. to 72s. 6d. delivered in the Manchester district. Forges are very busy on bars at £8 10s., second quality £8, hoops £8 12s. 6d., sheets £9 5s. Steelworks are also full of work on billets at £6 5s. net, and bars £8 5s., less 2½ per cent. Wagon works, foundries, and textile machinists are all full of work.

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Yorkshire and Derbyshire.

Leeds.

COAL.

There was a very good attendance on the Yorkshire coal Exchange on Tuesday, and business in most departments of the coal trade was brisk. There was some weakness in prices for prompt deliveries of steam coal, but otherwise quotations were fully maintained, and for small slacks for coking purposes quotations were distinctly higher. There was a strong tone about the market generally, especially for forward delivery. The West Yorkshire pits have not been able to work full time this week, not from any lack of business, but solely through the scarcity of wagons. Traffic difficulties on the railways are again very serious, and at most junctions there is great delay. West Riding merchants report instances of loaded trucks occupying six days in transit from the collieries to destination, a distance of about 20 miles. On the average the pits have worked about five days. Business in house coal with London and other distant markets keeps up remarkably well, considering the high prices quoted. For prompt delivery to London and the eastern and southern counties the following pit prices are quoted:—Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. 6d. to 14s.; Silkstone best, 13s. 6d. to 14s. (special qualities, 14s. to 14s. 6d.); Silkstone house, 12s. 6d. to 13s.; house nuts, 11s. 6d. to 12s. It is expected locally that a further advance in public prices in London will be announced shortly. The coastwise trade is busier. For fairly prompt shipment at Hull the following f.o.b. prices are current:—Haigh Moor best, 16s. 6d. to 17s.; Silkstone best, 15s. 6d. to 16s. 6d.; Silkstone house, 14s. 6d. to 15s.; house nuts, 13s. 6d. to 14s. West Riding merchants are fairly well employed, but report great difficulty in getting supplies of best coal. The retail trade has improved during the week. Pit prices are unchanged as under:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 17s to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; ordinary house coal, 15s. to 16s.; secondary sorts, 13s. to 14s. 6d. All descriptions of slack and nuts sell readily at full list rates. The industrial position in the manufacturing centres is very strong and the consumption of fuel greater than ever. Coking slacks are dearer. Pit prices:—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small engine nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best slacks, 8s. to 9s.; small slacks, 7s. 6d. to 8s.; coking smalls, 7s. 3d. to 7s. 9d. Washed furnace coke has been sold this week at 18s. 6d. per ton at the ovens—a record, apart from the strike, since 1900. The make is quite inadequate to the demand, although several new ranges of ovens have lately been got to work. The gas coal pits are busy. Contract needs take up nearly all the output, but for open market business no difficulty is found in securing the following pit prices:—Screened gas coal, 10s. 6d. to 11s. 6d.; gas nuts, 9s. 6d. to 10s. 6d.; unscreened gas coal, 9s. to 10s. For export at Hull the following f.o.b. prices are quoted:—Screened gas coal, 13s. to 13s. 6d.; gas nuts, 12s. 3d. to 12s. 6d.; unscreened gas coal, 11s. 9d. to 12s. 6d.

Barnsley.

COAL.

The quieter demand for large steam fuel on export account noticed last week has been continued, though the decreased buying is not more marked. The difficulty of procuring adequate shipping tonnage has again been experienced, and sellers are not disposed to grant any further concession in prices, in the belief that despite the fact the season is so far advanced there must be a revival of trade. For fully a month exports to the Baltic ports are regarded as possible, and it is believed a much larger tonnage than last year has yet to be dealt with, though the official return shows that during the past nine months about 150,000 tons more have been shipped from Hull to North Russia. There is also the fact that there is greater activity being shown by Continental buyers, and under these circumstances prices are being maintained with a very considerable degree of firmness. The larger collieries, which rely mainly on the export trade, are feeling in a slight degree the sluggishness which has set in, but are disposed to lay in stocks rather than seek to realise their output by reducing quotations. The business passing on home account continues to be of a very active description, and the best large steams are again quoted at 11s. 6d. per ton on the week. In regard to secondary descriptions of Barnsley hards values vary in a greater degree perhaps than for some time past, and quotations are from 10s. to 11s. per ton. All descriptions of the smaller grade steam fuel continue to be well cleared at the collieries, and sellers have little difficulty in realising late prices. Best washed nuts are selling from 10s. to 11s. per ton, and secondary descriptions from 6d. to 9d. per ton less. Good business continues to be done in slacks, the best qualities being quoted from 8s. to 6s. 3d. per ton, and rougher sorts, owing to the continued large demand on cokemaking account, are firm at from 7s. to 7s. 6d. per ton. The gas coal collieries continue to find full employment, though there is not a great deal of business being done beyond the supplies under contract, buyers being able to hold off with the present advanced prices which are asked. In regard to the house coal trade, the warmer weather has quickly had an effect on the demand, but colliery representatives report that the decrease in business has not been of a very material character. However, the coalowners are so well placed that they can easily put surplus fuel into stock rather than contribute to any weakening of quotations. The prices as quoted a week ago, as indicated, are firmly maintained about as follow:—Best Silkstone, 15s. per ton; best Barnsley softs, 14s. to 14s. 6d. per ton; secondary descriptions, 12s. 6d. to 13s. per ton; and best nuts from 11s. 6d. to 12s. per ton. The demand for coke continues to be of an extensive character, and the stronger prices of 17s. per ton at the ovens are easily maintained.

Hull.

COAL.

The Humber coal market has been quiet during the week, and best Yorkshire steam hards for export have further receded and are at least 6d. cheaper on the week. Owing to the continued scarcity of tonnage and high freights, charterers have been obliged to keep off the market; and this class of coal—the staple kind exported—being in good supply, the tone of the market has suffered, and to-day is reported very weak at 13s. 6d. to 14s., the latter being the top figure. Secondary quality is also a little easier. On the other hand, the home demand for manufacturing and domestic purposes continues good, and all kinds of small coal are steady at about late rates. Gas coal continues in good request, and house coal is active, Hartleys being scarce and somewhat dearer. Forward business is of only moderate proportions, negotiations taking place, as already reported, on the basis of 14s. 3d. or thereabouts for best steam hards f.o.b. at Hull. Large quantities of coal have been shipped at the docks both foreign and coastwise, but loading turns are easy and quick despatch certain. There still remains a great accumulation of coal in the sidings awaiting shipment, which is adding to the wagon difficulty. Owing to scarcity of tonnage on offer and the indifference of charterers, the Humber freight market has been quiet and only a few coal fixtures reported, the following rates having been paid for prompt or nearly prompt steamers from Hull:—Cronstadt 7s. 6d. and 7s. 9d., St. Petersburg 7s. 6d., Riga 7s., Reval 6s. 10½d., Rotterdam 4s. and 4s. 3d., Ghent 5s. 6d., Genoa 13s. 4½d. and 13s. 6d., Civita Vecchia 14s., Cronstadt (from Immingham) 7s. 9d., Pernau (from Immingham) 7s. 3d., Barcelona (from Grimsby) 13s., Ostend (from Goole) 5s. 6d. Coastwise business on the basis of Hull to London 4s. to 4s. 3d. The immediate outlook for a sufficiency of stems is not promising, though only a few more vessels are wanted for Cronstadt. The following are the approximate prices for prompt shipment f.o.b. Hull ruling to-day:—South Yorkshire: Best steam hards, 13s. 6d. to 14s.; washed double-screened nuts, 13s. to 13s. 6d.; unwashed double-screened nuts, 12s. to 12s. 6d.; washed single-screened nuts, 12s. 6d. to 13s.; unwashed single-screened nuts, 12s. to 12s. 6d.; washed smalls, 11s. 6d. to 11s. 9d.; unwashed smalls, 10s. 6d. to 10s. 9d. West Yorkshire: Hartleys, 13s. to 13s. 6d.; rough slack, 10s. to 10s. 6d.; pea slack, 8s. 3d. to 6s. 6d.; best Silkstone screened gas coal, 12s. 9d. to 13s.; best Silkstone unscreened gas coal, 12s. 6d. to 12s. 9d. Derbyshire and Notts: Best steam hards at Hull, 13s. 9d. to 14s.; best steam hards at Grimsby, 13s. 6d. to 13s. 9d.; Derbyshire nuts (doubles) at Hull, 12s. 9d. to 13s.; Derbyshire nuts (doubles) at Grimsby, 12s. 6d. to 12s. 9d.; Derbyshire large nuts at Hull, 12s. 6d to 12s. 9d.; Derbyshire large nuts at Grimsby, 12s. 3d. to 12s. 6d.; Nottinghamshire hards at Hull, 13s. 6d. to 14s.; Nottinghamshire hards at Grimsby, 13s. 3d. to 13s. 9d.

Chesterfield.

COAL.

The demand for house coal is of a steady character, and signs are not wanting of a possible rush of orders with a snap of cold weather. At present, the output of the collieries is readily disposed of at prices quoted in the new lists issued on October 1. Gas coal is moving freely, and managers of gasworks are anxious to secure full supplies against contracts. Fuel for manufacturing purposes continues in active demand, and the state of the order books of the collieries is now such as to make it practically impossible to add to existing commitments. Some collieries have sold their output several months ahead for all qualities. It is only with great difficulty that full deliveries can be made just now, owing to a scarcity of wagons, and the foggy weather tends to make matters worse. The Sheffield steelworks are requiring enormous quantities of fuel just now, cobbles and nuts for gas producers still being in exceptionally brisk request. Slack for boiler firing continues in great demand. Consumers find much difficulty in obtaining as [illegible] tonnage as they require, and, holding no stocks, they [illegible] depend upon the daily deliveries from the collierie[illegible] are strong for new contracts at a minimum advan[illegible] per ton. Steam coal for locomotive purposes m[illegible]ly, heavy deliveries going forward daily. Sever[illegible] of the railway companies find it impossible to secure sufficiently large supplies of locomotive coal to enable them to restore their reserve stocks to the same level as they were before they were depleted by the miners' strike. The demand for steam coal for export is easier owing to the approaching close of the Baltic season. A fair business, however, is being done for the lower Baltic ports. With regard to next year, little or no coal has yet been sold for the shipping season of 1913. Enquiries occasionally are made with the view to testing the market, but no contracts of any weight have yet been arranged. There is a brisk demand for cobbles and nuts for near Continental ports, and substantial shipments of these qualities are going forward. There is an exceptionally strong demand for washed slack for export as well as for home consumption, but supplies are not sufficient to meet the requirements of the market. Prices are steadily rising. The coke trade is very brisk. There is a very great demand, and the price is now 19s. per ton at the ovens. Owing to the active state of the coke market there is a great pressure for coking slack, which is extremely scarce. The price of this fuel is advancing rapidly. Prices are as follow:—Best 14s., seconds 12s. 6d., cobbles 12s., nuts 11s., slack 6s.

IRON.

There is no change to record in the condition of the iron trade of the district, which is of a satisfactory character. All the works of the district are actively employed, and will undoubtedly remain busy for some time to come.

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Nottingham.

COAL.

Within the past week there has been a brisk tone in the trade of this county. Most of the collieries are making five days a week and have plenty of orders on hand. In the domestic fuel section local merchants have experienced a little more activity in the last few days, following a brief spell of colder weather, and good business has been done at the local landsale depots. The advanced prices, however, are not stimulating the demand from the southern and eastern counties, although a moderate tonnage is being sent away. Values are being fully maintained and show practically no change from a week ago. There is no decline in the activity so far as steam coal is concerned, with the exception that an insufficient supply of empty wagons is causing some inconvenience. Orders for exports are keeping up well, and manufacturing fuel is in very good request. Prices generally are firm, best steams making 11s. to 12s. per ton, and seconds 10s. to 10s. 6d. Slacks are meeting with a brisk sale, best sorts realising remunerative prices. Gas fuel is in a good position.

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Leicestershire.

COAL.

The current of business flows full and even. There is a good demand for all descriptions of coal. Merchants, whilst taking their placed orders are rather in the mood to further operate. If there is any slowness it is in the best description of household coal, but the decline is not serious. All classes of household coal are in good request. Also there is a very good business being done in steam coal of all kinds. Local merchants are generally busy, but perhaps not so pressed for best households as they have been, but still they are doing a very fair business. The amount of business on hand at the colliery is heavy, and practically a full week is being worked. Deliveries of the heavy output are as full as possible, but might be heavier if the means of transport were fuller. Still there is no great cause for complaint, and stocks are in the total of no heavy amount. Prospects of business are quite good, and the market is very firm. The late increase in price is very fully sustained, and transactions are only concluded on that basis.

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South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL

There has been very little alteration during the past week in the condition of business in connection with the coal trade of the Cannock Chase district. Orders continue to come freely to hand and prices on the whole are satisfactory. The collieries are working full time and there is very little coal in stock. The demand for coal for household purposes is fairly well maintained, and for manufacturing sorts the enquiry continues satisfactory. Slack is in good request. A fair business is being done at the landsale depots, but there is no particular rush. Railway sales are keeping up very well.

Birmingham.

COAL.

A lull, not of great dimensions, however, has been experienced this week in the house coal department. People had bought well and are fighting shy of the enhanced rates now demanded. Neither owners nor merchants attach any importance to the slight fall in the demand, and they are looking forward to an active winter's trade. The manufacturing branches are kept going at high pressure. The Electric Supply Committee of Birmingham City Council have completed their contracts for the ensuing year at an advance of a shilling over last year's prices. The contract amounts to £167,000.

IRON.

The number of visitors from South Wales, Lancashire, and other districts attending the quarterly meeting of the South Staffordshire iron trade was, though substantial, not so large as usual, due to the great activity of trade in these centres. From all sides reports were forthcoming of abundance of work with values showing increasing strength, and a very favourable view was taken of future prospects. The market was not prolific in price movements. During the past quarter there has been a steady advance in values, which have now reached a point at which in the interests of trade generally they should remain undisturbed until circumstances arise which would warrant a further advance. Pig iron is 3s. to 4s. dearer than it was three months ago, and there are no indications of weakening. Makers, local and district, report that they have sold more iron than they can make in the next three or four months, and consumers are not inclined to pay the prohibitive prices which are asked for fresh orders. They therefore buy sparingly, and there is no room for speculative business. Current prices may be accepted as follow: Forge pig iron, South Staffordshire common, 60s.; part-mine, 65s. to 66s.; best all-mine forge, 90s. to 95s.; foundry, 95s.; cold-blast, 125s.; Northamptonshire, 63s. to 65s.; Derbyshire, 65s. to 66s. The scarcity of pigs and the high level of prices has brought about a steady advance in scrap iron. As much as 65s. a ton is obtained for heavy scrap, and prices generally are 10s to 15s. above what they were three months ago. Light cast scrap is bought in large quantities for the steel furnaces. In the finished branches interest centred around the prospect of another advance in marked bars. It was considered this would be justified by the recent advance in wages, but so far no move has been made. It must not, however, be assumed that the £9 10s. basis will remain unaltered till next quarter day. Makers are very busy for all qualities, and merchant bars are very firm at a market level of £6 5s. to £6 10s. delivered Birmingham. Small rounds, squares and flats are upheld at £8 5s. to £8 7s. 6d. at works, with 2s. 6d. to 5s. extra delivered basis. The quotations for galvanised sheets range from £12 15s. to £13 f.o.b. Liverpool; for February delivery an additional 5s. was asked, the underlying idea being to discourage business in view of the international outlook. In the event of the war in the Near East going on, considerable quantities of galvanised sheets will be required for military cantonments. Gas-strip makers, having reviewed the situation, decided to make no change meantime, and prices remain at £8 5s. to £8 7s. 6d. The works are fully employed. An advance of £1 a ton, however, was announced in tinned sheets, the Staffordshire Tinned Makers' Association having taken this step in view of the increasing demand and the high cost of tin. The basis now becomes: coke 34s. per hundredweight, best charcoal 36s. Active conditions prevail in the steel trade, but here again no change took place in values; but though official prices are unaltered where makers can give early delivery, they can command a premium on association rates. In demi-products there is no foreign competition of serious importance, and producers have no difficulty in getting their prices, which are £6 2s. 6d. to £6 5s. for Bessemer and Siemens qualities respectively.

◆

Forest of Dean.

Lydney.

COAL.

The situation generally throughout the house coal trade of this district is one of much firmness, and all the collieries are engaged five and six days in the week. All the coal brought to bank is quickly disposed of, very little, if any, going to stock. The demand on shipping account is highly satisfactory, and there are good prospects for the rest of the month. Orders from the inland merchants are coming in steadily, and good consignments are put on rail daily. Slacks are in good request. Prices of all house qualities remain as given in our last report. Steam prices are up 6d. per ton, and the pits are still very busy.

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ended Tuesday, October 1, 1912, is as follows:—Amsterdam, 1,579 tons; Abo, 149; Antwerp, 633; Bandholm, 1,666; Barcelona, 1,564; Bombay, 1,041; Bremen, 595; Buenos Ayres, 11,073; Copenhagen, 447; Constantinople, 1,996; Christiansund, 51; Cronstadt, 2,307; Christiania, 775; Dablshruk, 1,386; Dantzig, 545; Degerhamn, 930; Drontheim, 111; Guernsey, 226; Gothenburg, 909; Ghent, 1,361; Harlingen, 1,475; Hamburg, 6,884; Harburg, 3,778; Karachi, 97; Libau, 403; Leghorn, 276; Larvik, 557; Malaga, 702; Moss, 643; Marseilles, 215; Naples, 229; Odense, 2,085; Oporto, 980; Oxelosund, 3,680; Pernau, 5,416; Riga, 3,322; Rouen, 6,616; Rotterdam, 7,915; St. Petersburg, 16,254; Stettin, 437; Stockholm, 613; St. Brieux, 167; Tuborg, 1,456; total, 95,966 tons; corresponding period, October 1911, total, 65,192 tons.

SH COAL AND IRON TRADES.

THURSDAY OCTOBER 10.

North Wales.

COAL.

f this district are still able to work full
continued satisfactory demand for fuel of
ently all the pits are at present in full
s no lack of orders. With regard to the
the demand is about on a par with those
k, the prices remain at about the same
se figures there is a regular and steady
better seams of coal. Although at the
re is an average advance of 2s. to 3s. per
e the ruling prices last year, there is a
ers, as everyone is expecting an early
With regard to coal for manufacturing
vailable tonnage is readily disposed of at
there is a general scarcity of slack and
asioned by the present boom in the iron
. Slack is fast getting to be at a premium
qualities are concerned, and many collieries
rears with their contracts. Most of the
being used for coking purposes, and there
o washed slack on the market. Gas coal
od. All the gas works are taking as much
tract arrangements will allow of, and so
ompanies on account of locomotive con-
nt average prices are as follow:—Best
oal 16s and 17s. per ton f.o.r., seconds 1s.
n coal, 14s. per ton; nuts, 12s. per ton.
lity is realising 8s. 6d. per ton at the pit.
continues to obtain an average price of
ton at the works.

* * *

thshire, South Wales, &c.

COAL.

little new enquiry on the steam coal
writing, but notwithstanding the scarcity
there is a distinctly firmer tone evident.
llers are expectant that the war troubles
an a bigger demand for Welsh coal, and
ppears to be rather more coal available
ment than last week, prices have
r forward bookings sellers are firmer
ain a steady market. There are more
while sellers quote as firmly for these
ore tonnage is now available, while
een more active, promising to ease
ies which shippers have experienced in
some weeks past. Throughs and nuts
nchanged. The house coal trade shows
oth inland and export. Patent fuel
r and with collieries looking for wood,
ased a couple of shillings. Latest
g quotations may be taken as follow,
cash in 30 days, less 2½ per cent.:—
Newport Black Vein large, 15s. to
valleys, ordinaries, 14s. 3d. to 14s. 9d.;
t, 14s. 3d. to 14s. 6d.; other sorts, 13s. 6d.
smalls, best, 9s. to 9s. 3d.; seconds, 8s. 6d.
8s. to 8s. 3d.; screenings, 9s. 3d. to 9s. 6d.;
9s. 9d. to 11s; nuts, best washed,
house coals, best, 18s. to 18s. 6d.; seconds,
ut fuel, 17s. 6d. to 18s. 6d. Coke: Furnace,
ry, 27s. to 30s. Pitwood: Best French

IRON.

he week preceding the quarterly meeting,
en a great amount of new business
neral tone of the market remains strong.
rs are about to be placed and makers
an encouraging one. Work continues
tinplate bar and sheet bar mills, with
5 17s. 6d. Bessemer and £5 17s. 6d. to £6
mills continue exceedingly active, with
aintained. The pig iron trade continues
ellent demand, and, if anything, makers'
36s. to 87s. being the figure for Welsh
locally. Iron ore continues firm at 22s.
rubio c i f. Newport. Tinplates show a
ne week and makers will not entertain
upon their own terms, which are based
. 10½d. Bessemer, and 15s. 10½d. to 16s.
× 14.

COAL.

that the arrival of tonnage over the
good, the number of vessels reported
day being 209, the general tone of the
quiet. This was the more surprising
or the week were at least 15,000 tons
evious six days, the total for the port
Chartering-, however, were much less
the vessels taken up only showing a
f 304 000 tons, or about 60,000 tons less
s week. Whether the market will be
ly by the trouble in the Balkans it is
Certainly the demand for coal up to
been very great, the only war contract
of between 20,000 and 30,000 tons for
ment. This has received some con-
fact that several vessels have recently
he transport of coal to Oreol near Volo,
eft Cardiff on Saturday last with 3,000
But whatever the extra demand may
it will be greatly neutralised by the
Government, a telegram received by
n and Co from their agent at Con-
the eff ct that the military authorities
all available supplies. Until the
clear, of which there is very little
shippers are afraid to send their vessels
rts, however, to the countries involved
ved in the war are not very heavy, the
lsh coal sent to Greece, Bulgaria, and
first eight months of this year being
tons. The freight market for the moment is somewhat easier, Genoa having been done at 12s. 9d., Malta at 11s., Cronstadt at 10s. 6d., and the River Plate at 22s. 6d., but all buyers seem to be pursuing a hand-to-mouth policy, with the result that the output of coal continues to be in excess of requirements. Best Admiralty steam coals for prompt delivery do not command more than 16s. to 16s. 6d., though there are a few collieries which still hold out firmly for 16s. 9d., and in one or two cases even for 17s. per ton. Superior Admiralty seconds are selling at from 15s. 9d. to 16s., and other secondary qualities at 15s. 3d. to 15s. 6d. So far as the future is concerned, sellers are as firm as ever, being confident that the scarcity of tonnage is not going to continue indefinitely. Curious as it may seem the present condition of the coal trade is somewhat paradoxical, inasmuch as the boom in nearly all industries, which is now practically world wide, is really the cause of the temporary depression in the coal market. So great is the demand for tonnage from all quarters, and so highly remunerative the rates offered, that shipowners are sending their vessels elsewhere instead of to the coal ports. If trade had not been so good in other parts of the world, there is no doubt that collieries generallly would have benefited considerably from the flourishing condition of our own industries. Sales agents, however, are still very optimistic, and as an illustration of the confidence which they entertain regarding the future it is mentioned that contracts have been placed for Monmouthshire coals for next year at 16s. per ton, as compared with 14s. 3d. accepted last autumn, or an advance of 1s. 9d. per ton. Another factor which inspires confidence is the lowness of stocks at the foreign coal depots, the owners of which continue to pursue a cautious policy in the hope that prices may ere long become easier. Of one thing, however, they may be pretty certain, and that is that freights will continue very high for some time. Many buyers, particularly amongst the steamship lines, are beginning to recognise this fact, and are showing some eagerness to complete their arrangements for supplies of coal for next year. The last of the companies reported to have covered their requirements is the Booth Steamship Company, who usually take about 150,000 tons. It is said they have renewed their contract with the Dowlais Coal Company, and placed the balance with the Tredegar Company, but the prices at which they have bought have not transpired. Other contracts are in course of negotiation. With regard to the small coal market there is not much change to report. Prices all round continue very firm, best cargo qualities selling at 9s., and possibly a shade higher, though in cases where collieries are anxious to clear wagons, concessions may at times be obtained. As to next year it is stated on good authority that considerable quantities of cargo qualities have been sold at 9s. 6d. Best bunkerings for prompt delivery are selling at 10s. 3d. to 10s. 6d., and best ordinaries at 10s. to 10s. 3d. per ton. For shipment over next year collieries are asking from 10s. 6d. to 11s. for best bunkerings. Washed nuts are 15s, and washed peas 12s. 6d. to 13s. per ton. Very little new business is reported in Monmouthshire coals, but prices generally are steady. Black Veins are 15s. 3d. to 15s. 6d. western-valleys 14s. 9d. to 15s., and eastern-valleys (best) 14s. 3d. to 14s. 6d., and seconds 14s. to 14s. 3d., in each case f.o.b. Cardiff. Owing to the scarcity of tonnage, exporters have not yet been able to overtake the shipments enumerated in the first eight months of last year. From January 1 last to the end of August the exports from the Channel only amounted to 15,844,068 tons, as against 16,218,455 tons for the corresponding period of last year, being a decrease of 374,387 tons. There have been substantial increases to South America, but to Belgium there was a decrease in the eight months of 125,705 tons, to Egypt of 154,412 tons, to Italy of 104,841 tons, and to France of 63,542 tons. The question of providing better facilities for tipping still provokes considerable discussion. Progress is being made with the preliminaries for the erection of five new tips on the south-western side of the No. 1 dock at Barry. These tips will be of the high movable type, and when completed will afford facilities for the shipment of one million tons of coal annually. Extra siding accommodation has been provided near Cadoxton, and is proving very useful. Owing to the fine weather now being experienced, there is but little movement in house coals. Fancy qualities are quoted at 18s. to 19s.; secondary sorts 16s. 6d. to 17s. 6d. per ton No 3 Rhondda large is 16s. 9d. to 17s., through and through 14s. 3d., and small 11s. 9d. to 12s.; No. 2 large is 12s. 6d., through and through 10s. 3d., and small 8s. 9d. to 9s. per ton. Shipments coastwise from the Channel in August amounted to 328,417 tons, as against 320,980 tons in the corresponding month of last year, being an increase of 7,437 tons. From Cardiff alone the shipments amounted to 186,079 tons of which London took 41,760 tons, Liverpool 39,815. Southampton 38,932, and Bristol 17 259 tons. Newport shipped 53,929 tons, Port Talbot 5,439, Briton Ferry 9,718, and Swansea 29,962 tons. Shipments of patent fuel for the week were unusually heavy, the Crown Company despatching no less than 12,956 tons, Swansea 18 820 tons, and other makers 1,000 tons. Best brands for immediate shipment are 19s., for late October 18s. 9d. Coke is very firm. For all qualities there is a strong demand, and ordinary furnace has realised from 21s. to 22s. per ton. Special foundry is 28s., and ordinary 26s. per ton. The pitwood market is somewhat fluctuating; prices fell at one time to 21s. 6d., and then rose to as high as 22s. 6d., and even 23s. per ton.

IRON.

Owing to the high price of tin and steel, the tin-plate makers are quoting increased prices for their goods, and this is militating against trade, though the orders recently received for oil sizes amounted in the aggregate to close upon 100,000 boxes; 14 × 20 cokes are now quoted at 15s. 9d., 14 × 18¾ oil sizes at 16s., and 10 × 20 ditto at 23s. per box. It is feared that the war in the East will interfere considerably with trade. Roumania is a large consumer of Welsh products, and now occupies second position as regards tin-plates. Last year its imports reached a total of over 30,000 tons, whilst this year, up to the end of August it had imported over 21,000 tons. Shipowners are very loth to fix vessels for the Danubian ports lest the closing of the Dardanelles should cause them to be locked up indefinitely at the end of the outward voyage. In steel bars there is no material change, Siemens tin-bars still being quoted at £5 17s. 6d. to £6, and Bessemer at £5 15s. to £5 17s. 6d. per ton. The price of galvanised sheets is steadily rising, the general quotation for 24-gauge corrugateds being round about £13. The rail mills are well employed, and prices have hardened 2s. 6d., heavy sections being £6 12s. 6d. to £6 15s. with 2s. 6d to 5s extra for light sections. There is no change in pig iron, Welsh hæmatite being still quoted at 83s. 6d. f.o.b. Scrap metals continue to stiffen, new steel crop ends being 67s. to 70s., heavy steel 60s., old steel rails, mixed sections, 57s. 6d., doubled-headed rails 62s. 6d. to 65s., heavy wrought 55s., light ditto 37s. 6d., and cast scrap 57s. 6d. per ton.

Swansea.

COAL.

The trade of the port continues to display unusual activity; the coal trade was very brisk, but patent fuel was only moderate. The shipments together amounted to 116,442 tons. There was a capital attendance on 'Change this morning and the undertone of the anthracite coal market was again harder. Swansea Valley large was in good demand and values were moving in an upward direction. There was also a better demand for Red Vein large, with prices firm. Machine-made nuts and cobbles were, however, still on the slow side, whilst beans were slightly weaker. Rubbly culm was fairly steady, whilst duff was very firm and difficult to secure. In the steam coal market the conditions remained unchanged—large was still slow and smalls were firm at last quotations. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 21s. to 22s. 6d. net; Big Vein large, 18s. 6d. to 19s. 3d., less 2½ per cent.; Red Vein large, 14s. 3d. to 15s. 6d., less 2½ per cent.; machine-made cobbles, 22s. to 24s.; Paris, French, and German nuts, 23s. 6d. to 26s.; beans, 21s. to 23s. 9d.; machine-made large peas, 13s. to 14s. 6d.; ditto fine peas, 11s. 6d. to 13s., all net; rubbly culm, 7s. to 7s. 9d., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 18s. to 19s.; seconds, 14s. 6d. to 15s. 3d.; bunkers, 10s. 9d. to 11s. 6d.; smalls, 9s. 3d. to 10s. 9d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 18s. 6d.; through-and-through, 15s. to 16s. 6d.; small, 12s. 6d. to 13s. 3d.; No. 2 Rhondda large, 14s. to 15s. 6d.; through-and-through, 10s. 9d. to 11s. 6d.; smalls, 9s. 3d. to 10s. 6d., all less 2½ per cent. Patent fuel, 17s. 6d. to 18s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

The conditions in the iron and steel trades remain very brisk. There was a good yield of pig iron and all the steelworks and rolling mills in the district were experiencing a busy time. The production of the sheet mills was exceedingly heavy being fully 25 per cent. in excess of the corresponding period of last month. The tinplate industry continued to display activity in all its branches. The shipments of tinplates last week were 127,190 boxes, receipts from works 123,141 boxes, and stocks remaining in the dock warehouses and vans 193,457 boxes.

Llanelly.

COAL.

For nearly all coals there is an excellent demand, with prices holding firm. The inland trade could be better, but this will probably improve in a few weeks time as the weather gets colder. Shipping is improving, but there is still a great deal of delay in securing sufficient boats, and collieries are having considerable trouble in keeping going. There is a splendid demand for all kinds of horticultural coals, and order books are in a better condition than they have been for some time. Very often customers have to wait several weeks before they have their orders executed. All the machine-made kinds are bought as soon as they are made, and with the exception of coal waiting shipment there is no stock on hand. There is also a very big demand for all kinds of small steam and bituminous, and prices for these show no signs of coming down. Prices this week approximately are:—Best malting large, 23s. to 25s.; second malting large, 21s. to 23s.; Big Vein large, 17s. 6d. to 19s. 6d.; Red Vein large, 14s. to 15s.; machine-made large cobbles, 22s. to 23s. 6d.; German nuts, 24s. to 25s. 9d.; French nuts, 24s. to 25s. 6d.; Paris nuts, 25s. 6d.; machine-made large beans, 22s. to 24s.; ditto, second quality, 20s. to 22s.; machine-made large peas, 14s. to 15s.; rubbly culm, 7s. 6d.; duff, 5s.; large steam, 16s. to 16s. 6d.; through-and-through, 10s. 6d. to 11s.; small steam, 9s. 6d. to 10s. 6d.; bituminous small, 10s. 6d. to 11s. 6d.—all f.o.b.

THE IRISH COAL TRADE.

THURSDAY, OCTOBER 10.

Dublin.

The demand generally continues to be good, both locally and in the country districts, and prices have not yet been advanced for house coals as the weather for the past week or two has been very fine and summer like, buying being for winter rather than immediate requirements. There is no change in any of the quotations. City prices stand as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; steam coals, from 20s. per ton upwards; best coke, 23s. per ton, or 18s. per chaldron; "bell" coal, 1s. 5d. per sack. The coaling vessels arriving during the past week amounted to 53 as compared with 52 the week previously, chiefly from Workington, Newcastle-on-Tyne, West Bank, Campbeltown, Ayr, Garston, Newport, Whitehaven, Liverpool, Preston, Cardiff, Irvine, Swansea, Maryport, Girvan and Glasgow. The total quantity of coal discharged upon the quays was 25,436 tons.

Belfast.

The coal trade in this port continues to be fairly active in all branches with an increasing demand for household qualities, prices keeping firm but without change since the advances which were made in September. The inland trade is still hampered by the shortage of railway wagons, much delay being experienced in the carrying out of orders. Business with Scottish ports is fairly active, and the freight market keeps steady. City prices stand as follow:—Giant's Hall Arley coal, 26s. 6d. per ton; Hartley, 25s. 6d.; Wigan, 24s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 22s. 6d.; Orrell slack, 22s. 6d. Quotations ex-quay are unchanged, viz.:—Arley house coal, 22s. 8d. per ton; Scotch house coal, 19s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; Navigation steam, 16s. 6d. to 17s. 6d.; Welsh steam coal, 17s. to 18s. per ton. Coal cargoes arriving during the week were chiefly from Partington, Ayr, Glasgow, West Bank, Cardiff, Troon, Ardrossan, Garston, Newport, Girvan, Workington, Ellesmere Port, Irvine and Port Talbot.

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⁎ For other Miscellaneous Advertisements see Last White Page.*

ning Annual Meetings.

shire Institute of Mining and
Engineers ... ... October 14, 1912
ire and Warwickshire Institute of
neers ... October 1912 (2nd week)
ning and Metallurgy, March 13, 1913
ological Congress—
August 21, 1913 (Toronto)
y ... . Feb. 21, 1913
l Institute of Mining and Mechanical
August 2, 1913
itute of Engineers—
ual Dinner .. ... Jan. 23, 1913
ual Meeting . March 18, 1913

Colliery Guardian.

RIDAY, OCTOBER 11, 1912.

the exports of coal, coke and
uel amounted to 6,300,611 tons,
3,429, as against 6,000,852 tons.
19,005, in September 1911, and
valued at £3,395,355, in Sep-

st nine completed months of the
the total exports reached to
, valued at £29,939,766, as
49,566,969 tons, valued at
d 48,322,399 tons, valued at
the corresponding periods
911 and 1910.

alue of coal, coke and manufac-
rted from the United Kingdom
ber was 12s. 8·4d. per ton, as
11s. 4·7d. in September 1911 and
tember 1910.

luring the first nine completed
resent year is 12s. 6·2d. per ton,
with 11s. 4·3d. and 11s. 9·3d.
he corresponding periods of 1911

al meeting of the Manchester
Iining Society, held on Tuesday at
ms in Manchester, it was reported
ear had been one of unexampled
society's history. Sir Thomas
or of Geology at the Manchester
unanimously chosen president

ffice has issued a circular calling
first report of the Explosions in
e, published recently, and more
remarks with respect to the use
coalmines to prevent the ignition

from the National Federation of
en and Examiners had an inter-
three hours with Mr. R. A. S.
Chief Inspector of Mines, at the
Saturday. Questions affecting
colliery officials arising out of
Act were discussed at length.

is recent tour through the shale
of his constituency, the Lord
red with managers and deputa-
on difficulties which have arisen
lamps clause of the Coal Mines
ear. The Lord Advocate has
isitionists to lodge a claim for
the Secretary of State, and has
pport it on the ground of the
of the mines.

with the test of safety lamps, a
nemorandum has been issued by
in view of questions which have
manufacturers who desire to
be tested. These relate to wicks
llars, gauzes, tests for glass, and
form of lamps.

After a long conference yesterday the employers' and workmen's representatives from the coalfields of the Federated districts agreed upon proposals which they will recommend their constituents to adopt as a settlement of the miners' claim for an advance in wages. Subject to certain conditions, a general advance of 5 per cent. in wages is proposed.

The annual conference of the Miners' Federation of Great Britain came to a close on Friday last, when a discussion took place on the housing question.

The Nationalisation Bill.

At the annual conference of the Miners' Federation of Great Britain last week, during Thursday's session, one practical project and one visionary project were discussed. It is not surprising to find that the first led to a direct cleavage of opinion, whilst the second found the delegates in a temper of absolute unanimity; such is the habit of these conferences. We use the adjective "practical" in association with the Durham motion advocating a five days working week for all miners, because several of the delegates attacked the question from the point of view of its practical application, and even hinted that the continued acceptance of the motion merely as an abstract principle would, in the present temper of the men, subject the leaders to some awkward heckling.

On the other hand, we should, perhaps, extend an apology to the committee of the Miners' Federation for applying the word "visionary" to their Nationalisation Bill, considering the slavish regard that has been paid to detail in this precious measure. The truth, however, is that this attempted sublimation of a pious ideal, duly approved by generations of trade unionists, to a formula only serves to illuminate its absurdities. Indeed, it is scarcely possible to discuss some of the most vital provisions of the Bill in a serious spirit—as, for instance, the proposal that the body entrusted with the labour of carrying through the purchase shall consist of a commission comprising three coalowners, three nominees of the Miners' Federation and two nominees each of the Trade Union Congress and his Majesty the King, with one of the latter as chairman, having power, in case of disagreement, to fix the purchase price. This, in conjunction with the provision that the dividends on the "Guaranteed Three Per cent. Coal Mine Stock" (redeemable in 20 years at par), shall be paid out of the income of the "Coal Mines Fund," and "if that is insufficient shall be charged on the Consolidated Fund and the growing produce thereof." It amounts to a certainty that the select band of coalowners on the Commission would invariably find themselves in a minority; but this is not the main point, which is that the taxpayers who find the income for the Consolidated Fund, and in whose interests, we are frequently told, nationalisation of mines, railways and such things is imperative, are to have no voice in fixing the price of the property upon the yield of which they are to find the deficit!

The eight-hour day, the five-day week, the minimum wage, and other such equivalents of "money" are to be rescued from their present state of economic unsoundness by the expedient of substituting for the necessity of intensive production a *régime* of tax-assisted indolence. And, if the miners, why not other classes of labour, all resting—in more senses than one—on the hypothetical fat purse of the State. We greatly mistake the sanity of the public if they give any such "guarantee."

To pass on to some other absurdities: the proposal is to limit the purchase price to 12s. per ton of one year's output, where 100,000 tons or less have been raised as an average of the five years preceding, to be reduced to 10s. where this average has exceeded this total; but to disillusion those who imagine that they are to derive a benefit from not having "pushed" their production in the past, it must be pointed out that where, in the opinion of the Commission, a coalmine has not been fully developed, the amount which would be raised under full development shall be taken as the amount for the purpose of ascertaining the maximum value. What is meant by "full development" is not stated; and we are not told whether the exigencies of trade, such as a seasonal demand, or the supply of labour and transit facilities, are to be taken into account in fixing it. It is, perhaps, a fair estimate to take 12s. per ton of annual output as representing the capital sunk in British coalmines, but this represents the mean between extremes, and, in the case of some valuable properties, the purchase price on the basis proposed would not defray the labour cost in a single year. But we must recollect that royalty owners are to be ignored in the transaction, and any hoarding up of reserves is apparently to be penalised. We can imagine that shareholders and directors of concerns such as the Pearson and Knowles Coal and Iron Company, who have built up out of revenue substantial reserves in the shape of royalties and other classes of property, will quake when they read this cool proposal to deprive them altogether of the fruits of their foresight.

According to clause 2 of the Bill, a "coalmine" seems to include everything ancillary to the production, preparation and distribution of coal; so that the colliery that has been engaged purely in the getting of coal, leaving the further processes to others, would receive the same price as the colliery that has elected to conduct all these operations—*i.e.*, sizing, washing, coke-making, purification of by-products, briquette-making, power generation, &c.—on its own premises, and with its own capital.

The miners must surely know that no Government would dare to make such an offer in cold blood. Apart altogether from the opinions that may be held as to the feasibility or desirability of State ownership, the only possible method of expropriation can be that based on a fair purchase price without regard to the antecedents of the seller, and equivalent to the market value of his entire property. If this were done, however, the 3 per cent. arrangement would be clearly inadequate, for it is not only a considerably lower rate than that at which sound concerns can obtain debenture loans at the present day, but also less than the rate of interest which the market extracts from municipal undertakings, on a security, we say diffidently, infinitely more substantial than that which the miners can offer if their proposals are adopted.

Under the circumstances, it is not necessary to discuss the proposed establishment of State coal depots—it appears that the much-maligned middleman is to receive no compensation for the confiscation of his goodwill and establishment, but rather is to be fined for daring to exist—and the restrictions upon railways and others. It may be observed that the new Minister of Mines is to be pledged to "ensure that there is a sufficient supply of coal at reasonable prices throughout the United Kingdom"; but the miners are to be allowed to strike at will in the old sweet way. The prospective tribulations of this great official must excite our earnest sympathy. The whole of this barefaced attempt to force the community into making the miners a present of a property worth some £150,000,000 is altogether too ridiculous to deserve further consideration.

Trade Summary.

The London coal trade for the past week has continued firm and vigorous. Depot orders are reported weak, and public orders are slow, but factors have been buying freely. No change has yet been made in either the wholesale market quotations or in the public advertised prices. The question, however, has been freely discussed. Slacks are for the time being over plentiful, and prices are weaker, but double-screened nuts and peas are selling freely. Bakers' nuts and kitchener cobbles are also in good demand, and manufacturing qualities are increasing in volume. The tone of the market is distinctly firm, although the weather continues fairly mild. Railway empties are becoming scarce, and in many quarters limiting the output.

The market at Newcastle has gained in firmness during the week, but the situation in the Balkans has checked business. The forward demand is strong.

The Durham coal trade is firm, with a good all-round enquiry.

The demand for Lancashire house coal has slackened somewhat, but prices are steady. Manufacturing and shipping sorts are steady, but slack is rather more plentiful.

In West Yorkshire there is a stronger feeling, although steam coals have shown some weakness. The coastwise trade is busier, and further advances in house coal are anticipated.

There is a quieter export demand for South Yorkshire steam coal, shipping being scarce. Continental buyers, however, are more active. The home demand is strong in all its branches.

The position of Derbyshire house coal is strong, and fuel for manufacturing purposes continues in urgent request.

The market at Cardiff is quiet, less chartering has been recorded, and there are signs that business is being prejudicially affected by the trouble in the Near East. Steam coal prices are rather easier. Small coals continue very firm. Monmouthshire coals are quiet. There is little movement in house coals. Shipments of patent fuel have been heavy.

Quieter conditions prevail in Scotland, partly owing to wagon shortage. Steam coals are easy, but the demand for manufacturing sorts is unabated.

TEST OF SAFETY LAMPS.

Supplementary Memorandum.

The following supplementary memorandum has been issued by the Home Office, under date October 7, in view of questions which have been raised by manufacturers who desire o submit safety lamps to be tested:—

Wicks and Oil.—Makers should supply the wicks, and they may, if they desire, supply the oil, for the testing of their own lamps.

Locks.—The apparatus necessary for operating the locks of lamps submitted for testing (including magnetic and compressed-air locks) must be supplied by the maker.

Pillars.—A temporary exception will be made from the rule as to lamp pillars. Lamps now in use, if they conform to an approved type in all respects except that they have only four pillars, may continue to be used for a period not exceeding three years from January 1 next.

Gauzes.—The rule requiring double gauzes will not be applied to lamps now in use for a period of two years from January 1 next.

Tests for Glass.—If a lamp submitted for testing fails to pass the "*Tests of Glass*" (page 3 of the Memorandum), the makers will be allowed to submit the same lamp for re-testing with a different glass on payment of an additional fee of £2.

Variations in the Form of Lamps.—Slight variations in the form of a lamp (*e.g.*, improvements in the locking devices) may be made without the lamps being re-tested, providing the testing officer is satisfied that they are of such a nature as not to affect the requirements prescribed for the test. A lamp containing any such variation may be submitted to the testing officer, who will examine the lamp and decide whether or not the variation is of such a nature as to render a fresh test necessary. The fee for such examination is £2, payable in the same way as the fee for the test. If a fresh test is found to be necessary, this fee may be deducted from the fee for the fresh test.

North Staffordshire Institute of Mining and Mechanical Engineers.—The fortieth annual meeting of the members of this institute will be held in the large hall at the North Stafford Hotel, Stoke-on-Trent, on Monday, October 14, 1912, at 3 p.m. The new president, who will be elected at the meeting, will take the chair, and give an address. The members of the institute and their friends will dine at the North Stafford Hotel on the same day at 6 p.m., the president in the chair.

LABOUR AND WAGES.

North of England.

At the last quarterly meeting of the Cleveland Miners' and Quarrymen's Association notice was given by one of the delegates to move at the next meeting, "That the joint board be requested to make a thorough revision of the minimum rates and district rules now applicable to the Cleveland mining area under the Minimum Wage Act."

The Northumberland Coalowners have met a deputation of the Colliery Enginemen's and Firemen's Association at Coal Trade Office, Newcastle, to discuss the modified claims of the men respecting working hours and the basis wage movement. The locomotive men, both main and branch, asked for a ten-hours' day. They also asked that matters in regard to overtime should remain the same. The colliery firemen asked for an eight hours' day with a rise on their basis wage of 6d. per day; but this they subsequently modified to a demand for an eight hours' day, the same amount of wages to be paid for the eight hours as were now paid for twelve hours. They also asked to have the custom of classing them as "surface labourers" discontinued, and that they be classed with the enginemen for the purpose of the adjustment of their wages. The winding-men, who were originally in for a basis wage of 6s. a day, modified their claim to one of 5s. a day, plus the current advances; while the miscellaneous men abandoned their claim for 6d. increase on the daily wage, and now asked for an eight-hours' day at the current rate of wages. All the enginemen and firemen asked for a rent allowance of 3s. a week for those who occupied rented houses. The question of the formation of the Conciliation Board was also before the meeting, and it was agreed to allow this to stand over for further consideration. The owners agreed to consider the applications of the deputation, and to furnish a reply in due course.

An open-air mass meeting of the miners employed at the Seaton Delaval group of collieries was held on the 29th ult. to protest against the new Explosives Order. A resolution was carried calling upon the Home Secretary to seek to make its provisions inoperative in all non-gaseous collieries. It was stated, in regard to the proposal that representatives of the coalowners and the workmen should interview the Home Secretary, word had been received from the Home Office stating that, in their opinion, no good purpose could be served by granting the deputation an interview. The Miners' Federation had also asked for a meeting and been refused. The shots fired in Northumberland in 1911 were given as 1,642,806 by electric battery, 408,757 by fuse, and 5,478,687 by squib. It was estimated from these figures that the additional cost of shotfiring last year would have been £30,000 in Northumberland. It was decided that steps be taken to organise district mass meetings in order to forward resolutions of protest to the Home Secretary against the Explosives Order.

The Marquis of Londonderry on the 4th inst. received a deputation from the Dawdon miners at present on strike. After the men had stated their views Lord Londonderry said that in regard to the housing matter it was before the Owners' Association, and he could not do anything apart from the association. If, however, the men would return to work and put the matter before the joint committee in a constitutional manner their grievances would receive careful consideration. It was decided to remain on strike.

In his monthly report, Mr. Thomas Burt, M.P., says: "Evidently the general strike is not a short and easy cut to the millennium! The present industrial system is most unsatisfactory and wasteful, but, until we can establish something fairer and better—and this must be done largely by the workmen themselves—there is, in my opinion, no more effective method of settling industrial differences than a conciliation board, with an independent chairman." Concerning the proposal to re-establish the Conciliation Board for the county, Mr. Burt says: "Situated as we are at present, without a conciliation board, and consequently without an authoritative record of the price of coal ascertained by accountants, we are greatly hampered in discussing wage questions. All those of us who have had any experience in dealing with wages are agreed that it is most desirable that we should have such a board. No better scheme for settling wages has been suggested or devised. The coalowners, while rejecting the alterations which we had sought to embody in the new board, expressed their readiness to discuss and consider the question of a sliding-scale. The principle of a sliding-scale was really involved in our proposals, and in fixing the rate of wages the price of coal has always been one of the chief factors. The subject of the conciliation board, and also that of a sliding scale, will no doubt be further discussed."

Federated Area.

Mr. C. Bunfield, secretary, reported at the last meeting of the Notts Miners' Association on Saturday on the efforts he had made to secure an interview with the Erewash Valley coalowners respecting the interpretation of the bankworkers' recent wages agreement. Whilst at some collieries this agreement is being adhered to, at other collieries the miners complain that the owners are not acting justly. The secretary was instructed to again approach the owners, and, failing a meeting, a ballot vote is to be taken at those collieries where the agreement is not being carried out on the question of handing in notices. Officials submitted proposals with regard to the continuation of the Conciliation Board, and it was agreed that they should be placed before the men at meetings in the county for their decision thereon.

A meeting of the South Yorkshire Surface Workers Federation was held on the 26th ult. in Sheffield, and all the federated unions were fully represented. One of the first questions dealt with was an application from a large number of members engaged by non-associated collieries asking permission to take a ballot with a view to handing in notices to enforce the terms of agreement made between the Federation and the Coalowners' Association. It was resolved that ballot papers be issued. It was stated that at some collieries the agreement has been only partly carried out. Certain managers are leaving large numbers of men out, on the ground that they are not able-bodied. Other managers are not conceding eight hours to certain sections of firemen. It was decided to instruct branches to approach the collieries with local deputations, and in the event of no settlement, the secretary was instructed to request the Joint Board to be called together. It was decided by resolution that the secretary issue a circular to all unions throughout the country who accept surfacemen as members, and deal with surfacemen, inviting them to a conference to be held on November 2, either in Birmingham or Manchester. Further efforts, however, are to be made to settle the matter by means of negotiation. It is now stated that the ballot shows an overwhelming majority in favour of handing in notices. About eight collieries are affected.

The Derbyshire and Notts Enginemen and Firemen's Union held their half-yearly meeting of delegates at Nottingham last week. Winding men have decided that they will not instruct men who have not learned the elements of steam generation, thereby insisting that each man shall undergo the requisite term of apprenticeship. In respect of July's agreement it was reported that in some cases the employers had not paid up arrears. Sanction was given to the tendering of notices in the event of the amounts not being forthcoming immediately. The most important item on the agenda was that of the revision of the present registered rules. It was decided, on the recommendation of the Rules Revising Committee, that the contribution be the same as the Miners' Union—namely, 6d. a week, and that it provides for an old age pension at 65, with increased out-of-work pay, and extended to children (in case of lock-out or strike) under 13 years of age.

The miners' officials have given 14 days' notice to the Astley and Tyldesley collieries and to Messrs. W. Ramsden and Sons Limited, of the Shakerley Collieries, Tyldesley, that they will withdraw their members from the pits in a fortnight unless the non-union men who are at present working in the various Tyldesley pits decide to join the Miners' Federation.

At a meeting of the council of the Yorkshire Miners' Association, held at Barnsley on Tuesday, the council heard the opinions of the delegates on the proposal by the owners for a renewal of the Conciliation Board for three years. The men rejected the proposal for the renewal on the present lines, and instructed the representatives to press for the 5 per cent. unconditional advance, and, failing this, that the question should be submitted to the decision of the independent chairman.

The men at the Whitwood Mere Colliery were granted permission to take a ballot on the question of giving notice, owing to the secretary of the branch having been dismissed from the colliery. A similar sanction was given to the men at the Hoyland Silkstone Colliery, who complained that they were being treated in a tyrannical manner.

The trammers employed at the Manvers Main Colliery refused to go down the pit on Wednesday afternoon owing to a dispute regarding wages.

The employers' and workmen's representatives on the Coal Conciliation Board for the Federated area again met in London yesterday, after an interval of three weeks, to discuss the application of the miners for an increase in their wages. The whole day was spent in a series of joint and sectional conferences, and last evening the following official report was issued:—The

d for the coal trade of the Federated
nend the following terms of settle-

ation Board to be continued until
. determinable thereafter by three
either side, with a minimum of 50 per
888 rates, and a maximum of 65 per
ure regulations of the present Board to

ance of 5 per cent. in wages be paid to
workmen and those on the pit banks
pulating coal by putting on the reduc-
. made as from the first make-up day
909, such advance to commence as from
n day in October instant. The above
pplied as regards boys and day-wage
the basis rate of 1888, or upon the list
the case hitherto. Where workmen
act, and are not earning the minimum
Joint District Board for the district,
aid to such workmen, in addition to
er cent. on the 1888 rates so long as
at 55 per cent. above the standard of
nt of a reduction in wages, the above
ubject to such reduction.

recommendations are not accepted, the
ies to submit the matter in dispute to
served.

is adjourned till Monday, 21st inst.,
me the decision of the employers and
everal districts to be obtained.

Federation of Great Britain.

session of the Miners' Federation of
held at Swansea on Friday, presided
ert Smillie, J.P. Several matters of
terest came up for consideration, the
ing those of housing conditions and
Minimum Wage Act.

s arising out of the minimum wage
for some time the attention of the
resentatives of Northumberland being
atic in their complaints, and they
tion instructing the executive to take
or otherwise, to secure the abolition
ny district award which required a
l work absolutely full time before he
paid the minimum wage of his class
asonable excuse for his absence.

e (Northumberland) said they found
ent at the various collieries accepted
"reasonable excuses." There were
private character in men's lives which
absence from work, but which they
ulge to the management. There was
f sleeping late. Forty-five per cent.
ds had to enter the mine at 4.30 in
t was a very easy thing to sleep late,
t from work. Again, when a man
nine it had always been the custom
that day, but in his district there
a change of management in one of
a young manager had come on the
the back of his head that he would
ld customs.—The President said he
d easily meet Mr. Asquith and tell
ght to be expected to attend 100 per
g days underground.

s further moved:—

n instruction to the executive to take
the abolition of any age limit in any
above which the workmen cannot
num wage, and have the question of
removed in each case and have them
e local committee."

were carried unanimously.

proposed that every effort be put
slation for proper housing accommo-
rking classes of the country. The
e the biggest sinners in this respect,
more particularly where a new coal-
veloped, the housing conditions were
eed.

as carried unanimously.

inson (Lancashire) moved that the
se all its power to get put into use
tomatic machines for weighing the
solution was carried.

h, who is a member of the Depart-
ppointed to enquire into the causes
reventing gob fires, made an appeal
the Federation to give evidence
ion. On the motion of Mr. Albert
ded by Mr. D. Watts Morgan, the
d to the executive with a view to their discussing the matter and taking the best course for getting the fullest information to lay before the Departmental Committee.

Mr. Robert Smillie, the president of the Federation, was elected trustee in place of the late Mr. Enoch Edwards.

Mr. Middleton (Northumberland) moved a resolution empowering the executive to draft a rule declaring what majority in a ballot vote was necessary before a general strike could be entered upon and ended. The motion was agreed to.

Mr. J. Chapman (Northumberland) moved a resolution in favour of uniform notices to terminate contracts being given in the various districts of the Federation. This was carried.

The President said that the executive recognised that whatever resolution they might pass with regard to the surface workers, their first duty to them was to make an honest and energetic attempt to get them organised. If all the surface workers were members of the Federation they might take immediate steps in the matter; but when 50 or 60 per cent. were disorganised it would be quite impossible to do very much immediately. The executive asked that they should be empowered to do this work with a view to getting the surface men under the Eight Hours and the Minimum Wage Acts, with 5s. a day as the lowest wage paid. He would like to see all the surface workers and everybody about the collieries connected with their association. The resolution was seconded by Mr. W. Straker and agreed to.

Scotland.

The executive of the Scottish Miners' Federation met on Monday in Glasgow. It was agreed to recommend that the following constituencies should be contested in the mining interest:—West Fife, Mid-Lothian, Mid-Lanark, South Lanark, and South Ayrshire. It is proposed that the candidates should be:—West Fife, Mr. William Adamson, the sitting member; Mid-Lothian, Mr. Robert Brown; Mid-Lanark, Mr. Robert Smillie; South Ayrshire, Mr. Jas. Brown. In South Lanark, if agreed to, the candidate will be adopted at a later stage.

The Iron, Steel, and Engineering Trades.

The secretaries of the Midland Iron and Steel Wages Board publish the report of the accountants for the two months ended July and August, and announce that, in accordance with the sliding-scale arrangements, the wages for puddling during the months of October and November will be 9s. 9d. per ton, and all other mill and forge wages will be advanced 2½ per cent. These wages will take effect from Monday, October 7, and continue until Saturday, December 7, 1912. In addition to the puddling rate of 9s. 9d. per ton under the sliding scale, there will be an increase of 6d. per ton bonus given to the puddlers by resolution of the Wages Board which met on Monday, July 15 last. This increase applies to puddlers only, and will make the total puddling rate 10s. 3d. per ton.

The following intimation has been made to Messrs. James C. Bishop and James Gavin, joint secretaries of the Scottish Manufactured Iron Trade Conciliation and Arbitration Board, by Mr. John M. MacLeod, C.A., Glasgow:—"In terms of the remit, I have examined the employers' books for July and August 1912, and I certify the average net selling price at works brought out is £6 17s. 3·47d. per ton." This means an increase of 2½ per cent. in the wages of the workmen.

The accountants to the Board of Conciliation and Arbitration for the Manufactured Iron and Steel Trade of the North of England last week certified the average net selling price of iron rails, plates, bars, and angles for the two months ending August 31 last at £6 16s. 8·72d. per ton, as compared with £6 13s. 0·84d. for the previous two months. In accordance with sliding-scale arrangements, wages for October and November remain the same as prevailed during the preceding two months.

The quarterly ascertainment under the sliding scale in force in Cumberland shows that the average selling price of hæmatite iron warrants was 76s. 9d. per ton, compared with 70s. in the previous quarter. The Cumberland blastfurnacemen's wages therefore advance by 8½ per cent., and are 19 per cent. higher than in the corresponding quarter last year. They are now 46 per cent. above the standard.

The average net selling price of No. 3 Cleveland pig iron for the three months ending September 30 last having been certified at 54s. 5·64d. per ton, as compared with 50s. 0·43d. per ton for the previous three months, blastfurnacemen's wages on the north-east coast are advanced by 5·50 (5½) per cent. for the last quarter of the year. This carries wages from 22·50 per cent. above the standard to 28 per cent. above the standard.

THE SCOTCH COAL AND IRON TRADES.

THURSDAY, OCTOBER 10.

Glasgow and Lanarkshire.

COAL.

The coal shipments in the past week have, from various causes, fallen away to a considerable extent. At some of the ports there has been a plethora of vessels awaiting cargoes, but arrangements for transit from the collieries and loading fell short of what was required to have the vessels quickly loaded and despatched. This position is partly explained by the fact that many vessels had been fixed to load with the produce of a few collieries, and had therefore to await their turn, and could not be promptly supplied. The aggregate shipments at Scotch ports amounted to 330,096 tons, being 32,544 tons less than in the preceding week, and a decrease of 21,380 tons, compared with the corresponding week of 1911. At Glasgow 36,180 tons were despatched abroad and 33,366 coastwise, the total of 69,346 tons, comparing with 84,206 in the preceding week, and 76,176 in the corresponding week of last year. Complaints have been made of a short supply of railway wagons, a somewhat unusual occurrence for a long time past, and, no doubt, efforts will be made by railway managers to remedy this grievance. The business in steam coal has been of moderate extent, and the shipments of house coal have been smaller than could be desired. There is still a good enquiry for nuts, but the market as a whole has had a somewhat easier tendency. The advances in prices that were expected at the beginning of October have so far not been practicable in the shipping department of the trade, but some merchants have been endeavouring to raise the prices of coal for inland consumption. Steam coal is quoted f.o.b. at Glasgow 11s. 6d. to 12s., ell coal 11s. 9d. to 12s. 6d., splint 13s. 6d. to 14s., treble nuts 13s. to 13s. 6d., doubles 12s. 6d. to 13s., and singles 12s. to 12s. 6d. per ton. There is, of course, a very great contrast between the prices of shipping coal and those for home use. Best house coal is delivered in Glasgow at 21s. 9d. per ton, best parlour coal 19s. 9d., kitchen coal and treble nuts each 18s. 9d. per ton; and when sold by the cwt., the prices are 10½d. to 1s. for house coal. There is a very large demand for coal for manufacturing purposes.

IRON.

The Glasgow pig iron market has been irregular since last report, and has now become more susceptible to speculative influences. At the close of the past week the tone, which had been depressed, showed some recovery, and business opened comparatively strong this week, but the course of the market has been unsteady. Since last report Cleveland warrants have sold from 66s. 3d. to 67s. 4½d. and back to 66s. cash, 66s. 9d. to 67s. 7½d. one month, and 67s. 3d. to 68s. 2d. three months. Business has also been noted at 66s. 11d. for delivery in 12 days, 66s. 10d. 16 days, 67s. 2½d. November 12, and 66s. 9d. November 27. There has been a good demand for Cleveland pig iron in Scotland. The arrivals at Grangemouth from Middlesbrough and district reached 10,341 tons, being 3,062 tons more than in the corresponding week of last year. A quantity of Cumberland hæmatite warrants has been purchased in this market at 81s. cash. Scotch hematite is quoted by merchants 84s. 6d. for delivery at West of Scotland steel works. There are 88 furnaces in blast in Scotland, compared with 82 at this time last year. Prices of Scotch ordinary and special brands are firm. Govan and Monkland are quoted f.a.s. at Glasgow, Nos. 1, 74s. 6d., Nos. 3, 73s.; Calder, No. 1, 79s., No. 3, 74s.; Carnbroe, No. 1, 79s., No. 3, 75s.; Clyde, No. 1, 80s. 6d., No. 3, 75s. 6d.; Summerlee, No. 1, 81s., No. 3, 76s.; Gartsherrie and Langloan, Nos. 1, 82s. 6d., Nos. 3, 77s. 6d.; Coltness, No. 1, 97s. 6d., No. 3, 79s. 6d.; Eglinton, at Ardrossan or Troon, No. 1, 74s. 6d., No. 3, 73s. 6d.; Glengarnock, at Ardrossan, No. 1, 82s. 6d., No. 3, 77s. 6d.; Dalmellington, at Ayr, No. 1, 76s., No. 3, 74s.; Shotts, at Leith, No. 1, 81s., No. 3, 76s.; Carron, at Grangemouth, No. 1, 81s., No. 3, 76s. per ton. The shipments of pig iron from Scotch ports were 2,217 tons foreign and 3,422 coastwise, the total of 5,639 tons, comparing with 7,271 tons in the corresponding week of last year. Business in finished iron and steel has been quiet, but there is full and even pressing employment at the works, the orders in hand and specifications forthcoming being generally sufficient to keep the works busy during the remainder of the year.

Renfrew, Ayr and Dumbarton.

COAL.

The volume of business in the shipment department of the coal trade has been materially greater than it was in the preceding week, the shipments showing an increase of about 11,000 tons. It is right to note, however, that the previous week's shipments were considerably less than the average. The clearances have been at Bowling 156 tons, Irvine 1,081, Troon 6,429, Greenock 6,411, Ardrossan 6,155, and Ayr 18,403—total 37,635 tons, compared with 26,476 in the preceding week, and 30,724 in the corresponding week of last year. Of the total of 37,635 tons, only 2,400 tons went abroad, the rest being despatched coastwise and to Irish ports. House coal have only been in moderate request, owing to milder weather. Prices of all sorts of coal are well maintained.

Stirling, the Lothians and Fife.

COAL.

Business has been somewhat quieter in the Lothians, and the shipments at Frith of Forth ports are down about 20,000 tons. The clearances for abroad reached 85,414 tons, and 21,811 tons were sent coastwise. At Granton 8,875 tons were cleared, Bo'ness 13,035, Grangemouth 41,225, and Leith 44,120—total 107,225 tons, compared with 127,034 in the preceding week, and 114,301 in the corresponding week of last year. Best screened steam coal is quoted at Leith 12s. 6d. to 13s., secondary qualities 11s. 6d. to 12s., treble nuts 13s. 6d., doubles 13s. 9d. to 13s., and singles 12s. 3d. to 12s. 6d. per ton. The shipments at Fife ports are down about 9,000 tons compared with the preceding week, and the decrease has occurred in spite of an extraordinarily large supply of vessels awaiting cargoes. At Burntisland, the steamers were more numerous than at any time during the present year, but the supplies of coal were quite inadequate. The shipments were, at Methil 57,253 tons, Burntisland 52,240, Alloa 2,496, Dysart 1,657 Wemyss 1,085, Tayport 571 and Charleston 458—total 115,660 tons, against 123,844 in the preceding week, and 130,275 in the corresponding week of last year. First-class screened navigation coal is quoted at Methil and Burntisland 16s. to 16s. 6d., unscreened 14s. to 14s. 6d., first-class steam coal 13s. 6d., secondary qualities 11s. 6d. to 12s., treble nuts 14s. to 14s. 6d., doubles 13s. 6d. to 14s., and singles 12s. to 12s. 6d. per ton. Inland demand is fairly active and prices are steady.

THE LONDON COAL TRADE.

THURSDAY, OCTOBER 10.

The London coal trade for the past week has continued fairly busy; no change has yet taken place in prices in either the wholesale market or in the public advertised prices, although at every market day the question has been uppermost, and at times somewhat eagerly discussed. The volume of trade has largely increased, and buyers are more disposed to order freely than in the preceding week. The increases in the purchases, however, have been confined principally to the factors, whose stocks were exceedingly low at the end of the month. Prices generally have ruled about the same as at the end of September, and the bulk of the factors have bought somewhat freely during the past week. Merchants complain that the depot trade is slow, and public requirements are comparatively small, so that the orders have been of very small dimensions from the general run of merchants, and the weather also has kept fairly open and mild, so that the actual consumption of household qualities has not been unduly augmented. Stocks at the various depots continue increasing, and it is evident that the general public are well supplied for the current season of the year. Bakers' nuts are selling freely and all kinds of kitchen coals are in good demand. Manufacturing qualities also are increasing, and the prices all round continue firm. Small nuts have improved in value, and the unusual demand is well maintained. Slacks, however, are slow, and the relatively high prices are only obtainable with difficulty. Colliery representatives, however, are not eager to sell at any lower prices, and a fairly large stock at this season of the year is not looked upon as a drawback. The iron and steel industries are unusually firm, and the power stations for electric lighting are likely to increase their consumption every day now that the longer evenings are at hand. Gas coals are getting more and more difficult to obtain, and in many quarters the scarcity of railway wagons has become a very serious item, and the recent foggy weather has also stimulated the extra demand for both electric lighting and the ordinary gas lighting. Trade along the riverside continues very promising, and already considerable enquiries are in hand for an extra consumption of manufacturing fuel at many of the works along the Thames. Reports from the various depots and wharves show that the delivery trade has not been very brisk during the week, doubtless owing to the mild weather, but the evenings and mornings have been unusually cold. Seaborne qualities are in good demand, and prices continue firm. The old quotations are still in force—viz., 21s. 6d. for best Wallsend and 20s. 6d. for seconds. On Monday, 42 cargoes were reported to have arrived in the Thames, and on Wednesday only six, but they are all sold, and no cargoes have been on offer. The turnover of inland coals has been somewhat heavier during the past few days, but the bulk of the buying has been from factors. In some cases steam coals are said to be slightly weaker, but a good deal of forward business has been entered into. The shipping department has not been quite so brisk, but this is usually anticipated at this season of the year, especially as the Baltic trade is rapidly drawing to a close. On the other hand the Mediterranean ports are claiming special attention.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, October 4.—There was a very good enquiry for seaborne house coal to-day, but no cargoes available, owing to the scarcity of tonnage. Best (Durham) 21s. 6d., seconds, ditto, 20s. Cargoes 18.

Monday, October 7.—The seaborne house coal market was steady to-day, with no cargoes on offer. Best (Durham) 21s. 6d., seconds, ditto, 20s. 6d. Cargoes 42.

Wednesday, October 9.—The seaborne house coal market was firm to-day, but no cargoes of either Durham or Yorkshire available. Best (Durham) 21s. 6d., seconds, ditto, 20s. 6d. Cargoes 6.

THE BY-PRODUCTS TRADE.

Tar products:—The market is quiet and there is not very much business passing. Some products are decidedly weaker. Benzols, though not quite so firm, are fairly steady. Pitch keeps much about the same. Crude carbolic acid, however, is falling away very perceptibly, though crystals remain unchanged. Creosote firm. Nearest values are:—

Benzols, 90's, 11d.; ditto 50's, 10d.; toluol, 1s.; carbolic acid, crude (60 per cent.), 1s. 11d. to 2s.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 1s. 1d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 3d. for ordinary qualities; pitch, 48s. to 48s. 6d. f.o.b. east coast; ditto, 48s. to 48s. 6d. f.a.s. west coast.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—Quotations from different localities vary considerably, but there is no doubt that makers are very strong in their ideas for both prompt and forward. In the latter there is practically nothing doing on either side. Nitrate of soda keeps firm in price, so there is no chance of "cutting" from that quarter, while the general statistical position is satisfactory. Closing prompt prices are:—

London (ordinary makes), £13 12s. 6d.; Beckton, £14 2s. 6d.; Liverpool, £14 7s. 6d.; Hull, £14 6s. 3d.; Scotch ports, £14 10s. to £14 12s. 6d.; nitrate of soda (ordinary), per cwt., 11s. 6d.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

INTERNATIONAL ENGINEERING AND MACHINERY EXHIBITION.

At Olympia.

On Friday, October 4, Lord Selborne opened an exhibition at Olympia promoted by the Machine Tool and Engineering Association Limited, which for extent and interest can compare favourably with any of its predecessors.

Prior to the opening function, Mr. H. J. Mackinder, M.P., president of the association, presided at a luncheon, the company including, in addition to Lord Selborne, Mr. J. M. Robertson (Parliamentary Secretary to the Board of Trade), the Hon. Sir C. A. Parsons, Lord Feilding, Lord Glantawe, Sir Fortescue Flannery, M.P., Sir Cecil Hertslet, Mr. E. B. Ellington (president of the Institution of Mechanical Engineers), and representatives of some of the chief engineering firms in the country.

The Machine Tool and Engineering Association Limited has for its principal object the co-ordination and co-operation of the trade for the advertisement of its products, especially at exhibitions at home and abroad.

This has been rendered necessary by the rapid increase in the number of exhibitions, representation at each of which would impose a heavy burden upon individual manufacturers. On the other hand, by means of a collective exhibit a better advertisement can frequently be secured for a national industry than is possible by isolated effort on the part of individuals.

The exhibition, as the name of its promoters implies, is devoted largely to the display of heavy and light machine tools, that to-day play so important a part in most of our staple industries. Altogether there are upwards of 250 exhibitors, whose productions are classified on a system that might well be copied in the case of other industrial exhibitions. A considerable proportion of the machines are shown in operation, and the grouping and arrangement of stalls is such that the spectator has every opportunity of obtaining an insight into the mechanical wonders that are reared upon them.

The exhibition remains open until October 26, and an account of some of the more important exhibits will be given in a later issue.

CONTINENTAL MINING NOTES.

Belgium.

The Forges de Clabecq have formed, in collaboration with the Semet-Solvay Company, a company with a capital of 3 million francs for the erection and working of a coke installation at Vilvorde, similar to those now erected at Willebroeck, Hoboken, Ostend, and elsewhere, in which it is proposed to utilise German and English coals.

In the Centre, house coal has been advanced 1 fr., whilst the Mons Collieries have withdrawn the rebate of 1½ fr. given in respect of certain grades. As compared with last year, the following advances may be quoted:—Boiler and furnace coals, 3 fr.; house coals, 4 fr.; coking coals, 3½ fr.; coke, 3 fr.; briquettes, 4 fr.

France.

It is stated that concessions will shortly be granted in the Lorraine coalfield. There are five applications, viz., Abaucourt, Rancourt, Dombasle, Atton and Pont-a-Mousson. According to the *Echo des Mines* a start will be made with the first of these.

Manufacturing coals in the north of France have recently been advanced to 18½ fr. for through coal, counting 25 per cent. of large, or 4 fr. in excess of the price obtained last year. House coal prices in Paris have been advanced from 2 to 3 francs per ton. Briquette manufacturers have been largely influenced by the high price of pitch, which is 92 fr. per ton delivered.

Germany.

Coal Market in Upper Silesia.—The traffic has not only maintained its previous high level, but has even increased. As might have been anticipated, the cooler weather has stimulated the demand for house coal, which has now become so active as not only to absorb the output as fast as raised, but also to draw on the by no means extensive stocks. Although there are no particular causes obstructing regular delivery—such as low water or scarcity of railway wagons—it is becoming more difficult to satisfy the demands of the trade promptly, and deliveries are in many cases falling into arrear. Gas coal is in improved request, especially for Berlin and northern Germany, and the competition of English coals is scarcely noticed. Owing to the demand for coke, the enquiry for coking coal is so large that even the entire output is not sufficient to meet it. Industrial coals, of course, form the bulk of the trade, and there is no immediate likelihood of the demand slackening, the iron industry being well occupied for several months ahead, and the sugar-refiners now coming into the market to make up for the lessened demands of the brickmakers. Exports to Austria-Hungary are on the up grade, and Russian Poland is asking for more fuel than can be supplied, so that, unless there is an unexpected shortage in the supply of railway wagons, the traffic returns will be still higher than those for September. The coke market is still highly satisfactory, the whole output of blast-furnace and foundry coke being taken over directly, whilst the demand for other grades is also improving.

Ruhr Coal Market.—The demand for fuel is increasing to such an extent that the Syndicate is finding difficulty in satisfying the requirements of its customers. This is due to the flourishing general economic situation. The advent of the cooler season naturally creates increased interest in certain grades, such as house coal, gas coal and open-burning gas coal, the two latter being in good request for export. The backbone of the trade is, as before, the large demand for industrial coal, and the position is strengthened by the fact that the iron industry can be relied upon to take extensive deliveries for a long time ahead. South Germany, too, is again coming into the market, and supplies, which were delayed for a time by flood water, are again going forward as usual, but with this difference—that they are taken up as soon as they arrive, and in some kinds stocks are even being drawn upon. Foreign customers are once more buying largely, and even the strenuous efforts on the part of sellers of English coals have not so far had any adverse effect on the demand for Ruhr coal. The coke market is improving, though, for obvious reasons, it cannot rival the betterment in the state of the coal market, and the circumstance that the restriction on the output has been lowered for the present month indicates increased traffic. In view of the activity in the pig iron market and the busy condition of the ironfoundries, it is quite natural that the corresponding classes of coke should be most in request. Briquettes are selling about the same as usual.

Coal Market in South Germany.—The turnover is once more showing signs of improvement, the falling state of the river leading buyers to fear an interruption in the supply; and for this reason they are sending in specifications for delivery on current contracts with greater regularity than before. There is also a considerable amount of new business being done, the trade in industrial coals having become more active. Small nuts are attracting the most attention, but stocks are abundant, both at Rheinau and in the higher ports, so that orders can be filled promptly. The house coal trade has also improved considerably, private consumers being more active in placing their orders; and, in some instances it has been impossible to get the coal out of stock fast enough. Anthracite nuts are in special demand, and broken coke for domestic heating. Stocks in these and gas coke are large.

Output of Fuel in August.—The following shows the production of coal, coke, and briquettes during August and the eight months ended therewith:—

	August.		January-August.	
	1911. Tons.	1912. Tons.	1911. Tons.	1912. Tons.
Coal	13,898,211	15,909,840	106,176,645	116,595,324
Lignite	6,079,103	6,805,332	46,897,544	52,880,655
Coke	2,059,766	2,521,128	16,684,726	18,688,125
Coal briquettes	449,231	495,327	3,291,249	3,450,855
Lignite ditto	1,497,252	1,628,093	10,766,841	12,363,461

Imports and Exports.—The following table shows the imports and exports of fuel during August and the eight months ended therewith:—

	August.		January-August.	
	1911. Tons.	1912. Tons.	1911 Tons.	1912. Tons.
Imports—				
Coal	956,281	993,597	6,981,236	6,394,713
Lignite	442,924	558,897	4,544,188	4,779,051
Coke	51,846	63,543	402,626	389,345
Coal briquettes	7,548	4,118	69,996	32,924
Lignite ditto	7,173	8,124	70,704	78,608
Exports—				
Coal	2,114,772	2,721,635	17,340,092	20,554,655
Lignite	6,269	5,997	38,478	35,107
Coke	441,554	535,107	2,966,032	3,696,057
Coal briquettes	203,476	179,747	1,289,707	1,417,951
Lignite ditto	43,510	64,366	308,179	358,996

In August, 875,130 tons of British coal were imported, as against 816,085 tons last year; and in the eight months, 5,462,924 tons, as against 6,016,782 tons. In August, exports of German coal increased to Belgium (455,408 tons, against 297,455 tons), France (305,325 tons, against 190,022 tons) and to every other market except Egypt.

THE TIN-PLATE TRADE

Liverpool.

Business has been rather quiet the last day or two, but the tone of the market is quite good, and prices of all descriptions of plates are well maintained. Quotations for coke tins rule firm as follows:—I C 14 × 20 (112 sh. 108 lb.), 15s. 6d. to 15s. 9d. per box; I C 28 × 20 (112 sh. 216 lb.), 31s. 3d. to 31s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 16s. to 16s. 1½d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 16s. per box; I C 14 × 19½ (120 sh. 110 lb.), 16s. per box; I C 20 × 10 (225 sh. 156 lb.), 23s. per box; I C squares and odd sizes, 15s. 9d. to 16s. basis. Ternes rule steady at 26s. 6d. for I C 28 × 20, 112 sheets unassorted, and charcoal tins are in fair demand at 18s. and upwards according to finish. Blackplate in p. and c.a. quality are firm at £11 to £11 5s. per ton basis for delivery over first few months of next year. Prompt goods command more money. Coke wasters are in good demand, and prices are very firm as follow:—C W 14 × 20, 14s. 6d. to 14s. 9d. per box; C W 28 × 20, 29s. to 29s. 3d. per box; C W 14 × 18¾, 14s. 9d. per box; C W 20 × 10, 20s. 9d. to 21s. per box—all f.o.b. Wales, less 4 per cent.

RIC WINDING ENGINES.*

y A. E. du Pasquier.

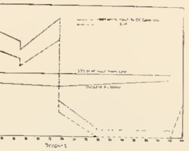
ntinued from page 633.)

qualising A.C. Winders.

r the satisfactory equalisation of been fully developed by the Westing- and has been in operation for some liery in this district. The author does ibing this system either at any length, s sufficiently well known. The essential the equaliser is in parallel with the n series with it, and in consequence deal with portions of the winding f converting the whole demand from s, the rheostatic losses of the A C. y compensated for by the smaller Further, as the flywheel is driven by the slip can be greatly extended—in per cent.—which means that a given un be obtained from a smaller wheel with the system first described. The e advantage, which is sometimes very .me equaliser set can serve more than

untage of the scheme, which the author mining engineers easily outweigh any consumption, is that the equaliser set light winding, or, in case of accident, shut down and winding continued.

uld like to emphasise the greater system in this respect, as apparently ons exist. As already pointed out, an l is an evil forced upon the consumer litions of supply at any time. With insion of supply companies or increase enerating plant, winding conditions d may have necessitated equalising in ime could perhaps be perfectly well ny equalising, and under such con- re is a striking example of such South Wales district—it must be system which will permit the saving arable from such sets, when no longer is at least not to be depreciated on . 3 shows a lay-out of this system, usual connections.



4 5 Tons from 632 ft., Output, 386 Tons per 29 8 Secs., Banking, 11 2 Secs.; Cylindro- t. to 16 ft. (Direct Coupled)

ulations as go to the final selection ew apparatus first cost must enter 13 and 14, calculated for the same three systems with which we have respective current consumptions and he of interest and are set out in

	A.C.	A.C. equalised.	D.C. equalised.
....	1·0	1·45	1·65
.. ..	4·52	5·22	4·66
....	0·8	0·9	0·92
winding	*Nil*	*Nil*	33 units per hour.
...Tons	*Nil*	4·5	7·5
....	—	800/560	800/680
om line	520	600	525
d from	1,040	750	620
f motor ....H.P.	550	550	540

the consumption figures it should be ese are for a complete winding cycle, ing period. The total units con- the year for a given coal output er matter, depending, of course, on he winder. In this particular case eir full daily output in eight hours, he 24 hours at the rate of one or —factors which favour the straight qualising during the heavy winding the equalised A.C. system.

Diagram 13 is interesting, as it shows the K.V A. demand with a rotary converter without any phase advancing capacity, and on the same diagram the effect on the K.V A. demand with a rotary capable of dealing with half the wattless component of the winding motor.

In comparing these curves with the line representing input to A.C. motor plus auxiliaries, which would represent the unequalised condition, it must be remembered that this curve is in El.H.P., and does not make any allowance for the power factor, as do the curves for the equalised hoist. The diagram is interesting, as it probably approaches as nearly to constant torque conditions as it is practically possible to get.

General Contrast of the two Systems.

It may be desirable to endeavour to summarise the relative advantages or disadvantages of the two main systems of electric winding, viz., A.C. and D.C. Ward-Leonard.

Simplicity.—Unquestionably all the advantage is with the A.C. system, one machine against three or four if two generators have to be used. This is allowing the exciter to balance the pump motor of the A.C. controller.

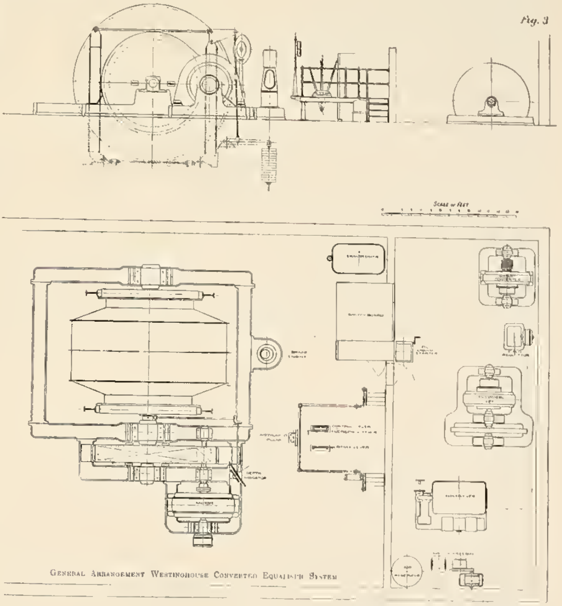
Mechanically.—Although for the above reasons the advantage should be with the A.C. motors, actually there is so little trouble with the D.C. winding motor and Ward-Leonard machines that this advantage is more imaginary than real.

Efficiency.—With the A.C motor there are rheostatic losses, but these are often more than offset by the no-load losses of the Ward-Leonard set, and the lower efficiency of the three machines against one. The advantage will usually be with the A.C motor.

Power Factor.—If the A.C. motor is geared, there is little either way; if direct coupled, then the power factor of the Ward-Leonard motor will be appreciably higher, which may effect some saving in cables and transformers.

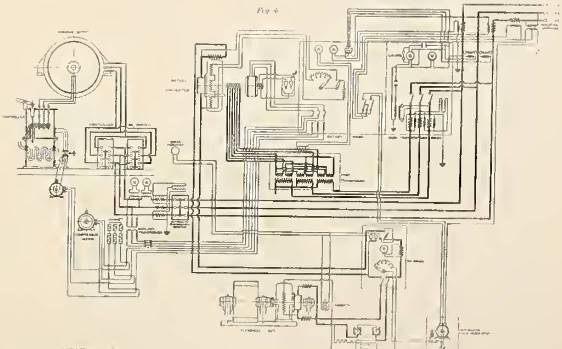
Effect on Regulation.—With the Ward-Leonard system the peak loads are actually higher, but the maximum peak being of shorter duration the advantage will be all with this system. Cases may arise where a straight Ward-Leonard winder could be installed,

Fig. 3



General Arrangement Westinghouse Converted Equaliser System

Fig 4



WESTINGHOUSE CONVERTER EQUALISER SYSTEM
DIAGRAM OF CONNECTIONS

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blished in the *Proceedings* of the South gineers.

Table III.

Alternative.	Accelerating period: Rate. M/sec.*	H.P. St.	H.P. End.	t_1 sec.	H.P. sec. ×10³.	Max. vel. period: Vel. M/sec	H.P. St.	H.P. End.	t_2 sec.	Decelerating period: H.P. Sec. ×10³.	— H.P.	t_3 sec.	Rate. M/sec.*	H.P. sec. lost in brakes 10³.	Total H.P. Sec. ×10³.	Heating capacity. H.P.	R.P.M. of drum.	Total time.	Rheostatic losses.
				Sec.					Sec.			Sec.						Sec.	P.c.
1	1·41	1,940	1,860	8	15·2	11·25	852	212	30	15·9	517	12	0·94	3·1	31·1	830	79	50	24·4
2	0·99	1,730	1,570	12	19·8	11·85	830	233	26	13·8	576	12	0·99	3·46	33·6	825	74	50	29·4
3	0·99	1,730	1,570	12	19·8	11·85	830	455	16·7	10·7	14·7	30·8	0·385	0·236	30·5	815	74	59·5	32·4
4	1·48	2,150	2,010	8	16·6	11·85	892	284	26	15·3	365	16	0·74	2·92	31·9	860	74	50	26·0
5	1·65	2,500	2,330	8	19·5	13·25	980	455	18	13·0	182	21	0·552	2·18	32·5	980	83	50	30·2
6	1·81	2,880	2,730	8	22·1	14·5	1,070	645	12	10·3	74·5	30	0·84	1·12	32·7	1,090	90·6	50	34·2
7	1·425	1,710		8	13·68	11·4	600		29	17·4	82	13	0·875	0·533	31·08	760	71·2	50	22·1
8	1·01	1,470		12	17·64	12·15	640		24	15·36	74	14	0·87	0·518	33·0	770	76	50	26·8
9	0·8275	1,455		16	23·28	13·25	702		18	12·61	51·5	16	0·8275	0·412	35·9	845	83·5	50	32·6
10	0·85	1,510		16	24·16	13·6	720		16	11·52	—	18	0·7575	—	35·68	865	85·5	50	33·8
11	0·7225 to 1·8	970	830	10*	9·0	14·45	1,100 max.		25·2	15·6		9·6	1·5	—	24·6	555	60	14·8	18·3

* Minutes.

whereas an A.C. winder would need equalising. It would be an extreme case, but is conceivable if the accelerating period is fairly long.

Control.—A considerable advantage must be conceded to the Ward-Leonard system. Not that the control is actually safer than with an A.C. equipment. It has been amply demonstrated that the A.C. control is sufficiently excellent to meet all practical requirements, but the Ward-Leonard control is more delicate and definite. Any speed from creeping to full can be got and maintained at will for any load condition, and efficiently. With A.C. control for any given resistance in the rotor circuit the speed will vary with the load, and all speed variation entails rheostatic losses.

Further, Ward-Leonard control lends itself better to automatic operation from the depth indicator. Several arrangements are available whereby the driver is prevented from accelerating at too rapid a rate, and at a fixed point towards the end of the wind the starting lever is automatically returned to within a few inches of the neutral position, this latter, of course, being an additional safeguard against carelessness or illness on on the part of the driver. With A.C. control the maximum rate of acceleration is equally taken out of the driver's control, his instructions being to throw his lever right over at the start, the acceleration then being fixed by the respective capacities of the tanks and pump in the usual type of controller. For decelerating it is also possible to arrange mechanically for the automatic return of the control lever, but there are greater complications in this, as much heavier masses have to be operated, and rheostatic losses are introduced towards the end of the wind which it is usually desirable to avoid. In practice, therefore, with A.C. control it is usual to rely on an excess speed device, in addition to the overwinding trip, which will automatically shut off power and apply the brakes should the speed in the retarding period at any point exceed the prescribed speed curve.

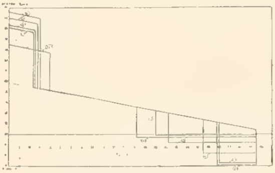

Diagram 15. Winding, 3 Tons from 450 Metres; Plain Cylindrical Drum, 3·05 Metres Diam. (Without Tail Rope)

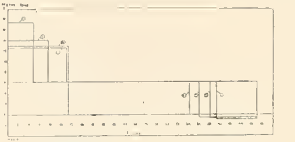

Diagram 16.—Winding 3 Tons from 450 Metres; Plain Cylindrical Drum, 3·05 Metres diam., with Equal weight Tail Rope.

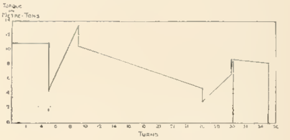

Diagram 17.—Winding 3 Tons from 450 Metres. Cylindro-Conical Drum, 2·3 to 4·6 Metres diam. Torque Turn Diagram.

There are several excellent mechanical devices for this purpose, and recently the Westinghouse Company have developed a very simple electrical device, combined with the depth indicator, which will protect against speed in excess of the prescribed speed curve over any part of the diagram. With A.C. control there is no difficulty in providing for creeping speeds for shaft inspections so long as this has been taken into account in the heat dissipating capacity of the controller.

Braking.—Here there may be some considerable advantage with the Ward-Leonard system, inasmuch as braking can be done regeneratively, with consequently smaller application of the mechanical brakes. On the other hand, as has been seen, in many cases the winding cycle and drum profile can be so designed that there is not much surplus energy to brake, which of course is the most efficient arrangement where possible. When shafts are deep, however, and lowering trips many and heavy, special arrangements for braking may have to be made with A.C. winders. The work would be too heavy for the mechanical brakes. Reverse current is entirely satisfactory from a reliable braking point of view, but wasteful. Braking by injecting D.C. current into the stator windings, with varying resistance in the rotor, has been suggested. It has many complications, and needs very intelligent control.

In the case of some of their larger South African A.C. winders dealing with depths of 4,000 feet, the Westinghouse Company devised a special form of Eddy current brake to meet these conditions. This brake is of considerable size, and briefly is comparable to a synchronous A.C. generator without any stator windings, the stator consisting of a smooth hollow C.I. casting water-cooled. Although adding considerably to the cost of the equipment, this method of braking will still compare favourably with any other system available at the present time. Application of the mechanical brakes is necessary to actually bring the winder to rest.

First Cost.—Advantage all with the A.C. winder. It is worth noticing that whereas there may be little or nothing between the first cost of a high class steam engine and a Ward-Leonard or equalised winder, a straight A.C. winder will invariably effect a considerable saving in first cost.

Maintenance.—The advantage is with the A.C. winder; the extra machines, with brushes, oil waste and cleaning, will tell their tale.

Equalising.—Either system can be equalised if necessary; the A.C. system at smaller expense.

Space Occupied.—Advantage with A.C. winder. Smaller engine-house required, with less capital outlay on buildings. The author does not know whether this summary of *pros* and *cons*, which has dragged out to a greater length than originally intended, has influenced any member to the selection of one type or another as the most suitable system to instal. His own view of the subject is that each system has its own advantages, and each may be employed in particular circumstances with advantage, to the exclusion of the others. But any dogmatic attempt to say generically, This is best, or That is best, is not justifiable.

Drum Profile.—With a view to showing in rather more detail how more particularly an A.C. winder diagram may be varied by changing conditions of time or speed, or both, Table III. has been prepared, the 11 alternatives given in the table being each calculated for the following duty:—

Depth of shaft……………………	450 m.
Weight of coal…… ……… ………	3 tons
Weight of tubs …………………	1 ton
Weight of each cage and chains	2·5 tons
Rope ………………………………	13 cm. circumference
Weight of rope …………………	6·45 kilogs. per metre
Centre of overhead sheaths ……	1·85 m.

Alternatives 1 to 6 inclusive are for a plain cylindrical drum without tail rope, 7 to 10 for the same drum with equal weight tail rope, and alternative 11 for a cylindro-conical drum. The cylindrical drum is 3·05 m. in diameter, that being the smallest drum which will hold the rope without excessive angling. The cylindro-conical drum is 2·3 to 4·6 metres diameter arranged for five starting turns and four turns on the scroll. The torque-turn diagrams for 1 to 6, 7 to 10, and 11 are shown in diagrams 15, 16 and 17 respectively.

An inspection of these diagrams and tabulated results will show:—How desirable it is in an A.C. winder to keep down the horse-power-seconds during the accelerating period. That for the same drum speed decreasing this time will decrease the area of this portion of the diagram, and consequently decrease any rheostatic losses. At the same time, this can only be done to a limited extent, as the peak horse-power tends to infinite as zero time is approached. Moreover it is desirable, apart from other considerations of supply, that the maximum demand should not exceed 2 to 2·5 times the heating capacity of the motor; alternatives 4, 5 and 6 are hardly admissible on this account. They have been calculated to show how, with unequalised winding conditions of this sort, the maximum horse-power, energy-consumption, losses, and heating capacity of motor may all be increased with an attempt to cut down the energy that has to be absorbed by braking.

Alternative 3 was calculated to show the effect on the diagram if the wind is allowed to coast out. It is about 2 per cent. more economical than No. 1, and has an 11 per cent. smaller peak load, but, as the time of the wind has to be increased nearly 20 per cent., it constitutes no improvement on alternative 1, which would be the best solution of a difficult A.C. winder problem.

Alternatives 7 to 10 show the improvement effected in the diagram by employing a tail rope. Examples have again been calculated with a view to reducing braking losses and maximum demands. It is worth noticing how the introduction of the tail rope has somewhat reduced these losses, but has not appreciably affected the total energy consumption; a heavier tail rope would have improved things.

In these examples also the general efficiency of the wind is not increased by endeavouring to eliminate braking losses.

Alternative 11 for the cylindro-conical drum is a marked example of the benefit of an equalising drum.

As compared with alternative 1, the total energy consumption and peak load are cut down 20 per cent and 43 per cent. respectively, and the rheostatic losses are reduced to a figure which would give the A.C. proposition an advantage in efficiency over a Ward-Leonard system, and this in spite of the GD^2 of the system* being considerably increased and the winding time shortened by about 5 seconds. The question of increasing GD^2 is interesting and has to be carefully considered. In the three sets of examples tabulated the GD^2 at the commencement of the wind in KGM^2 are 446,000, 473,600, and 517,000 respectively.

It may be pointed out that alternatives 4, 5 and 6 are a little more favourable than they should be, as the increased GD^2 of the larger motors was, for the sake of simplicity, not taken into account in the calculation. With cylindro-conical drums for considerable depths, if the small diameter of the drum is restricted by rope considerations, it can well be seen that an attempt to secure a more equalised diagram may not result in a commercially more economical scheme, owing to the GD^2 being greatly increased by the larger diameter of the drum, and further, as in the greater depths the limits of winding speeds are being approached, the revolutions of the drum shaft have to be reduced, and the cost of the whole plant may be increased to an uneconomical point.

(*To be continued.*)

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* $GD^2 \times 0{\cdot}184$ (in kgm.²) $= \frac{W R^2}{g}$ (in lb.-ft.²).

The Notts Education Committee has made a grant of £15 to the Midland branch of the National Association of Colliery Managers towards the provision of higher mining lectures to be given in the county during the winter session.

s to the Editor.

responsible either for the statements
inions expressed by correspondents.
s must be authenticated by the name
the sender, whether for publication or
can be taken of anonymous communi-

ons are only given by way of published
espondents, and not by letter, stamped
lopes are not required to be sent.

IERY ASSESSMENT.

to "Colliery Manager's" query:
lue of land is what it will let at from
ou are paying £4 per acre per annum,
ratable value You are therefore
he increased assessment. (2) The
that the area covered by the pit
ring sinking, is rated on the surface
ys, until the coal is got, then the
culated on the tonnage of coal raised
t. *See* 6 and 7 William IV., Chap. 96;
a, Chap. 103; 27 and 28 Victoria,
33 Victoria, Chap. 41—all these are
governing rating.

ober 6, 1912. GEORGE C. BOND.

OF COLLIERY SURVEYORS.

ed to see Mr. Lockerbie's letter in
27th ult., and quite agree that now is
for the formation of a mine surveyors'
ould be pleased to give him any
communicate with me through you.
e that mine surveyors should be
rofession as well as other professions.
that mine surveyors holding the
icate should communicate with Mr.
f with the view of having a meeting
urther procedure. SUFFERER.

ober 2, 1912.

EED OF SINKING.

been a number of vague statements
record sinkings," and in the writer's
t sinkings are claimed as "records,"
te information as to the actual
act conditions is brought forward to
laims.

sting to know, for instance, what is
e which has been sunk in seven days
. diameter (total excavation) in the
s.

g October 5, the Askern Coal and
ited sunk 29 yards 1 ft. in their
ur cost of £9 0s. 3¼d. per yard, under
onditions. This cost includes all
, at the pit mouth and dirt tip, and
d night chargeman's salaries.

ng carried out by Mr. Sam Howard,
perimeter of the sides down with
n, and the sinking is carried out by
ht-hour shifts, except at week-ends
are worked.

rtainly a fast rate of sinking. it
esting to have definite information
as to what has been done else-
circumstances, and whether this
beaten.

E. ARMSTRONG, Engineer.
Coal and Iron Company Limited.
ery, near Doncaster.
er 8, 1912.

ORRESPONDENTS.

men's Certificates.

The Coal Mines Act, 1911, does not
of a first- or second-class certificate
ld a fireman's certificate, but in order
man, deputy or examiner, a man must
ificate, notwithstanding the fact that
econd-class certificate of competency.
ding to the rules issued by the Board
ns under section 9 (2) of the Act, a
ates of competency must hold a
It would appear, however, that
rst- or second-class certificates, as
quired to possess a fireman's certifi-
led upon to undertake the duties of
aminer.

gley Bridge).—We think that you
e meaning of Clause 13 (*a*). This
ter January 1913 no one may be
nan, examiner or deputy, unless he
or second-class certificate of com-
of age or upwards, &c. There is
apparently to prevent him from obtaining a fireman's certificate from an approved institution before the age of 25, but he would be unable to act as a fireman until he had reached that age. Therefore a candidate for a first- or second-class certificate of competency would be able to obtain a fireman's certificate before presenting himself for examination. Having obtained a manager's certificate he would, of course, be able to act in the capacity of a fireman, even if below the age of 25.

Miners' Wages

T. W. K. (Roker).—The percentages above standard at which wages at present stand in the various districts are as follow:

Federated area	50
Scotland	62½
Northumberland	35
Durham	42½
South Wales	57½

The first two are based on the standards of 1888, and the latter three on the standards of 1879 In each instance they show the wages of underground workmen

MINING AND OTHER NOTES.

At the King's Dock, Swansea, operations have been commenced, and a goodly number of hands employed by Messrs. Alriq and Co., Rouen and Paris, at their new coal crushing and sizing works, which is the first of its kind put up in Wales. Coal brought mainly from the Swansea Valley is to be sized from the large lumps, instead of rubbly culm, which has formerly been the practice The company has its own quay, and will now have the advantage of direct conveyance of its anthracite coal to cranes, and thence to the holds of vessels by means of tubs, instead of coal drops. The whole process is carried on by machinery.

A deputation from the National Federation of Deputies, Firemen, and Examiners had an interview at the Home Office, on Saturday, with Mr. R. A. S. Redmayne, the chief inspector of mines. Questions affecting these classes of colliery officials arising out of the Coal Mines Act were discussed at length, and the chairman of the federation (Mr. Johnson) afterwards stated that Mr. Redmayne's assurances had afforded them considerable satisfaction.

In the course of his recent tour through the shale mining district of his constituency, the Lord Advocate has conferred with managers and deputations of miners on difficulties which have arisen under the safety lamps clause of the Coal Mines Act. The miners complain that the use of the safety lamp handicaps them very considerably in their employment, and that the management has even been compelled to shut down entirely certain seams which, owing to the low roof, cannot be properly lighted except by means of a naked light. Mr. Ure has been supplied with details of these accidents and with proofs of the remarkable freedom from gas of various mines in order to substantiate the claim for exemption being granted from the compulsory use of safety lamps. The Lord Advocate has advised the requisitionists to lodge a claim for exemption with the Secretary of State, and has promised to support it on the ground of the special character of the mines.

The inventory of estate has been lodged of the late Mr. Thomas R. J. Logan, of West Horlet, iron and coal master, and managing director of William Dixon Limited, of Govan and Calder Ironworks, the net amount being declared at £161,181 7s. 6d.

Mr. F. E. S. Coller has been appointed manager of the Elswick Shipyard, Newcastle, in succession to Mr. J. Carter, who has been appointed managing director of Cammell Laird and Co., Birkenhead. Mr. Coller was Mr. Carter's chief assistant at Elswick, and has been with Messrs. Armstrong, Whitworth and Co. a number of years.

Mr. E. Grant Hooper, superintending chemist, Government Laboratory, vice-president of the Society of Chemical Industry, has been appointed deputy Government chemist in succession to Mr H. W. Davis, who has retired.

An inrush of water has occurred in the Low Main seam of Kibblesworth Colliery, belonging to Messrs. Bowes and Partners. The inrush was apparently caused by one of the hewers in the "far in" west district having holed into some ancient workings, which it seems had not been in use for about 200 years, and of which no record existed. There were no lives endangered, and the men at work at the time quickly got out of the pit. A large staff of workmen has been set on to repair the wagonways, the ballast under the rails having been washed away during the inrush, so that dams may be built to stop the flow.

Mr. Rossiter Hoyle, the new Master Cutler of Sheffield, is managing director of the firm of Thomas Firth and Sons.

Under the auspices of the West of Scotland branch of the Association of Mining Electrical Engineers, an open meeting was held in Kilmarnock on Saturday evening, when Mr. Alexander Anderson, Wishaw, lectured on "Electricity: from the Generator to the Coal Face." The lecturer dealt with switchgear, distribution gear, motors, fuses and their limit regarding protection, and controllers. Under each heading he adduced many practical hints in regard to matters of design and construction.

Lecturing at the Wakefield Technical School last week on "Recent Developments in Mining Engineering," Prof. David Bowen, head of the mining department of the Leeds University, said most of these developments were the results of practical application of conclusions based on elaborate investigations in scientific and engineering laboratories, and constituted a striking argument in favour of specialised and intensive technical education. Quite recently it had been found possible to locate the presence of iron ore deposits by means of electric or Hertzian waves. Another particularly important development had reference to earth temperature measurements, by which depths could be measured approximately. The reduction of the value of the geotherm in any locality was in many instances a sure indication of the presence of oil or coal.

Mr. George Bell, who has acted as fore-overman at Felling Colliery, Durham, has been appointed to succeed Mr. George Emmerson as manager of Burradon Collieries, Northumberland, owned by the Burradon and Coxlodge Coal Company. Mr. Bell commenced his work as a driver at Brigg's Collieries, Normanton, and since then has passed successfully through all his grades and obtained a first-class certificate as manager at Leeds where he headed the list of passes. He is an enthusiast in ambulance work.

A vote of congratulation was passed to Mr J. Searston, manager of the Hardwick Collieries, Derbyshire, at the meeting of the Midland branch of the National Association of Colliery Managers, held at the University College, Nottingham, on Saturday, October 5, on his appointment as manager of the Dinnington Main Colliery, near Rotherham. Mr. Searston, who is a native of Alfreton and an ex-president of the branch, commenced his mining career at Messrs. James Oakes and Co's Riddings Collieries, and prior to becoming manager at Hardwick was four years in a similar position at Pentrich Colliery.

Messrs. Smith and Willows, coal merchants, of Bramley, are to have an addition to their firm in the person of Mr. William Holgate, who is to join them as a partner.

Consequent on the decease of Mr. J. S. Burton, the directors of Hamsteels Collieries Limited, have appointed Mr. Wm. Foster assistant manager of their Hamsteels coke establishment. Mr. Foster for 20 years has been coke-burner at Pease and Partners Limited, Waterhouses coke ovens, and during the last 10 years has had the additional duty of coke ovens chargeman.

The council of Sheffield University last week appointed Mr H. R. Dean, M.A., M.D.Oxon., to the Joseph Hunter chair of pathology, in place of Prof. J M. Beattie, who has been appointed to the chair of bacteriology in the University of Liverpool. Dr. Dean is at present assistant bacteriologist to the Lister Institute of Preventive Medicine. Mr. L. Southerns, B.A Cantab, B.Sc Lond, was appointed to the post of junior lecturer and demonstrator in physics in the place of Dr. J. Robinson, resigned. The council received the resignation of Prof. F. W. Hardwick of the professorship of mining owing to his retirement from active work.

The late Mr. William Graham Vivian, of Clyne Castle, Blackpyll, Glamorgan, of Parc le Brios, Penmaen, Glamorgan, and of Belgrave-square, S.W., of the firm of Messrs. Vivian and Sons, ore smelters and colliery proprietors, of Swansea, who died on August 21, aged 85, has left estate valued for probate at £1,000,000 "so far as at present can be ascertained." The testator's brother, Mr. Richard Glynn Vivian, of Sketty Hall, Swansea, who died in 1910, left estate valued at £284,104, and bequests for public uses amounting to £55,000, in addition to a valuable art collection.

At the recent meeting of the British Association, the general committee considered a recommendation from the mathematical section to the effect it was desirable that a detailed magnetic survey of the British Isles on the lines of that of Professors Rucker and Thorpe for the epoch of 1891, should now be repeated in order to test the questions as to the local variation of the terrestrial magnetic elements within 25 years. It was decided to make a representation to that effect to the Royal Society, the Admiralty Ordnance Survey, and the Meteorological Committee.

The firm of Harland and Wolff has sold to the recently formed Burmeister and Wain (Diesel System) Oil Engine Company Limited, the engineering and boilermaker shops at Govan, which it acquired in February of this year, from the London and Glasgow Shipbuilding Company. The works in future will be devoted entirely to the manufacture of oil engines for marine purposes.

At the annual meeting of Armstrong College, Newcastle-on-Tyne, the principal (Dr. W. H. Hadow) in his report stated that the proposal to establish a department of commerce had advanced a further stage towards realisation. A complete scheme for degree and diploma courses in commerce had been drafted, provisionally passed by the college council, and submitted for criticism to industrial firms and educational authorities. It would be presented in the coming session to the Senate of the University of Durham, and if approved, would be ready to come into operation by the end of next year. A donation of £1,000 from Mr. Frank Priestman had enabled the college to start one course of commercial lectures during the coming winter.

An important scheme having for its object the development of the resources of their collieries in South Shields was some time ago embarked upon by the Harton Coal Company, and substantial progress has been made with the work. The scheme provided for the sinking of new shafts at Harton Colliery and at the Bents for the purpose of providing both the Harton and St. Hilda pits with an independent system of ventilation, and it was expected that the new shaft at Harton Colliery would be brought into operation for the first time this week. It is intended to utilise this shaft exclusively for lowering and riding the men, numbering about 1,800, who are employed at the colliery, and to use the old shaft for raising coal only. At present the amount of coal drawn from the pit daily is from 2,000 to 2,500 tons, and by this new arrangement the output of the mine will, it is anticipated, be materially increased. When the new Bents shaft, which is to be worked in connection with St. Hilda Colliery, is completed, a similar system will be adopted, the new shaft being used by the men and the old one at St. Hilda for the drawing of coal. The machinery for both the new shafts is to be worked by electricity.

It is stated that the negotiations which have been proceeding for the absorption of Archibald Russell Limited, by Messrs. John Watson Limited, have fallen through.

The conference of the Iron and Steel Institute at Leeds was concluded on the 3rd inst. A fitting *finale* to the learned and scientific discussions of the week was the conferring of university honours on some of the leading members. The degree of D.Sc. was conferred upon Sir Robert Hadfield, M. Adolphe Greiner, of Seraing, Herr Friedrich Springorum, of Dortmund, and Mr. J. E. Stead, of Middlesbrough, whilst the president of the institute, Mr. Arthur Cooper, of Middlesbrough, was made a Doctor of Laws. At the same time a similar degree was conferred on Dr. W. E Garforth. In presenting him for admission to the degree the Vice-Chancellor said:—"It has been the privilege of this University to receive in an exceptional degree the help and counsel of men closely occupied in practical affairs, and also deeply interested in the furtherance of higher education and in the encouragement of scientific research. Mr. William Edward Garforth has won distinction and public gratitude by the part which he has taken in the conduct of scientific enquiries and experiments at Altofts into the important question of the explosions of coaldust and their prevention or mitigation. The University is under great obligation to him for his wise counsel, his sympathetic insight, and public spirit."

In a paragraph which appeared under this heading last week, referring to the presentation of coal specimens by Dr. Garforth to the University of Leeds, it was stated that the collection included sections "from coalseams in which explosions have occurred, such as those from No. 3 Bank Pit, Atherton, near Bolton." The reference is, of course, to the Pretoria Pit of the Hulton Collieries, and not to the neighbouring pits of Messrs. Fletcher, Burrows and Co., which are the only ones actually situated at Atherton.

Messrs. Strakers and Love are preparing for an increased output of mineral at their Brancepeth "A" pit.

Now that surface improvements have been effected at the old Neston Colliery, near Birkenhead, which has been taken over by a number of Wigan gentlemen, additional working places are being opened out, and a few more men are being employed.

Mr. J. P. Houfton, J.P., managing director of the Bolsover Colliery Company, has accepted the invitation of the Conservative and Liberal members of the Mansfield Town Council to become the chief magistrate of the borough in succession to Mr. T. Hall, "the miner mayor."

A trade correspondent learnt on Tuesday that further surveys of land in the vicinity of Kenyon, South Lancs, are to be undertaken on behalf of certain Wigan firms with a view to locating desirable sites for opening out new coalfields. Rumours of pending big colliery developments in the Kenyon neighbourhood have been current for some time past.

The Plaskynaston Foundry, Acrefair, which was put up for sale by auction a week or two ago, and withdrawn on account of the low price bid for it, has now been bought privately by some local gentlemen, at the head of which is Mr. T. Longdin, of Ruabon.

The ss. "Helen Heidmann" (Captain Fenner) from Hamburg, arrived at the Immingham Docks at 12.30 p m. on Saturday. She left again for Hamburg one hour after midnight, having loaded five different kinds of coal, trimmed into five different holds, with bunkers, say 2,500 tons; thus making a record for the whole of the Humber ports for the despatch of a steamer of this type. She will load out again from Immingham this week. The agent for the owner is Mr. George Dunston, M.I.M.E., of Thorne, Immingham and Hull.

At a meeting of the Hull Chamber of Commerce on Tuesday, a letter was read from Mr. T. R. Ferens, the member for East Hull, stating that he had been informed by an East Hull manufacturer, that in consequence of a complete block at the Alexandra Dock he had lost £60 since vessels could not be discharged. Mr. F. F. Lambert (a director of the North-Eastern Railway Company) said that no one was better acquainted with the scarcity of wagons than were the railway companies. The railway officials were fully alive to the position and could be depended upon to do what they were able to relieve the pressure. He thought the users themselves were sometimes to blame. There has been an enormously increased import of timber at Hull this year, the total for the nine months ended September being 660,899 loads as against 542,096 loads in the corresponding period of last year.

At a meeting of the council of Armstrong College held on Tuesday, Prof. Hallsworth wrote resigning the G. B Hunter lectureship in commercial and industrial economics, on his election to the Sir David Dale chair of economics in the college. The resignation was accepted and it was decided to advertise at once for a lecturer to fill the vacancy. Mr. L. Hawkes, B Sc., was appointed prize demonstrator in geology; and Mr. T. A. Saint, prize demonstrator in metallurgy, mining and surveying. On the recommendation of the house committee it was decided to establish an independent department of applied mathematics and mathematical physics, and to place the lecturer in applied mathematics, Dr. T. H. Havelock, in charge of the department. The council also resolved to erect a tablet at the college in memory of the late Mr. W. H. Pickering, who lost his life whilst acting as one of the rescue party in the Cadeby Colliery disaster last July. Mr. Pickering was a student at the college from 1878 to 1880.

A largely attended meeting of the Scottish branch of the National Association of Colliery Managers was held in the Royal Technical College, Glasgow, recently, Mr. Charles C. Reid, Cowdenbeath, the president, in the chair. It was reported that the membership of the branch was 228, thus giving to Scotland the honour of having the second strongest branch, numerically, in the association. It was decided that the council of the branch should consider in detail the provisions of the new Explosives Order with a view to formulating questions, on which Mr. Wm. Walker, Edinburgh, chief inspector of mines in Scotland, would be asked for guidance and advice. It was agreed to take part in a joint meeting with the east and west of Scotland branches of the Association of Mining Electrical Engineers, when a paper will be read by Mr. Sam. Mavor, Glasgow, on "The Mining Electrical Engineer." The meeting will be held in Edinburgh on Saturday, October 26.

THE FREIGHT MARKET.

The outward freight market on the north-east coast has been of moderate dimensions this week. The supply of tonnage has been fairly good. Rates are based on the following approximate figures for Tyne loading:—London, 4s.; Hamburg, 4s. 9d.; Cronstadt, 7s. 6d; Havre, 6s.; Bordeaux, 7s. 6d.; and Genoa, 12s. 9d. to 13s. At South Wales, chartering has been fairly active, but has now slowed down. The following are typical rates from Cardiff:—Bordeaux, 9 fr.; Caen, 6s. 9d.; Genoa, 12s. 9d.; Havre, 7s.; Lisbon, 9s. 6d. to 9s. 9d.; and River Plate, 22s. 6d. to 23s. 6d. A fair business at about former rates is being done at the Clyde. At the Humber, the market is firm and tonnage scarce. Homewards, Eastern markets are quiet and unchanged, charterers waiting to see the outcome of the Balkan crisis. At the Black Sea business is very small, owing to the war trouble. Charterers are offering high rates to attract tonnage, but, thus far, with only moderate success, and business will not be fully resumed until the present trouble has passed over. The Mediterranean and ore trades are steady. The Baltic is unchanged. America is dull. The River Plate is quietly firm.

Tyne to Algiers, 2,400, 11s. 3d., 600; 3,300, 11s. 3d.; Arendal, 1,000, 7s. 3d.; Bagnoli, 5,000, 12s. 9d.; Boulogne, 1,000, 6s. 3d.; Cronstadt, 3,200, 7s. 6d.; Genoa, 4,600. 12s. 11d.; 4,200, 12s. 10½d.; 3,000, 12s. 9d.; 3,400, 12s. 9d., river loading; 6,100, 12s. 9d.; 3,600, 13s.; Hamburg, 2,500, 4s 9d.; Libau, 2,000, 7s. 9d; 1,350, 8s.; Lisbon, 3,000, 9s. 9d.; 3,800, 9s 9d.; 4,000, 9s. 9d, from Dunston; 3,300, 10s., from Dunston; La Rochelle, 2,000, 7s. 9d.; Las Palmas, 5,000, 11s. 9d., reported; London, 1,800, 4s.; 3,500, 4s.; Marseilles, 6,000, 12s. 3d.; Moss, 1,000, 7s. 6d.; Mariager, 1,100, 8s. 3d.; Oporto, 1,350, 13s.; Port Said, 6,300, 12s. 6d.; Porto Ferrajo, 5,000, 12s. 6d.; River Plate, 5,000, 24s. 6d.; Savona, 3,400, 12s. 9d., river loading; Spezzia, 3,400, 12s. 9d., river loading; St. Petersburg, 850, 11s. 3d., coke; 900, 11s. 6d., coke.

Cardiff to Algiers, 3,500, 13½ fr., 600; 3,500, 13½ fr, 600 spot; Alexandria, 3,800, 13s., October 14; 3,300, 12s. 9d., October 14; 4,000, 12s. 9d.; Brindisi, 5,300, 13s. if 600; 12s. 9d. if 800, ppt.; Bordeaux, 1,500, 9 fr., spot; 2,800, ditto; Bahia Blanca, sail, 20s.; Carthagena, 1,600, 13s. 9d.; Caen, 1,200, 6s. 9d.; Carentan, 200, 10s.; Cronstadt or St. Petersburg, 2,000, 10s., berth guaranteed after 24 hours of arrival, or fine of £50 per day; Chatham, 2,800, 4s. 3d., Admiralty; Cronstadt, 2,000, 10s. 6d., spot; 3,200, 10s. 6d., ppt.; Cape Verds, 5,500, 12s. 6d., ppt.; Chantonay, 2,200, 9 fr., ppt.; Ferrol, 1,150, 10s., ppt.; Genoa, 3,300, 12s. 9d., ppt.; 4,400, 12s. 9d., ppt.; Granville, 1,450, 6s. 3d.; Havre, 780, 7s., ppt.; Islands, 6,500, 11s. 9d., ppt.; 4,600, 11s. 7½d., October 23; Lisbon, 2,500, 9s. 6d., 250, October 14; 3,000, 9s. 6d, 350, October 17; 2,000, 9s. 9d., 350, October 15; Lerwick, 215, 10s.; Las Palmas, 3,700, 11s. 9d., October 25; 6,500, 11s 9d.; 4,600, 11s. 7½d., ppt.; Marseilles, 4,700, 14¼ fr., ppt.; 12½ fr., voyages over next year; Maranham, sail, 20s.; Malaga, 2,650, 11s. 9d., 350; Malta, 3,100, 11s.; Monte Video, 5,000, 22s. 6d., ppt.; Naples, 4,100, 12s. 6d., ppt.; 4,200, 12s. 7½d., ppt.; Oran, 1,700, 14¼ fr., 500; 3,000, 14¼ fr., ppt.; Palermo, 14s., ppt.; Port Said, 5,000, 12s. 6d., October 14; Rio de Janeiro, 4,400, 24s., ppt.; 4,700, 24s. 4½d., mid-October; 4,500, 24s. 3d.; 23s. 6d.; sail, 20s.; River Plate, 6,000, 23s. 6d., ppt.; 5,000, 23s.; 5,000, 23s. 6d., mid-October; 5,000, 22s. 6d., November; 4,600, 22s. 6d., October 25; 4,000, 22s. 6d., with option; St. Nazaire, 2,200, 9 fr.; 3,300, 8½ fr., October 11; St. Malo, 6s. 9d.; 1,500, 6s. 10½d, ppt.; Spezzia, 6,200, 12s. if 800, 12s. 3d. if 600, f.d., ppt.; 3,200, 12s. 9d., ppt.; Savona, 3,200, 12s. 9d., ppt.; Teneriffe, 4,600, 11s. 7½d., ppt.; 3,700, 11s. 9d., October 25; 6,500, 11s. 9d.; Taranto, 5,300, 13s. with 600, 12s. 9d. with 800, ppt.; 5,300, 12s. 9d., 800, ppt.; Tunis, 4,000, 16¼ fr., ppt.; Tarragona, 3,200. 11s. 9d. coal, 12s. 6d. fuel; Valencia, 900, 13s. 3d; Wei-hai-Wei, 5,000, 22s 6d, Admiralty.

Newport to Buenos Ayres, 23s. 6d., ppt.; Marseilles, 3,100, 15s. 9d.; 3,300, 15 fr., ppt.; Naples, 5,200, 12s. 6d, ppt.; 4,000, 12s. 7½d.; Waterford, 220, 5s. 6d.; Trapani, 2,100, 14s. 1½d., ppt.; Lisbon, 1,600, 10s.; 300, October 15.

Rotterdam to Madeira. 2,200, 11s. 9d., October 15; Genoa, 2,600, 12s. 3d., October 15; Caen, 1,575, 6s. 9d., ppt.; La Rochelle, 2,525, 7s. 1½d., October; Rochefort, 2,525, 7s. 3d., October; Barcelona, 4,350, 13s. 3d., ppt.; Bordeaux, 3,500, 7s. 3d. coal, 8s. fuel, ppt.; Buenos Ayres, 5,000, 25s., ppt.; Leghorn, 4,500, 13s. 3d. coal, 14s. fuel, 15s. 3d. coke, ppt.; St. Nazaire, 3,400, 7s. 4½d.

Hamburg to Santos, sail, 22s. 6d.

Antwerp to River Plate, sail, pt.

Leith to Rendsburg, 1,500, 7s.

Swansea to Caen, 1,100, 7s.; Rouen, 950, 7s. 6d., spot; 1,700, 7s. 3d.; 1,250, 7s. 6d.; Stettin, 1,850, 8s.; Stockholm, 800, 8s.; Garrucha, 1,200, 15s., October 15; Marseilles, 16 fr.; Dieppe, 950, 7s. 3d.

Wear to River Plate, 4,200, 24s. 6d.; Bayonne, 2,800, 8s 6d, 400; Pillau, 1,400, 6s. 3d.; Rochefort, 1,900, 8s., 500.

Seaham Harbour to Pillau, 1,200, 7s.

Tees to Hamburg, 900, 7s, pig iron.

Blyth to Caen, 1800, 7s. 4½d.; Carlscrona, 1,300, 7s. 6d.; Helsingfors, 2,000, 7s. 9d.; Abo, 1,200, 8s. 3d.; Arendal, 1,000, 7s. 3d.

Hull to Rotterdam, 3,000, 4s. 3d.; Cronstadt, 2,900, 7s. 6d., mid-October; 2,000, 7s 6d.; Genoa, 3,300, 13s. 6d.; St. Petersburg, 2,800, 7s. 6d., ppt.; 1,800, 7s. 6d; Reval, 2,500, 6s. 10½d., late October; Riga, 2,270, 7s., mid-October; 3,500, 6s. 9d.; Civita Vecchia, 4,750, 14s.

Burntisland to Alexandria, 3,200, 12s. 3d.

Immingham to Pernau, 1,600, 7s. 3d.

Grimsby to Barcelona, 1,900, 13s., end October.

Fife port to Stockholm, 2,200, 8s.

Goole to Ostend, 950, 5s. 10½d, ppt.; Ghent, 950, 5s. 10½d.

Methil to Sondesborg, 1,400, 9s.

Port Talbot to St. Nazaire, 3,000, 8¼ fr.; Genoa, 13s., ppt.

Forth to Cronstadt, 2,000, 8s. 1½d.

London to Melbourne, sail, 18s, general cargo, October; Algeciras, 1,400 loads, sleepers, 15s. 6d., end October.

Glasgow and Liverpool to River Plate, three ports, 37s., general cargo, ppt.; 37s. 6d., general cargo.

Wales to West Coast South America and home to United Kingdom-Continent, sail, 1,979 reg., 44s. 6d. in and out, 45s. always stiffened; 44s. in and out, 44s. 6d. always stiffened; 49s. in and out, 49s. 6d always stiffened, end June cancelling at nitrate ports; Sierra Leone, sail, 17s.; Port Sudan, 15s., ppt.; nitrate port and home to United Kingdom-Continent, sail, 45s. 6d. in and out, 46s. always stiffened, November loading Wales, April-June on the Coast.

Homeward charters:—Azof, 6,400, Marseilles, 23 fr, option Rotterdam 20s., spot; 3,300, 20s. n.c or any, 20s. 6d. Hamburg, ppt.; 6,500, Marseilles, 25 fr., ppt.; 6,400, 22 fr., ppt.; 4,200, Rotterdam, 20s., Antwerp 20s. 3d., Weser 20s. 6d., ppt.; 7,200, Rotterdam, 19s 9d., Antwerp, Emden or Weser 20s., Hamburg 20s. 3d., with 3d. less barley, ppt.; 6,800, Rotterdam 20s., Emden, Weser or Hamburg 20s. 6d., ppt.; 3,400, 20s. 6d. n.c. or any, 21s. Hamburg, ppt.; 3,300, Rotterdam, basis 19s. 6d., with options, ppt.; Sulina, 4,700, Rotterdam 19s. 1½d., Antwerp 19s. 4½d., ppt.; Haiphong or Saigon, 6,600, France, 38s. rice, 39s. maize, 9d. extra two ports discharge, December-January; Carthagena, 3,600, Middlesbrough, 8s., October 20; Hornillo Bay, 3,000, Middlesbrough, 8s., mid-October; Santander, 2,100, Rotterdam, 7s. 1½d., ppt.; 1,800, 7s. 1½d., October; Savannah, 1,883 net, Liverpool or Continent, 55s. one port, Form O, October-November; Mobile, 20s., net, Liverpool or Manchester; 950 stds, 10 per cent., Mediterranean, 160s. one port, November; Gulf timber port, 1,750 stds, 10 per cent., River Plate, 185s., October; 2,011 net, 185s., November; Buenos Ayres or La Plata, 5,000, 10 per cent., United Kindom-Continent, 22s. 6d. o.c., less 6d., November 15-December 15; San Lorenzo, 4,500, 10 per cent, United Kingdom-Continent, 28s. o.c., less 6d. more if p.p., ppt.; not above, 6,200, 10 per cent., 28s. o.c., less 6d., October; 5,600, 10 per cent, 28s. 6d. o.c., less 6d., ppt.; 4,700, 10 per cent., 29s. o.c., less 6d., October; 6,500, 10 per cent., 27s. 6d. o.c., less 6d. b.d., completing below bar 2s. 6d., less 6d., option full cargo Buenos Ayres 25s. 6d., less 6d., October; Melbourne, sail, 35s., United Kingdom-Continent, January-February; time charter, States and West Indies, 7s. 6d., three months; 1,700, £687 10s, 12 months, delivery February; time charter Transatlantic trade. 12s. 1½d., one trip South Atlantic port to United Kingdom-Continent; 12s., one trip Gulf to United Kingdom-Continent; Bahia Blanca, 24s. 6d. o.c., United Kingdom-Continent, November; Kurrachee, 23s. p p. United Kingdom-Continent, 24s. France, late October; 6,000, United Kingdom-Continent, 23s. p.p., November 5-25; Chittagong, 33s. 9d. one port United Kingdom-Continent; Kherson, 3,100, Venice, 22 fr., spot; Kherson or Nicolaieff, 4,100 max., Sweden, 24s. one port, 24s. 6d. two ports, ppt.; Seville, 1,800, Nantes, 11s., ppt.; Port Said, 4,800, Calcutta, 11s., salt, mid-October; Memel, 1,400 loads, London river, 12s. 6d., sleepers, ppt.; St. Petersburg, 900 fr, East Coast coal port, 47s. 6d., props, ppt.; 2,510 net, Rotterdam 2s. 1½d., London 2s. 3d., wheat basis, ppt.; New York, 1,965 net, River Plate, 35 c., December; basis 29 c. two ports, Algeria, November-December; 2,065 net, West Italy, Sicily, basis 30 c. case oil, October; Odessa, 6,200, Rotterdam 19s., Hamburg 19s. 6d., on d.w., 600 tons general, ppt.; Novorossisk, 5,900, Rotterdam, 18s., ppt.; Kherson, Nicolaieff or Odessa, 4,800, London or Rotterdam, 18s., Antwerp, Emden or Weser 18s. 3d., Hamburg 18s. 6d., ppt.; 4,800, Weser, 18s. 9d, with 2,000 tons barley, ppt.; Bombay, 2,772 net, Antwerp, 26s., ore, October; Philadelphia, 30,000 qrs., 10 per cent., Hull, Avonmouth or Rotterdam, 3s. 9d. heavy grain, 3s. 3d. oats, November; Gulf, 1,000 stds., 10 per cent., Mediterranean, 162s. 6d. one port, 165s. two ports, October; La Plata, 4,100, 10 per cent., United Kingdom-Continent, ex. France and Germany, 25s. o.c., no reduction direct, ppt.; Newcastle, New South Wales, sail, 49s., West Coast South America and home to United Kingdom-Continent, always stiffened, 49s. 6d.; Portland, Or., sail, 45s., United Kingdom-Continent, November-December; 42s. 6d., December; 41s. 3d., January; 40s., February; Java, 27s. 6d., Vancouver, October-November; Haiphong and Saigon, 3,300 net, Havre and Dunkirk, 39s. rice, 40s. 9d. maize, November; Moji, 4 500-5,000, Manila, 6s., October; Mauritius, 2,669 net, Bombay, 12 annas, October-November; Philadelphia, 24,000 qrs., Rotterdam, 3s. 9d, heavy grain, spot; San Lorenzo, 3,600, 10 per cent., United Kingdom-Continent, 26s. o.c., less 6d., October-November; 4,400, 10 per cent., 24s. 3d. o.c., less 6d., January 10-February 10; San Juan, 1,083 net. Rotterdam, 9s. 6d., October; Alexandria, 2,442 net, Hull 15s., London 15s. 6d., 2,500 tons general cargo, ppt.; time charter, Canadian trade, 8s., one round trip, delivery Rotterdam; nitrate ports, 34s. 3d., United Kingdom-Continent or United States, February; Bombay, 26s., Antwerp.

EXPORTS OF COAL, COKE, AND MANUFACTURED FUEL FROM THE UNITED KINGDOM

During September, and the first nine months of 1910, 1911 and 1912

To	September, 1912.						September.					
	Coal—Small.		Coal—Through-and-through (unscreened).		Coal—Large.		All coal. Quantity (tons).			All coal. Value (£).		
	Tons.	£	Tons.	£	Tons.	£	1910.	1911.	1912.	1910.	1911.	1912.
	105,235	62,912	24,177	13,939	462,648	312,737	448,119	585,649	592,060	257,970	336,573	389,588
	110,679	58,033	27,517	16,024	336,778	212,185	406,984	369,463	474,974	225,565	181,975	286,242
	52,705	23,499	9,061	5,097	122,973	77,665	167,721	136,183	184,739	81,469	66,081	106,261
	75,563	43,113	50,705	31,659	146,762	91,586	271,711	275,643	273,030	143,268	138,871	166,358
	305,904	152,376	295,131	147,149	225,170	135,470	845,615	803,503	826,208	415,273	372,591	434,995
	75,621	39,801	35,326	19,708	55,037	34,433	216,889	171,019	165,984	111,288	84,509	93,945
	55,057	22,701	21,739	10,955	55,322	32,811	155,682	129,633	132,118	64,748	54,450	66,467
	355,921	172,523	222,030	117,907	340,324	245,055	741,188	853,509	918,275	403,719	458,083	535,485
d Madeira	21,842	10,925	8,073	4,980	62,802	46,309	85,816	79,770	92,717	51,518	50,386	62,214
	27,064	13,757	94,739	53,558	139,107	102,175	236,459	240,740	260,910	150,667	148,810	169,490
	141,460	63,670	211,098	118,661	407,448	300,319	812,617	714,500	760,006	460,842	409,871	482,650
	17,354	8,957	14,118	7,493	33,332	24,153	79,318	105,428	65,104	39,452	53,286	40,603
	7,113	3,380	21,061	10,556	16,966	13,504	58,969	56,353	45,140	34,353	29,874	27,440
	7,608	6,309	4,549	2,202	35,325	26,216	45,948	46,358	47,482	31,300	31,228	34,727
	21,991	10,348	51,366	28,123	185,418	133,523	257,479	267,303	258,775	160,609	167,178	172,299
	25,336	13,166	42,563	23,814	21,543	17,659	65,984	88,021	92,112	51,214	47,976	54,639
erica	—	—	—	—	103	121	125	1,153	103	146	710	121
	376	398	—	—	30,736	24,574	67,430	41,967	31,112	44,642	33,425	24,972
	6,977	4,769	—	—	130,865	108,001	127,075	140,850	137,842	97,101	112,109	112,773
	4,734	3,830	—	—	101,410	82,756	117,019	83,440	106,144	91,641	61,459	86,586
	16,121	14,204	—	—	287,803	222,933	224,508	297,497	303,924	166,546	219,964	237,137
	4,539	2,061	14,068	7,361	14,334	10,860	22,922	29,843	32,911	16,005	18,898	20,282
	11,353	5,706	9,418	5,814	15,887	12,141	53,596	42,297	36,658	34,136	26,708	23,661
	411	404	1,626	1,075	3,228	2,400	2,072	4,443	5,265	1,285	3,071	3,879
	788	616	—	—	12,147	10,263	10,297	14,847	12,035	5,713	8,726	10,879
	1,135	1,614	—	—	—	—	39	11,419	1,135	55	7,773	1,614
	302	332	—	—	30,567	23,961	9,333	23,946	30,869	7,257	17,717	24,293
	34,909	26,164	11,152	6,169	142,606	112,236	157,188	163,243	188,667	111,520	115,819	144,569
e	118,068	91,124	363	184	118,584	102,365	215,595	217,319	237,015	173,548	161,771	193,673
	1,106,120	531,770	268,864	148,969	3,064,612	2,166,247	4,096,835	4,289,349	4,439,596	2,381,338	2,473,595	2,846,986
	62,377	32,267	780,382	419,014	120,417	76,322	1,012,221	918,305	963,176	510,673	416,673	527,603
	53,312	30,092	—	—	101,393	62,450	157,690	124,479	154,705	81,570	65,745	92,542
s	148,221	80,318	120,211	64,377	14,635	8,670	228,762	238,108	283,067	115,123	113,643	153,365
	1,488,098	765,571	1,169,820	632,544	3,419,641	2,416,054	5,711,106	5,787,650	6,077,559	3,262,302	3,261,427	3,814,169
ptember 1911)	*1,301,254*	*571,261*	*1,141,537*	*551,583*	*3,344,859*	*2,138,583*	—	—	—	—	—	—
ptember 1910)	*1,336,775*	*597,000*	*1,051,189*	*525,975*	*3,323,142*	*2,139,327*	—	—	—	—	—	—
	—	—	—	—	—	—	87,409	91,103	97,679	63,874	70,500	85,817
uel	—	—	—	—	—	—	101,402	118,799	125,373	69,179	87,078	103,443
& manufactured fuel	—	—	—	—	—	—	5,899,917	6,000,852	6,300,611	3,395,355	3,419,005	4,003,429
	First nine months of 1912.						First nine months.					
	822,044	589,361	452	248	947,994	818,615	1,812,352	1,762,204	1,770,490	1,438,500	1,316,549	1,408,224
	7,712,715	3,571,979	2,016,209	1,102,168	23,081,277	16,439,694	33,831,913	34,735,081	32,810,201	20,115,919	20,021,628	21,113,841
	492,969	238,585	6,534,872	3,108,862	727,182	454,563	7,711,341	7,743,871	7,755,023	3,972,856	3,764,503	4,102,010
	316,249	186,801	2,816	2,973	797,828	488,744	1,118,538	1,098,581	1,146,393	596,944	574,306	678,518
s	1,089,771	575,773	1,069,510	566,273	109,035	67,570	2,050,733	2,278,953	2,268,316	1,041,693	1,087,932	1,209,616
	10,463,748	5,162,499	9,623,859	5,080,524	25,662,816	18,269,186	46,524,877	47,618,690	45,750,423	27,198,912	26,764,918	28,512,200
ine months of 1911 ...	*10,701,824*	*4,723,865*	*9,752,846*	*4,686,509*	*27,164,020*	*17,354,544*	—	—	—	—	—	—
ine months of 1910 ...	*10,609,756*	*4,754,554*	*8,474,128*	*4,301,983*	*27,440,993*	*18,142,375*	—	—	—	—	—	—
	—	—	—	—	—	—	658,378	711,697	680,713	488,938	510,182	556,323
uel	—	—	—	—	—	—	1,139,144	1,236,582	1,115,631	779,254	861,505	871,234
manufactured fuel	—	—	—	—	—	—	48,322,399	49,566,969	47,516,767	28,467,104	28,166,665	29,939,766

ENGINEERING COMPANIES.

. **Limited.**—This private company has a capital of £3,000 in £1 shares, to of patentees and manufacturers of and ng and other machinery, &c., and to vith G. Wilson, J. R. Henderson and rectors, R. S. Allan and J. McEwan. Registered office, Radhaugh Bridge-

Limited—This private company has a capital of £10,000 in £1 shares, to of a steel manufacturer and merchant T. Inman as the Apex Steel Company. ncaster (chairman), E. A. Langbeck son. Registered office, 17, Attercliffe-

mpany Limited—Dividend of 2½ per be carried forward. For 1910-11 only paid.

e and Limestone Company Limited. y has been registered, with a capital s, to take over the colliery business r of Barhaugh, parish of Kirkhaugh, e Barhaugh Colliery; and to adopt F. M. Dryden. R. E. Beavis is nd secretary. Registered office, berland.

Co. Limited.—The report for the tates that the net trading profit was ed £4,094 profit on the sale of invest- ought forward, making a total of ce dividend absorbs £3,300, and the dividend of 10 per cent. on the me as last year, absorbing £5,000, 4,144.

ineering Company Limited.—This been registered, with a capital of 1,000 preference), to take over the A. W. Robson as the Bradford Gas Thornton-road, Bradford. First n (chairman and managing director for life) and E. Watts. Qualification, 200 shares. Registered office, Thornton-road, Bradford.

Breakwell (W.) and Co. Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to take over the business of a coal, &c., merchant carried on by W. Breakwell at Netherton, Worcestershire, as W. Breakwell and Co. Sole director, W. Breakwell. Registered office, Bone Pit Wharf, Netherton, Worcestershire.

Callender's Cable and Construction Company Limited.—The directors have decided to pay the usual interim dividend on the ordinary shares, at the rate of 10 per cent. per annum, subject to deduction of income-tax.

Coal Consumers' Federation Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of coal merchants, &c., and to adopt an agreement with Mallet and Co. Limited. Qualification of first directors, who are to be appointed by signatories, 500 shares. Registered office, 4, Fenchurch-buildings, E.C.

Dick, Kerr and Co. Limited.—The profits earned during the 12 months' trading to June 30 amount to £3,275, which, added to the sum brought forward from last year, makes a total of £40,166. Out of this sum the debenture interest and trustees' fees have been paid, and there has been reserved the sum required to provide for the premium payable on the redemption of the present debenture stock. These items absorb £11,850, leaving a balance of £28,316 available for appropriation. The directors purpose to pay a dividend of 6 per cent. per annum on the preference share capital, and to carry forward the balance of £10,016.

Douglas and Grant Limited.—This private company has been registered in Edinburgh, with a capital of £60,000 in £1 shares, to acquire and carry on the business of Douglas and Grant, Kirkcaldy, engineers, iron and steel founders, boilermakers, &c. First directors, L. Grant, D. Landale, G. E. Douglas, L. C. Grant, and A. Ness. Qualification, £200. Registered office, Dunnikier Foundry, Kirkcaldy.

Drake and Gorham Limited.—The report for the year ended June states, after paying bonuses due to the staff, there is a net profit of 9,021 and £1,301 was brought forward, making £10,322, which it is proposed to appropriate as follows: Dividend of 4½ per cent. per annum, £5,625; written off underwriting commission, £3,000; carrying forward, £1,697.

Farad Electrical Company Limited.—This private company has been registered, with a capital of £1,500 in £1 shares, to carry on the business indicated by the title. Governing director: H. J. Whitehead. Registered office, Farad House, 20, Fairfield-street, Wandsworth, S.W.

Germain Company Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of mechanical, electrical and general engineers and manufacturers, toolmakers, founders, &c. First directors, W. R. Shepbard, P. A. Mossay, P. Dewandre, E. Digneffe and the president of the Société Anonyme des Ateliers Germain (while said Société holds 1,000 shares). Registered office, 1-2, George-street, Mansion House, E.C.

Glasgow Electrical Engineering Company Limited.—This private company has been registered in Edinburgh, with a capital of £1,000 in £1 shares, to carry on business as electrical engineers, &c. First directors, J. H. Garby and J. Stevens. Qualification, 100 shares. Registered office 47, Pitt-street, Glasgow.

Harrison and Clough Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to take over the business of nut, bolt and screw makers, engineers and factors, carried on at Park-street Works, Keighley, Yorks, as Harrison and Clough, and to adopt an agreement with T. Harrison A. Clough. First directors, T. Harrison, A. Clough and F. C. Rhodes. Qualification, 50 ordinary shares. Registered office, Park-street Works, Keighley.

Hecco Developments Limited.—This private company has been registered, with a capital of £100,000 in £1 shares, to carry on the business of engineers, ironfounders and manufacturers of agricultural implements and other machinery, toolmakers, brass founders, boilermakers, millwrights, machinists, steel and tin-plate makers, &c. Signatories, R. A. Draper, 82, Lancaster-road, West Norwood, S.E., and H. E. King, 67, Gilbey-road, Tooting, S.W.

International Channelling Machines Limited.—The accounts for the year ended June 30 last show a profit, including £753 brought forward, of £5,282. The directors propose to place £3,000 to reserve (increasing it to £7,500), and to pay the dividend on the preference shares, leaving £1,298 to be carried forward.

Lindsay's Paddington Ironworks Limited.—This private company has been registered, with a capital of £12,000 (5,000 preference shares of £1 each, 16,000 ordinary shares of 5s. each, and 3,000 deferred shares of £1 each), to carry on the business of ironfounders, engineers, toolmakers, &c. First directors, B E Holland, J. W. Oay and L. Holland. Remuneration, £450, £270 and £180 per annum respectively.

Marsons (1912) Limited.—This private company has been registered, with a capital of £500 in £1 shares, to acquire the business of machinists and manufacturers of screwing tools, tackle, appliances and machinery, lately carried on by Marsons Limited at St. George's Works, Cumberland-street, Birmingham. First directors: C. Marson and W. B. Taylor. Qualification, 10 shares. Registered office, 21, Cumberland-street, Birmingham.

North of Spain Collieries Limited.—This company has been registered, with a capital of £80,000 in £1 shares, to enter into an arrangement for the acquisition of certain mines in Spain and to develop and turn to account same. Signatories include: M. Dickerson, 30, Alma-road, St. Albans; G. C. Harvey, 112, Kilmorie-road, Forest Hill, S.E.; and A. L Nix, 14, Clarendon-street, Pimlico, S.W. Qualification of first directors (who are to be appointed), £100 Remuneration, £100 each per annum (chairman and vice-chairman, £150 each) and a percentage of the profits. Registered office, 5, Salters' Hall-court, Cannon-street, E.C

Oldham Bolt and Nut Works (1912) Limited.—This private company has been registered, with a capital of £5,000 in £1 shares, to acquire the machinery, plant, and stock-in-trade of the Oldham Bolt and Nut Works Limited, and to adopt an agreement with T. Harrison and A. Clough. First directors: T. Harrison, A. Clough, and F. C. Rhodes. Qualification, 50 ordinary shares Registered office, Lower Moor Ironworks, Derker-street, Oldham.

Peterson, Honeyman and Co. Limited.—This private company has been registered in Edinburgh, with a capital of £5,000 in £1 shares, to carry on business as exporters and importers of coal, iron, steel, &c. First directors: Mrs. Agnes E. Peterson and T. Tobiassen. Qualification, 100 shares. Registered office, 11, Bothwell-street, Glasgow.

Stothert and Pitt Limited.—The accounts for the year ended June show a profit, including £3,313 brought forward, of £15,119 After placing £1,000 to reserve (raising it to £10 000), the directors recommend a dividend of 7½ per cent., leaving £1,628 to be carried forward.

Vulcan Foundry Company Limited.—The report shows that during the year ended June last £18,436 was written off for repairs, renewals and depreciation of premises and plant. The board recommend a dividend of 10 per cent. on the ordinary shares for the year. The revenue reserve, after payment of the dividends declared at the last annual meeting, amounted to £78,768, and when credited with the profits of the past year and debited with the present dividends it will be increased to £90,107. The following figures summarise the year's results:—Gross profit, £59,199; directors' fees, &c., £1,611; depreciation, renewals, &c., £18,437; net profit, £39,151; income-tax, £1,493; preference dividend, £5,000; ordinary dividend, £25,257; general interest, £3,938.

Mortgages and Charges.—We are asked to state that the announcement given under the above heading in our issue of the 27th ult., in regard to the satisfaction of mortgage and charge on the business of Messrs. Baxendales Limited (in liquidation), does not refer to Messrs. Baxendale and Co. Limited, the well-known safety lamp makers, whose capital is unencumbered in any way.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Abstracts of Contracts Open.

Abergavenny, October 16.—For hard cobble coal, for the Abergavenny Group of Council Schools.

Borrisokane, October 21.—For 6 tons of the best double-screened Wigan coal, for the Guardians.

Cardiff, October 20.—For about 2,740 tons of large screened house, 920 tons of large screened smokeless steam, 576 tons of through-and-through smokeless steam, 3,375 tons of washed steam nuts, 550 tons of washed steam beans, 247 tons of washed anthracite nuts, 70 tons of smith's coal, and 40 tons of small coal; also 474 tons of gas coke, for the Corporation.

Chichester, October 17.—For 500 or 1,000 tons of Welsh steam coal, for the Corporation.

Farnham (Surrey), October 15.—For Wyken Ell coal spires, best Cresswell Top Hard hand-picked large, hard steam coal, and best Portland hand-picked hard, for the Urban District Council.

Grimsby, October 21.—For 12 months' supply of fine slack coal, for the Corporation.

Isleworth, October 15.—For steam and house coal, for the Brentford Guardians.

Khartoum (Egypt), October 14—Tenders are invited by the Steamers Department of the Sudan Government for the supply of 12,200 tons of Crown brand patent fuel (briquettes).

London, October 15.—The London County Council invites tenders for the supply and delivery from November 1, 1912, to June 30, 1913, of about 110,000 tons of coal for the Generating Station (Tramways Department), East Greenwich.

Maidstone, October 17.—For coal, for the Corporation

Manchester, October 14.—For good burgie, approximate quantities 4 200 tons and 9,750 tons respectively, for the Corporation.

Milborne St. Andrew (Dorset), October 10.—For 30 tons of coal, for the Dorset County Boys' Home, Milborne St. Andrew.

Mountain Ash, October 14.—For coal and coke, for the Governors of the Calligaer County Schools.

COAL AND COKE EXPORTED FROM PORTS IN ENGLAND, SCOTLAND AND WALES

During the month of September 1912, compared with the corresponding month of 1911.*

Port.	September 1912.		September 1911.		Coals.		Coke.	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle	879,147	19,785	785,995	27,111	93,152	—	—	7,326
North Shields	72,734	108	138,727	464	—	65,993	—	256
South Shields	115,641	1,672	138,910	1,323	—	23,269	349	—
Sunderland	212,316	3,935	236,166	4,230	—	23,850	—	295
West Hartlepool	109,914	1,314	125,299	2,337	—	15,385	—	1,023
Goole	145,842	3,958	92,340	2,075	53,502	—	1,883	—
Blyth	364,775	955	343,076	991	21,699	—	—	36
Newport	374,286	1,610	359,027	1,941	15,259	—	—	331
Liverpool	24,923	2,361	48,943	1,990	—	24,020	371	—
Methil	197,226	1,745	239,982	2,231	—	42,756	—	486
Glasgow	173,310	1,715	181,400	2,439	—	11,090	—	724
Kirkcaldy	8,407	—	9,499	—	—	1,092	—	—
Burntisland	193,047	702	174,772	—	18,275	—	702	—
Cardiff	1,587,815	5,104	1,402,379	7,387	185,436	—	—	2,283
Borrowstoness	48,845	1,732	49,079	193	—	234	1,539	—
Llanelly	13,559	—	10,411	—	3,148	—	—	—
Middlesbrough	2,007	6,766	362	3,232	1,645	—	3,534	—
Seaham	78,439	—	80,094	388	—	1,655	—	383
Swansea	270,721	3,106	256,538	224	14,183	—	2,882	—
Granton	10,607	1,449	13,826	4,172	—	3,219	—	2,723
Port Talbot	149,360	254	133,694	1,051	15,666	—	—	797
Alloa	15,758	—	17,187	—	—	1,429	—	—
Grangemouth	118,355	9,192	148,087	6,112	—	29,732	3,080	—
Neath	16,138	—	14,102	—	2,036	—	—	—
Hull	395,897	6,842	366,193	1,989	29,404	—	4,853	—
Amble	36,092	—	41,726	—	—	5,634	—	—
Troon	10,913	—	2,507	—	8,406	—	—	—
Grimsby	118,568	613	137,505	360	—	18,937	253	—
Ayr	4,147	—	1,059	—	3,088	—	—	—
Greenock	—	—	—	—	—	—	—	—
Leith	161,197	—	116,623	1	44,574	—	—	1
Ardrossan	2,855	—	6,653	—	—	3,798	—	—
Stockton	—	—	—	—	—	—	—	—

COAL AND COKE SHIPPED FOR LONDON AND OTHER PORTS IN THE UNITED KINGDOM.*

Port.	September 1911.		September 1912.		Port.	September 1911.		September 1912.	
	Coals.	Coke.	Coals.	Coke.		Coals.	Coke.	Coals.	Coke.
	Tons.	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.	Tons.
Newcastle	492,557	1,293	399,857	45	Ayr	64,663	60	55,621	—
North Shields	—	—	104	—	Irvine	6,382	—	3,438	—
South Shields	3,535	—	5,560	—	Alloa	580	—	885	—
Blyth	14,607	—	24,968	—	Whitehaven	20,538	—	21,726	—
Amble	11,383	—	7,689	—	Liverpool	174,394	153	161,780	—
Sunderland	155,670	—	120,103	—	Grimsby	5,405	—	4,681	—
Seaham	89,125	—	90,701	—	Granton	16,000	—	12,835	—
Hartlepool	43,585	10	57,877	—	Borrowstoness	12,341	—	12,365	23
Stockton	—	—	—	—	Burntisland	39,280	—	41,554	—
Middlesbro'	250	90	—	25	Kirkcaldy	3,003	—	3,611	—
Hull	91,010	—	80,249	491	Methil	20,761	—	24,090	—
Goole	126,755	—	132,852	—	Port Talbot	15,347	300 pf	27,103	729 c 300 pf
Swansea	18,920	400	36,430	440	Glasgow	47,111	614	35,230	582 c 100 pf
Cardiff	254,626	60	247,560	1,310	Grangemouth	22,353	50	17,500	430
Llanelly	4,812	—	7,071	—	Greenock	1,443	—	1,740	100
Newport	57,010	700 c 40 pf	61,068	17	Neath	12,725	—	5,814	—
Troon	26,640	—	19,363	—	Leith	8,575	—	3,724	6
Ardrossan	7,749	—	7,462	—					

* From *Browne's Export List.*

Nuneaton, October 16—For coal, for the Education Committee.

Smethwick, October 22.—For about 10,000 tons of gas coal and nuts, for the Corporation.

Wakefield, October 19.—For (1) coal and (2) coke, for the Education Committee.

he date given is the latest upon which tenders can be received

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Aldershot, October 15.—*Balancer, &c.*—For one balancer with switchgear, for the works in Laburnum-road, Aldershot, for the Urban District Council.

Bucharest (Roumania), November 25—*Steel Tubes*—For the supply of 600,650 m. of 127 mm.; No. 2, 90,300 m. of 228 mm., and 210,027 m. of 254 mm., for the Roumanian State Railways. Tenders to the Direction des Chemins de Fer.

Cairo (Egypt), November 25-30, December 10-14.—*Rails, &c.*—Tenders are invited by the Egyptian State Railways and Telegraphs Administration for the supply of (1) 14,150 metric tons of Vignole rails; (2) 2,847 metric tons of fishplates; (3) 760 metric tons of coachscrews; (4) 240 metric tons of bolts and nuts; and (5) 90,000 cast iron rail chairs. Copies of the *cahiers des charges* can be obtained by firms on the official list of approved manufacturers from Mr. A. L. Webb, C.M.G., Queen Anne's-chambers, Broadway, Westminster, London, S.W., on payment of 4s.

Chesham, October 26.—*Motor-driven Pumps.*—For No. 3 combined electric motors and low-lift centrifugal pumps, with capacities of 15,000 and 20,000 gallons per hour respectively, for the Urban District Council.

Coppull.—*Tunnel Driving.*—For driving tunnel about 200 yards. Tenders to Blainscough Colliery Company Limited, Coppull.

Eccles, October 14.—*Motor Fire Engine.*—For a four-cylinder petrol-driven motor fire engine, with first-aid equipment and fire escape combined, ready for running and attendance at a fire, for the Corporation.

Gillingham, October 22.—*Diesel Engine Plant.*—For one 500-horse power Diesel engine and alternator, for the Corporation.

Melbourne (Australia), October 22.—*Cable.*—For 1,680 yards 1·25 square inch lead-covered cable, 1,260 yards 0·3 square inch lead-covered cable, 7,290 yards 0·15 square inch lead-covered cable, 4,000 yards 19-15 S.W.G. lead-covered cable, 1,760 yards 7-14 S.W.G. lead-covered cable, 4,720 yards 7-16 S.W.G. lead-covered cable, for the Corporation.

Melbourne (Australia), January 6.—*Hydro-electric Power Plant, &c*—Tenders are invited by the Mount Lyell Mining and Railway Company for the supply and delivery of (1) a hydro-electric power plant, including pipe line, four turbines of 1,750-b.h.p. each, generators and accessories, transmission line and sub-station equipment; and (2) four motor-driven centrifugal blower sets for blastfurnace work, two similar sets for supplying air to converter vessels and a complete switchboard, with starting resistances, to control the blowers. Forms can be obtained at the London offices of the company, Palmerston House, Old Broad-street, London, E.C., at a cost of 21s. each set.

Rangoon (Burma), October 15.—*Spigot, &c., Pipes.*—For approximately 7,500 yards of 42 in. diameter lap-welded spigot and socket steel pipes of British manufacture, for the Municipal Committee.

Rotherham, October 16.—*Turbo-alternator, &c.*—For one 1,000 kw. steam turbo-alternator, condensing plant, steam and exhaust pipes, high-tension switchgear, &c., for the Corporation.

Stockholm (Sweden), October 15.—*Sheet Iron.*—Tenders are invited for five tubes of sheet iron of 3·5 m. inside diameter, and from 6 to 20 millimetres thick, and one tube of sheet iron of 0·85 m. diameter, and from 6 to 8 millimetres thick; the total weight of the iron being about 200 tons. Copies of the specifications, &c. (in Swedish), together with drawings, can be seen by British manufacturers at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Stoke-on-Trent, October 14.—*Tram Rails.*—For about 10 tons of new or secondhand tramway rails, about 20 lb. to the yard, for the Corporation.

Stourbridge, October 28.—*Boilers, &c.*—For two Lancashire boilers, each 7 ft. diameter and 24 ft. long, for a working pressure of 185 lb. per square inch, together with superheaters and economiser, for the Stourbridge and District Water Board.

North of England Institute of Mining and Mechanical Engineers.—A general meeting will be held in the Wood Memorial Hall, Newcastle-upon-Tyne, at two o'clock to-morrow (Saturday). The following papers will be read or taken as read:—"The Ignition of Coal Gas and Methane by Momentary Electric Arcs," by Prof. Wm. Thornton (with experimental illustrations); "Electrically Driven Winding Engines in South Africa," by Mr. A. W. Brown (illustrated by lantern slides); "A Photographic Method of Rapidly Copying out Pay Notes in Use at Throckley Colliery," by Messrs. T. V. Simpson and C. W. Bell.

F PATENT SPECIFICATIONS
ENTLY ACCEPTED.

rovements relating to Control Mechanism
Devices of Mining Apparatus. Mans-
efer Bauende Gewerkschaft, of 58, Markt,
—The present invention has for its
ratus common to the lifting devices of
ns each comprising a similar control
the lifting device of each section, the
bers being either positively connected
at the same control lever movement sets
r for the admission of the pressure
lifting device and the other control
ing the pressure medium from the other
is adjustment or setting of the two
effected by separate control levers. In
h permits of multiple reversals of the
without the lifting device of the other
therein, the control apparatus is
anner that the control lever, which for
in the lifting position, positively con-
rol lever into that position in which the

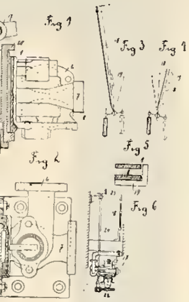
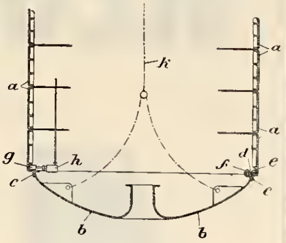


Fig 1 Fig 3 Fig 4 Fig 2 Fig 5 Fig 6

ther section sinks into the inoperative
es the control apparatus may comprise
of which the axis of rotation of the
ers is mounted in such a manner that
bers are caused to occupy the position
the pressure medium to permit of
the lifting devices of both sections for
tely freeing the shaft for the descent.
spectively a side elevation and plan,
on its left-hand half; figs. 3 and 4
positions of the two control levers
upon each other; fig. 5 is a section of
level with the driving dog; and fig. 6
he apparatus for shifting the pivot of
vers. (Three claims.)

ovements in or relating to the Sinking of
Tiefbohr u. Schachtbau Aktiengesell-
Dusseldorf 2, Germany.—This inven-
ratus and process by means of which
from the surface the cast iron bottom
ing shafts with cast iron tubbing to
water, without any possibility of this
ing of the bottom being prevented or
by the said water. The use of such
keeping off the water contained in
nce, described in the Patent Applica-
No. 5306, filed March 2, 1912, but in
scribed, as well as in other sinking
a cast iron protective bottom, the
cannot be extracted from the interior
urface. The present invention enables
ve bottom to be pulled up from the
d exchanged without the shaft water
eration. The invention consists in a
also in a process which can be carried
e apparatus in question. The novelty
rrangement consists in the packing
bottom and the lowest tubbing ring
hitherto, in a horizontal plane, but
tely vertically, for which purpose a
, provided with an approximately
al flange, which presents a seat for
ards. The connection between the
ottom is effected by circular or arc-
es, engaging by means of screws or the
th the protective bottom, and, on the
aped piece, and pressing the protec-
conical packing seat—that is to say,
ing above referred to. The process
his invention with the use of the above
or apparatus consists in a sufficient
es or the like being inserted between
and a flange on the lining, when the

bottom is to be removed from the shaft, whereupon the plates are removed by loosening the corresponding fixing screws and the shaft is filled up to the surface with water, whereupon the above-mentioned latches are pulled back by means of cables guided over rollers on the surface or by means of an electric or hydraulic device from the surface, so that the shaft bottom can then be raised to the surface by



means of a strong supporting cable connected to it. In that way it is possible to extract the protective bottom from the shaft from the surface without the ground or shaft water interfering with the pulling up of the protective bottom. A construction according to this invention is diagrammatically illustrated in section in the accompanying drawing. (Four claims.)

13657 (1912). *Improvements relating to Rock Drills and like Percussive Tools.* G. Rayner, of Grange Farm House, Carterknowle-road, Sheffield.—This invention relates to rock drills and like percussive tools of the type having a valve thrown from side to side by exposing one end or the other to exhaust through the movement of the main piston; and it has for its object an improved valve mechanism which shall be equally suitable for the reciprocating piston type and the hammer type of tool, and an improved general construction whereby the manufacture of the parts of such tools is greatly simplified, the assembling of the parts in proper relationship to each other is ensured, and the position and dimensions or port openings may be readily adapted to different working conditions. According to the invention, use is made of a three-collar valve, the end collars serving to control the inlets and the middle collar controlling the exhaust from the main cylinder so far as it concerns the working of the valve, the main exhaust from the cylinder taking place direct to the atmosphere through one or more

FIG 1

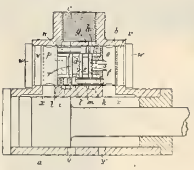
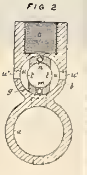


FIG 2



boles or openings made in the cylinder. The lining of the valve chest is formed with two holes corresponding in position to two annular inlet passages connected with the main supply, and it also has two narrow slots communicating with the annular passages, and a narrow slot communicating through an opening in the valve chest with the atmosphere. The slots are opened and closed by the three collars of the valve and provide adequate port area with the small valve throw, while the holes are always open to live motive fluid. The lining of the valve chest is also formed with passages communicating between the middle exhaust slot and two end port blocks and means are provided whereby to ensure the openings in the lining registering with those in the port blocks. Fig. 1 represents a longitudinal section and fig. 2 a cross section. (Three claims.)

13860 (1911). *Improvements in and relating to the Manufacture of Blasting Explosives.* O. Silberrad, The Silberrad Research Laboratories, Buckhurst Hill, Essex. — This invention consists in the production of explosives from the liquid nitration product described in Application No. 13861 of 1911 and hereafter referred to as "nitrol." In carrying the invention into effect according to one modification, a suitable quantity of soluble nitro-cellulose or collodion cotton is added to said nitrol, to effect gelatinisation by the aid of heat, and there is added thereto the desired amount of any suitable oxygen bearing salt with or without the addition of wood meal. The mixture is thoroughly incorporated and pressed into cartridges in the usual manner. For this purpose the following oxygen bearing salts are suitable: The nitrates and perchlorates of potassium, sodium or ammonium; the chlorates of potassium or sodium or any mixtures of these; but it is desirable to avoid any mixture containing a chlorate together with an ammonium salt as such a combination is likely to become unstable. Further, the keeping properties of the explosives produced are enhanced by the addition of a suitable preservative — viz., a small quantity of sodium or potassium bicarbonate, or when ammonium salts are present of ammonium benzoate. In cases where explosives are likely to be subjected to careless handling, then may be added a suitable quantity of any suitable deadening agent—as for example, castor oil, vaseline, camphor, or the like. The following example illustrates this modification of the invention: Nitrol, 15 to 25 parts; oxygen bearing salts, 50 to 85; soluble nitrocellulose or collodion cotton, 0·0 to 5; preservative, 0·1 to 1·0; wood meal, 0·0 to 5·0 parts. According to another modification, "nitrol" is introduced into explosives containing nitroglycerine, increasing the plasticity and generally increasing the efficiency of such explosives. For instance, mixtures of 80 to 90 parts of nitroglycerine, 8 to 12 parts of soluble nitrocellulose, and 5 to 10 parts of nitrol may be made—*e.g.*, a blasting jelly containing: Nitroglycerine, 85 per cent.; soluble nitrocellulose, 10; nitrol, 5 per cent. Again, a gelignite may be made containing nitroglycerine, say, 58 to 60 parts, soluble nitrocellulose 3 to 6 parts, potassium nitrate 20 to 40 parts, wood meal 0 to 6 parts, nitrol 1 to 10 parts, and sodium bicarbonate a trace—*e.g.*, nitroglycerine, 57·8 per cent.; soluble nitrocellulose, 4·8; potassium nitrate, 29·8; wood meal, 5·8; nitrol, 1·8 per cent.; sodium bicarbonate, a trace. (Four claims.)

15361 (1912). *Improvements in Winding Machines.* O. Imray, of Birkbeck Bank-chambers, Southampton-buildings, London (communicated by La Société Anonyme des Charbonnages de Rossais, Leval, Peronnes, Ste. Aldegonde et Genck, of 103, Boulevard de Waterloo, Brussels, Belgium).—In the winding machines for round cables at present in use in mines there are two drums, one of which winds up the cable of the ascending cage, while the cable of the descending cage is unwound from the other drum. The known arrangement of two drums *t t* in the same line, as shown in fig. 1 of the accompanying drawings, has the drawback that the machine takes up a considerable space, since each drum must be large enough to take the whole length of a cable, which may be 700 to 1,000 metres or more. The invention allows the two cables to be wound successively on the same drum. The arrangement according to the invention is shown in fig. 2, in which *b* is the working

Fig. 1.

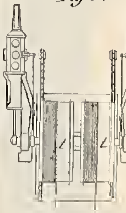
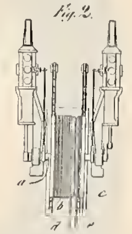


Fig. 2.



drum, having sufficient width to receive the whole length of the cable, while the part *c*, of very small width, is only for the purpose of adjusting the length of the cables. For this reason the part *c* is loose on the shaft; it is connected to the drum *b* in the ordinary working in the usual manner by coupling pins or otherwise. The cable *d* secured to the drum *b* is wound on it in the usual manner, and when the rotation of the shaft is reversed, cable *d* is unwound from the drum *b*, while the cable *e* attached to the narrow part *c* will be wound for two or three turns on *c* and then wound on the drum *b*. This method has the advantages of not only economising space, but effects still more important economies by lessening the length of the engine shaft, decreasing the total weight, and by the difference in cost between a drum properly so-called and the part *c*, which is of very reduced width and small weight. (One claim.)

20938 (1911). *Improved Process for the Recovery of Ammonia and By-products in Gas-producers.* W. Hunt, of the firm of Edmund Hunt and Co., 121, West George-street, Glasgow. (A communication from A. B. Duff, of Pittsburg, Pennsylvania, U.S.A.)—The improved process involves for its carrying out a producer of that kind having blowing grates divided by partitions into separate compartments, so that there may be produced a horizontal stratified blast—that is to say, a blast in which there are two differently proportioned or constituted layers, there being in some cases a larger proportion of air in the lower blast than in the upper. The invention has for its object to so proportion the constituents of these two blasts and to provide that their temperatures lie within certain well-defined limits, that those types of coking and hard-burning coals which it has not been possible to completely consume by means of either a single or stratified blast as hitherto used, may be employed in a producer for the production of ammonia and

(*Continued on page 760.*)

THE RECORD

840

square feet in one shift with

one "Siskol" Coal-Cutter.

INTERNATIONAL CHANNELLING MACHINES LD.,

SHEFFIELD.

e OFFICIAL figures
ently published by
I. Home Office show
t in the Manchester Dis=
t, for 1910, there were
Coal Cutters, of eleven
erent types, in use, of
ich 81, or more than half
he total number, were
SKOL" machines.

Is any further proof
ded as to which is the
t Coal Cutter?

NATIONAL CHANNELLING MACHINES LD.,
SHEFFIELD.

by-products with success, in that by the improved process in which the blasts are strictly delimited as to temperature and the proportions of their constituents, this type of coal is completely reduced to ash without waste. According to the invention, the upper stratum of blast delivered from the blowing device to the fuel bed of the producer is of air fully saturated with steam, and of a temperature within the limits of from 80 to 85 degrees Cent. Before delivery it is superheated to not less than 150 degs. Cent., as in certain other known producers where only one blast is used. The lower stratum of blast is of air saturated with steam and of a temperature of between 70 and 84 degrees Cent., the amount of steam carried by the lower stratum being always considerably less than the amount carried by the upper stratum. This lower blast may or may not be superheated to a temperature similar to that of the upper blast. The proportion of steam in the upper blast is such that its decomposition yields with the fuel the fullest proportion of ammonia. The proportion of air in this stratum is just sufficient to support that low stage of combustion most effective for the production of ammonia. There is, therefore, in this upper stratum a larger proportion of steam than in the lower stratum. The proportion of air in the lower stratum is sufficient to maintain that higher rate of combustion which will reduce the type of fuel treated completely to ash. The proportion of steam is merely sufficient to check excessive rapidity of combustion. There is, therefore, in this lower stratum a larger proportion of air than in the upper stratum. Thus, instead of as hitherto the ammonia producing blast so reducing the temperature of the fuel that coke falls to the ashpit instead of ash, according to the improved process, the fuel reduced in temperature for the production of ammonia in the upper stratum of the blast has its temperature resuscitated and is burnt to ash by the greater oxygen contents of the low stratum of blast—the extent of the resuscitation being, however, limited by the proportion of steam which that lower blast carries.

19462 (1911). *Improvements in and relating to Tools for Boring Earth and Soft Rocks.* A. Wolf, of 7, Jochmannstrasse, Liegnitz, Germany.—This invention relates to tools for boring earth and soft kinds of rock, and is an improvement on earth boring tools in which the material passes up the inside of a cylindrical part having cutters at its lower end. The boring tool, according to the invention, is intended for boring through the most unfavourable, stony and compact kinds of soil without difficulty, and comprises ploughshare-like cutters for loosening the soil by means of their points, which extend outwards beyond the cylinder and widen gradually into the form of a blade and cause the earth to turn upwards. Fig. 1 is an elevation of the improved share-like cutter; fig. 2 is a section taken at C—D fig. 1; fig. 3 is a section taken at A—B; fig. 4 is a transverse section through the complete tool; and fig. 5 is a longitudinal section at E—F fig. 4 showing the arrangement of the cutters in their casing or cylinder. (Two claims.)

FIG 4

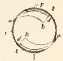


FIG 3

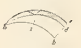


FIG 1

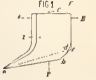
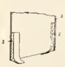


FIG 2

FIG 5



27660 (1911). *Improved Haulage Clip.* J. Whalvin, of Halls-road, Stapleford, Nottingham.—This invention relates to a clip which will hang from one end of the wagon and which will be sufficiently long to engage with the haulage rope when it is desired to put the wagon in motion. Fig. 1 is a front elevation of the improved clip in a closed position; fig. 2 is a side view showing the clip in an open position. Referring to figs. 1 and 2 the body H has at its top part a hook for attachment of the clip to the wagon, the style and size of the hook being modified to suit conditions. This body has four lugs or projections, the top two of which carry a pin on which the catch C is supported and which allows the catch to swing to and fro. The bottom two projections carry the fulcrum pin F for the lever L. The bottom or jaw of the body H, likewise of the catch C, may be of semicircular form as shown, or the inner surface which comes in contact with the rope may be of V-shape, thus making a rectangular hole when the clip is closed. The flat spring S is attached to the body of the clip H by a screw or other method and serves to force out the catch C when the lever L is pulled down. The clip is operated by the lever L, and it is evident that when this lever is pushed up the clip is closed by the nose N and obtains a grip on the rope, and when the lever is pulled down the clip disengages itself from the rope. The extent of the closing of the clip will be controlled by the length of the nose N on the lever L or it may be effected by the pin F, and in that case the pin would be of eccentric form. (One claim.)

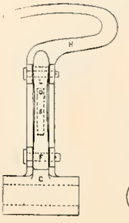


FIG 1.

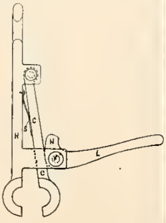


FIG 2.

GOVERNMENT PUBLICATIONS.

⁂ Any of the following publications may be obtained on application to this office at the price named post free.

Consular Reports: Leghorn, 2d.; Kermanshah, 4d.; Malaga, 4d.

Finance (1909-10) Act: 1910 Appeals Return, 3d.

National Insurance: Regulations, September 19, 1912, 1½d.; Model Rules for Medical Benefit, 1d. each, 3s. 3d per 100; Initial Expenses Order, October 2, 1912, 1d.; Special Order Enquiry Rules, September 20, 1912, 1d.

Colonial Reports: Bechuanaland Protectorate, 1911-12, 3½d.; Nyasaland, 4d.

Trade and Navigation Returns, September, 1s. 8d.

Bankruptcy Act Proceedings, 1911-12, 1d.

Companies' Consolidation Account, 1911-12, 1d.

Science Syllabuses, 12 for 7d.

PUBLICATIONS RECEIVED.

Knocker's Digest of Workmen's Compensation Cases. By Douglas Knocker. London: Butterworth and Co. Price 15s.

[This digest contains every case of present utility or authority decided under any of the Workmen's Compensation Acts and Rules in the House of Lords or the Supreme Court of Judicature in England up to May 15, 1912, and reported either before or since, and every such case decided in the Scottish Court of Session or the Supreme Court of Judicature in Ireland and reported up to May 15, 1912. The plan followed is excellent. Under each word or phrase in the Act the judicial decisions bearing thereon are set forth, the decisions in favour of employer and workman respectively being given in parallel columns. Space is left for noting up subsequent cases as they arise. There is also a good index and a table of cases.]

Second Report to the Secretary of State for the Home Department of the Explosions in Mines Committee. London: H M. Stationery Office. Price 7½d.

[This is given *in extenso* elsewhere in this issue.]

Records of the Geological Survey of India Vol. 42, Part 2. Calcutta: The Survey. Price 1 rupee.

[This part contains the General Report of the Director, Mr. H. H. Hayden. During the period covered the chief economic enquiries, as regards coal, were carried out in the Namchik valley, Assam, and in the Dilwal plateau of the Salt Range, Punjab, the results apparently being of little significance. The part also contains a report on "Dicotyledonous Leaves from the Coal Measures of Assam," by Dr. Seward.]

International Directory of the Book Trade, 1912. Berne: International Congress of Publishers.

[This bulky volume enables reference to be made according to various methods, the firms being arranged, in the first instance, in alphabetical order, and further, according to specialties, countries, geographical distribution and places.]

Commission of Conservation. Report of the Third Annual Meeting held at Ottawa January 16, 1912 Montreal: John Lovell and Son Limited.

Redress by Arbitration. By H. Foulks Lynch. Fifth edition, by A. R. Rudall. London: Effingham Wilson. Price 5s.

[This little book is useful to those engaged in arbitrations, as a means of learning quickly the law on various points that may arise. There are four chapters, dealing respectively with the submission, the arbitrators and umpire, the award, and incidental matters, whilst the appendix contains a number of forms, and the text of the Arbitration Act of 1889.]

The Truth About the Firemen's Examinations (Coal Mines Act, 1911, Sections 15 and 123b). By T. A. Southern. Price 6d.

Colliery Working and Management. By H. F. Bulman and R. A. S. Redmayne. Third edition. London: Crosby Lockwood and Son. Price 5s. net.

[A third edition of Messrs. Redmayne and Bulman's book is welcome at the present time, as it deals, as does no other, with the multifarious responsibilities of management, especially on the labour side. It describes the various classes of labour employed, the wages paid, the cost of working in different districts, and the profits earned by collieries. But little new matter seems to have been added, but the price has been reduced from 18s. to 5s., and we may look forward, we hope, to a further edition in which the authors will attack the new problems that have been produced by recent legislation, a work for which they are eminently fitted.]

NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

22144. Annealing furnaces. R. B. Thomas and T. F. Davies.
22152. Automatic safety device for use on railways. A. S. Cushing.
22163. Driving-chains. C. G. Renold and H. Renold Limited.
22217. Conveyor shoots or shaker channels. W. E. Kreiss.
22240. High explosives. W. S. Pierce.
22244. Lamps using liquid fuel. F. J. H. Rustige.
22288. Safety-devices for lifts or elevators. J. M. Martin and J. L. Gordon.
22357. Disintegrators. H. Buckley.
22361. Controlling the starting and working of power engines. A. Esplen.
22362. Ventilators. A. W. Farrer.
22363. Mode of detecting temperature variations and means therefor. E. A. Graham and W. J. Rickets.
22364. Systems of cable working. J. Gott.
22413. Treatment of complex sulphide and oxidised ores for the recovery therefrom of silver, gold, copper, zinc, lead, and the like. C. G. Bateman.
22427. Manufacture of steel. J. Fattelay (*dit* Victor).
22450. Mine exploders. Sterling Telephone and Electric Company Limited.
22501. Apparatus for removing flue dust and residues of combustion by means of suction from flues, smoke tubes, smoke boxes, and the like. T. Gruenwald.
22532. Metallic alloys. J. F. Duke.
22550. Treatment of copper. J. Kich.
22561. Electric furnaces. British Thomson-Houston Company Limited.
22655. Apparatus for washing coal and other minerals. A. France and P. Habets.
22679. Apparatus for preventing overspeeding and overwinding in colliery winding engines and the like. H. J. Moysey.
22692. Means or apparatus for scotching the wheels of vehicles, more particularly colliery tubs or wagons. H. Houghton.
22693. Continuous furnace for volatising chloride of tin from the prepared ore. H. Dixon.
22694. Furnaces. J. A. Rollinson and S. Rollinson.
22704. Cranes. C. M. Toplis.
22712. Machines for sharpening the teeth of saws for cutting steel or other metals. T. Humpage.
22715. Furnaces. H. Pape.
22738. Safety electric lamps more especially intended for use in mines. W. H. Hanson, H. L. Langston, and Electrical Power Storage Company Limited.

Complete Specifications Accepted.

To be published on October 24.

1911.

15352. Fire-tube boilers. Pielock.
19214. Superheaters. Woodroffe.
19305. Electric furnaces. Queneau.
21257. Rock-drills. Knapp.
21347. Air or gas compressors. Williams.
21433. Machines and appliances for boring rock, coal, and the like. Buckley and Smith.
21545. Elevating device for coal washing plants or the like. Greaves.
21588. Construction of smelting and fusing furnaces. Govan.
21681. Apparatus for spraying liquid fuel. Polliak and Howson.
24225. Workmen's time recorders and similar apparatus. Benzing.
24336. Chain grate stokers. Rosenthal and Davy.
28489. Process for rendering peat, wood waste and other vegetable substances suitable for the manufacture of paper pulp. Hellwig and Herrmann.
28495. Self-cleaning skip or truck for coal and other materials. Griffin.
28745. Jigging machine. Schuchard.
28789. Bearing for roller mills and other machines. Jones and Folland.
29348. Pouring gates for moulds and the process of forming same. Mills and Joyce.

1912.

1361. Steam superheaters for locomotive engines. Ferguson Superheaters Limited and Ferguson.
5519. Method of treating cast metal ingots. Russell.
9693. Mechanical stokers. Babcock and Wilcox Limited.

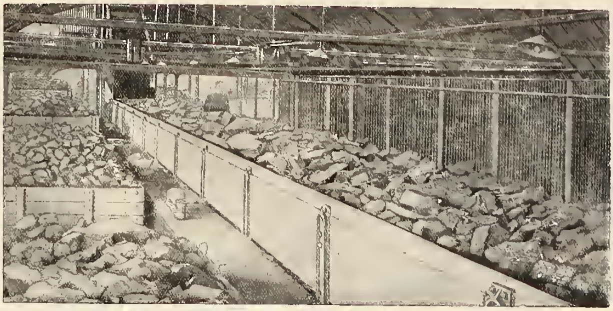
Complete Specifications open to Public Inspection before Acceptance.

1912.

16172. Process for removing sulphuretted hydrogen from gases. Burkheiser.
16864. Jigger or sorting machine for coarse and finer ores, coal and other substances. Hirtz and Krahé.
20108. Process of and apparatus for roasting ores and the like. Bracq.
21547. Steam boilers. Kestner.
21815. Hoists or lifts for conveying loads of all kinds. Schlösser.
21837. Compression of air and other gases. Aumont.
21842. Steam generators. Chantiers et Ateliers Augustin Normand.

At the Alnwick Petty Sessions, on Saturday, application was made on behalf of Messrs. John and William Storey, to have registered premises for the storage of explosives while they were engaged in sinking a pit shaft on the Southside Farm, at Sturton Grange, near Warkworth. The Bench granted the application.

OTTON BROS. LD.,



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X X GENERAL WARNING. X X X

NOTICE is hereby given, that in an action for Infringement of Blackett's Patent No. 14,953, of 1901, raised in the Court of Session, Edinburgh, at the instance of the Patentee, William Cuthbert Blackett, Mining Engineer, of Acorn Close, Sacriston, in the County of Durham, Complainer, against Dickson & Mann Limited, Engineers and Steel Founders, incorporated under the Companies' Acts, and having their registered office at Bathville Steel Works, Armadale, in the County of Linlithgow, Respondents, the Lord Ordinary (Lord Guthrie) by his Interlocutor or Order dated 17th November, 1908 (*inter alia*) certified the validity of the said Patent, in terms of section 35 of the Patents and Designs Act, 1907.

The Patentee hereby WARNS the trade and the public generally against making, selling, buying, dealing in or using Conveyors made in infringement of the said patent, which it is his intention to support and vindicate by all necessary means including legal proceedings. And further CAUTIONS infringers that they render themselves liable to an injunction or interdict with costs or expenses as well as to damages and delivery up of all infringing apparatus.

Dated this 25th day of January, 1909.

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Theedam, E. C., Ld., Dudley
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

ACCUMULATORS
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent

ACID PLANT
Daglish, Robert, and Co. Ld., St. Helens, Lancs.

AIR ANALYSIS APPARATUS
Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

AIR COMPRESSORS
Bailey, W. H., and Co. Ld., Salford, Manchester
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Bever, Dorling and Co. Ld., Bradford, Yorks
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co., St. Helens, Lancashire
Davis, John, and Son (Derby) Ld., Derby
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
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Harvey, G. A., and Co., Lewisham, London, S.E.
International Channelling Machines Ld., Sheffield
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Mining Engineering Co. Ld., (The), Sheffield
Nuneaton Engineering Co. Ld., Nuneaton
Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., F. Department, Ipswich
Robey and Co. Ld., Globe Works, Lincoln
United States Metallic Packing Co. Ld., Bradford
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

AIR PIPES
Allen, A., and Son Ld., Lower Gornal, Staffs.
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British Mannesmann Tube Co. Ld., London Wall
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Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Wood, John, and Sons Ld., Wigan

ALTERNATORS
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Mather and Platt Ld., Manchester
Mavor & Coulson Ld., 47, Broad-street, Glasgow

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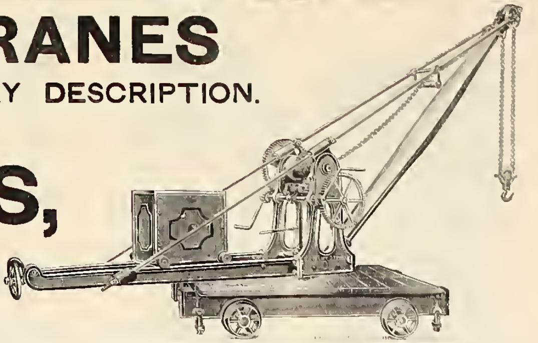

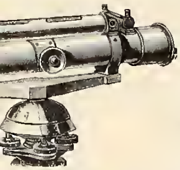

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Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating)
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Files
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

Fire Appliances
Fell, C. A., Dronfield, near Sheffield
Jacobson, Richard, 70, Shoe-lane, London, E.C.
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Purchasers' Guide to Advertisers' Specialities. (*continued*).

HINERY
Co., Holbeck-lane, Leeds

ply Co. Ld., 1, Pearson-pl., Cardif
Ld., Leeds
eral Engineering Co. Ld., Notts
nd Co., Midland Works, Sheffiel
el, & Coal Co. Ld., Stoke-on-Tren
Ld., Albion Works, Sheffield

ND STEEL)
Wagon Co. Ld., Chorley, Lanc
ls Ld., Nile-street, Birmingham
Works Ld., Great Bridge, Tipto

Co. Ld., Little Hulton, Bolton
house Electric and Manufacturing
nchester
ndler Ld., Hednesford, Staffs.
. Ld., Belfast
de Ld., Worcester
d., Stapleford, Nottingham

k Co. Ld., Sheffield

d., Stafford
Wagon Co. Ld., Chorley
k Co. Ld., Sheffield
, Lowmoor Ironworks, Bradford
nd Co., Midland Works, Sheffield
ring Co. Ld., Newport
igan) Ld., Wigan
and Co., Tipton
s Co. Ld., Sheffield

ES
nd Co. Ld., Bradford, Yorks.
Co. Ld., Castleton, Manchester
and Co. Ld., St. Helens, Lancs.
s Ld., 3, London Wall Bldgs., E.C.
nd Co. Ld., Nailsworth, Glos.
H., and Co. Ld., Wakefield
le) Ld., Tipton
d., Ipswich
Co. Ld., Pendleton, Manchester
Ld., Dudley
Vulcan Ironworks, Wigan
(Wigan) Ld., Wigan
ons Ld., Brook Foundry, Wigan
and Co., Tipton

S
field, near Sheffield
tapleford, Nottingham
nd Son, Dept. 11, Blackburn
Co. Ld. Bradford

t, Sheepscar Foundry, Leeds
ring Co. Ld., Newport
Co., Albion-place, Leeds

Co. Ld., Little Hulton, Bolton
., Stapleford, Nottingham
Ld., Hammerton-st., Burnley
Vulcan Ironworks, Wigan

K
Ld., Worcester and Manchester
Vulcan Ironworks, Wigan
Sons Ld., Wigan

Co, Ld., Tuckingmill, Cornwall

Co. Ld., Tuckingmill, Cornwall
. Ld., 32, Queen Victoria-st., E.C.
oy Ld., Cannon-st. House, E.C.
Son (Derby) Ld., Derby
Apparatus Co. Ld., Cinderford
s Co. Ld., Glasgow

.Ld., Elverton-st., Westminster
use Electric and Manufacturing
hester
o., Holbeck-lane, Leeds
ral Engineering Co. Ld., Notts
., Lincoln
wall Works, Birmingham

ke Oven and Bye-Product Co.,

use Electric and Manufacturin
hester
oke Oven and Bye-Product Co.,

Ld., Manchester

and Co., 10, Victoria-street,

S
Ld., Morley, Leeds
Son (Derby) Ld., Derby

TTINGS
Sons, Wolverhampton
Ld., Birmingham & Glasgow
Works Ld., Great Bridge, Tipton

thell Ld., Bristol

street, Leeds
son (Derby) Ld., Derby
, Edmund-pl., Aldersgate, E.C.
Co. Ld., Huddersfield
, 70, Shoe-lane, London, E.C.
d., Dudley
Co., 8 & 12, Vauxhall-rd., L'pool

TECTORS
street, Leeds
, 70, Shoe-lane, E.C.
Co. Ld., Huddersfield
d., Dudley

street, Leeds
g Ld., 28, New Bridge-st., E.C.
Co. Ld., Huddersfield
Co. Ld., Bradford

MOTOR LORRIES CARS &C.)
ons (Hudd.) Ld., Huddersfield

and Helsby Cables Ld., Prescot
ons (Hudd.) Ld., Huddersfield
dler Ld., Hednesford, Staffs.
d Co., 27, Queen Victoria Street
nd Co. Ld., St Helens, Lancs.
ring-street, Nottingham
ge Ld., Pendleton, Manchester
ring Co. Ld., Nuneaton.
arham Ld., Burton on-Trent
Wigan) Ld., Wigan
an Ld., Brook Foundry, Wigan

STEEL)
Co. Ld., St. Helens, Lancs.
Water-lane, Leeds
Ld., Manchester
ss, Liverpool
Newport, Mon.
Co., Midland Works, Sheffield
, Leeds Steel Works, Leeds
and Coal Co. Ld., Stoke-on-

mited. Albion Works, Sheffield

ERS (TUBE RODS ENAMELS)
Edmund-pl., Aldersgate, E.C.

GOVERNORS (ENGINE)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

GOVERNORS (HYDRAULIC)

GREASE
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

GRINDING MACHINERY
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

GRINDSTONES

GUNPOWDER
Curtis's and Harvey Ld., Cannon-st. House, E.C.

GUTTA PERCHA
Cort, Arthur, & Co. 303½, Camberwell-rd., London

HARNESS

HAULING DRUMS
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, H., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

HEADGEARS
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

HEADING MACHINES
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

HEAPSTEADS
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

HOISTS
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

HOOKS OR LINKS (SAFETY)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

HOPPERS
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Loampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

HOSE
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

HUMIDIFIERS
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

HYDRO ELECTRIC PLANTS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

HYDRAULIC JACKS
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

HYDRAULIC MACHINERY
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Ryland-street Works, Birmingham

HYDRAULIC REDUCING VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow

HYDROMETERS
Davis, John, and Son (Derby) Ld., Derby

INCLINE ROLLERS
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

INDIARUBBER GOODS
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Reddaway, F., & Co. Ld., Pendleton, Manchester

INDICATORS (STEAM ENGINE)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

INDUCED DRAUGHT FANS
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

INJECTORS AND EJECTORS
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

INSTRUCTION (POSTAL)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

INSTRUMENTS
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

IRON AND BRASS FOUNDERS
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

IRON AND STEEL
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld.; Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

JACKS (HYDRAULIC)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

JIGS
Ormerod, Edward, Atherton, near Manchester

JIM CROWS
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

JOINTING CEMENT
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

JOINTING (SHEET)
Thomas and Bishop, 119-125, Finsbury Pav., E.C

JOISTS (ROLLED STEEL)
Heenan and Froude Ld., Worcester
Benton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

KEPS (FOR WINDING CAGES)
Benthaue, D., 45, Bank-street, Sheffield
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

LAMP CLEANING MACHINES
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP GAUZE BRUSHES
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP GLASSES
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP OIL FILLING MACHINES
Ackroyd and Best Ld., Morley, nr Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C. Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP RE-LIGHTING APPARATUS (UNDERGROUND)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMPS (ARC)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

LAMPS (ELECTRIC)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

LAMPS (ELECTRIC SAFETY)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pare, Ed., Ld., Belvedere Works, Belvedere, Kent
Photos Miner's Electric Lamp Ld., Queen's-road, Battersea
Wolf Safety Lamp Co. Ld., 37, York place, Leeds

LAMPS (MINERS' SAFETY)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMPS (OUTDOOR)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

LATHES
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

LEATHER APPLIANCES

LESSONS BY POST
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

LIFTING AND HOISTING TACKLE
Benton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

LIGHTNING CONDUCTORS
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Shaw, John, Ld., Sheffield
Theedam, E. C., Ld., Dudley

LOCKNUT WASHERS
Benton, B. M., and Co., Sheffield

LOOSE COLLARS
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster S.W.

LUBRICATORS
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

MACHINERY (SECOND-HAND)
Bute Works Supply Co. Ld., Cardiff
Foot, R. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Benton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

MACHINE TOOLS
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

MATHEMATICAL INSTRUMENTS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

MECHANICAL STOKERS
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

METAL PERFORATORS
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

METALLIC PACKING
United States Metallic Packing Co. Ld., Soho Works, Bradford

METEOROLOGICAL INSTRUMENTS
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

MILLS (GRINDING)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

MINING DIALS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C
Thornton, A. G., Ld., King-st. West, Manchester

MINING MACHINERY
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

MINING TOOLS
Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

MOTORS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

MOTOR STARTERS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

MOTOR VANS AND WAGONS
Avonside Engine Co. Ld., Bristol
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.

NAILS, SPIKES, &C.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Frost, Albert, and Co., Howard street, Sheffield
Benton, B. M., and Co., Midland Works, Sheffield

OFFICE FURNITURE AND APPLIANCES
Glover, M., and Co., Holbeck-lane, Leeds
Thornton, A. G., Ld., King-st. West, Manchester

OIL BOTTLES
Baker, John, and Son, Bilston, Staffs
Theedam E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

OIL CABINETS
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

OIL SWITCHES
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

OILS AND LUBRICANTS
Ackroyd and Best Ld., Morley, nr. Leeds
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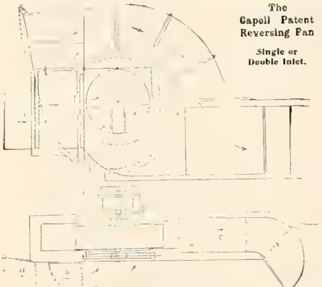

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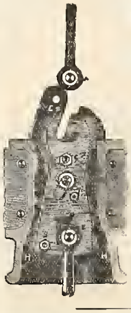

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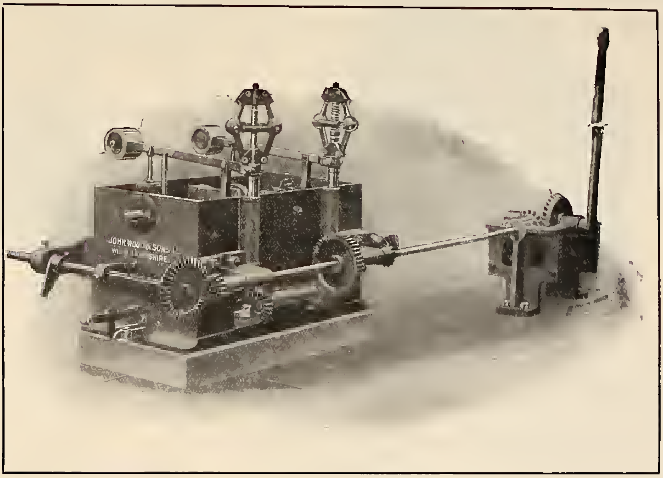

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Continued on Page 771.

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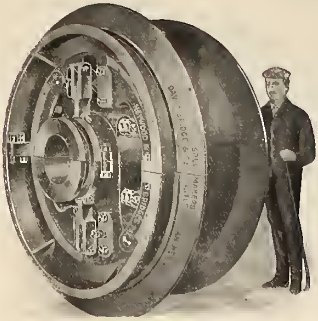

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Continued from Page 770.

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19685.	Cornish BOILER,	28 ft. 0 in. by 6 ft.,	"	80 lb.	"
18827.	ditto	20 ft. 0 in. by 6 ft.,	"	70/80 lb.	"
18812.	100-h.p. WATER-TUBE BOILER,		"	150 lb.	"
18813.	40-n.h.p. LOCO. BOILER,		"	140 lb.	"
16019.	ditto		"	180 lb.	"
19625.	Vertical BOILER,	8 ft. 9 in. by 3 ft. 3 in.,	"	100 lb.	"
18255.	ditto	7 ft. 6 in. by 3 ft. 3 in.,	"	80 lb.	"
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Locomotives always in stock or in progress.
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The Electricity Committee have for disposal three Lancashire BOILERS, by Yates & Thom, and one set of Green's ECONOMISERS, all complete with fittings, at present working at 130 lb. pressure, and insured by the Manchester Steam Users' Association.

The above may be inspected during office hours by arrangement on or before Friday, 25th October, 1912.

Full particulars and form of tender can be obtained from the undersigned, to whom all tenders must be delivered on or before Friday, 25th October, 1912.

The Committee do not undertake to accept the highest or any tender.

Corporation Electricity Works,
Jubilee-street, Blackburn,
8th October, 1912.

P. P. WHEELWRIGHT,
M.I.E.E.,
Borough Electrical Engineer.

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⁂ *For* **later Advertisements** *and* **Scale of Charges,** see **Page 746 (Leader Page).**

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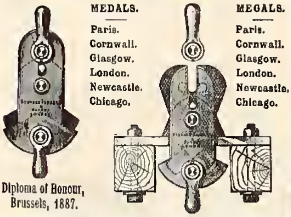

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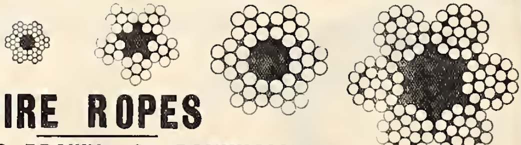

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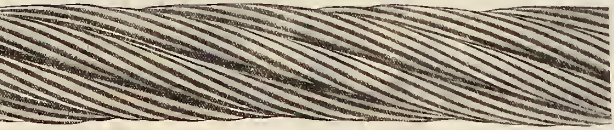

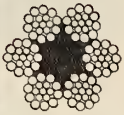

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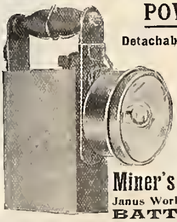

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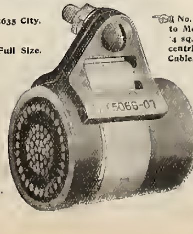

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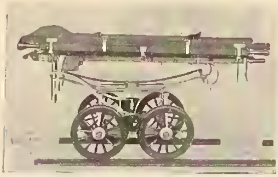

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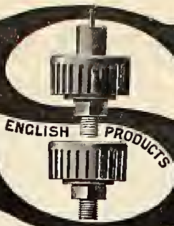

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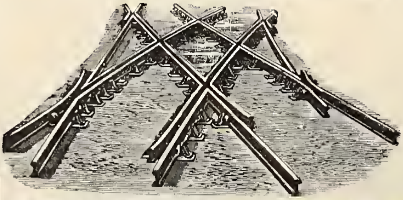

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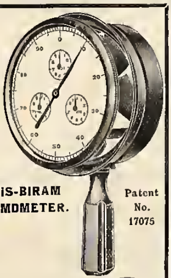

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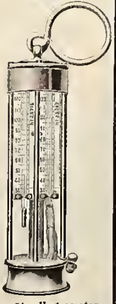

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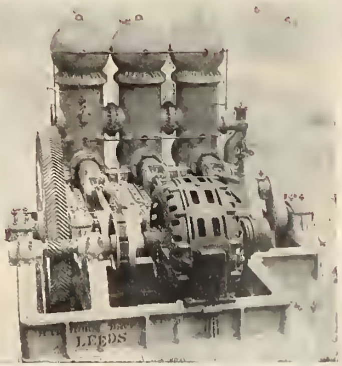

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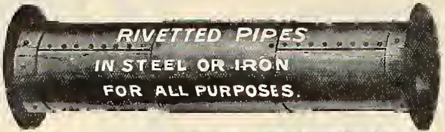

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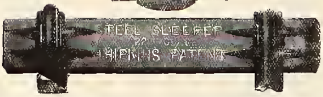

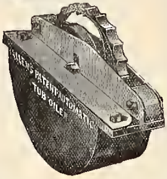

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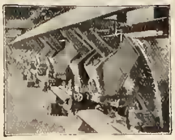

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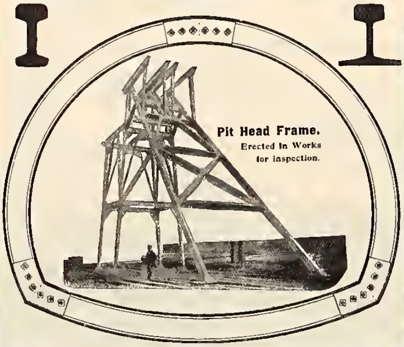
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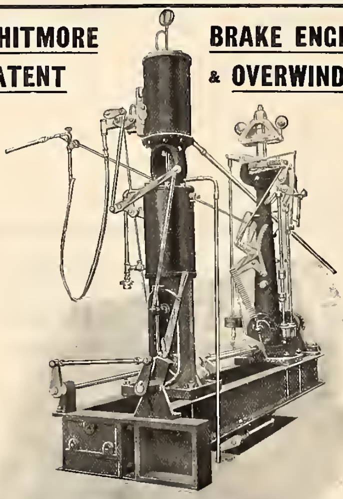

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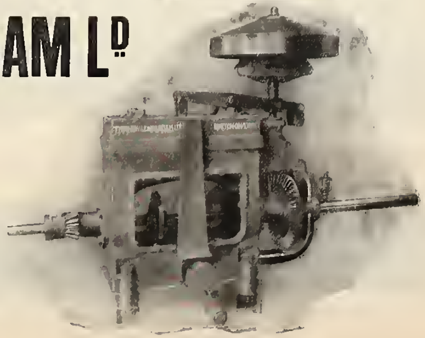

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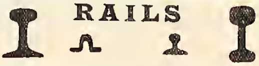

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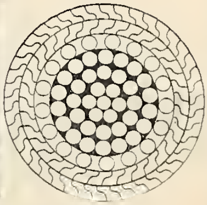

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THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

CIV. FRIDAY, OCTOBER 18, 1912 No. 2703.

VE INFLAMMABILITY OF COAL-DUSTS.

t of the Explosions in Mines Committee.

Continued from page 735.)

he Admixture of an Incombustible Dust with Coaldust.

s of experiments coal No. 227 N. was gnition temperature of which when pure Cent. The experiments were made under me conditions as those with the pure escribed. The results were as follow:—

Mixture.	Relative ignition temperature. Degs.
aldust and 4 per cent. shaledust	1,025
" 8 " "	1,045
" 10 " "	1,045
" 15 " "	1,075
" 20 " "	1,095
oaldust and 5 per cent. calcium	1,025
oaldust and 10 per cent. calcium	1,035
aldust and 15 per cent. calcium	1,045
aldust and 20 per cent. calcium	1,095
oaldust and 2 per cent. sodium	1,075
oaldust and 4 per cent. sodium	1 095

ments with sodium bicarbonate mixed t no proper propagation of flame took t the dust cloud, even where as little as sodium bicarbonate was present. The tures recorded are those temperatures was a pronounced burning of part of the he igniting coil. It might, perhaps, be say that no ignition (in the sense dealing with the pure coaldusts and the hale and calcium carbonate) took place temperature that could be employed— degs. Cent. For there was, even with of sodium bicarbonate added, no *general* f the dust cloud; but the flame (first case at a temperature of 1,075 degs.) the igniting coil appeared to be incapable ore than a few centimetres from the n.

ble effect of sodium bicarbonate is no fact that at a temperature as low as arbon dioxide is evolved in considerable m carbonate, which also yields carbon ting, requires a temperature of about before any quantity is evolved.

Temperatures of Various Substances

of comparison we place on record the tures of various combustible dusts other neasured in the same apparatus.

Substance.	Relative ignition temperature. Degs. Cent.
ur	340
wder................	550
odium	940
....	980
(maize)	980
(wheat)	995
(potato)	1,030

ing to note the differences in ignition the three kinds of starch tested. Starch ubstances differs in physical properties d there is no doubt that this difference ture of the starch grains must affect its ature.

the Relative Inflammability of Different Coaldusts at Lievin

eriments (described above) were made. ppeared of similar experiments made ntal Station of the Comité Central des rance at Liévin.[*] The experimental d at the Liévin station differs considerably from our own, and the results obtained are somewhat at variance. This being the case, we have thought it advisable to perform a number of experiments using an apparatus constructed on similar lines to that employed at Liévin. The results obtained are interesting, and bring out clearly the principles underlying the cause of the differences between the inflammabilities of different coaldusts. Before describing them, however, we wish to draw attention to what appears to us to be a misunderstanding by the authors of the Liévin report concerning certain statements contained in the Mining Association's *Record*—statements which we, on our part, uphold.

On page 25 of the report from Liévin that we are now discussing, it is stated that the Altofts experimenters did not consider that the volatile constituents of coal played any important part in the inflammability of the dust. It is stated, on page 128 of the Mining Association's *Record*, that "it seems most probable that the actual explosion is propagated practically entirely by the combustion of the dust as a whole"; whilst on page 123 the inflammability of different dusts is regarded as being determined by "such factors as (*a*) the temperature at which gas is most readily given off, (*b*) the stage in the heating at which the most inflammable mixture of gases makes its appearance, and (*c*) the shortest time of heating that will allow any gas at all to be distilled." That is to say, the *inflammation* of coaldust (apart from its *explosion*) is considered to be largely dependent upon the volatile matter it contains.

We believe that, in the light of these quotations and of the present report, it will be seen that the French and English experimenters are in no way at variance respecting the *rôle* played during the initial inflammation of coaldust clouds by the gases that can be evolved from coal on heating.

The main conclusions drawn by the French experimenters, as a result of their "Fifth Series of Experiments," are that, under the conditions of their experiments, the temperature necessary for the ignition of different coaldusts does not vary from one coal to another; and that the ease of propagation of flame by one coaldust relative to another is directly measured by its total contents of "volatile matter." The index of "inflammability" employed in the French experiments is the size or length of the flame produced when a given quantity of the dust is blown through a vertical porcelain tube of 25 mm. internal diameter and 10 cm. long, heated to a temperature of 900 degs. Cent.

We have made similar experiments, employing the apparatus shown in fig. 4. The dust, carefully sieved and dried, is introduced into the horizontal dust tube, its weight being 0·2 gramme. The wide portion of this dust tube is then placed vertically over the small electric furnace, a slip of copper gauze being introduced between the furnace tube and the dust tube. The temperature, measured by means of a platinum and platinum-rhodium thermo-couple passing through the furnace and in contact with its walls, is then raised to 900 degs. and maintained constant. A tap, which connects the dust tube to the apparatus for giving a constant puff of air (fig. 2), is now quickly opened. All the dust in the dust tube is thus projected downwards through the furnace. It ignites there, and a flame appears underneath. This flame is photographed, the experiments being made in the dark, and the sensitised plate being exposed a little time before the tap is opened and allowed to remain exposed until all flame has disappeared. It is from the appearance of such flames that the French experimenters judge the relative inflammabilities of the different dusts.

In making these experiments we found that, provided all the experimental conditions were maintained rigidly constant, the size and type of flame obtained from one particular coal remained remarkably constant from one experiment to another. Comparison between one coal and another by means of the photographs of their flames can, therefore, be relied on.

We give in fig. 5 the photographs of the flames of five different coaldusts, four of which contained about the same content of volatile matter, namely about 34 per cent. Their order of inflammability, according to the length of flame produced, was as follows:—

Coal number.	Order of Inflammability.	Volatile matter. Per cent. on ash-free dry coal.	Percentage extracted by pyridine.
230 N.	1	33·40	35·1
240 N.	2	34·50	34·4
209 N.	3	34·18	27·2
211 N	4	34·63	20·7
*221 N.	5	22·60	5·8

* Semi-anthracite.

This table and the accompanying photograph therefore, show that the order of inflammability does not depend upon the total volatile matter present, but upon such portion only of the volatile matter as is capable of being extracted by pyridine.

So far, therefore, as the size of flame can be regarded as a measure of the inflammability of the dust, these results afford a striking confirmation of our conclusions (advanced as a result of our experiments on the ignition-temperatures of the dust clouds) respecting the dependence of the inflammability of the dust, not on its total content of "volatile matter," but on the proportion of the paraffin yielding, readily decomposed constituents that it contains.

From what we have already said regarding the influence of the time of contact between the dust particles and the heated surface, it will be evident that, in our opinion, the method of testing "inflammability" that has been adopted by the French experimenters depends for its success on the proper adjustment of the temperature to the time of passage of the dust cloud through the heated tube. The validity of these considerations is well shown by the series of experiments described below, in which the area of the igniting surface and the time of passage of the dust cloud across this surface were varied. The area of igniting surface was increased by introducing into the porcelain tube a loosely rolled spiral of fine copper gauze, so arranged as not to restrict to any great extent the passage of the dust cloud through the tube. The time of passage of the dust cloud was varied by altering the time of fall of the piston in the cylinder of the apparatus for giving a constant puff of air. In the table that follows, the relative rates of passage of the dust cloud are given by the times taken for the piston to fall. Two pairs of experiments were made with a coal (No. 201 N.), which contained 38·84 per cent. of volatile matter and had an ignition temperature, as determined in our apparatus, of 1,055 degs. Cent. The results were as follows:—

EXPERIMENTS ON THE IGNITION OF COAL NO. 201 N.

Time of fall of air piston.	Relative ignition temperature.	
	Porcelain tube empty.	Porcelain tube containing copper gauze spiral.
Seconds.	Degs. Cent.	Degs. Cent.
12	840	760
35	820	690

The ignition temperature of methane in air lies between 650 degs. and 750 degs., and, as the above experiments show, it is possible, by increasing sufficiently the area of the igniting surface and the time of contact of the dust particles with it, to cause a coaldust (which yields methane on first heating) to inflame at a temperature of 690 degs. Cent. Methane is not, however, the only paraffin hydrocarbon evolved from coal on first heating; in fact, during the first few seconds, ethane, propane, and butane are all evolved in considerable quantity. The ignition temperatures of ethane and of propane in oxygen[*] are 520 degs. to 630 degs. Cent. and 490 degs. to 570 degs. Cent. respectively. Moreover, a less quantity of these hydrocarbons than of methane is required to form a "lower-limit mixture" with air or oxygen.

It should, therefore, be possible to effect the ignition of coaldust at a lower temperature than 690 degs. Cent. under suitable conditions. To test this, we have made some experiments in which, just before the coaldust cloud was puffed through the vertical porcelain tube, a gentle stream of oxygen was allowed to pass up the tube. Under these conditions, with the porcelain tube containing the copper spiral, and with a time of fall of the air piston of 11 seconds, a coaldust (No. 218 N.) ignited at a temperature of 560 degs. Cent.

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[*] série d'essais sur les inflammations de M. J. Taffanel and A. Durr, Paris, August

[*] Dixon and Coward, *Jour. Chem. Soc.*, 95, p. 519 (1909).

The use of oxygen in this way, to start the inflammation of coaldust, enabled us to test the relative inflammabilities of dusts which could not be ignited in air, owing to the fact that it was impossible to raise the electric furnace to a temperature much higher than 1,200 degs. without running the risk of fusing the platinum wire with which it was wound. Thus, with the porcelain tube containing the copper gauze spiral, and with a time of fall of the air piston of 11 seconds, the following results were obtained:—

Dust.	Relative ignition temperature. Degs. Cent.
Bituminous coal (218 N.) (as above)	560
Semi-anthracite coal (222 N)	600
Anthracite coal	780
Wood charcoal	750

The wood charcoal dust had been specially purified by heating in chlorine gas at 1,000 degs. and in a vacuum at 1,100 degs. during four or five days, and contained no inflammable gases. A photograph of the flash produced after the ignition of the cloud is shown in fig. 6. It is obvious that, once inflammation has been effected, the presence of "volatile matter," capable of yielding inflammable gases on heating, is not *essential* for the propagation of inflammation. That it is not necessary for the propagation of *violent* combustion is evidenced by several explosions that have been obtained with wood charcoal dust which did not contain any volatile matter in the large gallery. It would seem, therefore, that the *ultimate* violence produced by the explosive combustion of a combustible dust and air must depend, not on the volatility of the constituents of the coal, but upon the calorific value of the dust; and that, for this reason, anthracite dust or wood charcoal dust, which could only be inflamed with difficulty, would when once inflamed ultimately produce a more violent explosion than the dust of bituminous coal, the calorific value of which is, in general, less than that of anthracite or wood charcoal. It has, in fact, been found in the large gallery that after a certain length of travel the explosion of wood charcoal dust and air produced a greater pressure than that of a bituminous coal (containing 35 per cent. of volatile matter) after the same distance of travel.

It is interesting to note that the ignition temperature of anthracite dust, as shown in the above table, is higher than that of wood charcoal dust, in spite of the fact that the former contained about 6 per cent. of "volatile matter" and the latter none at all. The difference must be ascribed to the difference in density (and therefore in the "close packing" of the molecular structure) of the two substances, a factor the possible influence of which must be remembered when considering the relative ignition temperatures of all coaldusts.

Finally, we may mention that with wood charcoal dust, which could evolve no inflammable gases by distillation, the ignition temperature was the same whether the vertical porcelain tube was empty or contained the copper gauze spiral.

Summary.

A method is described by which the relative inflammability of different dusts can be ascertained by measuring the temperature of a platinum coil which just ignites a uniform cloud of dust and air projected across the coil fixed in a glass tube. It is shown that the relative inflammability does not depend upon the "total volatile matter," but on the relative ease with which inflammable gases are evolved.

The order of inflammability so obtained corresponds in a remarkable degree with the percentage of inflammable matter extracted from the same coals by pyridine.

We are of opinion that these two methods form a valuable means of discriminating between different coals in regard to the sensitiveness of their dusts to ignition. It must, however, be borne in mind that these tests have been made with dusts artificially ground and sieved to an equal degree of fineness, and since coals differ considerably in their power of resistance to pulverisation, the friability of a coal must be taken into account.*

There are three appendices to the report. Appendix 1 ("The Volatile Constituents of Coal," by R. V. Wheeler, D.Sc., chief chemist, and M. J. Burgess, assistant chemist to the Explosions in Mines Committee) is an abridgment of two papers in the *Transactions* of the Chemical Society, vol. 97, 1910, and vol. 99, 1911. Appendix 2 deals with the extraction of coal by pyridine, and Appendix 3 gives the analyses of all the samples of coal tested in the manner described in the report.

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* No doubt also the porosity of a coal and the shape of its dust particles may affect its inflammability.

MINING INSTITUTE OF SCOTLAND.

A general meeting of the Mining Institute of Scotland was held on Saturday in the Heriot-Watt College, Edinburgh. Mr. James Hamilton (president) occupied the chair, and there was a large attendance of members. At the outset the following gentlemen were admitted to membership: Messrs. R. T. Stewart, mine manager, Corbin, British Columbia, Canada; D. B. Reekie, mining engineer, Coaltown, of Wemyss; M. B. Miller, mining engineer, Motherwell; John Fleming, colliery fireman, Kelty; R. A. D. Howie, coalmaster, Hurlford, Ayrshire; W. M. Dunn, coalmaster, Sandyford, Tollcross; D. Black, mechanical draughtsman, Twechar; A. M. Cunningham, colliery fireman, Coaltown of Wemyss, Fife; Stewart Kirk, mine manager, Behar and Orissa, Bengal Coal Company Limited, India; and Tomomaro Tanagita, mining engineer, Tokio.

The Inglis Engine Controller.

Discussion was resumed on the paper contributed by Mr. James Black, Airdrie, on "The Inglis Engine Controller."

Mr. Peter Milligan, Arniston, Gorebridge, said the patentee (Mr. Inglis) had informed him that the winding engines at Arniston were the largest his controller had been connected to yet. They had two of the controllers working on the winding engines for the past three months, and under the conditions they had at the colliery the overwinding test was very severe. It resulted in the cage going 5 ft. 4 in. above the mark with full steam, and while exceeding the arranged speed in the shaft the engines were brought to a standstill in less than two revolutions per minute. At the Gore Pit he had to explain that the tests were equally as satisfactory and altogether they were satisfied with the results in working with the controllers. The winding enginemen, he added, did not like the controllers at first, as they controlled their action whenever they treated their engines roughly and they predicted a loss in outputs. They were now, however, quite pleased with them, and were disposed to wonder why safety books should be compulsory when the Inglis controller was attached to winding engines.

The discussion was thereafter closed and the author cordially thanked for his paper.

Facts and Theories Relating to Fans.

The second paper discussed was that by Mr. D. M. Mowat, Coatbridge, on "Facts and Theories Relating to Fans."

Mr. J. B. Thomson, Hamilton, described and gave the results of a number of small experiments on fans which he had made several years ago.

Mr. William McCreath, Glasgow, thought the author had pointed out in a very clear way the mistake of using a small fan to produce a large quantity of air. The use of small quick-running fans for the ventilation of a colliery of considerable size was, to his mind, a mistake. A very high water-gauge in many cases was not required, and a moderately high water-gauge with a judicious splitting of the air and of airways would prove much more efficient.

Mr. Mark Brand, Twechar, gave the results of certain tests carried out by himself. In the opinion of the speaker, the two important points in fan construction might be summarised as follows:—(1) The area of the fan inlet in relation to the resistance of the mine; and (2) the area of the fan outlet to the resistance of the mine. These, of course, were to include the area of the passage through the fan itself.

Mr. Henry Briggs, Heriot-Watt College, Edinburgh, called attention to the fact that the usual formula $\left(\frac{v^2}{g}\right)$ ought not to be used for fans of all characters, but only for those fans having their blades radial at the tips.

Mr. Mowat briefly replied to the points raised and announced his intention of replying more fully to the discussion at a future meeting.

Prize for Student Members

Mr. James Barrowman, secretary, announced that the council had arranged to accept the offer of a member, who desired to remain anonymous, to award a prize to the contributor of the best paper sent in this session under the following conditions:—The competition was to be open to students and associates on the roll of the institute for session 1912-13; that the prize, which was one of five guineas, was to be awarded for the best paper not exceeding 5,000 words in length, on "Accidents in Shafts: Their Causes and Prevention;" that plans and sketches accompanying the papers will be taken into account in the adjudication; and that all papers entered for the competition must be in hand by March 31, 1913.

The Annual Dinner.

It was announced that the first of the annual dinners to be inaugurated this session by the institute had been arranged by the council to be held in the Windsor Hotel, Glasgow, on Saturday, December 7.

The Use of Old Wire Ropes in Timbering Roadways.

Mr. John McLuckie, Dalserf, thereafter read a paper on "The Use of Old Wire Ropes for Timbering Roadways." At the outset the author explained that some time ago he was asked by the institute to carry out tests with old wire ropes. These tests were quite experimental and did not take the question of cost into account. At that time the experiments achieved results beyond his expectation, and an experience since, extending over three and a-half years, had confirmed his first impression of the value and efficiency of old ropes as a means of lengthening the life of crown timber below ground. Careful notes of the expense of the upkeep of a haulage road, before and after the use of old ropes, had shown that the saving in timber alone was very great, whilst the saving in wages for labour was double the saving in timber. Crowns, which were formerly renewed once in six months, had not been renewed since the introduction of old ropes three years ago. Some of them could still be seen standing in Canderrigg Colliery, Lanarkshire, bent, and, in some cases, broken, with nothing but the rope holding the crowns together. For some time previous to the introduction of the use of these ropes, two men were almost fully employed on one of the main roads, repairing and renewing the timber, but since old ropes had been used to support the crowns, not a third of their time had been spent on this road. Proceeding, the author adduced figures to show that the total cost for timbering the road in 1908 was nearly 2½d. per ton, but that in the three years following, when old ropes were used, the cost was reduced to an average of 1¼d. per ton.

In a discussion on a former paper on this subject, fears were expressed that men might be injured by coming into contact with broken wires in the old ropes, but up to the present no one, he was glad to say, had been injured in that way. The freedom from accidents from broken wires might be due to the fact that only the best parts of old ropes were selected for the crowns. The difficulty in fixing the rope on the crown had been overcome and the cost of material and time reduced to 5d., so that the price of 7d. per crown, given on a previous occasion, was too high. Moreover, much useful information had been obtained by experience in fixing the rope by the men who put up the timber. For example, it had been found that when it was impossible to get all the crowns straight, care was required in putting a rope on a bent crown. A rope put on the concave side of a bent crown was of little service in giving direct or immediate support to a crown, because when the weight came on the rope would become slacker instead of tighter, and the crown might be broken before the rope tightened up to give support. For the same reason it was important to lay the rope along the crown as straight as possible. The rope should never be put on the underside of a bent crown, as in that case the crown would cant and serve no purpose whatever; in fact, a crown should never be placed horizontally across a road lying in a semi-circular fashion. The method practised at Canderrigg was found to work very well and was as follows:—The crown is first examined to decide as to the better side on which to put the rope; a small piece of the crown is then flattened, and a small V-shaped notch is made in the thick end of the crown on the outer edges of the diameter. The rope is then laid in the V-shaped groove of the crown and a staple driven hard down so as to keep the rope from shifting. The rope now being in position, it is an easy matter to put a few more staples along the centre of the crown, at intervals of about 20 inches. The rope having been fixed firmly on the bottom side of the crown, its end is turned back over the end of the crown, and a staple driven hard down on the top of the rope, near the end of the crown, the other end being left unfinished in case the crown requires to be made shorter after being sent into the workings. In any case, the man who puts up the timber finishes the one end, unless the exact length has been given to begin with.

Discussion on the paper was adjourned till next meeting.

Grimsby Coal Exports.—The official return of the quantity of coal exported from Grimsby during the week ended October 11 is as follows:—Foreign: Trelleborg, 3,753; Ahus, 1,460; Drammen, 756; Helsingborg, 1,046; Ronne, 1,480; Dieppe, 1,275; Rotterdam, 676; Esbjerg, 541; Riga, 2,186; Hasle, 351; Hamburg, 870; Gefle, 6,405; Stockholm, 3,677; Christiania, 604; Gothenburg, 619; Malmo, 2,183; Arendal, 659; Halmstadt, 104; and Bremen, 375 tons; total, 29,314 tons. Coastwise: London, 98; Ramsgate, 276; Gravesend, 630; Portsmouth, 420; Folkestone, 320 tons; total, 1,744 tons. The totals for the corresponding week last year were as follow: Foreign, 34,071; coastwise, 1,137 tons.

ENGLAND INSTITUTE OF MINING MECHANICAL ENGINEERS.

eeting of the members of the North of ute of Mining and Mechanical Engineers Wood Memorial Hall, Newcastle-upon- day, the 12th inst., Mr. W. C. Blackett

reported that it had been unanimously Mr. Thos. Douglas, the only surviving ber of the institute, should be asked to orary member. Mr. Douglas had accepted

ng gentlemen were admitted into the mbers: Mr. Wm. Thos. Anderson, con- er, P.O. box 57, East Rand, Transvaal; as. Fairbrother, colliery manager, the gation Collieries Limited, Dannhauser, Africa; and Mr. Guy Ernest Regis, er, P.O. box 1305, Johannesburg, Trans- te member: Mr. Hugh Nicholas Wood, e, Fence Houses. Associate: Mr. Jas. ry under-manager, West Thornley, Tow am.

Electricity and Explosions.

Thornton, D.Sc., D.Eng., professor of neering in Armstrong College, Newcastle, paper on "The Ignition of Coal Gas and omentary Electric Arcs." At the outset, previous investigations on that question w chiefly the influence of changes in the re, and gave a short historical account of carried out.

l Mines Act of 1911 prohibited the use of re more than 1¼ per cent. of gas might be nited the pressure to 20 volts in signalling the bare wires used might be touched eemed well, therefore, to re-examine the he ignition of gas by single sparks such as arise in mining practice, especially at ages, with special reference to the influence centage of gas and of differences between nating current. To connect these with gas- nes, experiments were also made with coal usual town supply for lighting and power. ay of obtaining a spark between metals at a ght be renewed was that used in the present making contact between two round wires ht angles.

on described in detail the explosion-vessel nd the methods of its use. The pole-rods ron, copper and nickel, the first to represent the conditions of mining signalling wires, e case, also, of armouring in possible contact luctors; the second to give the case of conducting wire; and the third chiefly as a tated that no attempt had been made to the kind of break likely to arise in practice, results then be under sufficiently uniform comparison. It was necessary to make a of trials under conditions as nearly as possible to proceed by small steps in the approach to urrent. To determine each point on the stions of 600 breaks were recorded, on an r 50,000 in all.

current was taken to be one which fired the sparks slowly repeated. Near the critical trials were made with fresh charges of more in difficult cases.

cult to obtain pure firedamp in large quan- ignitions were made in a mixture of coal-gas composition of the gas used was as follows:— r cent.; olefines, 3·9; carbon monoxide, 5·3; hydrogen, 47·1; and nitrogen, 9·4. Part of lone during the coal strike, during which the as modified by the extensive use of "water- rific value, however, was little less than that upply. After some preliminary trials, it was n 6 to 1 or 11 per cent. mixture rather than the mixtures about 9 per cent., on account of the increase in the current necessary for ignition of the minimum which was found later to ime of explosion"—*i.e.*, the interval of time oment of ignition and the establishment of pressure of explosion—was also less at 11 than . In working with direct currents, large ere used up to 50 volts; above that, a voltage used. The resistances inserted were non- very case—*i.e.*, having a power-factor greater consisted at the higher voltages of banks of

were given in the following table, in which arked "inductive" were for circuits having of 0·0025 henry added, that being approxi- f average signalling circuits. The figures licated that no ignition took place at the t that could be used without burning the :—

Least Direct-current, in Amperes, which Ignited at Break of an 11 per Cent Mixture of Coal-gas and Air Atmospheric Pressure; Temperature, 18 Degs. to 20 Degs. Cent.

Volts.	Iron (diameter, 0·075 in.).		Copper (diameter, 0·065 in.).		Nickel (diameter, 0·05 in.).	
	Non-inductive.	Inductive.	Non-inductive.	Inductive.	Non-inductive.	Inductive.
12	16·00	7·50	—	—	—	—
20	5·00	4·50	>20·000	>20·000	>20·000	—
50	2·04	2·00	1·050	1·000	2·200	2·10
100	1·15	0·95	0·350	0·250	0·600	0·75
240	0·42	0·40	0·030	0·020	0·220	0·35
480	0·12	0·10	0·025	0·016	0·025	0·18

The time of explosion of methane did not appear to have been recorded. In view, therefore, of the known shortness of the range of percentages of methane in which ignitions were possible, it was decided to make all trials in the mixture giving perfect combustion—*i.e.*, 9·36 per cent. The results were as follow:—

Least Direct-current to Ignite a 9·36 per Cent. Mixture of Methane and Air. Atmospheric Pressure; Temperature, 18 Degs. Cent.

Volts.	Ampères.		
	Iron poles.	Copper poles.	Nickel poles.
50	4·00	4·000	4·00
100	1·05	0·900	1·15
240	0·40	0·175	0·55
480	0·10	0·050	0·15

The currents required to ignite a mixture of marsh gas and air in its most explosive proportions coincided, when the poles were iron, with those of coal gas and air in a mixture having a minimum "time of explosion." In the very rich mixture of 12·2 per cent. of marsh gas and air, the currents for copper and iron were more than doubled and nearly agreed, crossing at 230 volts, the iron curve being higher at the lower voltages. In order to bring the copper curve up to that for iron, the quenching action of the denser gas must be greater for copper than for iron arcs, the current to cause ignition being therefore greater. At voltages below 50 the currents increased very rapidly, and it would appear to be impossible to ignite even the most explosive mixture of firedamp and air by single break-sparks from a signalling circuit at the maximum voltage of 20 allowed by the Coal Mines Acts. At these low voltages electric signalling might be used with safety in any part of a coalmine, provided that care was taken to prevent wires from remaining in contact on short circuit and by local heating from becoming red-hot where they touched—an improbable occurrence. The bells should be preferably of the single-stroke pattern; no bell of the trembler type was safe in gas unless the sparking-contact was enclosed in an explosion-proof case.

In order to examine the influence of the size of the wire, the igniting currents of mixtures of coal gas and of methane with air were found with poles of iron, copper and nickel in three sizes at constant voltage. In all cases the igniting current was a linear function of the diameter, in coal gas nearly proportional to it, the lines intersecting the vertical axis at about 0·5 ampère. In methane the rate of change of current with diameter was the same at 75 volts for all three substances, that for iron cutting the axis at 1·5, copper at 2·2, and nickel at 2·6 ampères. At the lower voltages, iron and nickel changed places in order of igniting activity. Since, at that voltage, the arcs were short compared with the diameters of the rods, the sectional area of the spark, assumed to be circular, was also a linear function of the diameter, for a given length of arc. The higher currents required at the larger diameters would, therefore, appear to be proportional to the surface of the metal in contact with the arc and to its cooling action.

With low-voltage apparatus the inductance of the circuit was of the first importance from the point of view of safety at break. The risk of ignition increased rapidly as the inductance was raised, and no direct-current signalling circuit could be regarded as safe with a total inductance of 0·1 henry. In practice they had, as a rule, much less than that, and a typical mining signalling circuit connected through the explosion chamber failed to show any signs of igniting the most explosive mixture of coal gas and air when the contact was broken in it. The maintained spark at the spring contact in a trembler bell was known to ignite gas. The curve of the least energy required to ignite the mixture was interesting. At the lower inductance there was some variation, but the energy remained nearly constant about 0·10 joule. They had there a measure of the electrical energy required to start a gaseous explosion by arcs of short duration. It was, in thermal units, about 0·025 small calories, equivalent to the combustion of 4·1 cubic centimetres of coal gas or of 37 cubic centimetres of an 11 per cent. mixture.

It was agreed that the cause of the period of induction observed in all gaseous explosions was the slow combustion of a certain volume of gas before enough heat was set free to enable the mixture to ignite itself; but there could be no doubt that the ignition of only a few cubic centimetres—in a test tube for example—was necessary to start an explosion. A similar pause was observed in coaldust ignitions. With both gas and coaldust, it was longer when the source of ignition was an incandescent wire than with an arc, possibly to some extent in the latter case on account of the clear space around an incandescent wire in gases investigated by Lodge and Clark, but in the former more probably on account of the "combustion by stages" of the paraffins in the presence of hot wires. Wüllner and Lehmann found that, with a Leyden jar having an area of 2,000 square centimetres, a discharge spark 0·5 mm. long was sufficient to ignite gas, but not less. The energy of that would appear to be about one-tenth of that with break sparks, owing, no doubt, to the more active ionisation first shown by Hertz to be characteristic of high-frequency sparks. Momentary arcs of the kind the author was considering appeared to ignite gas with difficulty in comparison with the shattering sparks from condenser discharge.

The known influence of inductance in prolonging breaking sparks led to an attempt to measure their duration. The results were as shown:—

Time of Duration, in Seconds, of Direct-current Break Sparks in a 9·36 per cent. Mixture of Methane and Air; Circuits Non-inductive.

Voltage	50			100		
Pole	Copper.	Iron.	Nickel.	Copper.	Iron.	Nickel.
Ampères	4·0	4·5	4·5	0·9	1·02	1·1
Duration in seconds	0·016	0·014	0·0125	0·0073	0·02	0·0128

Voltage	240			480		
Pole	Copper.	Iron.	Nickel.	Copper.	Iron.	Nickel.
Ampères	0·175	0·4	0·55	0·05	0·15	0·16
Duration in seconds	0·0025	0·0045	0·0065	0·0079	0·0036	0·0135

In view of the known quenching influence of the gas, a few observations were made in mixtures of marsh-gas and air of various strengths, and were noted as follow:—

Time of Duration of Direct-current Break Sparks. Circuits, Non-inductive; Voltage, 50 throughout.

Percentage of methane	6	6	12	14
Least current for ignition, in ampères	3·8	3·7	5·75	12·0
Duration in seconds	0·03	0·015	0·022	0·032

It was now seen that, when the voltage was maintained at a constant pressure, the rate of variation of the duration of the spark with change of percentage of methane was similar to that of the igniting current. The result was interesting as showing that the duration of the spark was proportional to the current passing and not to the energy of the spark. The results showed that the least current required for ignition in a circuit at a constant voltage must vary considerably with the richness of the gaseous mixture. To examine that more fully, experiments were first made on coal gas. Below 6 per cent., no ignitions could be obtained. That was the limit found by most observers with the usual sparking coil ignition. The upper limit was generally assigned at 30 per cent., but it was clear that ignition could occur beyond it, provided that the source was violent. The flash at 13 ampères 50 volts was brilliant, the activity of the circuit approaching 1-horse power. The tabular result was as follows:—

Variation of Least-igniting Current with Percentage of Coal Gas in Air. Atmospheric Pressure and Temperature; voltage, 50 throughout; small iron poles.

Gas percentage	6	7	8	9	10	11
Ampères	3·8	2·0	1·48	1·4	1·48	1·7
Gas percentage	13	15	18	20	25	30
Ampères	2·0	2·37	3·0	3·5	7·0	13·0

With methane, the results were as follow:—

Variation of Igniting Current with Percentage of Methane in Air. Voltage, 50; small iron poles.

Percentage	5	6	7	8	10	12	13·5	14
Ampères	5	3·6	3·2	3·7	4·6	5·75	7·0	12

No ignitions could be obtained at 4 or above 14 per cent., the limits generally given being 5 and 13. The limiting values under the present conditions would appear to be 4·25 and 14·25.

The limiting percentages of mixture might, and probably did, depend on the method of ignition and upon the presence of small quantities of more highly-combustible gases. In the present case, analysis did not reveal any of these in quantities readily detected in the gas upon which the percentage experiments were made. The analysis of the gas as prepared from sodium acetate and soda-lime was as follows.—Carbon dioxide, 0·2 per cent.; air, 3·5; and methane, 96·3. Hydrogen or acetone, if present, was less than 0·2 per cent.

In the previous work, the influence of the time of duration of the spark, although masked by that of voltage, had been always in evidence. It was to be expected, therefore, that very different values from the above might be obtained by the use of alternating currents. The first experiments on these were made at 40 periods with coal gas and air and with the same density of mixture (11 per cent.) throughout. To avoid disturbing effects, pure sine wave-forms were used. The currents required for ignition were all much greater than the direct currents at the same voltages, the ratios being shown in the following table:—

Ratios of Least Alternating to Least Direct Igniting Currents. Coal Gas and Air, 11 per cent.; 40 periods, Non-inductive Circuits.

Volts	50	100	200	300	400	500
Ratios $\frac{A.C.}{D.C.}$	3·0	4·9	6·2	9·0	10·8	12·5

COALMINING IN INDIA IN 1911

(Continued from page 742.)

Accidents.

During the year 1911, at mines regulated by the Indian Mines Act, 1901, there were 137 fatal accidents, being an increase of 20 as compared with the number in 1910, and an increase of 11 as compared with the average number of the last three years. These accidents involved the loss of 174 lives. This is a decrease of 12 upon the number of deaths in 1910. In that year, however, 55 deaths were the result of five accidents, whereas in 1911 only two accidents caused more than three deaths. In one case 14 persons and in the other four persons were killed. The death-rate per 1,000 employed was 1·18, that of the preceding three years being 1·18. At coalmines only these figures were 1·38 and 1·32, and at mines other than coal 0·66 and 0·77. At coalmines in England, during the 10 years ending with and including 1910, the death-rate per 1,000 employed varied from 1·24 (lowest) to 1·69 (highest). The death-rate per million tons raised at coalmines only was 12·28, that of the preceding three years being 12·74. At coalmines in England, except in 1909 and 1910, when explosions, causing loss of life on a large scale, occurred, and when the death-rate per million tons of coal raised was 5·23 and 6·37 respectively, the rate has not reached five since 1895. Of the persons killed, 137 were males and 37 were females.

The deaths occurring in each class of mine worked were as follow:—148 in coal mines, 10 in mica mines, four in manganese mines, one in salt mines, one in wolframite mines, six in gold mines, one in limestone mines, and three in copper mines. Seventeen persons lost their lives by explosions of firedamp, 94 by falls of roof and sides, 13 in shafts, seven by explosives, two by suffocation of gases, one by irruption of water, 19 by haulage, five by other accidents underground, and 16 on the surface. In addition to them there were 23 others causing the death of 23 persons.

Sixty-seven per cent. of the statistical accidents and 68 per cent. of the deaths occurred in the Bengal coalmines. Of the persons employed in them, 53 per cent. were employed in Jharia, where, in 1911, 65 per cent. of the accidents in these coalfields occurred. Accidents have largely increased in Jharia. Having averaged just under 43 in number for the previous three years, they rose in 1911 to 60, the great majority of them being caused by falls of roof and sides, which continue to be the most fruitful source of accidents generally, and which are now assuming large proportions. In the year under review they formed 54 per cent. of the total number of fatal accidents, the rate for the preceding three years being 41 per cent. These figures appear to call for serious consideration on the part of colliery owners and managers.

A study of each individual accident shows that many lives would have been saved by the exercise of greater vigilance on the part of the subordinate officials, and more frequent inspections of the roof and sides of all roads open to traffic and of all working places. Inexperience on the part of the miners still contributes towards many of these accidents. It is well known that, unlike the miners in England, they rarely examine their working places either before they start work or at any period during the shift. This indifference will take time to eradicate; but much good would be done, as is done at some mines, in the direction of educating them to protect themselves, if the officials insisted on all miners sounding their working places themselves at each inspection by the officials, and saw that that any danger observed was remedied on the spot. In the last annual report, reference was made to supervision generally. In 1911 there were 23 fatal accidents which were due to lack of proper supervision.

Pillar robbing and working in unauthorised places, which is largely due to defective supervision and discipline, were responsible for 19 fatal and 3 serious accidents. When breaches of discipline such as these are detected, fines are usually inflicted; and it is hoped that the impending introduction of the special rules for coalmines to be made under section 21 of the Indian Mines Act, which have now been agreed upon between the officers of this department and a committee representing the general body of managers in Bengal, will strengthen the hands of managers in this respect.

There were 124 serious (non-fatal) accidents, causing injury to 136 persons.

Three serious fires broke out in coalmines in Bengal during the year. The first case occurred at the East Indian Coal Company's Brahmanbarari mine in the Jharia coalfield. The seam affected was No. 15 seam, which is 26 ft. in thickness and was being worked by inclines from an outcrop 4,400 ft. in length to a maximum distance of 2,200 ft. on the dip. The area is split up by barriers of solid coal into three sections, of which the north section contains 14 acres, the south section 67 acres, and the west or dip section 14 acres. The whole of the area has been divided up by galleries into pillars 50 ft. square. These galleries are of the full height of the coal, *i.e.*, 26 ft. In 1909 goafing, or the extraction of the pillars, was commenced in both the north and south sections, and some 12 acres of these were subsequently got. Owing to the great thickness of the seam, however, it was not possible to obtain complete extraction, and portions of the pillars had to be abandoned and became crushed in the goaf. Conditions favourable for spontaneous combustion were thus set up, and in February 1911 a small fire broke out in the goaf of the north section. This was kept within bounds by flooding and eventually sealed off by brick stoppings. Warned by this occurrence, the management proceeded to divide up the south section into six panels by means of brick stoppings in dykes and at other convenient points. Before the work was completed, however, a second and independent outbreak of fire was discovered on the edge of a goaf in this section of the workings. Efforts were at once made to cut out the burning material; but, just when success appeared to be in sight, heavy falls of roof drove back the workers, and compelled the abandonment of the attempt some days later. Meanwhile, the goaf had been surrounded by canvas stoppings and the work of reinforcing these with brick was proceeding. A second line of brick stoppings was also being built in the limited openings through a dyke, which traverses the south section and divides it roughly into two halves. Meanwhile the products of combustion were finding their way to the surface through fissures in the subsided ground; but, later, heavy rains fell and caused a reversal of the air current, and the smoke was driven back on the workers to such an extent that all work underground had to be stopped, and eventually nearly all the inclines and air pits on the outcrop were emitting smoke, and in some cases large sheets of flame. As soon as work underground in No. 15 seam became impossible, attention was directed to the salving of No. 14A seam, which is 7 ft. in thickness and lies 10 ft. below No. 15 seam. All openings between the two seams were dammed off, and complete isolation secured. Meanwhile all the openings to the surface in No. 15 seam were gradually closed by earth filling, and the fire was then brought under control. It is satisfactory to record that no lives were lost during the conduct of the salvage operations. On one occasion five workpeople were overcome by foul gases, and, but for the prompt action of the manager and staff, would undoubtedly have lost their lives. It is also of interest to note that subsequent salvage operations, skilfully contrived and boldly executed, have resulted in the recovery of more than 50 per cent. of the area originally lost.

The second case occurred at the Tareni Coal Company's Haripur mine, where a fire broke out in some old workings. It spread with rapidity throughout the mine, and, the pillars being very small and the coal lying at a shallow depth, the whole mine soon collapsed and was lost. This fire also spread to the adjoining mines of Babu B. L. Chatterji and the Baraboni Coal Concern Limited, on the west and east respectively, the intervening barriers being too thin to withstand the strain set up by the collapses. The former mine was saved by the building of a few brick stoppings, but the latter had to be closed down. Salvage operations have lately been commenced, but as they have not been completed, they will be referred to in the next annual report.

The third case occurred at the East Indian Coal Company Limited's Kenwadih mine. The salvage operations attempted were attended by an explosion. The mine has not yet been reopened.

An explosion occurred at the Bengal Nagpur Coal Company Limited's Gangutia coalmine which is unique in the annals of Indian mining, and under other circumstances might have had very disastrous results. Two men, carrying naked lights, made an attempt to retrace their steps to the surface through some extensive abandoned workings, through which they had entered the mine, without authority. They lost their way, and entered a place full of firedamp, which ignited at their lights, and caused an explosion resulting in their deaths. The mine is a large one, working the Sanctoria seam, and dates back to the earliest days of which there is any official record. When it was ascertained that the deceased were missing, the manager was advised and a rescue party was formed at once of all the officials and six or seven miners, who carried four safety lamps and six naked lights. As the manager had convinced himself that an explosion had occurred, this proceeding was the height of rashness, and might have resulted in the loss of the party. Two open kerosine lamps were found near the bodies, and also a number of bamboo fencing poles, around one of which one man had his arms entwined. It was found on investigation that the deceased had come to the surface, had afterwards entered the mine by No. 2 incline, and had endeavoured to find their way through the old workings. The only entrance into the old workings from the present workings before the explosion was through a small hole in a stopping covered by a brattice cloth. All the other roads were closed by stoppings built of stone and mud. In every case these were demolished by the force of the blast. Large stones that had been projected by the force were found deeply embedded in the props, and three props at one point were knocked out. Further along the level on the out-bye side the timber and pillars were heavily encrusted with unburnt moist coaldust. There was not the slightest trace of coking, owing to the very wet state of the level. Had the mine been dry and dusty, the explosion probably would have been propagated throughout the workings of the mine and a heavy toll of life taken, as the mine was full of people at the time. The particular lesson inculcated by the accident is the danger that must always be present where a large accumulation of gas, accessible by any means to the workmen of a mine, exists. If it is possible to remove such an accumulation, nothing less than completely isolating the area with stoppings should be attempted. Except for the small hole in one of the stoppings, this was actually the case here.

For the first time in the history of the Jharia coalfield an explosion has to be reported, which resulted in the death of 14 persons, at the East Indian Coal Company Limited's Kendwadih coalmine, Nos. 2, 3 and 5 shafts. The colliery was worked with naked lights, and no trace of firedamp had ever been detected. On the afternoon of November 6 the European assistant was told that two women had been ill near an old goaf situated to the rise of the pits, from which the pillars of coal had been removed. He did not, he says, suspect that their illness was due to foul gas, and there is no particular reason why he should have done so. On the morning of the 7th, however, several workpeople, on proceeding to work in No. 11 seam, were overcome by foul gas, and it was evident that a fire had started somewhere underground. This was traced by the management to the goaf above mentioned. No sign of actual fire was visible, but white vapour was seen, and the west side of the goaf was found to be warm. The agent arrived at the colliery at midday on the 7th, and it was decided to attempt to dam off the fire by erecting brick stoppings. The agent had considered the feasibility of building stoppings round the fire area and then closing the area by a stopping in the rise connection in No. 11 seam. He had, however, abandoned the idea on account of the number and large size of the stoppings required, and arranged to construct five stoppings.

The manager descended No. 2 shaft at half-past seven the following morning, November 9. Three stoppings were completed. He returned to the surface at half-past eight, and a few minutes afterwards an explosion occurred. A vast cloud of dust was emitted from No. 2 shaft (downcast) to a height of about 200 ft. No. 3 shaft also sent out a cloud of dust, and native witnesses affirm that dust came up No. 5 shaft also. The cages at No. 2 shaft were found to be jammed, but those at No. 3 shaft were clear, but the shaft was upcasting, and was emitting smoke and strong firestink. The cages were kept going up and down, and in about half an hour two men came up. Just at the top one fell off and fell down the shaft. The other was rescued, but subsequently died.

After the recovery of the bodies the pits were sealed down, and have not yet been reopened. The total death roll was nine men and five women.

In the great majority of the mines in the Bengal coalfields, in which no firedamp is found, the air current is very feeble, ventilation practically being effected by diffusion.

As regards the actual cause of the explosion, all who were concerned in it hold the opinion that the explosion originated at the fire; and with that opinion Mr. Adams agrees. The directions of the force distinctly tend to show that the force came from inbye of the fire stoppings, blowing them all except one towards the pit. The fact that they were blown out in this way goes to show that such force must have been very considerable, an additional proof of which is furnished by the fact that all those found dead had sustained injuries in addition to being burnt. The only possible alternative theory is that gas found its way back over one of the unfinished stoppings and was ignited by a naked light carried by one of the persons near it. In such a case the force would not have been so clearly indicated in one direction. No firedamp had ever been seen in the mine, and it is evident that such explosive mixture as was present was

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ntinued from page 742.)

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For the first time in the history of the Jharia coalfield an explosion has to be reported, which resulted in the death of 11 persons, at the East Indian Coal Company Limited's Kendwadih coalmine, Nos. 2, 3 and 5 shafts. The colliery was worked with naked lights, and no trace of firedamp had ever been detected. On the afternoon of November 6 the European assistant was told that two women had been ill near an old goaf situated to the rise of the pits, from which the pillars of coal had been removed. He did not, he says, suspect that their illness was due to foul gas, and there is no particular reason why he should have done so. On the morning of the 7th, however, several workpeople, on proceeding to work in No. 11 seam, were overcome by foul gas, and it was evident that a fire had started somewhere underground. This was traced by the management to the goaf above mentioned. No sign of actual fire was visible, but white vapour was seen, and the west side of the goaf was found to be warm. The agent arrived at the colliery at midday on the 7th, and it was decided to attempt to dam off the fire by erecting brick stoppings. The agent had considered the feasibility of building stoppings round the fire area and then closing the area by a stopping in the rise connection in No. 11 seam. He had, however, abandoned the idea on account of the number and large size of the stoppings required, and arranged to construct five stoppings.

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71 to 84 per cent. methane, and 5 to 27 per cent. of carbon dioxide. The usual end to bacteria and ferments was death, or extinction by their own products. Under favourable conditions autoxidation then set in on the warm products and dead bacteria and fermented, and this might cause sufficient heating to fire the material. We might take it then, that ordinary coals were the products of bacterial ferment and enzyme action on vegetable remains. The process had, no doubt, gone as far as the ferments, &c., could take it in the case of anthracites; no further heating from this cause is likely. In other kinds of coal the action of the bacterial &c., was certainly going on when the mother substance was buried; this was proved by the presence of enormous quantities of methane in the virgin coal, the occurrence gas of this composition, which could not be explained by any other means. How long this bacteria, or ferment action continued was not known, and in many seams it might be still in progress, even though the bacteria and ferments might not be alive. The enzymes, which were the complicated chemical compounds in the bacteria and ferments, had the property of bringing about the same changes as the ferments from which they are derived.

Referring back to Fayol's conclusions, the three zones which he describes might well point to the heating being started by bacterial action spreading outwards as the second stage of autoxidation set in on the warm product left by the first. If it were merely due to slow oxidation alone one would expect the coal to be warmed up gradually, and the heat increasing regularity from outside to the central bit of really hot coal at 250 degs. Cent. (482 degs. Fahr.), and not in two distinct hot and warm zones with the third outer one at about ordinary temperature.

In considering the application of Fayol's results to the gob or waste in mines, it must be confessed that the description of the development of the heating to the smoke stage in the heaps was startlingly like the symptoms of many gob-fires. Instead of the height of heap in Fayol's experiment, we must, of course, substitute the distance between the gates or roads across which a small current of air may be supposed to be sucked by the difference in pressure. The period of about three months, mentioned by Fayol, was also very significant. At gob-fires the lecturer had often asked the question, How long was it since this waste was made? The answer was quite often, About three months or a little more. If the heat caused by the absorption of oxygen is confined and cannot get away rapidly, the mass of coal will gradually be warmed up, and we know from the many experiments conducted in the laboratory that the rate of absorption of oxygen by the coal increases enormously with increase in temperature.

With regard to the heating of coal in heaps in the open, Fayol found that the weather had no effect on the course of the action. This does not apply to gob-fires in mines. We know that damp, changeable weather appears to breed gob-fires in mines, and the crop of them in South Yorkshire in the spring and summer of 1912 will long be remembered. In an average year it is during the damp, foggy weather in the autumn and winter months that these heatings are most prevalent. It must not be overlooked, however, that dampness is not the only characteristic of changeable weather, and a more important factor is that during such periods the atmospheric pressure is constantly changing. Quick up-and-down movements in the atmospheric pressure must often have been the one remaining thing required to make an explosive mixture in the goaf and roads of a mine, and they have certainly been the finishing touch in causing many a gob-fire.

Various Kinds of Gob-fires.

As a matter of experience, it is well known to all who have to deal with these spontaneous heatings in mines that each heating has its own peculiarities or individuality. No two gob-fires have exactly the same features, and each one has to be taken and treated on its own merits. These heatings can be divided into three distinct classes:—(1) Those which occur in the unworked coal; (2) those which originate in the coal and shale left in the goaf—left there because it is dangerous to the man to take it out or because for some reason it does not pay to take out; (3) those which originate on a fault side where some coal is often left, and where the coal is often found in fine condition, caused by the grind it has been subjected to.

The second class of heating is generally supposed to be due to a short-circuiting of air through such waste from the intake to the return road. The fires of this class all have one feature in common which is that of some means the roof has been held up and has not been able to crush the waste close enough to prevent the short-circuiting. Apart from preventing short-circuiting, another effect of the roof putting pressure on the waste is that better contact is made with the strata, and so extra heat in the waste is more quickly conducted away. The short-circuiting of air explanation is borne out by the fact that this class of heating is often caused or developed by a fall at or near the face, preventing the usual fire ventilation in its normal course, and presumably increasing the amount of the air short-circuiting. Also it has been observed on several occasions that on increasing the water-gauge to remove a troublesome quantity of gas in a district, by giving it more air heatings in the waste have followed serious enough to necessitate digging out, and, *vice versa*, heatings in the early paraffin stage have often been stopped and put out by decreasing the ventilation in the district affected.

In many cases it has been observed that the first signs of a gob-fire are not noticed in the return, but in the intake side of the waste; such a heating can hardly be said to be caused by short circuiting of the air. In these cases the first signs, smell or smoke, are observed after a big decrease in atmospheric pressure. Such places may be likened to a bottle having only one opening for the air.

In most gob-fires of any size belonging to class 2 and 3 some props are found to have been left in. Timber left will certainly tend to hold up an open space for some time, and if the coal does warm up these, no doubt the timber will light up sooner than the coal, but in all probability such timber is not the primary cause of heating. It will certainly hasten things on, and, moreover, it makes the treatment of such heatings much more difficult by reason of the pungent fumes given off, and it is more likely to blaze up when uncovered and exposed to air than coal at the same temperature. It is therefore of great importance in a mine subject to gob-fires that *no* timber should be left in the waste.

Preventive Measures.

Dr. Harger then proceeded to consider the question from the chemical side. After a large gob-fire had been dug out and removed to the pit top, the question arose as to what to do with the huge cavity out of which perhaps 1,000 tons of material had been taken. Dr. Harger considered that the proper way to treat such a hole is to leave it open, well supported by brick pillars and walls, for several weeks, then to thoroughly saturate the floor and sides with a strong solution of calcium chloride and gob it up with dirt, wetting this with the same solution as layer and layer is put in.

In considering the question of how to prevent or lessen the number of gob-fires, it appeared that a reversal of the air-current from time to time (when the men were out of the pit) would be a move in the right direction. This periodical reversal of the air current would be a very simple means of removing most of the danger of dust explosions. The first reversal would throw into the air all, or nearly all, of the fine dust which had been deposited in the sheltered places, and make an explosive mixture of dust and air, but the second would have no great tendency to do that in the portion towards the return, and so very likely an explosive mixture was not formed in that portion. If the dust was not put into the air, and removed by a sudden reversal of the ventilation current, neither would it be by an ignition, or a blown-out shot, if the dust was not removed. This was one of the lessons of the recent disaster at Cadeby. There were three explosions. No. 1 took place against the air-current, and perhaps a little along the return—perhaps not. The normal ventilation was only affected for a minute or two probably, and proceeded as usual for nine or ten hours. When No. 2 took place, this also came against the air-current. Again the ordinary ventilating current was only interrupted for a minute or two, and it went on as usual, only impaired somewhat by a big fall in the intake. Then stoppings were built in the return and intake roads, and as they progressed of course the current of air diminished, and finally the return stopping was finished, and the current stopped. Just as the intake stopping was being finished, No. 3 explosion took place, and blew out some of the bricks in it (the intake stopping).

One way of treating gob-fires with absolute safety was to put a district in which one was discovered immediately on reduced oxygen ventilation. With 17 per cent. oxygen the fire could not make much headway, could not blaze up, and the gas coming off, mixed with any proportion of this air, was not likely to form an explosive mixture, so the heated material could be dug out in absolute safety. To guard against too great a reduction of oxygen, one or two acetylene safety lamps must be employed—the rest being, of course, electric ones.

A still better plan than this in dealing with the problem was, *not to wait for the fires to develop*, but to have a constant supply of inert gas conveyed into the suspected wastes, where these heatings were most likely to occur, and so prevent them forming. The quantity of such gas required was comparatively small—just sufficient to counteract the changes in the atmospheric pressure, or to overcome or counteract any short-circuiting. A current of inert gas put into the waste under pressure, all openings being stopped up as much as possible, would undoubtedly arrest any such heating. The supply of inert gas need not necessarily be kept up for long, as it was only a matter of time when the pressure of the roof would come on, and prevent gas of any kind getting at it, and also conduct away the heat. This inert gas was easily obtained by the combustion of suitable fuel, but care must be taken that it contained *no* carbon monoxide. The exhaust gas from an ordinary gas-engine, with its exhaust apparatus suitably modified, would give excellent results if the air supply was controlled, and complete combustion attained by passing the hot gases over a catalytic material.

Use of Inert Gas.

Since the Cadeby explosion, Dr. Harger said he had had the opportunity of working out on a large scale the production of inert gas, free from carbon monoxide. Using a 25-horse power gas engine, the exhaust gas was found to be so hot that complete combustion was readily effected without the use of a strong catalyser. All that was necessary was to pass the hot gases, directly after leaving the cylinder, over ordinary firebrick broken into about 1 in. pieces, which offers plenty of surface, and, provided ½ per cent. of oxygen is left, combustion of the inflammable gases is complete. In many cases it would not be convenient to use such engines, and the products of combustion from a gas-fired boiler or a coaldust-fired boiler would be preferred. The flue gas from these would certainly not have the same temperature; but by an equilibrating device, complete combustion could be induced without any excess of oxygen being left in the gas. This device could also be used with the gases from Lancashire boilers, the gas being passed through the apparatus before the economiser was reached.

The equilibrating apparatus (called an equilibrator) consisted of an iron vessel divided into two parts. The front part was packed with ½ in. to 1 in. pieces of special brick made of a mixture of clay and titaniferous bog iron ore, or other suitable catalyst; while the second part was packed with granulated copper, or scrap copper wire. The bog iron ore bricks have the property of causing combustible gas and oxygen to react at a low temperature, and by this means the last traces of gas were oxidised to carbon monoxide and water. If there was an excess of gas, it was removed by the copper oxide; while if there was an excess of oxygen, it was removed by the copper that is simultaneously present. To oxidise some of the copper, a slight excess of air was allowed when the apparatus was started; but in normal working, when sufficient copper oxide had been once formed, only the exact amount of air required for complete combustion was allowed. Owing to fluctuations of pressure and other conditions there would at one time be a slight excess of air, and at another a slight excess of gas. The pressure of both copper and copper oxide neutralised both these effects. Silica windows could be fitted into the copper-packet part of the apparatus, so that any prolonged reducing or oxidising agent could be seen and remedied by regulation of the quantity of air supplied to the engine or boiler.

By means of this apparatus a constant supply of inert gas of known composition, and entirely free from carbon monoxide, was automatically obtained. Whatever the source of the burnt gases, they might, after treatment in the manner described, be used directly, but it was preferable to remove any sulphur dioxide, if present. This could be easily done by passing the gas through a small scrubber charged with limestone, but probably, for treating wastes to prevent gob-fires, the trace of sulphur dioxide was better left in, as the position at which it escaped from the waste was thin, indicated by the smell, and, if such position was not suitable, it could be plastered up and the gas forced in another direction. It was, on the whole, preferable to remove the sulphur dioxide. These burnt gases, treated in the manner described, consisted of 81 per. cent. nitrogen and 19 to 18½ per cent. carbon dioxide. The inert gas cost nothing after the first capital outlay, and at some times that would amount to very little, where there were already gas engines or dust-fired boilers. The only working cost was the extension of pipes from time to time, and repairs and alterations to the same; and this was, of course, little compared with the cost of the present system, not counting the alleviation of the great worry and anxiety these heatings caused to everyone concerned.

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ELECTRIC WINDING ENGINES.*

By A. E. du Pasquier.

General Contrast of the Two Systems.

(Continued from page 752.)

When laying out a winding diagram, particularly for an A.C. hoist, where the most economical conditions have, perhaps, to be more carefully studied, one may feel, if not accustomed to the work, that there are so many variables affecting the result that it is difficult to know in what direction to look for the best result. Trial and error must enter fairly largely into all such attempts, but a little practice will enable the best results to be quickly secured if a few rather elementary conditions are borne in mind.

In uniform acceleration the accelerating torque turns are dependent on drum speed only, and for any given speed are independent of the number of turns during the period, and therefore independent of the time. The accelerating torque turns divided by the average statical moment during the retardation period will determine the number of turns required for coasting out; any less number of turns entails braking. For uniform acceleration the number of turns in the accelerating and retarding periods will be given by multiplying half the revolutions per second by the time $W = \frac{nt}{2}$ and the total time for the wind will equal $2 (W_1 + W_3) + W_2 \frac{60}{N}$ W_1, W_2, and W_3 representing the number of turns in the accelerating, maximum velocity, and retarding periods respectively and N resolutions per minute.

Taking conditions of constant statical moment (cylindrical drum with tail rope) as being the simplest case:—

If the minimum drum size, as determined from rope diameter, depth and angling, will not complete the wind in the required time at a reasonable maximum velocity, there are three directions in which the required output can be got:—

(1) With the same maximum velocity, reducing the time allowed for the accelerating and retarding periods. From the consumption per wind point of view this will be economical; but a limit is soon reached, as a maximum acceleration of about 6 ft. per second per second is about as far as is advisable, and the braking will become very heavy if this time is cut down appreciably. The peak load will also be considerably increased and the diagram more unequalised. Usually only small time adjustments can be made this way.

(2) Increasing the maximum velocity by speeding up the drum. This will also tend to a more unequalised diagram, as the accelerating torque and torque turns are increased in the ratio of the square of the speeds. Braking losses and consumption will be increased, but the first cost will be favourable.

(3) Increasing the maximum velocity by increasing drum diameter. This will increase the GD^2 of the whole system very nearly as the diameter³, the accelerating torque and torque turns will also be increased, but as the statical moment increases with the increased radius the diagram will be better equalised, the braking less than in (2), and the peak higher, the consumption per wind being about the same. First cost greater.

These conditions will apply generally to any type of drum. In every case start with the minimum drum dimensions, and if at a reasonable speed this will not give the output, and the adjustment required is outside the range of (1), see what can be done by speeding up. If possible, it may decrease the actual plant cost, and greatly simplifies the calculations. Statical moments and inertias remain the same, and it is only necessary to increase the accelerating torque as the square of the speed ratio, converting the torque curve so obtained into horse-power at the increased speed.

We have seen how the winding diagram can be influenced and improved by suitably designing the drum with a view to smoothing out the peaks. It may be worth while noting two factors which have considerable bearing on this, inasmuch as they tie the drum designer to dimensions he might otherwise wish to avoid. These are, of course, the centres of the overhead sheaths and the diameter of the rope it is necessary to employ.

Dealing first with the question of centres: this may hamper a designer in two ways. In some cases it may drive him to larger diameters than he would otherwise employ, to reduce the overall width of drum, in order to prevent excessive angling. In other cases, for the same reason, it may necessitate extended drum widths, entailing idle zones in the centre of the drum. Advantage is sometimes taken of drums of this nature to utilise the central and unused portion of the drum for the brake path; only one brake would then be used, and the author is of opinion many mining men would not favour that scheme, and, indeed, is doubtful whether it fully conforms with the new mining regulations. When the centres are such as to require wide drums of this nature to avoid excessive angling, it is sometimes necessary to provide double drums with a view to cutting down the inertia as much as possible.

With scroll drums of the type dealt with in this paper, it can be very embarrassing, as the width of the large diameter cylindrical portion must be at least as great as the centres of the pulleys in order to ensure the rope coiling properly on the scroll. A very ingenious drum profile, again due to Mr. Bramwell, is shown, with his permission, in diagram 18. Were the drum not arranged in this fashion, owing to the large centres—9 ft. 10 in.—two drums would have to be used, with somewhat increased inertia and considerably increased expense.

In concluding this portion of the paper the author has thought it may interest the members to show some diagrams calculated for rather heavier winding duties than previously illustrated. Diagrams 19, 20 and 21 are all calculated for outputs of 360 tons per hour from 750 yards or thereabouts. They illustrate how susceptible the diagram shape is to comparatively small changes in the conditions or winding cycle, and incidentally the labour and experience necessary to determine the most efficient operating conditions. It is not proposed to criticise these diagrams at any length—they can be analysed at leisure by anyone sufficiently interested—but it may again be pointed out that when calculating out various equalising drums, if tied to a maximum rope speed, although the diagram may be better equalised by adopting larger ratios between the starting cone and cylindrical portions of the drum, the inertia of the drum will increase and the speed decrease until commercially perhaps no improvement has been effected. This is the case with diagrams 20 and 21. Diagram 19 is far from satisfactory; it does not build up enough towards the end of the wind, but actually it is the most economical of them all.

Generally with regard to all the diagrams submitted it is perhaps unnecessary to mention that these are calculated diagrams, and that in practice the angular acceleration is not a straight line, that the torque during the accelerating period is in these diagrams usually averaged, and in practice would not be strictly represented by a straight line, and further that there is a time lag which prevents instantaneous response to change of load which has the effect of considerably rounding off the diagram. It would, however, be too tedious to try to faithfully represent the actual shape of the diagram as it would be traced by, say, a very sensitive recording wattmeter, nor would any useful purpose be served by so doing, the diagrammatic method giving results which would be slightly bettered in actual practice.

A point that enters largely into the economics of a winding engine is the relation of net weight lifted to the depth of the shaft; as the depth increased the load should also be increased if comfortable and economical winding conditions are to be obtained. One cannot lay down any hard and fast limits; but for a depth of 500 yards the economical lower limit would seem to be 3 tons with about a 50-second wind, giving an output of about 200 tons an hour. If a larger output is required it is more economically obtained by increasing the load rather than by shortening the allowable winding time. Diagrams 19, 20 and 21 are all calculated for 6 tons from 750 yards; at the same time a 12-ton lift is being carefully considered; if adopted, it will greatly improve the winding proposition: the torque turn diagram becomes much more uniform, the winding speed is halved, actual peak load more than halved, wear and tear in ropes and guides greatly reduced, and the consumption per ton reduced approximately 10 per cent. The author also suggests that having decided on the required output per hour, it is a mistake to allow for margins on the decking time if the time allowable for winding is not already ample. He has in mind a winding engine put in some few years ago when, with apparently 50 seconds winding time available, this was reduced to 45 seconds. With a 50 seconds winding time and a cylindro-conical drum the required output could have been raised with an A.C. motor no larger than needed for the performance shown on diagram 11. It would have needed equalising for the first couple of years, but at the present time the power company in question could probably serve it unequalised, and, apart from the economy in first cost, the power consumption per ton of coal would be some 10 per cent better. The effect of pushing the winding time to 45 seconds and using a cylindrical drum with tail rope with a one-deck cage was to nearly double the capacity of the winding motor required.

Referring to diagram 18, it will be noted that Mr Bramwell is lapping his ropes. As an electrical engineer greatly interested in this class of work, the author is delighted to see this being done in this country. It has been the practice on the Rand for some time. They are accustomed to work there with factors of safety on their ropes reduced to a point which would astonish many mining engineers in this country. In a very interesting paper read by Mr. Alpheus Williams, of De Beers, some time ago, he stated that some of their winding ropes had a factor of safety as low as 2·3—when allowing for static and accelerating stresses.

Undoubtedly for electric winding, or indeed for any other winding, every endeavour should be made to keep drums as light and as small as possible; as such design is intimately dependent on the question of angling, lapping and rope diameters, the author hopes that some valuable information on these very important points may be forthcoming in the discussion.

A further point arising from the same consideration is the advisability of overlay in the drum centre. Many mining engineers are opposed to this, on the score of unequal wear of the lagging, but the author contends that with the much steadier running obtained with electric winding the wear on the lagging is so inconsiderable anyway that double this amount in the centre would not cause any appreciable inconvenience; it can also be provided for to a certain extent by slightly crowning the lagging. Again, of course, if permitted it makes for smaller drums, lighter diagrams and lower first cost.

The other point mentioned was the bearing of the rope diameter on the diameter of the drum. Many quite unnecessarily large diameter drums are installed through a misconception of what is nowadays necessary in this respect. The author had hoped to have been able to tabulate some figures from the leading rope-makers bearing on the questions of the ratio of drum to rope diameter, cost and life. Messrs. Latch and Batchelor and Joseph Wright were good enough to furnish some particulars, but it was found impracticable to effectively analyse them. In reply to a particular enquiry for a winding rope to deal with a gross weight of 7½ tons from a depth of 500 yards at a maximum speed of 2,700 ft. per minute, makers were prepared to recommend 5½ in. circumference ropes consisting of six strands of 19/·109 wire on a hemp core for use in connection with a 10 ft. diameter drum, or six strands of 37/·078 in. for coiling on a 6-ft. diameter drum, the ratio of rope diameter to drum diameter being 1 : 73·5 and 1 : 44 respectively, and of drum diameter to diameter of individual wire being 1 : 1,100 and 1 : 925 respectively, the breaking strain of these ropes being 105 tons and weight 26 to 27 pounds per fathom. It would appear, therefore, as though the drum diameter restriction was more imaginary than real, as for a winder of these dimensions there would be nothing gained by going as low as 6 ft. for the small diameter of the drum. It is interesting to compare these figures with the usual proportions taken of 100 times and 1,000 times for the ratio of rope diameter and diameter of individual wire to the diameter of drum usually accepted as being correct. Probably the ratio of 1 : 1,000 is about right, as the diameter of the individual wires forming the strand cannot be reduced far without seriously decreasing the life of the rope; but it would look as though there were no justification for the rule that the drum diameter should not be less than 100 times the rope diameter.

In determining the minimum drum diameter, however, the increase in the bending stress of the rope must be carefully considered. The load imposed on the rope due to bending is very much more than probably many people may think; *e.g.*, in the two examples cited, the bending stresses are for the 6-strand, 19/·109 in. on a 10 ft. diameter drum—10,300 lb.; 6-strand, 37/·078 in. on a 6 ft. diameter drum—12,300 lb. Assuming that the total load including rope is 10·5 tons and an acceleration of 4 ft. per second,² the maximum load on rope would be:

	6-strand 19/·109 in. Lb.		6-strand 37/·078 in. Lb.
Dead load	23,500	...	23,500
Accelerated load	2,920	...	2,920
Bending stress	10,300	...	12,300
Total load	36 720	...	38,720
Factor of safety	6·4	...	6·1

from which it will be seen that the bending stress may be a very considerable factor, amounting in these particular cases to 28 and 32 per cent respectively of the total load on the rope. Nevertheless, such stresses are not prohibitive, and with commercial ropes of modern construction drum diameters can be adopted which need

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* From a paper published in the *Proceedings* of the South Wales Institute of Engineers.

RIG WINDING ENGINES.*

y A. E. du Pasquier.

Contrast of the Two Systems.

ntinued from page 752.)

at a winding diagram, particularly for
here the most economical conditions
be more carefully studied, one may
tomed to the work, that there are so
ffecting the result that it is difficult to
ection to look for the best result. Trial
enter fairly largely into all such
little practice will enable the best
kly secured if a few rather elementary
rne in mind.

eleration the accelerating torque turns
drum speed only, and for any given
ndent of the number of turns during
therefore independent of the time.
torque turns divided by the average
during the retardation period will
mber of turns required for coasting
mber of turns entails braking. For
tion the number of turns in the
retarding periods will be given by
the revolutions per second by the

the total time for the wind will equal

$W_{.} \div \frac{60}{N}$ W_1, W_2, and W_3 representing the
in the accelerating, maximum velocity.
eriods respectively and N resolutions

tions of constant statical moment
with tail rope) as being the simplest

n drum size, as determined from rope
and angling, will not complete the wind
me at a reasonable maximum velocity,
irections in which the required output

ame maximum velocity, reducing the
the accelerating and retarding periods.
ption per wind point of view this will
but a limit is soon reached, as a
ration of about 6 ft. per second per
s far as is advisable, and the braking
heavy if this time is cut down appre-
ak load will also be considerably
e diagram more unequalised. Usually
djustments can be made this way.

the maximum velocity by speeding up
will also tend to a more unequalised
accelerating torque and torque turns
he ratio of the square of the speeds.
d consumption will be increased, but
be favourable.

the maximum velocity by increasing
This will increase the G D^2 of the
very nearly as the diameter^3, the
que and torque turns will also be
s the statical moment increases with
lius the diagram will be better equalised.
than in (2), and the peak higher, the
wind being about the same. First cost

ns will apply generally to any type of
y case start with the minimum drum
f at a reasonable speed this will not give
he adjustment required is outside the
what can be done by speeding up. If
decrease the actual plant cost, and
s the calculations. Statical moments
in the same, and it is only necessary
celerating torque as the square of the
erting the torque curve so obtained into
e increased speed.

n how the winding diagram can be
proved by suitably designing the drum
smoothing out the peaks. It may be
ng two factors which have considerable
nasmuch as they tie the drum designer
might otherwise wish to avoid. These
e centres of the overhead sheaths and
he rope it is necessary to employ.

ith the question of centres: this may
er in two ways. In some cases it may
er diameters than he would otherwise
e the overall width of drum, in order to
angling. In other cases, for the same
necessitate extended drum widths,
es in the centre of the drum. Advantage
en of drums of this nature to utilise the central and unused portion of the drum for the brake path; only one brake would then be used, and the author is of opinion many mining men would not favour that scheme, and, indeed, is doubtful whether it fully conforms with the new mining regulations. When the centres are such as to require wide drums of this nature to avoid excessive angling, it is sometimes necessary to provide double drums with a view to cutting down the inertia as much as possible.

With scroll drums of the type dealt with in this paper, it can be very embarrassing, as the width of the large diameter cylindrical portion must be at least as great as the centres af the pulleys in order to ensure the rope coiling properly on the scroll. A very ingenious drum profile, again due to Mr. Bramwell, is shown, with his permission, in diagram 18. Were the drum not arranged in this fashion, owing to the large centres—9 ft. 10 in.—two drums would have to be used, with somewhat increased inertia and considerably increased expense.

In concluding this portion of the paper the author has thought it may interest the members to show some diagrams calculated for rather heavier winding duties than previously illustrated. Diagrams 19, 20 and 21 are all calculated for outputs of 360 tons per hour from 750 yards or thereabouts. They illustrate how susceptible the diagram shape is to comparatively small changes in the conditions or winding cycle, and incidentally the labour and experience necessary to determine the most efficient operating conditions. It is not proposed to criticise these diagrams at any length—they can be analysed at leisure by anyone sufficiently interested—but it may again be pointed out that when calculating out various equalising drums, if tied to a maximum rope speed, although the diagram may be better equalised by adopting larger ratios between the starting cone and cylindrical portions of the drum, the inertia of the drum will increase and the speed decrease until commercially perhaps no improvement has been effected. This is the case with diagrams 20 and 21. Diagram 19 is far from satisfactory; it does not build up enough towards the end of the wind, but actually it is the most economical of them all.

Generally with regard to all the diagrams submitted it is perhaps unnecessary to mention that these are calculated diagrams, and that in practice the angular acceleration is not a straight line, that the torque during the accelerating period is in these diagrams usually averaged, and in practice would not be strictly represented by a straight line, and further that there is a time lag which prevents instantaneous response to change of load which has the effect of considerably rounding off the diagram. It would, however, be too tedious to try to faithfully represent the actual shape of the diagram as it would be traced by, say, a very sensitive recording wattmeter, nor would any useful purpose be served by so doing, the diagrammatic method giving results which would be slightly bettered in actual practice.

A point that enters largely into the economics of a winding engine is the relation of net weight lifted to the depth of the shaft; as the depth increased the load should also be increased if comfortable and economical winding conditions are to be obtained. One cannot lay down any hard and fast limits; but for a depth of 500 yards the economical lower limit would seem to be 3 tons with about a 50-second wind, giving an output of about 200 tons an hour. If a larger output is required it is more economically obtained by increasing the load rather than by shortening the allowable winding time. Diagrams 19, 20 and 21 are all calculated for 6 tons from 750 yards; at the same time a 12-ton lift is being carefully considered; if adopted, it will greatly improve the winding proposition: the torque turn diagram becomes much more uniform, the winding speed is halved, actual peak load more than halved, wear and tear in ropes and guides greatly reduced, and the consumption per ton reduced approximately 10 per cent. The author also suggests that having decided on the required output per hour, it is a mistake to allow for margins on the decking time if the time allowable for winding is not already ample. He has in mind a winding engine put in some few years ago when, with apparently 50 seconds winding time available, this was reduced to 45 seconds. With a 50 seconds winding time and a cylindro-conical drum the required output could have been raised with an A.C. motor no larger than needed for the performance shown on diagram 11. It would have needed equalising for the first couple of years, but at the present time the power company in question could probably serve it unequalised, and, apart from the economy in first cost, the power consumption per ton of coal would be some 10 per cent. better. The effect of pushing the winding time to 45 seconds and using a cylindrical drum with tail rope with a one-deck cage was to nearly double the capacity of the winding motor required.

Referring to diagram 18, it will be noted that Mr Bramwell is lapping his ropes. As an electrical engineer greatly interested in this class of work, the author is delighted to see this being done in this country. It has been the practice on the Rand for some time. They are accustomed to work there with factors of safety on their ropes reduced to a point which would astonish many mining engineers in this country. In a very interesting paper read by Mr. Alpheus Williams, of De Beers, some time ago, he stated that some of their winding ropes had a factor of safety as low as 2·3—when allowing for static and accelerating stresses.

Undoubtedly for electric winding, or indeed for any other winding, every endeavour should be made to keep drums as light and as small as possible; as such design is intimately dependent on the question of angling, lapping and rope diameters, the author hopes that some valuable information on these very important points may be forthcoming in the discussion.

A further point arising from the same consideration is the advisability of overlay in the drum centre. Many mining engineers are opposed to this, on the score of unequal wear of the lagging, but the author contends that with the much steadier running obtained with electric winding the wear on the lagging is so inconsiderable anyway that double this amount in the centre would not cause any appreciable inconvenience; it can also be provided for to a certain extent by slightly crowning the lagging. Again, of course, if permitted it makes for smaller drums, lighter diagrams and lower first cost.

The other point mentioned was the bearing of the rope diameter on the diameter of the drum. Many quite unnecessarily large diameter drums are installed through a misconception of what is nowadays necessary in this respect. The author had hoped to have been able to tabulate some figures from the leading rope-makers bearing on the questions of the ratio of drum to rope diameter, cost and life. Messrs. Latch and Batchelor and Joseph Wright were good enough to furnish some particulars, but it was found impracticable to effectively analyse them. In reply to a particular enquiry for a winding rope to deal with a gross weight of 7½ tons from a depth of 500 yards at a maximum speed of 2,700 ft. per minute, makers were prepared to recommend 5¼ in. circumference ropes consisting of six strands of 19/·109 wire on a hemp core for use in connection with a 10 ft. diameter drum, or six strands of 37/·078 in. for coiling on a 6-ft. diameter drum, the ratio of rope diameter to drum diameter being 1 : 73·5 and 1 : 44 respectively, and of drum diameter to diameter of individual wire being 1 : 1,100 and 1 : 925 respectively, the breaking strain of these ropes being 105 tons and weight 26 to 27 pounds per fathom. It would appear, therefore, as though the drum diameter restriction was more imaginary than real, as for a winder of these dimensions there would be nothing gained by going as low as 6 ft. for the small diameter of the drum. It is interesting to compare these figures with the usual proportions taken of 100 times and 1,000 times for the ratio of rope diameter and diameter of individual wire to the diameter of drum usually accepted as being correct. Probably the ratio of 1 : 1,000 is about right, as the diameter of the individual wires forming the strand cannot be reduced far without seriously decreasing the life of the rope; but it would look as though there were no justification for the rule that the drum diameter should not be less than 100 times the rope diameter.

In determining the minimum drum diameter, however, the increase in the bending stress of the rope must be carefully considered. The load imposed on the rope due to bending is very much more than probably many people may think; *e.g.*, in the two examples cited, the bending stresses are for the 6-strand, 19/·109 in. on a 10 ft. diameter drum—10,300 lb.; 6-strand, 37/·078 in. on a 6 ft. diameter drum—12,300 lb. Assuming that the total load including rope is 10·5 tons and an acceleration of 4 ft. per second,' the maximum load on rope would be:

	6-strand 19/·109 in. Lb.		6-strand 37/·078 in. Lb.
Dead load........	23,500	...	23,500
Accelerated load	2,920	..	2,920
Bending stress......	10,300	...	12,300
Total load..................	36,720	...	38,720
Factor of safety	6·4	...	6·1

from which it will be seen that the bending stress may be a very considerable factor, amounting in these particular cases to 28 and 32 per cent. respectively of the total load on the rope. Nevertheless, such stresses are not prohibitive, and with commercial ropes of modern construction drum diameters can be adopted which need

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published in the *Proceedings* of the South
f Engineers.

not be restrictive or detrimental to the most efficient winding conditions from this point of view only, while for any given maximum velocity small diameters greatly improve the proposition, they reduce the statical moment and inertia, increase the drum speed, reduce the first cost, and, with scroll drums, greatly assist in equalising the diagram without unduly increasing the inertia.

Dealing with this question of ropes arises the advisability of giving the rope further support than is obtained by coiling on plain cylindrical lagging, and the advisability of grooving the lagging to support, say, one-third of the rope circumference; if this is adopted it doubtless ensures uniform coiling and avoids spreading and side crush; but, on the other hand, it increases the overall width of the drum, and as the side crush can only be of the order of one-thirtieth to one-fortieth the load on the rope, it does not seem to the author that this can have any really detrimental effect on the life of the rope. The new regulations requiring the renewal of all winding ropes after 3½ years' life have a bearing on this, inasmuch as there will probably be a tendency to stress ropes rather higher on this account.

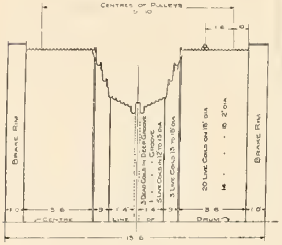

Diagram 18.

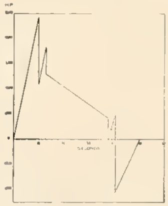

Diagram 19.—6 Tons coal from 750 yds., Output, 360 Tons per hour; Centres of Overhead Pulleys, 9 ft. 10 in., 2 in. diam. rope; GD^2 of Drum, 1·95 × 10^6 KGM². Overall Width of Drum, 18 ft. 6 in.; r.p.m. of Drum Shaft, 60.

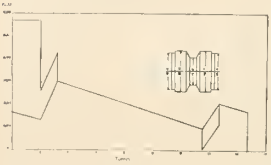

Diagram 19a

On this question of ropes the author would like to invite discussion as to whether it is not possible to depart from the old factor of safety of 10 rule, and submits that with modern conditions, electric winding engines, and keps that can be drawn without lifting the cage, such margins on the working load are no longer necessary. Conceivably in the earlier days, with the irregular turning moment of the engine transmitting and setting up rope vibrations leading to crystallisation and increasing brittleness, with old-fashioned keps necessitating lifting the cage, and slack in the bridles, some considerable margin of safety over the working load was necessary. But when it is possible to eliminate some of these factors it would seem that much smaller factors of safety could be adopted which might have the additional advantage of enabling lower tensile steel to be used.

In Mr. Alpheus Williams's paper, previously mentioned, are given very full particulars of the life of the ropes used at all the various De Beers mines. No doubt many members here have seen these results; but as supporting the possibility of using ropes with smaller margins successfully the author has thought the following details taken from the paper in question may be interesting:—

Details of load—	
Skip	7,200 lb.
Half weight of tail rope	1,065 lb.
Load	10,000 lb
Circumference and weight of rope	5 in. — 4·31 lb. per foot crucible steel.
Breaking stress of steel	95/100 short tons per sq. inch.
" " rope	70 16 short tons.
Depth of shaft	1,840 ft.
Weight of rope, including 50 ft. of tail rope	8,490 lb.
Factor of safety, omitting bending and acceleration	5·2.
Total stress on rope due to load, acceleration and bending	60,121 lb.
Actual factor of safety	2 33.
Number of hours, Sundays omitted	5.472.
Total loads hoisted	701,727 = 3¼ million tons.
Stretch while in use	41 ft.
Cost per load per 100 ft. of rope	·004d. = ·008d. per ton per 100 ft.
Cost per load	·1d. = ·02d. per ton.

The maximum velocity of the rope approaches 80 ft. per second, and the actual factor of safety is calculated for an acceleration of 10 ft. per second per second.

There are certain sub-variations of the winding systems here considered which have not been dealt with in this paper because the same general principles apply as to those under discussion, and because their application would seem to be restricted to winders of the smaller size. There are also two other systems of which some notice may be taken—viz., the conjunction of turbine, Ward-Leonard generator and A.C. generator, the turbine having considerable overload capacity by means of relay-operated by-passes if necessary, the A.C. generator supplying the general load of the colliery or as much of it as it can, and the Ward-Leonard generator the winding engine. There is an example at work at Manveschaft, Silesia. It is conceivable that cases might arise here and there where such a system might have some advantage, but it would seem that the application must be very limited.

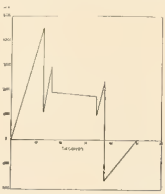

Diagram 20.—Six tons coal from 750 yards; Output, 360 Tons per hour; Centres of Overhead Pulleys, 9 ft. 10 in., 2 in. diam. rope; GD^2 of Drum 3·1 × 10^6 KGM²; Overall Width of Drum, 19 ft. 10 in., r.p.m. of Drum Shaft, 56·5

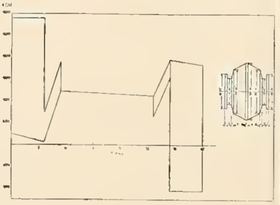

Diagram 20a

Another system is the series system due to Prof. Thury. In this country, where there is no high tension D.C. transmission, a motor-generator set is necessary. Full-load current is always circulating in the generator and motor, whether the winder is at rest or not, speed variation being obtained by rocking the brushes of the winding motor forward or backward according to the desired direction of rotation, the brushes of the generator being also automatically worked forward to enable it to generate sufficient E.M.F. to maintain full-load current against the increasing back E.M.F. of the winding motor. The objections are: Expense—the heating capacity of the machines should be greater than with a Ward-Leonard drive—and difficulty with the automatic generator brush movement. In the author's knowledge there are three small winders in operation on this system, one in Scotland and two in Spain.

There is yet one other system which has been advocated for work of this description—viz., the three-phase commutator motor. At the present time there are two types of such motor obtainable—the series motor and the double-repulsion motor. In both cases speed regulation is obtained by brush displacement, and at first sight it appears that such a device might prove the solution of the electric winding problem, inasmuch as efficient speed regulation is obtained with an A.C. supply without rheostatic losses or the introduction of converting machinery. On looking more closely into the matter, however, this view cannot be upheld, as there are great disadvantages, very difficult to surmount. In the first place, where complete speed regulation is required, the maximum capacity of such motors would seem to be limited at present to about 500-horse power, on account of various difficulties connected with the design. And secondly, such motors have a series characteristic—*i.e.*, the speed varying inversely with the torque. This condition of things makes too great a demand upon the skill and reliability of the driver.

With any given position of the controller, the speed will vary inversely with the load, and in the case of a plain cylindrical drum without tail rope it would probably require the nicest manipulation to bring the cage to bank without excessive braking.

Regenerative braking is possible by rocking the brushes beyond the neutral position, but such regenerated current will not necessarily be of the same frequency as the supply current, and therefore would only heat the system without doing useful work. At the same time it must be pointed out that such motors are of comparatively recent origin and these defects may be overcome in the future, but at present they will probably find a field rather in surface-haulage work than for main winding.

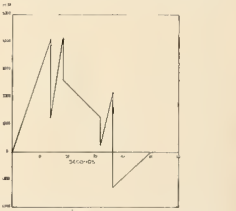

Diagram 21.—6 Tons coal from 750 yds.; Output, 360 Tons per hour; Centres of Overhead Pulleys, 9 ft. 10 in., 2 in. diam. rope; GD^2 of Drum, 3 66 × 10^6 KGM²; Overall Width of Drum, 16 ft. 4 in; r.p.m. of Drum Shaft, 52·5.

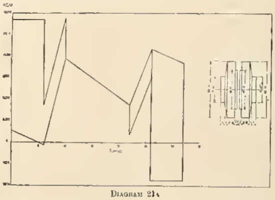

Diagram 21a

A word may perhaps be permitted on the question of the advisability of installing new steam winding engines with exhaust-steam turbines, rather than electric winding engines right away. There is a certain glamour about an exhaust-steam turbine proposition which has been responsible for much bad engineering and many unfulfilled expectations. Unquestionably the adjunct of an exhaust turbine may greatly improve the performance of the steam winding engine, but this extra economy is not obtained without considerable expense. There are some interesting figures bearing on this given in Mr. Chartres's paper before this institute in 1909.* It in no way reduces the boiler plant necessary for the very varying winding engine load; it introduces additional running machinery requiring skilled attendance which a colliery company would be well without; and in most cases, with power available at a reasonable figure, and with the ordinary colliery load factor, the electrical winder will still show a saving in cost per ton of coal raised after debiting it with any margin there may be between the cost of units generated by the exhaust-turbo plant and the cost for the same number of units if purchased from the power company. Undoubtedly it may be a valuable expedient when high-class steam

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* *Proceedings*, vol. 26, No. 4, p. 750.

are already installed, but in the author's
n a new colliery lay-out with steam
aust turbines is to reap only half the
e by the complete conversion.
to note that, under the last Mining
ch require a separate winding engine
in readiness at every shaft used as an
ably cheap geared A.C. winder is
t economical solution, as there are no
f any kind, and the capital outlay will
small.

s to the Editor.

responsible either for the statements
pinions expressed by correspondents.
ns must be authenticated by the name
the sender, whether for publication or
e can be taken of anonymous communi-

ons are only given by way of published
espondents, and not by letter, stamped
lopes are not required to be sent.

S OF COLLIERY SURVEYORS.

ith interest Mr. Lockerbie's letter in
27th ult., also "Sufferer's" contribu-
subject in your current number, and
ement with the idea expressed by your
It is quite time that mine surveyors,
e Office certificate, banded themselves
nal helpfulness and protection, and I
o co-operate with others in any scheme
ect the formation of a mine surveyors'
FRATERNITY.
ber 14, 1912.

OBITUARY.

rred at Streatham on Saturday of Mr.
, who was for nearly 40 years the editor
r. Pendred was born in Ireland in 1836. He
ool and his education was due to his own
ity for books, aided by a highly retentive
known to Zerah Colburn, the editor of
at time, by his letters, and when he came
for work Colburn assisted to find him an
works in Staffordshire. But his letters
bjects had attracted the attention of
wards, the proprietor of the *Mechanics'*
r a few months in the works he was asked
f that paper. Two years or so later, in
rn left, Pendred was appointed to the
Engineer, which he retained until his
when he was succeded by his second son.
of the publication in the technical Press
gs. He was an old member of the Iron
and of the Society of Engineers, and late
invitation to become a member of the
chanical Engineers. He leaves a widow

nounced of Mr. Finlay Finlayson, con-
elhaven, Airdrie. After a sojourn in the
where he was chief erector in the large
nd Anderson, he went to Cumberland to
neer in the Monklead Iron and Steel
e later he was engaged in putting down
Steelworks, and then went to the Vulcan
. After being some time with Stewarts
ydesdale, he settled down at Airdrie as a
r with his son, Mr. T R. Finlayson, at
irdrie.

an, of Guisborough, one of the most
local leaders of the Cleveland Miners'
n Tuesday of last week after a lingering
n served for many years on the executive
sociation, and was a member of the
ible for the arrangements of the exami-
ificates of mine managers.

place on the 11th inst. at Lyndhurst,
, of Mr. Robert Middleton, head of the
, in Meanwood-road, Leeds. Mr. Mid-
5 years of age, had been seriously ill for
. Mr. Middleton was on the Leeds
Engineering Employers' Federation, and
engineering committee of the Leeds
eaves a widow, and a son, Mr. R C.
as been with him at the Sheepscar

s been called to a new preparation suit-
tion of steel and other structures at the
C.," which is supplied by the Patent
, 11-14, Dunedin-house, Basinghall-
.C., and the Mill, Runhall, Hardingham,
nper and cold-water paint. It is wash-
d germproof, and can be obtained in any

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Effect of the War on Coal Freights and on Tinplate Trade—Miners' President Exposes Syndicalist Tactics—Huge Increase in the Burden of Rates on Collieries—New Localities Heavily Hit—The Agitation for Increase of Surfacemen's Wages—One more Breach of the Conciliation Board Agreement—Enginemen and Stokers' Sectional Action—One Class of 449 Students.

By their embargo on Greek tonnage, the Turkish Government are likely to add still further to the cost of coal exports; and the extent to which this will operate is an interesting subject of speculation at the moment. At least a hundred thousand tons has been held up; and though this is mainly eastern Mediterranean tonnage which does not come into competition with British, its removal at a time of exceptional pressure is a bull point for chartering clerks—one they will not fail to make the most of. It has to be noted that the good crops in Southern Russia, and the very great need for the Russian Government to ensure due access to Western markets, establishes probability that some arrangement for getting cargoes through the Bosphorus and the Dardanelles will be arrived at; more especially as Austria, in respect of the Hungarian crops, with Roumania as well, would be seriously inconvenienced if the two straits were closed, and neutral vessels not allowed to carry corn outward from the Danubian ports and the Black Sea. Under provision of some special arrangement, it is believed that the trade is likely to be maintained; and thus the cancelling of the Greek service becomes directly applicable to the British shipping position so far as regards rate of freight, already so very onerous to the coal trade.

On Swansea Metal Exchange during Tuesday, one chief subject of conversation was the probable effect of the war upon the tinplate trade. Last year Roumania and the Black Sea ports of Russia took no less than 38,800 tons, this being an increase of 8,000 tons over the preceding year; and the feature of the business is its rapid expansion, the 1910 total being 5,000 tons better than 1909. At present the figures are really 8 per cent. of the total exports. Usually the Danube ports do not close till December and remain closed till March, so that there is a normal cessation of shipments during the winter; but to have an earlier closure, with doubt as to date of re-opening, is a serious matter. One line of steamers regularly trading between Swansea and the Danube ports has cancelled its sailings.

The hope is entertained that the Foreign Office will take steps to keep open the Bosphorus and the Dardanelles, so that access to neutral ports may be maintained; and this should not be impracticable, because merchant vessels could be passed through the straits under Turkish convoy during day-time, even if the Porte could not assent to free passage.

Mr. W. Brace, M.P., has made a plain declaration against the tactics of the advanced wing of the trade unionists, and not before it was time, for it is necessary that the rank and file of the Federationists should have a clear idea whither some of the loudest talkers would lead them, and it is equally necessary that leaders who realise the risks and dangers (to the men themselves) of the new policy, should utter warning. In Mr. Brace's opinion, the object of the extremists is to secure official positions in the unions, and then to use the organisations for revolutionary purposes. He gives serious caution because of the suffering which such a policy entails upon the men and their families. What has to be particularly observed is that the declaration of the president may be taken as an indication that attempts to co-operate with the extremists will henceforth be abandoned, and that exposure of their ultimate aims, with warning against its unavoidable hardships, will rally the colliers to closer support of the Federation, so that the practically free hand they have had will no longer be permitted them.

The colliery districts are especially oppressed with the burden of rates, and it is notable that within three years the rates in the Rhondda have risen from 7s. to 9s. 2d. in the £. Nothing can more strikingly illustrate the enormous burden which is placed upon industry, and so far as collieries are concerned—these being by far the greatest ratepayers in their respective areas—the matter is one of peculiar importance to shareholders. The Local Taxation Returns just issued give abundant proof that the sums from the Imperial Exchequer in aid of local rates are not at all commensurate with the additional burdens that local ratepayers have to encounter. New laws impose additional costs upon the local authorities, legislation such as the Mines Act and the Minimum Wage Act lay still heavier burdens upon enterprise and capital, but Parliament does not provide out of the national funds that additional help to the localities which is commensurate with what new laws impose.

On the contrary, the last four or five years show an actual decrease—for whereas the Exchequer grants exceeded 25 per cent. in 1906, they were less than 25 per cent. last year, and this despite the large increase which new laws have imposed. It is to be hoped that the Departmental Committee which has been investigating the relations of Imperial to local taxation will make some recommendation likely to relieve industry. In the Rhondda the Education rate alone has increased from 1s. 6d. to 2s. 3½d. in the £ within three years. This is included in the Poor rate, which, notwithstanding its name, bears the burden of many other purposes than poor relief. In the year ended March 25, 1910, the Poor rate of the Rhondda was 3s. 6d., whilst for the current year it will not be less than 5s. 6d.

In new colliery areas especially the burden of local taxation is felt, because these localities have to provide schools, roads, bridges, drains, water supply, and many other services which older communities inherit in large measure from preceding generations. New localities have therefore a fair claim upon the national exchequer—certainly in regard to services essentially national, like education; and a far larger proportion of the local outlay should be borne from Imperial sources.

Further discussion has been provoked by the declared intention of the miners' leaders to press forward their claim that surfacemen should be paid not less than 5s. per day. It is pointed out that the claim is in direct breach of the agreement, and that while claiming the Conciliation Board agreement to be still in force as regards the giving of a month's notice, the leaders are advocating its cessation in the important matter of rate of wages to these classes of workmen.

Really, no doubt, the raising of this question has a bearing upon the grave difficulty originating in the reorganisation scheme. This is not going at all well. Indeed, its unacceptability to large sections, and especially the failure of so large a number to vote, makes very doubtful the next step. At a meeting of the South Wales miners' executive, on Monday, the subject came up, and one interesting statement was made, namely, that the number of Federation members is now approximately 100,000, as compared with 160,000 a couple of years ago. Out of that hundred thousand, not more than four-fifths voted on the question of centralising the organisation, and there was in that vote a majority of 10,000 in favour of the new proposals. Since then, the anthracite section notified its intention to break away on this very question, and other important sections are seriously dissentient. On Monday, an adjournment was decided on.

A great part of the time of Monday's meeting was occupied with an endeavour to frame a scheme for providing medical attendance for colliers' families now that the Insurance Act makes an alteration in the relations of the men themselves to the old funds.

Without a doubt, the claim on behalf of the surfacemen is to be pursued vigorously. The Miners' Federation of Great Britain central executive, according to the resolution at Swansea, is to take immediate steps for securing not less than 5s. a day for them; also to bring these men under the provision of the Eight Hours and the Minimum Wage Acts. The probable course of action will be that each district will open separate negotiations with the employers.

A very striking fact is the declaration of Mr. Hartshorn that the resolution of the Swansea conference regarding the 5s. does not mean that no more than 5s. for all surfacemen shall be paid. What it does mean, he states, is that "no surfaceman's day-wage must be less than that amount" Indeed, he argues that the sum should be applied to labourers and screen men only, and that a higher wage than 5s. a day will be required for those who do heavier work, such as pushing trams, attending to *tracks*, banking coal, and so on.

As to the charge that the men's leaders are, by this claim, breaking the agreement, they retort that the coalowners have themselves violated the agreement by refusing to give a calendar month's notice such as is stipulated therein, and by endeavouring to substitute 24 hours' notice. A weekly engagement is now suggested; and the men would have agreed to this, were it not that the owners sought to establish that the remainder of the old agreement was operative. The Federation's representatives, although willing to accept the weekly notice, would not agree, except upon consideration that Clauses 24 and 26 were deleted, their object being to keep open the way for securing improvement of the surfacemen's wage. Clause 24 provides for maintenance of the old rates and conditions; and Clause 26 appointed March 1915 for termination of the agreement.

There is a considerable amount of unrest in certain areas because of questions arising as to the operation of the minimum wage award. Speaking a few days ago, at Bargoed, Mr. J. Hill, one of the leaders, said it seemed to him that the employers were deliberately trifling with the men's claims, and availing themselves of the rule which placed upon the men the onus of proof before they got their pay. He stated that, when the Act was passed, all understood that the employers would have to pay men their wages until the case was made out that the men were not entitled to the wages. This point would have to be contested in the courts, but in the meantime the district must consider the advisability of resorting to force by stopping the pits. Pieceworkers were, he added, now worse off than before the strike.

Colliery enginemen and stokers still continue their endeavours to perfect their organisation independently of the miners. As has been mentioned more than once in this column, the Miners' Federation leaders seek to embrace in the Federation the enginemen's union—which includes craftsmen of various grades, and is distinct from the Colliery Winding Enginemen's Association; but the enginemen and stokers object, preferring to act separately. They held another meeting last week, and conferred at Cardiff with representatives of the National Federation of Enginemen; and ultimately it was decided that that organisation should seek a meeting with the executive of the Miners' Federation of Great Britain in order to arrive at a settlement of differences by arranging a line of demarcation for membership between the miners' organisation and that of the enginemen, &c.

The importance of this question to colliery managers, no less than to the trades unionists, needs no explanation, for these sections of workmen have, to a certain extent, a controlling position in reference to the working of the mines, and a small number could set thousands of men in idleness in case of a sectional dispute. Whatever be the final arrangement between the two unions, it is to be hoped that the evil of sectional action will be averted.

The enterprise of the Alexandra Dock Company in constructing their magnificent new dock—which is to be a mile long and a quarter of a mile wide—is more than fully justified as each month's trade returns shows the progress of Newport. September figures are very gratifying Coal exports foreign rose from 359,027 tons (in the corresponding month last year) to 375,176 tons last month; while coastwise the increase was from 57,000 to 61,000 tons. The same feature of progress is seen in the iron trade, and in manufactures of iron and steel. Tinplate increased from 1,349 to 2,007 tons; galvanised sheets from 2,864 to 3,345 tons; steel sheet bars and hoops nearly doubled, being 1,544 tons; and rails from 476 to 3,609 tons.

Llanhilleth colliers struck for a day upon a demand that gates should be placed on the cages. At a meeting, the agent advised them to resume work, but to continue the agitation for gates to be put on; and consequently the stoppage was for only one day. In answer to a deputation, the manager stated that the requirements of the Act were being complied with in regard to protective measures, inasmuch as bars were fixed across the cage.

The Carmarthen Education Committee have had to consider a letter from H.M. inspector in Swansea, who pointed out that the classes for colliery firemen were too large, the number attending being so great that it was impossible for the teacher to do justice to the men. This was especially the case at Ammanford, Llanelly and Cross Hands. One of the members of the Education Committee stated that the Ammanford class recently had as many as 449 students; the room was crowded to suffocation and there was only one teacher to cope with the work. The mining committee are considering the matter, with a view to remedy.

Two men were fined in the Ystrad Court, in the Rhondda, on Monday, on account of a broken lamp—one for passing it, and the other for neglecting to examine it. The gauze of the lamp had been broken, and the manager said there were 1,346 men in the mine at the time the lamp was used. Had the light come in contact with gas, a disastrous explosion might have occurred, the lamp being little better than a naked light.

At the Cambrian Collieries, in Clydach Vale, much unrest prevails because of the large proportion of men who fail to pay up their subscriptions. The men's committee have issued a circular expressing determination to bring every man into the Federation, and declaring that "we do not wish to stop the colliery, but we are determined every man must become a member."

The anthracite section of miners, who have declared against the centralisation scheme, are now taking a ballot upon the question, and, judging by previous action, the result will be decisively in opposition.

MANCHESTER GEOLOGICAL AND MINING SOCIETY.

Annual Meeting

The annual meeting of this society was held on Tuesday, the 8th inst., in the society's rooms, 5, John Dalton-street, Manchester. Mr. Geo. B. Harrison, H.M.I.M., occupied the chair at the beginning of the meeting, and then gave place to Sir Thomas Holland, professor of geology at the Manchester University, who was unanimously chosen to be president during the ensuing year.

Annual Report.

The council, in their report, which was read by the Hon. Secretary (Mr. Sydney A. Smith) expressed pleasure in being able to record a considerable increase of members during the year. The classification of the membership for the year 1911-12 was as follows:—Honorary members, non-federated, 10; members, including life members, federated, 252; non-federated members, 32; associated members, 23; associates, 7; students, 21; subscribers, 2; total, 347—a net gain of 39. The council recorded with great regret the death of two esteemed honorary members—Mr. Joseph Dickinson and Mr. Joseph S. Martin. The council had also to lament the death of two federated members, one student, and one non-federated member, namely, Mr. Joseph Hadfield, Mr. A. E. Tansley, and Mr. T. E. Evans. Members of the Fossil Mollusca Committee, it was stated, had had several meetings under the chairmanship of Mr. John Gerrard, H.M.I.M. "It is," the council added, "very much desired that any specimens of fossil shells, plants, fishes, &c., from the Lancashire coalmines should be forwarded to the society's rooms, or to the Geological Museum at the Manchester University." Mr. J. Lomax had presented to the society a valuable set of microscopic slides of coal sections, for which the council had expressed their thanks on behalf of the society.

The report further stated that Mr. J. S. Burrows had been appointed a joint trustee in the place of the late Mr. Dickinson, and that the society's representatives on the council of the Institution of Mining Engineers for the year 1912-13 are Mr. H. Stanley Atherton, Mr. John Gerrard, Col. Geo. H. Hollingworth, Mr. Sydney A. Smith, Mr. T. H. Wordsworth, Mr. Geo. H. Winstanley, and Mr. Robert Winstanley. The funds of the society were in a satisfactory condition, and the expenditure during the year had been normal. The council took this opportunity of congratulating Mr. W. E. Garforth on the honour done him by the Leeds and Birmingham Universities in conferring upon him the honorary degree of LL.D. He had been re-elected president of the Institution of Mining Engineers for the year 1912-13. There had been a liberal response to the appeal for subscriptions to the fund for the extension of the geological section of the Manchester Museum, and the council had pleasure in stating that owing to the generosity of the society's members and others the sum of £1,040 had been paid over by the society to the Museum authorities. The new buildings would be opened on October 31 next.

Col. Hollingworth, honorary treasurer, submitted a statement of the accounts showing a surplus on the year's working of £113 18s. 6d., and a net advance financially of £50.

Mr Harrison spoke of the remarkable progress which the society is making, and predicted that the advance during the coming year will be still greater.

On the motion of Mr. W. Scott Barrett (chairman of the Lancashire County Council), seconded by Mr. J. S Burrows, of Messrs Fletcher, Burrows and Co., Atherton Collieries, the report and accounts were approved.

On the proposal of Mr. Harrison, seconded by Mr. Robert Winstanley, Sir Thomas Holland was called to take the office of president.

Sir Thomas Holland intimated that he would give his presidential address on another occasion, and he recalled the policy which he pursued when a Government official in India, of trying to unite the theoretical, and, as some people chose to say, the useless geologists with the practical and useful mining men. He thanked the members very cordially for the honour they had conferred upon him by electing him as their president for the ensuing year.

Messrs. H. Stanley Atherton, Owen R. Jones, W. Pickstone, and Percy Lee Wood were elected vice-presidents of the society. For the council the following were chosen:—Messrs. C. F Bourchier, V. Bramall, R. F. Clarke, L. R. Fletcher, R V. Hart-Davis, Geo. Knox, R. Landless, A. H. Leech, W. Ollerenshaw, W. Pickup, and T. H. Wordsworth. Messrs. V Bramall and H. Stanley Atherton were appointed honorary auditors. Col. Hollingworth and Mr. Sydney A. Smith were reappointed honorary treasurer and honorary secretary respectively.

Mr. W. Watts gave an interesting report of his attendance, as delegate, of the recent meetings of the British Association at Dundee.

Shipment of Bunker Coal—During September, 1,593,347 tons of coal, &c., were shipped for the use of steamers engaged in the foreign trade, as against 1,681,507 tons in September 1911 and 1,789,126 tons in September 1910. The aggregate shipment during the first nine completed months of the present year was 13,202,091 tons, as compared with 14,346,947 tons and 14,528,745 tons in the corresponding periods of 1911 and 1910 respectively.

The Prevention of Gob-fires.—The inaugural lecture of the Mining Department of the University of Leeds was delivered recently at the Philosophical Hall by Mr. David Bowen, head of the department. Col. Shaw, of Pontefract, who presided, said he had selected the subject of "Gob-fires and Spontaneous Combustion in Coalmines" because the Cadeby disaster had made this a most interesting subject to Yorkshiremen. The universities had taken up the matter scientifically, and he was convinced that in the end the scientific men, when they had joined hands with the practical men, would be able to do something to mitigate the danger. A Commission had been appointed to go into the question of gob-fires, but, in his opinion, the Commission was an absolute farce. The Commission was small in numbers, it had only one man representing the miners, and the coalowners on the Commission were more particularly interested in their own pits. It should have been a large Commission, and the coal trade itself should have been represented. If the report of the Commission were not satisfactory and acceptable, it would leave it in the hands of the Government to bring in panic legislation. Dealing with the matter from a practical point of view, Col. Shaw said he had found the best plan of dealing with gob-fires was to leave in the "top soft" and fill up the places with incombustible material as small and tightly packed as possible. Water should not be taken near a gob-fire. If water were taken into any Barnsley bed, they were likely to bring down the roof and leave pockets above, which would become receptacles for gas. Mr. Bowen, in the course of his lecture, said some mining engineers were of opinion that the heat generated by the crushing of pillars supporting the roof was the cause of some underground fires. The exact value of this supposition rested entirely on a fundamental distinction as to whether or not the subsidence of the roof was produced and controlled in a regular manner above the field of extraction of the coal. It could be proved, in fact, that so long as the roof was allowed to fall uniformly throughout the waste spaces or gobs, its influence as regards the generation of heat must be considered as absolutely insignificant. Therefore, the same held true *à fortiori* in the case where complete packing of the empty spaces was employed. But a considerable degree of heating might ensue if by any means there occurred a concentration of pressure at special points—which was totally avoided in the case of complete packing of waste spaces. The coals which appeared to be most liable to the action of spontaneous combustion were lignites and free-burning bituminous coals, which contain a high percentage of oxygen and volatile constituents. Further, it seemed that the more impure the coal, the more rapid the spontaneous combustion. The action of moisture was an open question, though the general opinion seemed to be that its presence increased the tendency to heat. Some mining engineers thought the nature of the strata forming the roof was of some importance, from the point of view of heat conductivity. Undoubtedly the best preventive method was to fill up all the empty spaces with incombustible material such as sand.

COAL AND IRON TRADES.

Thursday, October 17.

erland, Durham and Cleveland.

-Tyne.

COAL.

eek 134,818 tons of coal and 1,044 tons of
ched from Tyne Dock, a decrease of 13,170
6,776 tons of coke when compared with the
he corresponding week of last year. The
nces amounted to 63,678 tons of coal and
e, an increase of 9,836 tons of coal and e
59 tons of coke. The Blyth shipments
44 tons of coal and coke, an increase of
following important sales of fuel have been
the week:—25,000 tons of good Durham
ng coal, for shipment to Germany over the
onths, at 14s. per ton f.o.b.; 50,000 tons of
l Durham bunkers, for regular shipment
o June next on behalf of the French Trans-
g Company, at from 12s. 9d. to 13s. f.o.b.;
patent fuel, for delivery to the Paris, Lyons
Railways over next year, a contract placed
e firm at a price not stated; 25,000 tons of
s, for delivery over next year, at 13s. f.o.b.;
e steam seconds, for shipment over next
2s. to 12s. 6d. f.o.b.; and 20,000 tons
alls for similar delivery, at 9s. f.o.b. In
ted that the contract to supply the Berlin
ome 400,000 tons of gas coal has been closed.
ut 275,000 tons appear to have been ordered
e first time that so large a proportion of the
s gone in that direction—whilst the balance
been ordered from Hamburg merchants for
hem coal at delivered prices estimated to
to 11s. 6d. f.o.b. The high prices of local
d as the reason for the diversion of so large
mportant order. The Porto Ferrajo Iron-
to have concluded contracts for 100,000 tons
g coal at about 13s. 9d. per ton f.o.b. for
. fairly large quantity of blastfurnace coke
delivery at Middlesbrough over the first
r at about 22s. 3d. per ton at the ovens.
tial lot has been sold to west coast iron-
ry over next year at 23s. per ton at the
the highest prices which have been attained
derable period. Tenders for the supply
Durham gas coal to the Stettin Gasworks
tted. The Trieste Gasworks are inviting
tons of Durham gas coal for next year's
are wanted by the 28th inst. Christiania
ring for 6,000 tons of steam smalls for
e first six months of next year. Some of
o merchants are in the market for steam
ivery. There is a rather strong enquiry
from such far-distant places as Bombay
e general tone of the market is very
ncertitude as to developments of the
especially with reference to the possible
Dardanelles, militates somewhat against
, but, on the whole, the market is
d under these worries. Prices continue
eth, and there is a strength in Durham
al, which is without parallel in recent
uotations for prompt shipment are as
ams, Blyths (D.C.B.), 13s. 3d. per ton, an
the week; Tynes (Bowers, &c.), 13s. 3d.
rease of from 3d. to 6d.; seconds, Blyths,
; Tynes (Hastings or West Hartleys),
unscreened, 11s. 6d. to 12s., unaltered;
6d. to 9s. 9d., a decrease of 3d.; Tynes,
r; specials, 10s. to 10s. 6d., 6d. higher;
to 14s., a rise of 6d.; gas bests (New
de), 13s. 6d., no change; seconds (Pelaw
3s. to 13s. 3d., 3d. higher; specials, 13s. 6d.,
ned bunkers, Durhams, 13s. 3d. to 13s. 6d.,
; Northumbrians, 11s. 6d. to 12s., steady;
o 13s. 6d., unaltered; smalls, 13s., firm;
., steady; coke, foundry, 25s., no change;
firm; and gas coke, 23s., 1s. improved.

COAL.

m Sunderland last week amounted to
and 855 tons of coke as compared with
and 610 tons of coke for the correspon-
, being an increase of 10,695 tons of coal
245 tons of coke. The coal market is
effect of the trouble in the Balkans is a
n the part of both buyers and sellers in
ard business particularly not to commit
ge transactions until the horizon clears
t supplies are scarce and very firmly
ward shipment the position as mentioned
d the tendency is towards higher values.
es for coking and bunkering purposes are
steady trade for gas coals with continued
s coke is scarce and has advanced in
coals are quiet owing to the favourable
ch Transatlantic Company has contracted
good unscreened bunkers at 12s. 9d. to 13s. per ton, delivery over next year, and 10,000 tons of best gas coal is reported sold at 13s. 6d. for November-December delivery. A fairly large quantity of blast-furnace coke has been sold for delivery at Middlesbrough up to June next year at a delivered price which leaves 22s. 3d. at the ovens, and a further quantity has been sold to the west coast at 23s. at the ovens. Prices are as follow:—Best gas coals, 13s. 6d.; seconds, 13s. to 13s. 3d.; coking unscreened, 13s. 6d. to 14s.; coking smalls, 13s. 6d. to 13s. 9d.; smithies, 13s. 6d.; households, 14s.; bests, 15s.; best foundry coke, 25s.; blast-furnace coke, 24s.; gashouse coke, 22s. Bunker quotations are as follow:—Morrison's Marley Hill, 14s.; Pease's South Derwent, Framwellgate, 13s. 6d.; Priestman's, Consett, Burnhope, 13s. 6d.; Ryhope, South Hetton, 13s. 6d.—all free on board South Dock. The freights are strong. In coasting fixtures are:—London 4s., Havre 5s. 9d., Rouen 7s., Hamburg 5s.; Bay ports, St. Nazaire 7s. 9d., Bordeaux 7s. 9d., Oporto 13s.; Baltic has paid for Stockholm 6s. 6d., Fairwater 6s. 6d., Libau 7s. 6d. Mediterranean rates are stronger with Genoa at 13s. 3d., Piræus 13s. 6d., Port Said 12s. 6d., and Oran 11s. 3d. Sunderland to Rio de Janeiro has fixed at 24s.

Middlesbrough-on-Tees.

COAL.

Fuel keeps steady and firm. There is a continued good demand for gas coal, not only for prompt loadings, but on forward account. Several Continental firms are enquiring for the better kind of gas coal, so that the opinion abroad seems to be that prices are not likely to recede. The enquiries on Continental account are for something like a quarter of a million tons. Best Durham gas coal stands at 13s. 6d., and seconds 13s. to 13s. 3d. The good demand for bunker coal is met by a large supply. Ordinary Durham bunkers stand at 13s. f.o.b., best sorts are 13s. 3d. to 14s., and specials 14s. 6d. to 15s. Coking coal is in full demand. Unscreened coking runs from 13s. 6d. to 14s., and coking smalls from 13s. 6d. to 13s. 9d. The increased production of coke is fully absorbed. In addition to the very large local requirements, heavy lots are going from this district to West Cumberland and Furness, and shipments are on a large scale. Up to 24s. is named for average qualities of blast-furnace coke delivered at Teesside works; foundry coke for shipment is in the neighbourhood of 25s. f.o.b., and gas coke ranges from 21s. 6d. to 22s. f.o.b.

IRON.

The market is rather unsettled, and this is attributed mainly to the trouble in the Balkans. At present there is very little business passing. Sellers will not commit themselves forward at anything like current quotations, and as buyers are indifferent about doing business, having fairly large contracts made, what transactions are occurring are confined to small odd lots for early delivery. No. 3 g.m.b. Cleveland pig is 67s. for early f.o.b. delivery, and that is also the market quotation for No. 4 foundry and No. 4 forge. Foundry and forge iron are so scarce that they promise to be dearer than No. 3 in the near future. Mottled and white iron each stand at 66s. 6d. There is a fairly good supply of No. 1 Cleveland, the market quotation for which is 70s. 6d. Very little east coast hæmatite pig is available for sale, and mixed numbers are firm at 80s. for this year's delivery. Foreign ore, though idle, is very firm. Market rates are still based on fully 23s. ex-ship Tees for rubio of 50 per cent. quality. The various branches of the finished iron and steel industries present no new features of moment. Producers have very large contracts made, and works are going at full pressure, but few new orders are being placed, largely because manufacturers are too busy to be able to guarantee deliveries to suit customers.

South-West Lancashire.

COAL.

The household demand for inland trade continues to proceed upon quiet lines, being helped in this respect by the previous heavy purchases and the mild weather. Prices rule unchanged at about 16s. 3d. for best qualities, 14s. 6d. to 14s. 9d. for medium sorts, and 12s. 3d., or near that, for kitchen coals—all into wagons at the pit. There is little change to report as regards shipping. The strong demand under contract for bunkering fuel is well maintained. Open sale business is relatively less active, and largely confined to immediate requirements, while the export trade continues to be affected by the scarcity of tonnage. Quotations for screened Lancashire steam coals rule from 12s. 6d. to 13s. 6d. f.o.b., according to quality. About an average shipment is being made of household coal for the coastwise and cross-Channel trade. Prices for prompt shipment are firm at about 16s. 6d. for best coals, with 15s. for good second-grades. There is not much to report that is new in reference to slacks; the quantity going into consumption keeps highly satisfactory. Prices for open sale rule from 9s. 9d. to 10s. for best rough qualities, good medium grades 9s. to 9s. 3d., and the commoner and finer sorts at about 8s. 6d.—all into wagons at the pit.

South Lancashire and Cheshire.

COAL.

The Manchester Coal Exchange was well attended on Tuesday. The demand for house coal may be said to be only moderate, the fine weather being in favour of the consumer; but prices are well maintained at late rates, 16s. 6d. to 17s. for the best house grades, with good medium qualities 15s. 3d. to 16s. and the commoner sorts from 12s 6d. to 13s.—all into wagons at the pit. Furnace coal meets with steady enquiry, the price being about 12s. 6d. per ton at the pit. There is a brisk business in shipping coal, the price being steady at about 14s. f.o.b. Partington. About 14s. 6d. is being paid for best Yorkshire hards. The demand for slack is still very good, with prices unchanged from 9s. to 9s. 9d. for the best qualities, with the commoner grades at from 8s. to 8s. 6d.—all into wagons at the pit.

IRON.

Trade still continues very brisk, with pig iron inclined to be still firmer. We are informed on good authority that work is rather slackening off in the foundries; some months ago moulders could not be had, and now it is quite easy to secure them. Forges keep very busy, and as much as 72s. 6d. has to be paid for forge iron. The prices of bars, hoops and sheets are unaltered, and all makers are full of work and new orders are only promised for very extended delivery. Steelworks are busily employed without any change in billets or bars. Wagon builders are asking higher prices.

Yorkshire and Derbyshire.

Leeds.

COAL.

The market on Tuesday was attended by representatives of all sections of traders, including a good many agents from South Yorkshire and exporters from Hull. Business was fairly good, although steam coal for prompt shipment was offered more freely and at slightly lower figures. The house coal trade is still quiet; but prices are unaffected, as stocks at the pits are of no moment. Full-time work would be general were it not for the scarcity of empty wagons. Probably five days' full work will have been averaged in West Yorkshire, and the output has been cleared daily. Orders from London and the eastern and southern counties are not numerous, but contract supplies are readily taken. Pit prices are firmly held, and for prompt delivery average as follow —Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. to 14s.; Silkstone best, 13s. to 14s. (special qualities, 14s. to 14s. 6d.); Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. 6d. to 12s. The coastwise trade is fairly brisk, there being a good enquiry for the cheaper grades of Silkstone house coal for the south coast. Shipping tonnage has been more plentiful this week, and the clearances from Goole have been heavy. For prompt shipment the following f.o.b. prices are quoted in Hull:—Haigh Moor house coal, 16s. 6d. to 17s.; Silkstone best, 15s. 6d. to 16s. 6d.; Silkstone house, 14s. 9d. to 15s. 6d.; house nuts, 13s. 6d. to 14s. In Leeds, Bradford, Halifax, Huddersfield and the heavy woollen district, merchants report a quieter retail trade, the demand from the public running chiefly on the cheaper sorts. Pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 16s.; ordinary house coal, 14s. to 14s. 6d.; secondary qualities, 13s. to 14s. Manufacturing fuel is very firm. Small nuts are scarce, as some of the coke manufacturers are using them in the ovens on account of the inadequate supply of coking smalls. Current pit prices:—Large double-screened engine nuts, 9s. 6d. to 10s. 6d.; small nuts, 9s. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. to 10s.; best rough slacks, 8s. to 9s.; small slacks, 7s. 6d. to 8s.; coking smalls, 7s. 3d. to 7s. 9d. Washed furnace coke remains very scarce, and spot sales are reported at 18s. per ton at the ovens. A very big tonnage is being sent to the Frodingham district, and also to the Midlands. The gas coal pits are fully employed, and contract deliveries are on such a heavy scale that there is scarcely anything on offer in the open market. A few late-comers are seeking to fix up new contracts, and find that values have appreciably hardened since July. Current pit prices:—Screened gas coal, 11s. to 12s.; gas nuts, 10s. to 11s.; unscreened gas coal, 9s. 9d. to 10s. 3d. Export prices at Hull approximate the following f.o.b. figures:—Screened gas coal, 13s. to 13s. 6d.; gas nuts, 12s. 6d. to 12s. 9d.; unscreened gas coal, 12s. to 12s. 6d.

Barnsley.

COAL.

With exporters continuing in their decreased buying of large steam fuel, the position is rather weaker, though coalowners are endeavouring to meet the situation by laying in stocks. There, however, seems to be a considerable amount of confidence prevailing that business will be more active with freights becoming more reasonable, but the Baltic season is now well advanced, though there are hopes that with the continuance of fine weather the lower ports will be reached for a considerable time yet. Buyers, however, find prices easier, and the best hards are now being sold at 11s. per ton, and in a similar degree secondary qualities are also affected, and prices are down to about 10s. to 10s. 3d. per ton. So far as the home market is concerned, every effort has been made to maintain late quotations, and stocks are being accumulated rather than place a large surplus of coal on the market. A good deal of interest has been aroused from the fact that the Carlton Main Colliery Company Limited have accepted the contract of the Cunard Steamship Company for a quarter-million tons for the year. The coal to be supplied is described as a mixture of large washed nuts and washed slack, and the price is stated to be 10s. 6d. per ton at the pit. This is the first time this company has secured the contract, but they have now an output of between 6,000 and 7,000 tons per day from their comparatively new collieries at Grimethorpe and Frickley. Great activity, however, still prevails in regard to all kinds of small coal suitable for manufacturing purposes, and in this respect the market is very firm. Though the collieries are working full time, the supply of this class of fuel is not too great, and the demand pretty well absorbs the tonnage available. This is particularly the case with respect to steam nuts, the best sorts of which are being sold at from 10s. 3d. to 10s. 6d. per ton washed, with secondary qualities about 9s. 6d. to 9s. 9d. per ton. Both single- and double-screened varieties are also very good to sell, and quite a strong enquiry both for current and forward deliveries continues to be made for slacks and rougher descriptions of fuel. The heavy demand for cokemaking purposes is again very marked, and the scarcity tends to give greater firmness to prices. The best quality slacks are now making from 8s. to 8s. 3d. per ton, and the secondary brands are from 7s. to 7s. 6d. per ton. Enquiry for all kinds of gas coal is well sustained, and the production of the collieries, although making full-time working, is almost entirely required on contract account, and sellers are able to make slightly better figures on supplementary sales. There has been a little indication of more activity in the house coal trade, and buyers are becoming to generally accept the position that concessions will not be available. The stocks in hand at the collieries, despite the quieter state of things within the last two or three weeks, are reported to be negotiable, and do not become a factor in regard to quotations. The enquiries from London and the eastern counties is more brisk, and markets in the nearer districts are showing greater readiness to take something like a normal delivery for this period of the year. Present quotations are about as follow: Best Silkstone, 15s. per ton, best Barnsley softs 14s. to 14s. 6d. per ton, secondary qualities 12s. 6d. to 13s. per ton, and nuts from 10s. 6d. to 12s. per ton. The remarkable demand for coke has had the effect of giving further strength to quotations, owing to the shortage in the production, and although new plants have been recently installed, buyers find difficulty in obtaining regular adequate supplies, and prices for coke are now between 17s. and 18s. per ton at the ovens for ordinary qualities.

Hull.

COAL.

There was a good attendance at the Humber Coal Exchange to-day, and the market was firm in all departments, being supported by a brisk demand for all qualities, including unscreened gas coal. Steam hards showed a much firmer tone, and were quoted at 3d. higher on the week, while secondary sorts advanced in sympathy. Most of the Baltic requirements for this year have been shipped or arranged for, but there is an increasing enquiry for Mediterranean and other directions. There is also a fair amount of forward business in progress, and at least one important contract has been entered into for best Yorkshire steam hards over the next Baltic season, 14s. 3d. f.o.b. at Hull being the figure named. All other kinds of coal are a good market, the demand for secondary sorts and for small coal for manufacturing purposes being as great as ever, with the result that prices are well maintained. Both gas and house coal are steady. Loading conditions at the docks are easy, and though about 60,000 tons will be shipped at the Alexandra Dock this week, the total quantity despatched will be something less than of late. At Immingham a fair amount is being shipped, but nothing like what the appliances at the King's Dock are capable of. It is stated that the railway officials are having a conference with the coal shippers in the course of the next few days. At Goole a new hoist of 200 tons capacity has been brought into use this week. The freight market is quiet. The demand for the Baltic is about satisfied, and booking is now being done for the Mediterranean. Rates generally are fairly firm, though there is an easier tendency in the Baltic direction at the time of writing, Riga having been done twice at 6s. 6d., and again at 6s. 4½d., as against 6s. 7½d. and 6s. 9d. earlier in the week. Other fixtures include Cronstadt 7s. 6d., Genoa 13s. 3d., Port Said 12s. 9d., Naples 12s. 9d., Rouen 6s. 6d., and Buenos Ayres 22s.; from Goole, Guernsey 8s., London 5s. 3d.; and from Grimsby, Bergen 7s. 3d. Rates for the near Continental ports are unchanged. The following are the approximate prices for prompt shipment f.o.b. Hull:—South Yorkshire: Best steam hards, 13s. 9d. to 14s.; washed double-screened nuts, 13s. 6d. to 14s. 3d.; unwashed double-screened nuts, 12s. 6d. to 13s.; washed single-screened nuts, 13s. to 13s. 9d.; unwashed single-screened nuts, 12s. to 12s. 6d.; washed smalls, 11s. 6d. to 11s. 9d.; unwashed smalls, 10s. 6d. to 10s. 9d. West Yorkshire: Hartleys, 13s. to 13s. 6d.; rough slack, 10s. 3d. to 10s. 9d.; pea slack, 8s. 6d. to 9s.; best Silkstone screened gas coal, 13s. to 13s. 3d.; best Silkstone unscreened gas coal, 12s. 6d. to 12s. 9d. Derbyshire and Notts: Best steam hards at Hull, 14s. to 14s. 3d.; best steam hards at Grimsby, 13s. 9d. to 14s.; Derbyshire nuts (doubles) at Hull, 13s. to 13s. 3d.; Derbyshire nuts (doubles) at Grimsby, 12s. 9d. to 13s.; Derbyshire large nuts at Hull, 12s. 9d. to 13s.; Derbyshire large nuts at Grimsby, 12s. 6d. to 12s. 9d.; Nottinghamshire hards at Hull, 13s. 9d. to 14s. 3d.; Nottinghamshire hards at Grimsby, 13s. 6d. to 14s.

Chesterfield.

COAL.

The house coal trade is quieter this week, the mild weather causing a temporary cessation of buying. Orders coming to hand, however, are sufficient to enable the pits producing this class of fuel to work full time. Prices remain firm on the basis of the figures quoted in the lists issued at the beginning of this month. There is not the slightest sign of any falling off in the demand for coal for manufacturing purposes; on the contrary, the pressure is greater than it has been at any period of the year. Some classes, such as cobbles and nuts for gas-producers, are scarce, and are only obtainable by such consumers as entered into contracts a few months ago. Slack is in great demand for boiler firing, and prices are firmer than they were at the beginning of October. Consumers experience much difficulty in securing as much of this fuel as they require, and in some instances the higher qualities of coal have had to be called into requisition. The demand for slack for the Lancashire cotton mills continues on an enormous scale, and it is with the greatest difficulty that consumers' needs are met. Prices are strong, and collieries are now unable to add to their commitments for slack. Steam coal for locomotive use continues to move freely, and railway companies are pressing for supplies. They gladly accept deliveries where they can be made in excess of contract quantities. The export branch of the coal trade is rather quieter owing to the approaching close of the Baltic season. This, however, does not apply to the shipping trade of North Derbyshire, which is practically a continuous one all the year round. Prices of the best Derbyshire Top Hards remain firm and unchanged at 14s. to 14s. 3d. per ton delivered free alongside steamer at Grimsby. No contracts have yet been arranged for next year, as buyers are keeping off the market at present and are waiting developments. There is a very strong demand for washed nuts and washed slack for current shipment, and prices are up 3d. per ton on the week. Enquiries for these qualities over next year are numerous and give promise of an active business. Cobbles and nuts of the larger sizes are in good demand for prompt shipment. Much difficulty is experienced at the collieries owing to scarcity of wagons, and this trouble will become acute with a period of foggy weather, such as it is feared we may expect as a legacy of the wet summer of this year. Coke continues in strong demand both for blastfurnaces and for steel melting. Prices remain firm at the high level, which coke has recently attained. Coking fuel is in active request, but the supply is far below the requirements of the markets. Collieries continue to take off the market substantial quantities which they require for consumption at their own by-product plants. This naturally has the effect of appreciating the value of small coal. Prices are as follow:—Best 14s., seconds 12s. 6d., cobbles 12s., nuts 11s., slack 8s.

IRON.

A good steady business is being done in all branches of the iron trade. Orders are plentiful and prospects hopeful for the winter.

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Nottingham.

COAL.

Compared with a week ago, the tone of the coal trade in this county has not been quite so active. This remark applies more particularly to the house coal section, in which the fine weather of the past few days has tended to ease the demand by those householders who purchase to meet immediate requirements, and consequently the business done by local merchants and at the landsale depots has been affected somewhat. Nevertheless there is a fair trade, but prices are slightly irregular for lower-grade fuel, and spot lots are being offered at easier rates. Current quotations for hand-picked brights are from 13s. to 14s. per ton, good households 12s. to 13s., seconds 10s. 6d. to 11s. 6d., with lower qualities at proportionately reduced rates. There is scarcely the same amount of briskness in the steam coal branch, and it is possible that the Balkan trouble may have something to do with a weakening in exports. However, industrials are in very active request in the home market. Prices are being well maintained for best hards at 11s. 6d. to 12s., and seconds 9s. 6d. to 10s. 6d. A good amount of gas fuel is going out of hand on contract account. Coke is selling well at good rates.

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Leicestershire.

COAL.

There is a very active business continuing here. All the collieries are well supplied with orders and are making a very good output. If all the coal it was to raise could be delivered a fuller week would be generally made. But as it is, the output may well be regarded as satisfactory. There is an active demand for all descriptions of coal. Perhaps the weak spot at the present time is for the best classes of household coal, but this is only temporary. All other household coals are in very good request. Steam coals are just as much wanted as they have been for some time past, and all descriptions are disposed of. Local merchants are not just now so much pressed for delivery as they have been, but, on the whole, they are doing fairly good business. The market sustains its late attitude—that of firmness—and the high prices lately ruling are those on which business is done. The prospects for the immediate future are good, and a busy time is anticipated for some time to come.

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South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL

The coal trade generally throughout the Cannock Chase district continues satisfactory, and prospects are quite good. Orders are plentiful for nearly all qualities of fuel, and there is not very much coal in stock. The collieries throughout the district are well employed. The demand for the best qualities of house coal is not particularly pressing, but still, considering the mildness of the weather the house coal trade generally is good. The enquiry for fuel for manufacturing purposes is in much the same satisfactory condition as when last reported. There is very little change to report in railway and canal sales.

Birmingham.

COAL.

For the time being the household demand has gone quieter, due in some measure to the mild weather, and also to the fact that people stocked heavily last month. For all kinds of manufacturing fuel the call is very active, and some difficulty is being found owing to scarcity of wagons and a certain amount of congestion on the railways. Furnace coal commands 9s. 3d. to 10s. per ton delivered into truck or boat at the collieries, and the tendency is upward. Furnace coke is in active sale at 24s. 6d. to 25s. per ton delivered in this district.

IRON.

The weekly market was well attended, and enquiries elicited that good business had resulted from last week's quarterly meeting, at which South Wales manufacturers seemed inclined to encourage business for next year's delivery. The fact that there were no sensational advances has had a steadying effect, and, with order books well filled in practically every department, the outlook is distinctly cheerful. The whole make of pig iron in the district is going into speedy consumption to meet the demands of forges and mills, which are working up to their full capacity in order to make up arrears of delivery. For Staffordshire common iron there seems more disposition among producers to sell for forward delivery at about 60s. Northamptonshire and Derbyshire brands were maintained at last week's rates, and it is generally accepted that there is no prospect of an early recession. Bar makers, both of standard and second qualities, have heavy contracts running, and have no difficulty in getting their prices, viz., £9 10s. for marked and £8 5s. to £8 10s. for merchant bars. Common iron for nuts and bolts makes £7 17s. 6d. to £8 2s. 6d. delivered Darlaston and Wednesbury. Belated deliveries of Belgian bars are arriving, the price being about £7 5s. per ton net. Deliveries are very irregular. Despite the recent advances in tubes, gas-strip remains on the basis of £8 5s. a ton for lots of 25 tons and upwards. Mild steel hoops and strip are selling freely at £8 5s. to, in special cases, £8 15s. a ton delivered, the average being £8 10s. Demi-products—largets, billets, &c.—are becoming more plentiful; quotations are £6 to £6 2s. 6d. per ton for Bessemer qualities, with 2s. 6d. extra for Siemens, compared with £5 15s. to £5 16s. 3d. for Continental supplies, which are not particularly large. Galvanised sheets are stronger at £13 to £13 5s. These figures have been reached by reason of the recent advances in spelter and the activity of the colonial and Indian demand. Black sheets for galvanising have also gone up recently in keeping with other products. For sheets of 24-gauge £8 10s. to £8 15s. is freely obtained, and lighter sheets vary from £10 per ton for 29-gauge to £10 5s. for 30-gauge, delivered in the district. The principal steelworks in the Midlands are well sold into the third quarter of next year, and in special cases makers are getting a premium on Association rates. The chain and anchor trades are enjoying a period of exceptional prosperity, which promises to be maintained for months to come.

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Forest of Dean.

Lydney.

COAL.

The majority of the house coal pits of this coalfield have been doing a brisk business since our last report, but there is nothing in the way of pressure felt, the demand being comfortably met. Five and six days in the week is the average work, and stocks are kept well in hand. Shipping arrangements have been somewhat upset by the foggy weather along the coast; otherwise shipments have been satisfactory. The demand from the inland districts is good. Prices remain at—block 16s. 6d., rubbles 15s. 9d., nuts 14s., and rough slack 6s. 6d. at pit. Steam coal continues in heavy request, and all produced is quickly placed. Prices are ruling firm.

re, Somersetshire and Wilts.

COAL.

and Son report that the wholesale
h coast ports has been subject to con-
during the past fortnight, this being
ry high freights demanded from most
ports. These rates have been perfectly
ne of the year, and have had the effect
country merchants to undertake rail
from those colliery districts where coal
summer wholesale prices. The railways
ry busy with this kind of traffic. Coal
dealing with another question which is
develop rail supplies to the south coast,
chartering of foreign steamers for the
This is a proposal of some east coast
ut at present excepting London and
gnised charter conditions which have
quarter of a century for the south coast
based on the life experience of ship-
rchants. It is expected that a successful
against this totally unnecessary and
n, which is not claimed by the majority

NDON COAL TRADE.

URSDAY, OCTOBER 17.

trade for the past week has been very
t at this season of the year being
to the atmospheric changes, and the
most part being warm and bright, the
wn very little tendency to buy in
rger proportions of the previous week.
also at nearly all the wharves and
to be slower, and comparatively few
g in from the general public. On the
culties with the rolling stock and the
at the colliery end has rendered it
ccumulation of orders to be easily
lliery representatives have little or no
carcity of wholesale orders is looked
e feature at this season of the year
g the winter demand. The shipping
sually firm, and the higher prices
yne and Humber ports prevent any
into the London area, and the vessels
nes are almost exclusively gas coals
or Wallsend and smalls overdue, so
argo offering for sale. Prices, therefore,
nd are largely nominal. The foggy
en a strong impetus to all kinds of
itable for electric lighting, the con-
must have been abnormally strong
or two. Slacks have been the only
hown any weakening tendency, and
the collieries has been so regular, the
s of fuel has been beyond the demand.
of the peas and double-screen nuts
wonderfully sustained, and prices are
cargoes were reported as arriving in
Wednesday 13, but all sold. No cargoes
Yorkshire were on offer. The difference
ts for coastwise and foreign transport
verage for the past five years in cost
more than doubled at the present
e demand for vessels of all classes
strong, also on enquiry at the London
f vessels is becoming a very serious
e in the tonnage brought forward
many cases to the coal being left
the dock, and the competition for
ertain of the larger boats, not usually
g coal and coke, has been very keen,
the Thames side are unusually busy,
such as the sugar refiners and the
orks, are large consumers of fuel, and
nments to keep going full time
continues in good demand, but the
omewhat easier. The difficulty with
t Act largely influences the use of
adaptation of mechanical means for
n smoke. The attendance on the
ast week has not been so pronounced
mild weather, especially during the
has undoubtedly kept many of the
g any further buying, although the
d to a fair amount of household coal
iness has been restricted; enquiries,
ing forward for the coming year's
nuary 1 next, and although collieries
trongly averse to taking on any more
cases already fixed the prices are as
no yielding or lessening in the prices

ham, Fawens and Co.'s Report.

-The general tone of the seaborne
good to-day, but no supplies forth-
m) 21s. 6d., seconds, ditto, 20s. 6d.

-The seaborne house coal market was
ay, but no cargoes available. Best
nds, ditto, 20s. 6d. Cargoes 31.

6.—The seaborne house coal market
argoes reported sold. Best (Durham)
20s. 6d. Cargoes 6.

on of Engineers next week will pay
field, inspecting the works of Messrs.
on Limited, and Messrs. Cammell,
at Sheffield.

THE SCOTCH COAL AND IRON TRADES.

THURSDAY, OCTOBER 17.

Glasgow and Lanarkshire.

COAL.

The business in the shipping department of the coal trade has amounted to a fair average, but it is not so large as in some recent weeks. Aggregate shipments at the Scotch ports reached 330,483 tons, which was 387 tons better than in the preceding week, but 28,105 tons less than in the corresponding week of last year. Considerable restiveness has occurred among the workmen at the docks, and this has led to loss of time and curtailed the shipments. On the east coast the coal trimmers stopped work on Saturday at one o'clock, instead of working till four as had been the custom, and on this account a number of vessels were unable to clear at the end of the week, and so the figures of the shipments were by this means reduced. The quantity of coal despatched from Glasgow was somewhat larger than in the preceding week. Exports amounted to 34,204 tons, the coastwise shipments being 39,641 and the total of 73,845 tons compared with 69,546 in the preceding week and 78,822 in the corresponding week of last year. But for a scarcity of coal wagons the shipments might have been larger. The absence of vessels has also tended to curtail the amount of the shipments. Shippers report that the enquiry has been quite good, but that from the causes just alluded to, the amount of business done has not come up to expectation. There has been a moderate business in steam coal, which is quoted f.o.b. 11s. to 12s. The better qualities of house coal have been in fair demand for shipment, and ell is at 11s. 9d. to 12s. 3d. Splint coal meets with a ready market, both for inland use and export, and is quoted at 13s. 6d. to 14s. Treble nuts are at 13s. to 13s. 6d., doubles 12s. 6d. to 13s., and singles 12s. to 12s. 6d. per ton. House coal meets with a good demand for home use and all kinds of furnace coal sell readily at firm rates.

IRON.

The pig iron market has been irregular, and prices have fallen considerably owing to the disturbing influence of the Balkan outbreaks. Since last report business has been done in Cleveland warrants at 66s. 5d. to 65s. 4d. cash, 66s. 9½d. to 65s. 8½d. one month, and 67s. 4½d. to 66s. three months. Transactions are also reported at 65s. for delivery in 18 days, and 66s. 9d. for 21 and 28 days. There is a strong demand for Cleveland iron in Scotland, and some makers have recently been occasionally short of supplies. The arrivals at Grangemouth from Middlesbrough and district amounted to 10,409 tons, being 209 tons more than in the corresponding week. For Scotch pig iron there is a steady outlet at home. The production is fully maintained, and the prices are steady, notwithstanding the weakness in the values of warrants. Govan and Monkland are quoted f.a.s. at Glasgow, Nos. 1, 75s., Nos. 3, 73s. 6d.; Calder, No. 1, 79s., No. 3, 74s.; Carnbroe, No. 1, 79s., No. 3, 75s.; Clyde, No. 1, 80s. 6d., No. 3, 75s. 6d.; Summerlee, No. 1, 81s., No. 3, 76s.; Gartsherrie and Langloan, Nos. 1, 82s. 6d., Nos. 3, 77s. 6d.; Coltness, No. 1, 97s. 6d., No. 3, 79s. 6d.; Eglinton, at Ardrossan or Troon, No. 1, 75s., No. 3, 74s.; Glengarnock, at Ardrossan, No. 1, 82s. 6d., No. 3, 77s. 6d.; Dalmellington, at Ayr, No. 1, 76s., No. 3, 74s.; Shotts, at Leith, and Carron, at Grangemouth, Nos. 1, 81s., Nos. 3, 76s. per ton. The shipments of pig iron at Scotch ports in the past week amounted to 4,782 tons, being 77 tons less than in the corresponding week of 1911. Makers of malleable iron and steel have order books well filled, and their main difficulty is to meet the requirements of customers as regards delivery. Prices are unchanged on the basis of £8 2s. 6d. for Crown bars, and also the same figure for Siemens steel ship plates, subject to the usual discounts.

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Renfrew, Ayr and Dumbarton.

COAL.

There has been rather less doing in the shipment department of the coal trade of this district. The clearances were at Bowling 200 tons, Greenock 1,257, Ardrossan 3,520, Troon 8,000, Irvine 614, and Ayr 16,809—total 30,200 tons, compared with 37,635 in the preceding week, and 37,385 in the corresponding week of last year. The exports were unusually small, amounting to only 700 tons, while the rest of the shipments, totalling 38,500 tons were despatched coastwise and to Irish ports. There has been dissatisfaction among the coal trimmers at Ardrossan, who are asking an increase of ½d. per hour in wages, alleging that the men at Ayr, Irvine and Troon have better remuneration to that extent. The inland demand for coal is well maintained. House coal is selling in gradually increasing quantities and the consumption in iron and steel works and other factories is very large, prices of all sorts of coal being well maintained.

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Stirling, the Lothians and Fife.

COAL.

At some of the Firth of Forth ports, the shipments of coal have been curtailed by the coal trimmers leaving off work at one o'clock instead of four o'clock on Saturday as usual. Steamers have thus been delayed in their sailings. The foreign shipments in the past week amounted to 84,822 tons, and 20,426 tons were despatched coastwise. At Grangemouth 43,888 tons were cleared, Granton 6,382, Leith 37,410, Bo'ness 17,568—total 105,248 tons, against 107,255 in the preceding week, and 119,888 in the corresponding week of last year. Best screened steam coal is quoted at Leith 12s. 6d. to 13s., secondary qualities 11s. 6d. to 12s., treble nuts 13s. 6d., doubles 12s. 9d. to 13s., and singles 12s. 3d. to 12s. 6d. per ton. At Fife ports the loading facilities have not been equal to the demand, but the clearances are somewhat better than they were in the preceding week. At Burntisland 62,070 tons were despatched, Methil 52,369, Alloa 2,000, Dysart 2,221, Wemyss 1,430, Tayport 600, and Charleston 500—total 121,190 tons, compared with 115,660 in the preceding week, and 122,493 in the corresponding week of 1911. The demand for all kinds of coal is good, and prices are firm. First-class screened navigation coal is quoted at Methil and Burntisland 16s. to 16s. 6d., unscreened 14s. to 14s. 6d. First-class steam 13s. 6d., secondary qualities 11s. 6d. to 12s., treble nuts 14s. to 14s. 6d., doubles 13s. to 13s. 6d., singles 12s. to 12s. 6d. per ton.

THE IRISH COAL TRADE.

THURSDAY, OCTOBER 17.

Dublin.

The advances which have been made at the other side have not yet affected prices here, and there is no change, so far, either in household or steam coals, although higher rates are momentarily anticipated. A fairly good business continues to be done in most classes of coal, both in the city and inland districts. City prices are as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; steam coals, from 20s. per ton upwards; best coke, 23s. per ton, or 18s. per chaldron; "ball" coal, 1s. 5d. per sack. At the Gracefield Collieries, Wolfhill, Queen's County, the pit-mouth prices are:—Best large malting coal, 20s. per ton; best hand-picked breakage; 20s. per ton, and 17s. 6d. per ton; cobbles screened and beans screened, 17s. 6d.; culm, 5s. The coaling vessels arriving in this port during the past week amounted to 64, as compared with 53 the week previously, chiefly from Ardrossan, Garston, Cardiff, Burryport, Ayr, Preston, West Bank, Partington, Glasgow, Girvan, Newport, Neath Abbey, Irvine, and Liverpool. The total quantity of coal discharged upon the quays was 27,121 tons.

Belfast.

Although trade upon the whole is fairly good the demand this week is below the average of recent weeks, the fine weather probably being accountable for any falling off on household account. There is a plentiful supply in the port, and merchants are now working off the accumulation of orders for the inland trade caused by the shortage of railway wagons. There is no further advance to report in prices. Quotations in the city are as follow:—Giant's Hall Arley coal, 26s. 6d. per ton; Hartley, 25s. 6d.; Wigan, 24s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 22s. 6d.; Orrell slack, 22s. 6d. Prices ex-quay:—Arley house coal, 22s. 8d. per ton; Scotch house coal, 19s. 6d. per ton; Scotch steam coal, 16s. 6d. to 17s. 6d.; navigation steam, 16s. 6d. to 17s. 6d.; Welsh steam, 17s. to 18s. per ton. Coal cargoes arriving during the week were chiefly from Glasgow, Ardrossan, Garston, Ayr, Neath Abbey, Maryport, Preston, Campbeltown, Ellesmere Port, Workington, Partington, Troon, Whitehaven, Girvan, Swansea, and Manchester.

THE TIN-PLATE TRADE

Liverpool.

The tone of the market is good, and prices for all descriptions are well maintained. Manufacturers are all very full of orders, and are standing firmly to their quotations for next year's shipments. There has been a very fair enquiry during the week, a moderate business being reported. Quotations may be called firm as follow:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 15s. 6d. to 15s. 9d. per box; I C 28 × 20 (112 sh. 216 lb.), 31s. 3d. to 31s. 9d. per box; I C 28 × 20 (56 sh. 108 lb.), 16s. to 16s. 1½d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. 10½d. to 16s. per box; I C 14 × 19¼ (120 sh. 110 lb.), 15s. 10½d. to 16s. per box; I C 20 × 10 (225 sh. 156 lb.), 23s. to 23s. 3d. per box; I C squares and odd sizes, 16s. to 16s. 3d. basis for usual specifications. Charcoal tins are quiet at 18s. to 18s. 6d. and upwards, according to finish. Terneplates are steady at 26s. 3d. to 26s. 9d. per box for I C 28 × 20, unassorted. Coke wasters are in good request, and prices rule firm as follow:—C W 14 × 20, 14s. 6d. to 14s. 9d. per box; C W 28 × 20, 29s. to 29s. 3d. per box; C W 14 × 18¾, 14s. 7½d. to 14s. 9d. per box; C W 14 × 19¼, 14s. 7½d. to 14s. 9d. per box; C W 20 × 10, 20s. 9d. to 21s. per box—all f.o.b. Wales, less 4 per cent.

THE BY-PRODUCTS TRADE.

Tar products:—The market is quiet and in some cases prices are easier. Pitch keeps much about the same. Benzols are firm, and so are naphthas, but carbolics are weaker than they have been for some past. Creosote firm. Nearest values are:—

Benzols, 90's, 1s.; ditto 50's, 11d.; toluol, 11¾d.; carbolic acid, crude (60 per cent.), 1s. 11d. to 2s.; ditto crystals (40 per cent.), 7¼d.; solvent naphtha, 1s. 1d., as in quality and package; crude ditto, 5¼d. in bulk; creosote, 3¼d. for ordinary qualities; pitch, 47s. to 47s. 6d. f.o.b. east coast; ditto, 46s. 6d. to 47s. f.a.s. west coast.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—Business is very largely at a standstill, owing to the naturally slackening demand at the moment, and also to the firm attitude of sellers in regard to both prompt and forward figures. The statistical position is very satisfactory, and it is reassuring to see the inability of "bearing" tactics to materially affect quotations. Closing prompt prices are:—

London (ordinary makes), £13 12s. 6d.; Beckton, £14; Liverpool, £14 6s. 3d.; Hull, £14 5s.; Scotch ports, £14 7s. 6d. to £14 10s.; nitrate of soda (ordinary), per cwt., 11s. 6d.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

Institution of Mechanical Engineers.—The first monthly general meeting of the coming session will be held in the meeting hall of the institution on Friday evening, October 25, at eight o'clock. A paper on "Characteristic Dynamical Diagrams for the Motion of a Train during the Accelerating and Retarding Periods," will be read by Prof. W. E. Dalby, London; and a paper on "Theory and Experiment in the Flow of Steam through Nozzles," by Prof. J. B. Henderson, D.Sc., of Greenwich, will also be presented. Members are reminded that applications for grants (up to about £34) in aid of original research in mechanical engineering, under the conditions issued in January last, should be sent to the council before 31st inst. The graduates' monthly meetings will be resumed at the institution on Monday, October 21, at 8 p.m.

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⁂ *For other Miscellaneous Advertisements see Last White Page.*

Forthcoming Annual Meetings.

South Staffordshire and Warwickshire Institute of Mining Engineers	October 21, 1912
Institution of Mining and Metallurgy	March 13, 1913
International Geological Congress—	August 21, 1913 (Toronto)
Geological Society	Feb. 21, 1913
North of England Institute of Mining and Mechanical Engineers	August 2, 1913
South Wales Institute of Engineers—	
Annual Dinner . .	Jan. 23, 1913
Annual Meeting . ..	March 18, 1913
Institution of Mechanical Engineers	Feb. 14, 1913
Annual Dinner . ..	April 17, 1913
Mining Institute of Scotland—	
Annual Dinner	Dec. 7, 1912

The Colliery Guardian.

LONDON, FRIDAY, OCTOBER 18, 1912.

"The Ignition of Coal Gas and Methane by Momentary Electric Arcs" was the subject of an interesting paper read by Prof. W. M. Thornton, of Armstrong College, at a meeting of the North of England Institute of Mining and Mechanical Engineers, held on Saturday in Newcastle. Another paper read was that of Mr. W. A. Brown on "Electrically-driven Winding Engines in South Africa."

A general meeting of the Mining Institute of Scotland was held in the Heriot-Watt College, Edinburgh, on Saturday, when a paper on "Experiences of the Use of Old Wire Ropes in Timbering Roadways" was read by Mr. John M'Luckie. Mr. James Black's paper on "The Inglis Controller" and a paper by Mr. D. M. Mowat on "Facts and Theories relating to Fans" were discussed.

At the annual meeting, on Monday, of the South Staffordshire and Warwickshire Institute of Mining Engineers, two important papers will be read—viz., "The Effects of Air Vitiation on the Light given by a Safety Lamp," by Drs. Haldane and Llewellyn, and "Illumination of the Coal Face, with special reference to the Incidence of Nystagmus," by Dr. Llewellyn.

Coal Trade Conciliation Board
gh on the 10th inst. In the
Hunter presided as neutral
eard parties upon the interpre-
ard his lordship gave last June
t. advance in wages, equal to 6d.
888 basis. The question at issue
t advance was to be given to all
ther the advance certain of the
ived under the Minimum Wage
considered part of the 12½ per
s lordship had awarded. Lord
derstood, indicated the view he
nd will issue a written opinion
oard in the afternoon had under
application by the coalowners
of wages by 12½ per cent. The
ly withdrew their claim.

by the Industrial Council into
affecting industrial agreements
ers and employed was reopened
Wednesday. Sir George R.
ndustrial Commissioner, has not
England from Canada, and the
pied by Sir Thomas Ratcliffe-
relating to the iron and steel
orth of England was given by
hackeray, of Sunderland, repre-
ou Manufacturers' Association.
infrequency of strikes in trades
rs and men were well organised
asised by Mr. William Hawdon,
gh, representing the Cleveland
sociation.

f the executive of the Miners'
reat Britain was held in London
Mr. Robert Smillie presiding, to
regulations of the Home Office
es Regulation Act. It is under-
miners generally approve of the
will seek an interview with the
y at an early date. The coal-
eady arranged an interview with
which will take place in about a
.

iggest coal contracts on record
was negotiated this week, when
vere made for the supply of
coal to the Central Argentine
rice being just under 17s. a ton.
as been apportioned to the Lewis
andard and Hood's collieries.

neeting of the North Staffordshire
ning and Mechanical Engineers
onday at Stoke, when the new
Hugh Johnstone, H.M. inspector
Midland and Southern Division,
dress, in which he touched upon
e important developments in the
ipment of collieries. A report of
be given in next week's *Colliery*
he evening the annual dinner was
Cunynghame being the principal

THE southern limit of the
Hainault coalfield has hitherto
been considered to be sharply
defined by the line of the great
Southern or Eifel fault, which
runs in an approximately east
ion in this portion of its outcrop.
great tectonic feature throughout
he Belgian coalfields. Along its
ferous rocks on the north are
y against strata of Devonian age
and the hade of this fault was
eclude any possibility of finding
le area of coal measures to the
line. Being an upthrow fault, it would naturally be expected that a borehole near the fault line in Devonian rocks would penetrate the coal measures at a depth below; but all earlier exploration in the proximity of the fault supported the view that, for practical purposes, the coalfield of Hainault terminated along the great Eifel fault.

This interpretation, however, has proved to be fallacious, and the circumstances leading to this conclusion may be traced to the results of investigations carried out, in the first instance, in the northern part of the basin in the neighbourhood of what is known as the Centre fault. It appears that this portion of the coalfield is, in fact, traversed by a complex of faults, the most important being known by the names of the St. Quentin, Placard, Northern and Centre faults. Between these faults the strata are continually repeated, and possibly the three first-mentioned faults may unite in depth with the Centre fault, which seems to run roughly parallel with the Great Southern or Eifel fault.

Modern views have endowed this Centre fault with a tectonic importance which even exceeds that of the Eifel fault, since it is believed that this Centre fault is the one which separates the unmoved and but little known massif of the north from the profoundly disturbed rocks lying to the south. This Centre fault is, in short, regarded as a great thrust plane along which the whole of the southern portion of the coalfield has been pushed towards the north in a broken and disturbed series by the process so well described by the term *charriage*.

The conception of *nappes de charriage*, originating with MARCEL BERTRAND in his study of the Alps in 1884, seems destined to throw great light upon the structure of the coal basins of Northern Europe. Thus Belgian geologists now recognise that the remnants of older rocks seen at Boussu, Fontaine-l'Evêque, Landelies and Charleroi are not now "in place," but have been pushed northwards along a thrust plane far from their parent masses. Thus, according to BRIART, the Landelies mass consists of three slices detached from the Upper Devonian, carboniferous limestone and lower coal measures respectively, which have not only been pushed as a whole upon the main thrust plane for several miles, but have also slipped successively one over the other. Such thrusts are by no means exceptional, for some of the Alpine movements have resulted in far larger masses being bodily transferred between 20 and 30 miles.

The bearing of these researches upon the southern limit of the Hainault coalfield is obvious. If the great Eifel fault follows the same law as the other faults of this basin its inclination diminishes with the depth, and it rapidly flattens out into a thrust plane of a low angle of inclination, beneath which the extension of the coalfield may be expected to continue, at workable depths, for an unknown distance beyond its present delimitation. To test this point, numerous borings have been sunk to the south of the fault. One of these at Mahy-Faux, at a distance of 700 m. from its outcrop, penetrated the fault plane at a depth of 335 m. The inclination of the fault at this point is, therefore, about 25 degs. In another boring, at Buvrinnes-Station, 1,600 m. from the outcrop of the fault, the fault plane was pierced at a depth of 566 m., showing a diminution of its inclination to 13 degs.

This flattening of the fault plane, together with the fact that coal-bearing strata have almost invariably been reached in borings beneath the Devonian rocks in this area, prove a considerable extension of the coalfield to the south. The precise structure of this new coal-bearing region, and its easterly extension, cannot be determined until further evidence is available. Neither is it possible to say to what extent the coal-bearing strata are broken up by subsidiary faulting; but it is generally believed that these new discoveries will open up a large area of coalmining property, and will add materially to the life of the Hainault coalfield. These coal-seams occur under somewhat unique conditions, lying, as they do, beneath considerable thicknesses of Devonian rocks. The circumstances are similar to the well-known inversion in the Radstock area, where, although on a smaller scale, coal measures have been folded beneath the carboniferous limestone. But in the Hainault basin the movements have been more than a simple overfold, and have been accompanied by a lateral thrust of considerable intensity.

The economic position of the Belgian coalfields is a question that concerns not only the coal-mining industries of Westphalia and the Pas-de-Calais, but also the export trade of Great Britain, apart from the development of the Campine coalfield. The tendency of the Belgian coal trade has hitherto been rather in the direction of concentration than in an increase in the area of operations. Until lately the total number of workings has been notably diminishing, while the output, although increasing, has not made any considerable progress for the last 10 years. In northern France the position of Belgium has been generally regarded as unimportant from a competitive point of view, and at any rate insignificant in comparison with the area controlled by the Westphalian Syndicate. It is, however, by no means certain that this view is sound in face of these new discoveries in Hainault, which has always been the most important of the coal-producing areas of Belgium. In 1910 Hainault produced 70 per cent. of the coal raised in Belgian territory, and the addition to this field of many square miles of coalseams, at a workable depth, may materially influence its competitive position. Nor must it be forgotten that the great Southern fault affects a wide region, probably extending from the Pas-de-Calais, through the Ardennes and Eifel district, to the Westphalian coalfield, and it is impossible to say how far the recent Hainault researches may influence the reading of other areas along this great line of disturbance

---

Trade Summary.

The London coal trade for the past week has not been so brisk as the preceding week. The milder weather somewhat lessening the public orders. The shortage, however, of wagons, and the accumulation of back orders has kept all colliery prices firm and last quotations are fully maintained. No cargoes are offering for either Durham or Yorkshire coal by water, the vessels arriving in the Thames being all sold. Double-screened nuts and peas are firm, but slacks are over plentiful and prices weaker. Manufacturing coals are in good demand, and coke is selling freely. Gas coals are coming forward in larger tonnages, but all under contract. The shipping trade is unusually brisk and the freights continue abnormally high.

The general tone of the market at Newcastle is very good indeed, notwithstanding that the Balkan situation militates to some extent against forward business. Steam coals and bunkers are rather dearer. House, gas, and coking coals are steady and coke is very firm.

The Durham coal trade is very active, especially as regards manufacturing descriptions. Coking and bunkering sorts are strong, and there is a steady trade in gas coals. House coals are quiet.

The Lancashire house coal trade is quietly steady. The business for shipping and factory use is well sustained, and large supplies of slacks are going into consumption.

In West Yorkshire, whilst business is active, prices show an easier tendency, both as regards steam and house coals. Manufacturing coal is very firm.

In South Yorkshire the position of steam coal has weakened somewhat, but prospects are good. Manufacturing coals continue in active request, and cokemaking slacks are in strong demand. There is a fair call for house coal, and prices are firm. Coke is exceptionally strong.

Derbyshire house coal is in less urgent request, but prices are unaltered. There is no falling off in the demand for manufacturing coal, and steam coal continues to move freely.

So far, the outbreak of war has had no direct influence on the market at Cardiff, but sellers are adopting a cautious policy. Prompt trade is subject to great irregularities, and prices vary considerably. The small coal market is very steady. Monmouthshire coals are firm. Bituminous sorts are unchanged, as is patent fuel.

In Scotland there has been a fair business done in the shipping branch, but wagons and vessels are scarce. Business in steam and house coal is fairly good.

INDIAN AND COLONIAL NOTES.

India.

Large Rolling Stock Contracts Placed.—It is announced that the India Office, in order to make up for the restricted indents of recent years, have now decided to purchase rolling stock upon the deferred payment system. An order has been placed with the Metropolitan Carriage, Wagon and Finance Company, of Birmingham and Manchester, for no fewer than 3,000 freight wagons of various types. Included among the contracts recently placed in Great Britain for the Indian railways are 300 covered wagons for the Great Indian Peninsula Railway, to be built by the Birmingham Railway Carriage and Wagon Company, of Smethwick; 100 bogie railway wagons for the Indian North-Western Railway, 66 patent hopper wagons for the Nizam's Guaranteed State Railway, and 50 bogie covered wagons for the Bengal-Nagpur Railway, to be provided by the Leeds Forge Company. For the Burma railways the Metropolitan Carriage, Wagon and Finance Company are to supply 34 large cattle wagons, whilst the Blake Boiler, Wagon and Engineering Company have the initial order for 13 side-tipping wagons of a new design for the South Indian Railway, to which system the Leeds Forge Company is also to supply 87 all-steel open and covered wagons.

Australia.

The Coal Vend Appeal.—The appeal in the coal vend case, writes our Sydney correspondent, under date of August 27, is now being heard before the full bench of the Federal High Court, the appellants being four of the inter-state shipping companies, all the colliery owners included in the action having paid the fines inflicted upon them. The first point to be decided is what the Australian Industries Preservation Act means by "monopoly." The word is not used in the Act in its legal, or even popular sense, and the Court was asked to determine what it really meant. In like manner the Court will be asked what is the meaning of the words "to the public detriment." Much will depend upon whether the alleged vend agreement, fixing a minimum selling price for coal, is legal, and whether it was not a logical result of the system of collective bargaining introduced by the institution of the system of industrial agreements between amalgamated trades' unions on the one hand and associations of employers on the other. The Chief Justice said that if the vend agreement was lawful, the appellants could not be convicted under the Act for doing something in the nature of giving effect to it. The Federal Attorney-General has admitted this, but states that the real offence consisted in asking unreasonable prices; the judge before whom the case was heard stating that in some cases "a penny per ton too much was charged," and so on. In the course of the opening of the case for the appellants, it was explained that the older established collieries at Newcastle had been carrying on operations for a number of years, and that at the beginning of 1900 the Maitland field had become developed, coming into competition by selling coal at very low prices. Subsequently the competition became so keen that much of the production had to be disposed of at unremunerative prices. The shipping companies bought the coal, and sold it to consumers in the various States. They agreed with large consumers, such as the Victorian Railways and the Melbourne Gas Company, to supply large quantities of coal on certain conditions, and also had coal yards in Melbourne and Adelaide, where coal was stored and sold to retail dealers. They had also a number of small annual contracts, and it was argued that it was unreasonable to say that the man who not only brought the coal down, but was also a merchant, should not be entitled to something beyond his freight. He was also entitled to other expenses in the yard, handling, bagging, etc.; also supervision. It was also contended that the consumer who took 300 tons could not be supplied so cheaply as the one who took 100,000 tons, but the difference per ton would be very small. The judge would not, however, admit this, and treated the difference of a penny per ton as an offence.

Canada.

A correspondent says:—A party of financiers interested in the Jasper Park Collieries Limited, located on the main line of the Grand Trunk Pacific Railway, west of Edmonton, Alta., recently inspected the property. As a result the management has decided to spend 250,000 dols. on a new permanent plant. The mine is at present in operation with a force of 227 men, many of whom are employed in development work, the output being about 10,000 tons per month, all of which is taken by the Grand Trunk Pacific. The machine shop, power-house, and supply shops are nearly completed, and it is expected that the mine will be in full operation by December 1 with a force of 500 men and an output of 2,000 tons of coal per day.

MINING AND OTHER NOTES.

The Elba Colliery, Gowerton, was flooded on Saturday morning by an inrush of water from an old working adjoining. The water rushed down into one of the drifts. Several men were working not far away, but they made their escape.

A meeting was held on the 11th inst. under the auspices of the Newcastle Chamber of Commerce, for the further discussion of the coasting coal charter. Various objections were raised to certain of the clauses, and after long consultation it was decided that Mr. Herbert Shaw should arrange a joint meeting with the shipowners in order to confer as to the proposed amendments.

The Lothian coalmasters, it is reported, are again proposing to go to Parliament for power to construct a railway between the Lothians' coalfields and Leith. It is understood, however, that the scheme is being modified in several respects in order to avoid opposition encountered when the last Bill was presented.

Another group of cottages for the aged mineworkers of Northumberland was commenced on Saturday at Annitsford, when foundation-stones were laid of ten new houses. The governors of the association held a meeting in the Burt Hall, Newcastle, on the same day. The question under discussion was that of providing accommodation for aged mineworkers who are bachelors or widowers. It was stated that a considerable number had applied for cottages, but had no one to look after them. The chairman presented a report of his visits to Haswell Moor, and to Middlestone Moor, where hostels for aged workers have been established. There were 14 old bachelors or widowers housed in one building, with separate apartments and a caretaker to look after them.

In room of Mr. J. Clark, who has received an important appointment at Lochgelly, Mr. Henry Telfer, junior, at present agent for the Lanarkshire collieries of Wilsons and Clyde Coal Company, has been engaged as colliery manager for the Niddrie and Benhar Coal Company Limited for the Niddrie group of collieries.

Mr. Thomas Robert Johnston Logan, of West Hurlet, Nitshill, Renfrewshire, and of Glasgow, ironmaster, chairman of Messrs. William Dixon Limited, who died on August 9, aged 76, left personal estate in the United Kingdom valued at £155,646, of which his holding in Messrs. William Dixon Limited is valued for probate at £49,726.

A fire broke out with startling suddenness in the Devonbank coalmine, Alloa, on Tuesday afternoon. Two hundred men were below, and they were nearly all suffering from injuries when they escaped.

A meeting of the coal merchants' section of the Bradford Chamber of Trade took place at the Chamber's rooms on Wednesday evening of last week, Mr. H. Mosley occupying the chair. A long discussion took place upon the matter of factors supplying coal clubs, and the association decided to take action, along with other associations of the trade, to prevent this practice. It was announced that a meeting was to be held in Leeds shortly of colliery proprietors, factors and merchants to deal with this matter. Some complaint had been made against the Midland Railway Company of overcharging for siding rent, and also of delay in delivering coal from the railways. Some reference was also made to the recent controversy in the city on the question of a municipal coal supply.

The directors of the Anglo-Westphalian Kent Coal Syndicate Limited, have given out contracts for two new boreholes, and boring operations have been commenced at both the sites selected; so that in all three borings are now in progress on behalf of this company.

Messrs. Holdsworth and Sons Limited, of Bradford, inform us that the Port Talbot Steel Company Limited, a new steelworks in South Wales, have favoured them with their order for a complete steam plant, which include five Yorkshire boilers 24 ft. by 9 ft. 3 in. diameter. The guaranteed equivalent evaporation of each boiler 24 ft. by 9 ft. 3 in. is 1,800 gallons of water per hour.

The council of the Institution of Civil Engineers has awarded a Watt gold medal to Prof. W. H. Burr (New York) and the Crampton prize to Prof. R. J. Durley (Montreal) for papers read during the session 1911-12. The Howard quinquennial prize for 1912 has been awarded to Mr. J. H. Darby (Sheffield), in recognition of improvement introduced by him in iron and steel production, and the Indian premium for 1912 to Mr. H. H. G. Mitchell (Madras). The council has made the following awards in respect of students' papers read during the session: The James Forrest medal and a Miller prize to Mr. E. P. Currall (Birmingham); and Miller prizes to Messrs. J. H. Taylor (Glasgow), W. P. Warlow (Bristol), G. Ingram (London), E. F. Hunt (London), H. J. F. Gourley (London), H. G. Hoskings (London), E. A. Cross (Birmingham), and J. and W. Legg (London); and the James Prescott Joule medal to Mr. V. E. Green (Birmingham).

The North-Eastern Railway Company have raised the surcharge on the rates, for the carriage of coal and coke to be used for ironmaking, from 5 per cent. to 9 per cent. for the present quarter. It is a long time since the surcharge was so high, and the figure indicates the prosperous condition of the iron trade, as the surcharge is regulated by the selling price of iron.

The large number of homes for aged miners which have been provided in Durham County in recent years is shortly to be augmented, and South Shields—the business centre for the Harton Coal Company's group of collieries—is one of the places where the development will be witnessed. On the southern outskirts of the town it is intended to build a group of 30 of these homes, while a dozen or more will also be erected in connection with the Boldon Colliery.

At the annual meeting of South Staffordshire Mines Drainage Commission, Mr. G. Macpherson was unanimously elected chairman, and Messrs. J. S. Childe and J. R. V. Marchant were reappointed arbitrators. Alderman J. Hughes, who presided, remarked that during the year 49 tons of water had been raised in the district for every ton of mineral, which was a record, and nearly double what it had been in some past years. He hoped, therefore, that the colliery owners would bestir themselves in the development of the mines of the district, so that the Commissioners would be in receipt of a much greater revenue to meet the cost of pumping operations.

To a recent meeting of the Scottish branch of the National Association of Colliery Managers, Mr. John Blake, Neilsland Colliery, contributed an interesting paper on "Some notes on the Coal Mines Act, 1911." The discussion was taken part in by Messrs. Beveridge (Kelty), G. L. Kerr (Glasgow), Robertson (Coalburn), Paterson (Netherburn), Wm. Wilson (Armadale), McPhee (Bothwell Park), McLuckie (Dalserf), Kilpatrick (Uddingston), and Boyd (Kilsyth). It transpired in the course of the discussion that the inspectors in Scotland were themselves at variance as to the precise interpretation to be placed on certain clauses in the Act.

Two hundred new houses, artistically designed, semi-detached, and provided with three bedrooms, are to be built at Huntington, Cannock, for the accommodation of workmen. The Littleton Colliery Company, whose pits at Huntington have been open for ten years and give employment to between 2,000 and 3,000 men, is actively interested in the scheme. It is a curious fact that, notwithstanding the colliery development, the population of Huntington has decreased by 51 during the past ten years, and is now only 300.

THE WELSH COAL AND IRON TRADES.

Thursday, October 17.

North Wales.

Ruabon.

COAL.

The demand for coal of various grades continues fairly brisk in this district, and there is no doubt that if a snap of cold weather occurred, things would be very brisk indeed, and prices would harden considerably. The thing which troubles the colliery proprietors most at the present time is not lack of orders but shortage of railway wagons. This shortage has made it necessary for some collieries to play on one or two shifts. With reference to the different grades of coal, a fair amount has gone down to Ellesmere Port and Birkenhead for shipment, and though coal sold for bunkers does not fetch such a good price as it would for other markets, yet the fact that the wagons get emptied and returned quickly to the collieries is a great consideration, as often the quick return of a train of wagons from a shipping order decides the fact as to whether a colliery shall work the next day or not. The railway companies are sending in a fair number of trucks for supplies against their own contracts, and the collieries who have large locomotive contracts are able to despatch large quantities, and this, added to the other trade done, enables them to work the full time. Gas coal continues to go away in average quantities, and this class of trade accounts for a good percentage of the total tonnage despatched from this locality. With regard to the household trade, this continues steady, though there is no particular rush just at the moment. It is freely rumoured that there will be another advance in price in the near future, and this news, doubtless, will quicken up this class of trade, but as before mentioned, the great drawback is lack of empty trucks for the merchants' trade. The demand for slack and small fuel for manufacturing purposes continues to be very good, the market for which holds a strong position, and some collieries are in arrears with their contracts, and consequently prices are gradually rising, and the coke trade continues to be in a brisk state. It is also very difficult to get any quantity of nuts, as the output of these is strictly limited, and most of it is already arranged for under contracts with gas companies. The current pit prices are, on the average, as follow:—Best large house coal 16s. to 17s. per ton; best smalls and large main seam, 15s. and 16s. per ton; steam coal for manufacturing purposes, 13s. and 14s. per ton; bunkers for Birkenhead and Liverpool, 11s. to 13s. per ton; washed nuts, 11s. to 12s. per ton; slack, according to quality, 7s. to 9s. 6d. per ton; gas coke, 17s. to 18s. at works.

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Monmouthshire, South Wales, &c.

Newport.

COAL

A good healthy tone permeates the coal market in all departments, more especially for November and farther ahead. The ever-present tonnage difficulty for the present exercises a restraining influence on business, sellers showing

relax their demands, while buyers are
ope of forcing easier terms. There are
tions, however, tending to show that
ly to be firmer than otherwise. There is
g demand, freights are higher and more
made in the freight market than usual,
no doubt, attracting tonnage. The
mpty wagons to keep pits from stopping
managers here and there to offer slight
r the present this is not an important
intenance of present values being more
ouse coal and patent fuel trades there is
. Coke continues scarce, with prices as
vood supplies are not more than buyers
ntract, and here too values are being
Latest approximate quotations may be
l prices f.o.b. cash in 30 days, less 2½ per
best Newport Black Vein large, 15s. to
alleys, ordinaries, 14s. 3d. to 14s. 9d.;
t, 14s. to 14s. 6d.; other sorts, 13s. 6d.
smalls, best, 9s. to 9s. 3d.; seconds, 8s. 6d.
8s. to 8s. 3d.; screenings, 9s. 3d. to 9s. 6d.;
8s. to 18s. 6d.; seconds, 17s. to 17s. 6d.;
9s. 9d. to 11s.; nuts, best washed,
patent fuel, 17s. 6d. to 18s. 3d. Coke:
6s.; foundry, 27s. 6d. to 30s. Pitwood:
. to 24s. ex-ship.

IRON.

the local iron and steel trades continues
ere is a strong business tone noticeable
Enquiry is decidedly better, and more
vn on the part of buyers to settle at
ll departments are uniformly well placed
ooks, and for forward delivery values
ces. Tin-plate and sheet bars continue
d values, sellers' prices again being
emer and £5 17s. 6d. to £6 Siemens for
till difficult to get works to give delivery
fications already in hand, and all mills
est pressure. The rail department con-
oyed with a fair enquiry, and the outlook
otations are unaltered on the week. At
there is sustained activity, most pro-
arrears with their deliveries. Welsh
at 86s. to 87s. delivered to works in the
is unaltered on the basis of 22s. to
bio c.i.f. Newport. The tin-plate trade
ry, there being more buying, but prices
from 15s. 9d. to 15s. 10½d. Bessemer, and
iemens for I C's 20 × 14 × 112. Other
cordingly. Black-plate £11 12s. 6d. to

COAL.

of writing the outbreak of war in the
l but little effect on this market. It is
s had come forward from Greece for
000 tons of Admiralty steam coals of a
ter, but this will be more than counter-
by the diminished exports of coal to
Asiatic Turkey. Not that there will be
the demand from Turkey. On the
ure to be considerable pressure for coals
nd naval authorities in that country.
dent, notwithstanding that the Turkish
commandeered all supplies lying at the
the difficulty will be to find tonnage.
ng collieries report that within the last
received very urgent enquiries for coal,
hipowners are loth to allow their vessels
port where they would be likely to be
Grecian or Italian warships. So far,
alian warships are concerned, this fear
groundless, for the announcement was
y that peace had been concluded between
But owing to the uncertainty existing
rse of events in the Balkans, there seems
on all hands to adopt a very cautious
l, of course, depend upon whether the
e closed. In the event of this being
urally mean the blocking of an enormous
not only in the Black Sea and the Azof,
e as well. Considering, however, how
affect the Great Powers, it is hardly
would resort to so drastic a measure.
ght market is being very closely watched.
en made to conceal from exporters the
tion that is going on in the shipbuilding
s that has recently leaked out that new
nt of between 200,000 and 300,000 tons
ally being turned out at the various
her as a surprise to most people. Should
end, it is not improbable that this
e supplemented by the closing of
rtainly this probability is not lost
yers, who are consequently loth to
to the purchase of any large quantities
hts are at their present level. Whatever
one of a forward character is conducted
y that it is difficult to obtain particulars
e only large contract reported within the
t by the Argentine Central Railways for
s of steam coals for delivery over next
ought are the Lewis-Merthyr and the
tons each) and Hood's Glamorgan (80,000
has been secured has not been disclosed,
o be a little under 12s., less 3d. and 2½d.
tract placed of any importance is that of
nd Mediterranean Railways, which are
ht 82,000 tons of large coal and 57,000
from Messrs. Pyman, Watson and Co. at
rge and 29½ fr. for small, inclusive of the
delivered into trucks at Marseilles. As
acts, however, there is a very serious set-
Steamship Company, who consume about
ion tons of steam coals per annum, are
ain gone to Yorkshire for their require-
e invited for the supply to the Govern-
Nigeria, for the first six months of next
of best double-screened Admiralty steam
tenders for the supply annually of from
ns for delivery over three or five years
nsideration. Welsh coals for immediate
o show great irregularity. A fair amount of tonnage is being taken up every week, but unfortunately it is not sufficient to meet the requirements of coalowners, who, in order to avoid stoppages at the pits, have frequently to accept much lower than the quoted prices. For instance, though best steam coals are quoted at 16s. 9d. to 17s. per ton, it is no uncommon occurrence to find that cargoes have been obtained by buyers at 16s. to 16s. 3d. per ton. As regards superior Admiralty seconds, the same thing occurs. Though quoted at 16s. to 16s. 6d. in numerous instances, they have changed hands at 15s. 6d. to 15s. 9d. per ton. The small coal market is very steady. The termination of the vintage in Italy is bringing more buyers into the market and best bunkerings sell freely at 10s. 3d. to 10s. 6d., best ordinaries at 10s. to 10s. 3d., and cargo qualities at about 9s. 3d. per ton. Washed nuts are round about 15s., and washed peas 13s. per ton. A good deal of negotiation has been going on with buyers anxious to cover their requirements for next year, and it is reported that one colliery producing good cargo small has arranged to supply something like 100,000 tons over next year at 9s. 6d. per ton. This is about 1s. 6d. in excess of the figure obtained at the close of last year for shipment over the current 12 months. Another colliery has obtained 11s. per ton for a portion of its output, but that is for bunkering purposes. Monmouthshire coals are steady. Most collieries are reported to have fairly good stems and are indisposed to make any abatement in their quotations. Black Veins are 15s. 3d. to 15s. 6d., western-valleys 14s. 6d. to 14s. 9d., and best eastern-valleys 14s. 3d., all f.o.b. Cardiff. In bituminous coals there is practically no alteration, No. 3 Rhondda large is 16s. 9d. to 17s., through-and-through 14s. 3d., and small 11s. 9d. to 12s.; No. 2 large is 12s. to 12s. 6d., through-and-through 10s. 6d. and small 8s. 9d. to 9s. per ton. In patent fuel there is no material change. Large shipments have taken place during the week, but they have mostly been in fulfilment of old contracts. The Crown Patent Fuel Company despatched 8,307 tons, other local makers 13,340 tons, Swansea 13,600 tons and Newport 3,300 tons. For prompt delivery 19s. is still obtainable for best brands. The Paris, Lyons and Mediterranean Railways have bought 55,000 tons of Star patent fuel from Messrs. Tabb, Burletson and Co., for delivery by August 31, at 37·80 fr., into trucks at Marseilles. The Algerian State Railways have placed their order for 54,000 tons of Arrow fuel with Messrs. A. Cape and Co., of Paris. The price accepted has not been stated, but it is understood to be round about 17s. 6d. per ton. There continues to be a very strong demand for coke, and prices are higher. Ordinary foundry is 25s. to 28s., special 29s. to 31s. Furnace coke is 22s. to 23s. Pitwood is 23s. 6d. to 24s. per ton. The following table shows the exports from the Bristol Channel for the last eight months, together with the increase or decrease as compared with the corresponding period of last year:—

	Eight months' exports. Tons.	Increase. Tons.	Decrease. Tons.
Russia	288,733	74,409	—
Sweden	135,999	49,428	—
Norway	75,369	9,333	—
Denmark	24,371	5,466	—
Germany	157,301	237	—
Netherlands	89,962	—	2,788
Java	28,231	22,299	—
Dutch possessions in Indian Seas	9,910	—	1,678
Belgium	186,872	—	125,705
France	3,466,732	—	63,542
Algeria	327,194	—	35,076
French Somaliland	18,762	—	1,634
Madagascar	15 351	5,769	—
Portugal	400,885	14,432	—
Azores	18,768	819	—
Madeira	72,629	20,293	—
Spain	666,840	65,792	—
Canary Islands	442,881	—	72,330
Italy	3,169,733	—	104,841
Austria-Hungary	83,083	—	28,392
Greece	176,585	—	26,188
Bulgaria	16,251	—	11,924
Roumania	87,165	8,221	—
Turkey (European)	73,204	—	20,605
" (Asiatic)	88,884	—	10,552
Egypt	1,097,498	—	154,412
Tripoli	9,430	5,353	—
Tunis	82,797	16,340	—
Siam	1,966	—	6,148
China (exclusive of Hong Kong)	12,962	5,600	—
Japan	15,521	7,118	—
Mexico	14,571	—	948
Peru	13,558	7,758	—
Chili	371,629	59,407	—
Brazil	838,425	—	8,772
Uruguay	438,216	—	66,249
Argentine Republic	1,651,938	—	18,421
Channel Islands	48 784	5,128	—
Gibraltar	154 576	20,293	—
Malta	175,263	—	36,903
Cape of Good Hope	11,309	—	7,263
Mauritius	13,006	5,995	—
Aden	138,371	27,192	—
British India	44,040	—	17,962
Straits Settlements	11,924	819	—
Ceylon	151,648	—	12,773
Hong Kong	20,708	—	2,665
Canada	11,714	1,656	—
British West Indies	7,026	1,414	—
Italian East Africa	26,112	16,741	—
West Africa, French	64,233	1,673	—
" Portuguese	197,199	7,886	—
" British	54,971	169	—

IRON.

The tin-plate market is quiet, but notwithstanding that tin has fallen £5 per ton, manufacturers adhere very steadily to their prices. The key to the position is the strength of the pig iron market. Producers of hæmatite all over the country are so well supplied with orders that there does not seem likely to be any change in the present position for many months to come. Welsh hæmatite is quoted at 85s., or 1s. 6d. above last week. The only disquieting feature is the probable effect which the war in the Balkans may have on the tinplate trade. In some quarters it was at one time feared that the Black Sea might be closed, but that fear has been very largely dispelled by the announcement of peace between Italy and Turkey. How serious such a step would be is evidenced by the exports of tinplates to the Russian and Roumanian markets. Last year they amounted to 38,803 tons, equivalent to 8 per cent. of the total exports of Welsh tinplates. Last week the total shipments of tinplates were fairly good, amounting to 118,916 boxes, or within about 12,500 boxes of the receipts from works. Stocks are not at all excessive, being only 200,000 boxes, or less than a fortnight's supply. Bessemer 14 × 20 cokes are 15s. 7½d. to 15s. 9d., and oil sizes 15s. 10½d. to 16s. 1½d. per box. Orders for about 100,000 boxes of oil sizes have been placed within the last few days. Importations of foreign steel during the week were fairly large, Newport alone receiving 2,615 tons of sheet bars, and 5,375 tons of billets. The local mills continue to be well employed, and prices are unchanged, still ranging from £5 15s. to £6 per ton, according to quality and terms of delivery. There is a gratifying improvement in the galvanised sheet trade, the average production of the sheet mills this last few weeks showing an increase compared with a couple of months ago of quite 20 per cent. Stocks are practically *nil*, whilst the demand continues to be of a pressing nature. Generally, 24-gauge corrugateds are £13. Employment at the Dowlais works is rather quiet. All the furnaces (except of course the blast furnaces and the mills) have only had a four days turn. Scrap metals are firmer, old steel bars (mixed sections) being 60s., and double headed rails 65s. per ton. Best rubio iron ore is firm at 22s. 6d., but very little buying is going on.

Swansea.

COAL.

Last week the trade of the port was again of a favourable nature, although there was a slight decrease compared with the previous week. This was chiefly owing to the shortage of tonnage supplies. The shipments of coal and patent fuel were 94,838 tons. There was a good attendance on 'Change this morning, but there was no material alteration to report in the general condition of the anthracite coal market; the undertone was steady. There was a good demand for Swansea Valley large, with prices a shade harder. Red Vein large was also firm. Machine-made nuts and cobbles were barely holding their own. Beans and peas were easier, as also was rubbly culm. Duff, however, was very strong. In the steam coal department there was no outstanding feature; large was freely offered for immediate delivery at reduced figures, but little business was doing. Smalls were firm. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 16s. 6d. to 19s. 3d., less 2½ per cent.; Red Vein large, 15s. to 15s. 9d., less 2½ per cent.; machine-made cobbles, 21s. 6d. to 23s. 6d.; Paris, French, and German nuts, 23s. to 26s.; beans, 21s. to 23s. 3d.; machine-made large peas, 12s. 6d. to 14s.; ditto fine peas, 11s. to 12s. 6d., all net; rubbly culm, 6s. 3d. to 6s. 9d., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 17s. 9d. to 18s. 6d.; seconds, 14s. to 15s.; bunkers, 10s. 6d. to 11s. 6d.; small, 9s. 6d. to 10s. 9d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. to 18s.; through-and-through, 15s. to 16s.; small, 11s. 6d. to 13s.; No. 2 Rhondda large, 14s. to 15s. 6d.; through-and-through, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 6d., all less 2½ per cent. Patent fuel, 17s. to 18s., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

On the whole the general trade of the district during last week compared favourably with that of any similar period of the past three months. There was a satisfactory yield of pig iron, and all the steel-smelting furnaces and bar-rolling mills in the locality were actively engaged. During the past few weeks there has been a gratifying improvement in the output of galvanised sheets, and the average production of the sheet mills showed an increase compared with a couple of months ago of quite 20 per cent. Stocks of this class of material are practically *nil*, while the demand continued to be of a pressing nature. All-round employment was seen in the tin-plate trade. The shipments of tin-plates last week were 118,916 boxes, receipts from works 131,498 boxes, and stocks in the dock warehouses and vans 206,009 boxes.

Llanelly.

COAL.

The only complaint to be heard locally is that of shortage of tonnage, and the difficulty collieries have to keep going owing to wagons being kept underload waiting boat arrivals. The market generally is in a splendid position, and prices all that can be desired, with every prospect of advances being made shortly. The anthracite trade especially is going very strong, and there should be quite a boom this winter, with prices higher than they have been for some time. Perhaps it is fortunate for buyers in this country that boats are scarce, as were it otherwise they would experience a great deal of difficulty in getting their wants supplied. The kinds most difficult to get just now are stove nuts and horticultural sorts. All the machine-made coals are fully sold. Culm is easier, and prices are not so firm. Steam and bituminous smalls are also a good market, and the demand exceeds the make. This week's quotations are:—Best malting large, 23s. to 25s.; second malting large, 21s. to 23s.; Big Vein large, 17s. to 19s.; Red Vein large, 14s. to 15s.; machine-made large cobbles, 22s. to 23s. 6d.; German nuts, French nuts, and Paris nuts, 24s. to 25s. 6d.; machine-made large beans, 22s to 24s.; machine-made and washed peas, 14s. to 15s.; rubbly culm, 6s. 6d. to 7s.; duff, 5s. to 5s. 6d.; large steam, 16s. to 16s. 6d.; through-and-through, 10s. 9d. to 11s. 3d.; small steam, 9s. 6d. to 10s. 6d.; bituminous small, 10s. 9d. to 11s. 6d.—all f.o.b.

South Staffordshire and Warwickshire Institute of Mining Engineers.—The forty-fifth annual meeting will be held at the University, Edmund-street, Birmingham, on Monday afternoon, October 21, at 3 p.m. The newly-elected president will take the chair, after which the following important papers will be read:—"The Effects of Air Vitiation on the Light given by a Safety Lamp," by Drs. J. S. Haldane and T. L. Llewellyn; and "Illumination of the Coal Face, with special reference to the incidence of Miners' Nystagmus," by Dr. T. L. Llewellyn. Messrs. J. Davis and Son, Derby, will exhibit modern mining apparatus and appliances, and Messrs. Heenan and Froude Limited, Worcester, will exhibit their "Wallace" patent overwinding prevention gear.

LABOUR AND WAGES.

North of England.

At a mass meeting of surface workers and night-shift workers, held at Blyth on Saturday, the respective agitations promoted by both parties for the removal of grievances, which have been banned as "unconstitutional" agitations by the executive committee of the miners' union, were formally blessed by Mr. Wm. Straker, the miners' secretary. Mr. Straker announced that the demand of the night workers for the restoration of the short shift which they enjoyed prior to the passing of the Eight Hours Act would be put on the agenda of the miners' council meeting in November, and, if carried, the owners would at once be approached on the subject. Referring to the claims of the surface workers for shorter hours and higher pay, he said that the surface workers of Northumberland got from 3s. 6d. to 4s. per day and worked 11 hours or more. In Yorkshire they received 4s. to 4s. 3d. a day of eight hours' work. There was no reason why the Northumberland surface worker should do the same work during longer hours and for less pay than prevailed in other counties.

The Cleveland ironstone mineowners and the representatives of the miners met at Middlesbrough this week to consider wages for the next three months. Sir Hugh Bell, Bart., presided. The chairman pointed out that the recent certified average net selling price of Cleveland pig iron was 54s. 5·64d., and that the advance due to the men, according to the formula adopted for for some years past, was 4·75 per cent. The men's representatives intimated that they had no power to settle the question that day, as they would have to report to the men in the district and meet the owners again. It was agreed that a further meeting be held on the 28th inst. The subject of surfacemen's wages was also considered, the men having requested an advance in the base rates. This matter was also left over to the meeting on the 28th.

The Northumberland Coalowners' Association, in response to an application by the Miners' Association, has refused an urgency meeting to discuss the Seghill dispute until the men return to work. The Seghill miners have now been on strike about seven weeks, and, though they are without financial benefits from their association, independent assistance from the other districts of the coalfield have enabled them to continue the strike. A special meeting of the executive committee of the Northumberland Miners' Association was held on the 10th inst. in the Burt Hall, Newcastle, under the presidency of Mr. Joseph English, when the owners' letter was under discussion. It was decided to ask the Seghill men to receive a deputation, and that a circular be issued to the branches pointing out the position at Seghill, and the need of giving assistance to relieve the distress.

The Northumberland miners have rejected the proposal that they should increase their contributions to the county association. Otherwise the returns in connection with the voting on the resolutions passed at the special council meeting of the Miners' Association show that all the proposals submitted have been confirmed. Testimony has been given to the following proposal:—"That we institute legal action against any colliery owner guilty of violating the Mines (Eight Hours) Act, and that our branches be requested to send to our central offices particulars of cases where they believe the Act has been violated." Restoration of short shifts, the granting of free houses, rent, and fire coal to stonemen, shifters, and ridders, and the council's definition of stonework, are the headings of other resolutions passed by the council, and which the lodges have affirmed.

On Saturday night, at Sunderland, a large company of winding engine men from all parts of Durham county held a meeting. A discussion took place on the draft of general regulations affecting the hours of winding engine men, and dissatisfaction was expressed at interference with the system that had so successfully operated for forty years, and also at the manner in which the draft of regulations, as issued by the Home Office, had been dealt with by their representatives. It was agreed to arrange for a series of mass meetings throughout the country for all classes of colliery engine men.

Federated Area.

Mr. C. Bunfield, secretary of the Notts Miners' Association, speaking at a miners' meeting at Kirkby, on Friday evening, dealt with the position of surfacemen other than bank workers at the Bentinck Colliery, and a resolution was passed that the men would support the Miners' Association and the surface workers in their efforts to obtain better conditions, shorter hours, and increased wages, and that if these things were not obtainable by mutual arrangement, they were prepared to stand by the surfacemen even if it came to the handing in of notices.

Miners' officials, on Monday, handed in the notices of the surfacemen employed at Bentley Colliery to terminate a fortnight hence, and if no settlement is come to in the meantime about 3,000 men and boys will be thrown out of employment. A conference between the surfacemen and the management was fruitless.

Some trouble has arisen at the Manvers Main Collieries, near Mexborough, where some 300 trammers have been out on strike because they were not receiving the minimum wage. The colliery company had paid the minimum wage per "stall," but the trammers, instead of receiving the full amount from the colliers, had received "scorage" rate—payment at the rate of so much per score tubs filled, which rate worked out at considerably less than the minimum. On the 10th inst., however, an agreement was arrived at whereby the men agreed to resume work.

A meeting of miners at Walsall Wood, Staffordshire, on Sunday acted on the advice of Mr. Dean, miners' agent, to approve a 5 per cent. advance on the maximum wage. The meeting, however, expressed the opinion that the present basis of 1888 should be abolished and the present legal minimum rate be made a basis for future negotiations.

The executive of the Yorkshire Miners' Association held a meeting at Barnsley on Saturday. Mr. Smith (president) reported that he had had an interview with the management of the Glass Houghton Colliery, but he regretted it had not been possible to effect a general settlement, and the men would have to give in their notices. The management, the men alleged, were seeking to impose new conditions to customs and agreements which had been in operation for years. About 2,000 men and boys will be affected. It seems that the management a short time ago offered to work the pit six days a week, but the colliers declined. The by-workmen, who thus lost a shift, thereupon started to fill coal on the Friday night shift, and this is what the colliers object to.

A strike which had been in progress for a few days at the Shirland Colliery, belonging to the Blackwell Company, has been ended. The dispute arose owing, principally, to the proposal of the management that certain workers should sign an agreement to have 3s. deducted from their wages for breakages of lamp glasses—6d. for the breakage and 2s. 6d. for the fine. Further objection was made to the presence of one or two non-union men in the pit. A ballot is to decide whether notices shall be handed in on the non-union question.

Scotland.

Lord Hunter, as neutral chairman at a meeting of the Scottish Coal Conciliation Board in Edinburgh, on the 10th inst., was asked to decide whether his recent award of 12½ per cent. advance in wages on the 1888 basis was to be given to all men, or whether, in the case of those whose wages were advanced under the Minimum Wage Act, that advance was to be considered part of what they would receive under his lordship's award. An official statement issued merely said that this point was considered; but it is understood that after indicating his views on the matter Lord Hunter announced that he would give his decision in writing later. At a subsequent meeting of the Board there was considered a claim, which was resisted by the men's representatives, that in view of the falling prices, &c., wages should now be reduced 12½ per cent. on the 1888 basis. An authorised statement concerning this application of the owners, which was discussed without the neutral chairman, said that the parties very fully discussed it, and the owners ultimately agreed to withdraw their application.

At the recent meeting of the North British Railway Company Mr. William Whitelaw, the chairman, intimated that it was quite within the bounds of possibility that the new dock at Methil would be partially opened this year. Things have now reached such a stage that the basin has been flooded and Messrs. M'Alpine and Sons are concentrating on the work of removing the "bottle neck or stopper at the entrance to the fairway." In a recent neap tide the water on the sill on the old dock was not more than 22 ft., while on the sill of the new dock there was a depth of 31 ft. In 1887, when the first dock was opened at Methil, the coal output of Fife was 2,459,395 tons; last year the output was 9,037,790 tons. At Valleyfield and the southern boundaries of Culross, the Fife Coal Company have opened up two pits and the Coltness Iron Company have sunk two shafts on the northern fringes of the parish of Culross, tapping a coalfield which is estimated to yield at least 20,000,000 tons. The expenditure on the Culross and Valleyfield fields cannot have been much short of £300,000. At Kinglassie and Lochore the Fife Coal Company have spent from £200,000 to £300,000 on new fittings, and at Wemyss Colliery the Wemyss Coal Company have just sunk two pits, within half a mile of Methil dock, with a view to tapping a great field of coal under the Firth of Forth. At a depth of nearly 280 fathoms, the great Dysart seam in the Wemyss field is being opened up. A large increase in the housing accommodation at Methil and Denbeath is anticipated.

NORTH STAFFORDSHIRE INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

Annual Meeting.

The fortieth annual meeting of the members of this institute took place on Monday, the 14th inst., at the North Stafford Hotel, Stoke-on-Trent. At the outset Mr. J. Gregory presided, in the absence, through indisposition, of the retiring president, Mr. A. Hassam.

The chairman regretted that since their last meeting, the death had occurred of Mr. Benjamin Woodworth, who, he believed, was one of the original members. A vote of sympathy with the relatives was carried in silence.

Report of Council.

The council reported that the membership at July 31 last was 178, as compared with 180 at July 31, 1911. The final result of the year's working was a balance of £72 17s. 2d. at the bank, as compared with £34 1s. 1d. a year ago. There had been four ordinary general meetings, six council meetings, and one excursion meeting during the year. It was gratifying to record that building operations had been commenced in connection with the erection of the Central School of Science and Technology at Stoke, and it was expected that the building would be opened in the autumn of 1913.

New Officers.

The ballot for the appointment of officers for the ensuing year resulted as follows:—

President, Mr. Hugh Johnstone, H.M. divisional inspector of mines, for the Midland and Southern district.

Vice-presidents, Messrs. J. Gregory, J. T. Stobbs, and F. H. Wynne.

Treasurer, Mr. G. E. Lawton.

Secretary, Mr. F. R. Atkinson.

Council: Prof. John Cadman, D Sc.; Messrs. J. R. L. Allott, T. E. Buckley, John Heath, James Maddock, W. G. Peasegood, W. Statham, Wm. Teelwright, Joseph Wain, Wm. Barber, A. S. Heath and N. R. H. MacGowan.

Mr. Johnstone, who had a cordial reception, said his first duty as their new president was to ask them to accord a very hearty vote of thanks to Mr. A. Hassam, the retiring president, for the very painstaking and efficient manner in which he had discharged the duties of his office during the past two sessions.

Mr. G. P. Hyslop, in seconding the vote of thanks, said it had been a matter of great regret to Mr. Hassam that he had been unable to attend as many meetings as he would have liked, and it was also a cause for regret that illness prevented his attendance that day.

The vote was unanimously accorded.

Mr. Johnstone then delivered his presidential address, which is unavoidably held over until next week.

Annual Dinner.

The annual dinner was subsequently held under the presidency of Mr. Hugh Johnstone, the guest of the evening being Sir Henry H. S. Cunynghame.

The toast of the "Coal, Iron, and Steel Trades of North Staffordshire" was proposed by Mr. W. M. Huntbach, and in responding Mr. E. B. Wain referred to the Coal Mines Act. He said they prided themselves in that district that they had done something to make the life of the collier safer and healthier, and as law-abiding citizens they would do their best to carry out a very difficult, and here and there a very ridiculous, Coal Mines Act. There were clauses in it that could not be carried out with safety, and the Act did not leave them one little bit safer than the old Act.

Mr. W. Simons, general manager of the Shelton Iron, Steel and Coal Company Limited, in also replying, said the iron and steel industries were extremely busy—not only in North Staffs, but on the Continent and in America. Whilst the exports of the United Kingdom had remained practically stationary during the last five years, the North Staffordshire output had increased considerably.

Sir Henry Cunynghame, in proposing "The Institute," gave a description of the Government experimental station at Eskmeals, and an explanation of the coaldust experiments which are being conducted there. Dealing with the explosibility of coaldust, he said they might say: "Is coaldust as explosive as gunpowder?" His answer was "It is very nearly." As to the remedy, he firmly believed that it was not to make barriers of inert matter or to have zones of it, but to put the stonedust everywhere where there was coaldust. In a short time the committee would probably be in a position to recommend the regular use of stonedust, but meanwhile, if he was in charge of a mine liable to gob-fires, he should use it.

Mr. Johnstone, replying, said he was rather surprised to find that North Staffs coaldust had attained an unenviable notoriety amongst those who had conducted these experiments. They had three seams which were admitted to yield the most dangerous coaldust—coaldust which Sir Henry Cunynghame said was practically as inflammable as gunpowder.

NATIONAL ASSOCIATION OF COLLIERY MANAGERS.

Yorkshire Branch's Annual Dinner.

The annual banquet of the Yorkshire branch of the National Association of Colliery Managers was held on Saturday, October 5, at the Hotel Metropole, Leeds. Mr. **James Elce** (Elsecar), who is president this year, was in the chair, and there was a record attendance.

Mr. **George Blake Walker**, in proposing "Success to the Yorkshire Branch," gave some interesting details of colliery work in Australia. In Australia, he said, they had a Minister of Mines who was formerly a working collier, and originally worked in South Staffordshire, and for some part of his time in South Yorkshire. Wages, of course, were very high in Australia. Trammers, as a rule, got about 10s. per day, and that, of course, was a step further than the Yorkshire minimum wage as arranged by Sir Edward Clarke. The rates of living in Australia were higher than in England, but not so high in proportion as the increased wages. It was thought about 60 per cent. would represent the higher cost of living as compared with the higher wages. The social condition of a decent, hardworking man in Australia was a very enviable one. He had a good climate, generally a nice house of his own with a piece of land, and, as a rule, other things which made life pleasant and agreeable. As to the mining industry and colliery management in Australia, the conditions in some districts were not so easy to-day as when the outcrops were being worked. Labour was so expensive, that great efforts were being made to reduce the necessity for labour, and electricity was being largely introduced into the mines, and at the newest collieries everything would be electrically driven, including the winding. The selling price of coal at the ports was at present 11s. per ton—not a very fat price considering the cost of labour. The colliery people over there were taking an interest in rescue work and rescue stations. They were also very much concerned on the question of gob-fires, which—although they did not have them to the extent they had reached in England—were giving them some trouble. Continuing, Mr. Blake Walker said some people thought that the whole life of the colliery manager would in the future be occupied very nearly in filling up forms. But there was a limit to that, and if this work increased, some of the forms would certainly have to be filled up by deputy, which would not of course produce the same effect.

Mr. **Elce**, in responding, said, in connection with the Acts piled upon them during the past few months, their association had worked very hard, and the Yorkshire branch had done its share of the work. Mr. Blake Walker had referred to the fact that the position of Minister of Mines in Australia was held by a man who had been a working miner. He thought that some of their legislation, if it had depended on some of the Labour men, would have turned out better than it had done—he would not say all of it, but some of it. Some of those who were present at the meetings in London when the Mines Bill was discussed before it became an Act, remarked that if the matter had been dealt with by men who knew something of working underground, the Act would have tended a lot more in the interest of safety, and need not have had in it so many irritating and worrying conditions.

Mr. **Walter Hargreaves** (Leeds), in proposing "H.M. Inspectors of Mines," alluded to the work of the late Mr. W. H. Pickering. A good deal had been said about the wonderful things which had been happening during the past year. They certainly were wonderful when they considered the legislation which had been heaped upon them, and was likely still to be heaped upon them—he believed the General and Special Rules would probably have far more effect on them than the Act itself—one wondered how the colliery manager would be able to do all that was expected of him. In the western part of West Yorkshire the minimum wage was a terrible nightmare. At the same time they were confronted with a request from the miners' association that all trammers should be paid 5s. 8d. per day, and that would include a large number of boys—anybody who happened to be tramming a tub of coal. They had any number of trammers only 14 years of age, and yet it was seriously contended that those should be included.

Mr. J. R. R **Wilson**, H.M. inspector of mines, responded.

Mr. T. **Beech**, who proposed "Our Visitors," said he hoped the Special Rules when they came out would modify the position a good deal. What might be in store for the future he could not say. Perhaps there would be no colliery managers' association, and all the colliery managers would be merged into a sort of junior Home Office.

Mr. H. A. **Abbott** replied.

COASTWISE SHIPMENTS IN AUGUST.

According to the monthly coal tables the following were the coastwise shipments during August:—

From	Total cargo.		Total bunker.	
	1911	1912.	1911.	1912.
	Tons	Tons	Tons.	Tons
Bristol Channel ports	320,980	328,417	18,752	22,583
North-western ports	215,891	257,029	62 483	76,626
North-eastern ports	565,620	630,913	25 359	22,758
Humber ports	185,011	208 036	8,705	15,210
Other ports on east coast	11,483	19,050	6 213	7,876
Other English ports	5 448	3 228	13,119	7,400
Total from England and Wales	1,304,433	1,536,673	134,632	152,453
Ports on east coast of Scotland	130,477	128,938	13,888	19,022
Ports on west coast of Scotland	177,033	144,962	34 677	39 136
Total from Scotland	307,510	273,900	48,565	58,158
Irish ports	—	—	4,079	2,878
Total from United Kingdom	1 611,943	1,810,573	187,276	213,489

The destination of cargo shipments was as follows:—

To ports in	August 1911. Tons.		August 1912. Tons.
England and Wales	1,068,662	...	1,253,382
Scotland	153,222	...	135,577
Ireland	390,059	...	421,614

Shipments to London amounted to 739,874 tons.

CONTINENTAL MINING NOTES.

Belgium.

Numerous borings are now being put down to the south of the Centre basin. Amongst these is that of the Courcelles-Nord Company at Biennelez-Happart, which has encountered 13 rich seams down to a depth of 800 m. It is the most southerly of the borings yet executed, and confirms the existence of this new coalfield, which until recently was quite unsuspected. The Fontaine-l'Eveque Company are boring near Aulne, and operations are also being begun near Sobre-sur-Sambre. In Hainault the Charbonnages Belges are putting down a trial bore at Sars-la-Bruyère, near Blaregnies, whilst the Levant du Flenu Company are making preparations at Hyon-Ciply, near Mount Panisel.

The following table shows the exports and imports of fuel during the first eight months of 1912:—

	Exports.		Imports.	
	1911. Tons.	1912. Tons.	1911. Tons.	1912. Tons.
Coal	3,486,023	3,304,650	4,851,585	3,286,686
Coke	667,274	648,156	447,138	605,985
Briquettes	329,445	431,658	245,155	285,086

Exports in August included 427,046 tons of coal, 96,742 tons of coke, and 51,711 tons of briquettes. Imports in the same month included 665,682 tons of coal, 75,210 tons of coke, and 37,967 tons of briquettes.

France.

The following shows the exports and imports of coal during the eight months ended with August:—

	Imports. January-August.		Exports. January-August.	
	1911. Tons.	1912. Tons.	1911. Tons.	1912. Tons.
Coal	10,692,900	10,102,900	863,620	1,333,030
Coke	1,577,300	1,780,300	99,380	120,350
Briquettes	783,400	731,100	79,390	142,780

Germany has increased her sales at the expense of Great Britain and Belgium, as will be seen from the following, showing exports of coal according to country of origin: Great Britain, 5,547,000 tons (as against 6,020,100 tons); Belgium, 2,223,700 tons (2,553,700 tons); Germany, 2,166,200 tons (1,961,400 tons). On the other hand, France exported 836,660 tons of coal to Belgium, as against 544,630 last year. A large part of the increase is due to larger bunker shipments.

It is interesting to note that the La Clarence mine, at which a disastrous explosion occurred, was equipped with *arrêt-barrages*. At the time of the accident M. Taffanel was in New York, but hurried back to France, and carried out an examination of the workings. He found that the *arrêt-barrages* had failed to act, on account of the slowness of the explosion—a fact already anticipated in the Liévin reports. It has now been decided to flood the mine. In all 79 men were killed by the explosion.

Germany.

Coal Syndicate Report for August.—The calculated distribution was 7,032,269 tons (5,849,383 tons in August 1911), or 260,454 tons (216 644 tons) per working day; being 99·15 per cent. (82·61 per cent.) of the participation. Total coal raised, 8,501,212 tons, or 314,860 tons per working day. The total coal distribution of the syndicated pits was 8,589,166 tons (7,286,439 tons), or 318,177 tons (269,868 tons) per working day. Deliveries, including local sales, miners' house coal and supply of coal to pits' own ironworks: Coal: 5,604,140 tons (4,864,705 tons), or 207,561 tons (180,174 tons) per working day. Coke: 1,751,238 tons (1,367,195 tons), or 56,492 tons (44,103 tons) per working day. Briquettes: 401,208 tons (351,057 tons), or 14,860 tons (13,002 tons) per working day.

Coal, Coke and Briquette Traffic in Ruhr Harbours, August. The total railway consignments of fuel to these harbours amounted to: Ruhrort, 1,184,920 tons; Duisburg, 409,703 tons; Hochfeld, 43,644 tons; or an aggregate of 1,638,267 tons. Shipments outward: To Coblenz and places higher up the Rhine, 817,030 tons; to places below Coblenz, 15,654 tons; to Holland, 945,790 tons; to Belgium, 340,661 tons; to France, 33,696 tons; to other destinations, 41,355 tons. Total shipments: From Ruhrort, 1,184,810 tons; Duisburg, 385,968 tons; Hochfeld, 46,540 tons; Rheinpreussen, 93,708 tons; Schwelgern, 103,039 tons; Walsum, 80,062 tons; aggregate, 1,894,187 tons.

Hamburg Coal Trade.—Mr H. W. Heidmann, of Hamburg, writes as follows:—The imports of coal into Hamburg have been in September:—

From	1912 Tons.		1911. Tons.
Northumberland and Durham	256,098	...	159,318
Yorkshire, Derbyshire, &c.	58,888	...	44,590
Scotland	125,310	...	109,203
Wales	6,644	...	2,230
Coke		..	716
Total	440,610	...	316,061

Miners' Wages in Prussia during the Second Quarter of 1912.—The total number of persons engaged in mines in Upper Silesia was 118,965, working an average of 70 shifts and earning in the aggregate 30·182 million marks, the average earnings being 254 marks per head or 3·64 marks per shift. In Lower Silesia the 27,998 miners worked an average of 73 shifts and earned 6,936,000 marks, being 248 marks per head or 3·40 marks per shift. In the Dortmund district the number of miners was 355,862, working an average of 77 shifts and earning 136,864,000 marks, being 385 marks per head, or 5 marks per shift. The number engaged in the State mines at Saarbrücken was 50,231, working 71 shifts and earning 15,720,000 marks—in all, being 300 marks per head, or 4·21 marks per shift. In the Aachen district 25,065 miners worked 76 shifts and earned 9,265,000 marks, being 370 marks per head, or 4·84 marks per shift. Average earnings of various classes of workers per shift: In Upper Silesia, the hewers (4·86 per cent. of the total number engaged), earned 4·22 marks per shift; other underground workers (16·8 per cent.), 3·98 marks; surface workers (24·5 per cent.), 3·27 marks; youths under 16 (5·1 per cent.), 1·21 marks; women (6·0 per cent.), 1·27 marks. In Lower Silesia, hewers (18·6 per cent.) were paid 3·65 marks; other underground workers (20 per cent.), 3·50 marks; surface workers (27·3 per cent.), 3·17 marks; youths (2·8 per cent.), 1·29 marks; women (1·3 per cent.), 1·60 marks. Dortmund district: Hewers (50·6 per cent.), 5·97 marks; other underground workers (26·5 per cent.), 4·30 marks; surface workers (19·2 per cent.), 4·16 marks; youths (3·7 per cent.), 1·40 marks. Saarbrücken: Hewers (49·9 per cent.), 4·79 marks; other underground workers (27·4 per cent.), 3·89 marks; surface workers (20·1 per cent.), 3·62 marks; youths (2·6 per cent.), 1·42 marks. Aachen: Hewers (57·4 per cent.), 5·51 marks; other under underground workers (15 per cent.), 4·43 marks; surface workers (23·6 per cent.), 4·05 marks; youths (4 per cent.), 1·58 marks.

Russia.

Attention is being called to the possibility of introducing Donetz coal in Egypt. It is believed that coal can be delivered at Port Said at from 19 to 20 kopecs per pood. According to the latest advices shipments from Mariupol have been greatly disorganised owing to the depletion of stocks and the short supplies coming forward from the mines.

The Donetz collieries are at present suffering from a shortage of labour. The past six months has been a period of exceptional activity, and the output of coal in the first half of the year amounted to 549¼ million poods, and that of anthracite to 100½ million poods, increase of 11·5 and 25·7 per cent. respectively on the figures for the corresponding period of last year. During the same period 81 million poods of coke were produced at mines and 32½ million poods at works, a total increase of 15½ per cent.

COAL, IRON AND ENGINEERING COMPANIES.

Baldwins Limited.—The report for the year ended June 30 states that the profits on manufacturing and trading accounts, &c., for the year, including balance of interest and dividend account, amounted to £132,998. Against this sum the following charges have been made:—£11,620 for management expenses, including income-tax, directors' and trustees' fees, solicitors' and auditors' charges, &c.; £10,534 for expenditure on alterations, improvements, and development of mines; and £30,000 for depreciation. The payment of premiums on sinking funds for the redemption of leaseholds and debenture stock absorbs £11,357, and payment of the debenture interest £22,500. After deducting the amount required for the preference dividend there remains £114,236, making with the sum brought forward a total of £163,826. The directors have appropriated £60,000 to reserve and recommend a final dividend of 7½ per cent., free of tax, making 10 per cent. for the year, leaving £48,826 to be carried forward.

British-Italian Shipping and Coal Company Limited.—This private company has been registered, with a capital of £5,000 in £1 shares, to carry on the business indicated by the title. First directors, D. P Barratt and M. Alberti (both permanent managing directors). Qualification, £500. Registered office, 131, The Exchange, Cardiff

British Riddling Company Limited—This private company has been registered in Edinburgh, with a capital of £10,000 in £1 shares (£3,000 preferred), to carry on the business of iron ore riddlers or separators, coal screeners, &c. Managing director, John Donaldson (subject to holding £1,000). Registered office, 209, West George-street, Glasgow.

Broomhill Collieries Limited.—The balance-sheet here given shows the position of the company at the end of the financial year, June 30, 1912. The profit for the year amounts to £43,105 18s. 11d, which it is proposed to appropriate as follows: Debenture interest for the year, less income-tax, paid January 1 and July 1, 1912, £6,203 13s. 10d.; balance of sinking fund for 1910-11, £9,158 16s 6d.; sinking fund for 1911-12, £10,111; depreciation, £10,000; leaving balance to be carried forward, £7,632 8s. 7d. The year's profit, £43,105 18s 11d, compares with £6,296 14s. 2d. for the previous year. The output was 664,910 tons, as against 721,902 for last year. The decrease is due to the national strike of miners, which lasted from March 1 to April 9, 1912. The Minimum Wage, the National Insurance, and the new Mines Acts, with the advance in prices of all materials, will considerably increase the cost of production. The balance of profit, £7,632 8s. 7d. carried forward to the next year's account, is to partly provide for this unavoidable expenditure, which cannot be approximately estimated. The profit on raising coal during the period under review was £29,992 18s. 3d., but the losses from the same source in 1910 and 1911 were £2,306 6s. 1d., leaving for the three years (before payment of debenture interest) £27,686 12s. 2d., or 3·50d. per ton on the 1,897,790 tons of coal raised during the three years. This profit of 3·50d. per ton is exclusive debenture interest, which was (for 1910, 1911, and 1912) £19,229 11s., or 2·43d. per ton. The net profit for three years, therefore, is £8,457 1s. 2d., or 1·07d. per ton, without adequate allowance for depreciation. The £30,333 required for the sinking fund has been provided from other sources of revenue—viz., harbour interest, steamers' freights, &c. The profits from the steamers have been much greater this year than formerly, thus largely swelling the net revenue from other sources than coal extraction. The cost of Workmen's Compensation in 1911 was £909 9s. 9d.; in 1912, £1,688 16s. 3d The fires at Newburgh and Broomhill, the latter of which started in December of last year, are now under control, and not likely to give serious trouble. The cost of these fires during this year was £2,055 10s. 11d., making a total expenditure to date of £15,268 14s. 2d., to which must be added the loss caused by lessened output. The debenture stock purchased and cancelled during the year was £13,768, leaving £139,516 still outstanding.

Davies (T.) Limited.—This private company has been registered, with a capital of £15,000 in £1 shares (5,000 preferred), to carry on the business of ironfounders, mechanical engineers, mechanical engineers, manufacturers of agricultural implements and other machinery, toolmakers, &c, to acquire the business carried on at Widnes and Liverpool by T. Davies Limited, and to adopt an agreement with W C, Spencer and T. Davies.

Economic Coaling Appliances Company Limited.—This company has been registered, with a capital of £16,000 in £1 shares, to acquire any invention relating to mechanical stokers, or apparatus for mechanically feeding and distributing solid fuel to furnaces, in particular to acquire from O. Frederici the benefit of certain existing inventions relating to such stokers. Minimum cash subscription, seven shares. Qualification of first directors (who are to be appointed), 50 shares. Remuneration, £50 each per annum (chairman £75) and a percentage of the profits.

Furness, Withy and Co. Limited.—A circular has been issued in which it is stated that the board has given further consideration to the proposals for enlarging the capital of the company, but the special reasons making the early adoption of that course desirable have disappeared, since the increased profits accruing under existing trade conditions will enable the directors to provide for the payment of the additional properties recently acquired, and by applying the surplus profits in this manner they regard it as adding to the strength of the company and preferable to increasing the share capital. The board propose in future to pay quarterly dividends on the ordinary shares of 2½ per cent., free of income-tax, making 10 per cent. per annum, the warrants to be posted on July 31, October 31, January 31, and April 30 in each year, and the arrangement to take effect on the 31st inst., when an interim dividend of 5 per cent. will be paid for the two quarterly periods ending on that date.

Gibson (R.) and Co. Limited.—This private company has been registered, with a capital of £4,000 in £1 shares, to take over the business of an engineer, tool-maker, machinist, &c, carried on by R Gibson at Trafford Weint, South Castle-street, and 7-11, Peter's-lane, Liverpool, as R. Gibson and Co.

Gomersal Colliery Company Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to carry on the business of coal and iron masters, smelters, engineers, patent fuel manufacturers, &c. First directors: W. Ackroyd and W. Walker. Qualification, 50 shares. Registered office, Nutter-lane, Gomersal.

Hewitt and Kellett Limited.—This private company has been registered, with a capital of £12,000 in £1 shares, to carry on the business of makers of boilers, steam pipes, locomotives, electrical and mechanical engineers, &c, and to acquire the business carried on by J. Hewitt, F. M. Hewitt and A. E. Hewitt at Parry-lane, Bowling, Bradford, as Hewitt and Kellett, also to take on tenancy from the said J. Hewitt the premises in Parry-lane, Bradford.

Kingston Colliery Company Limited.—This private company has been registered, with a capital of £7,000 in £1 shares, to take over the business of colliery proprietors and coal merchants carried on by W. M Reynolds and J Worsley at Hyde, Cheshire. First directors: W. M. Reynolds and J. Worsley. Qualification, £100. Registered office Hall-street, Hyde, Cheshire

Letters Patent Insurance Company Limited.—Mr. Edgar Cohen, presiding at the statutory meeting of this company, said that the business of the company was somewhat different from that of ordinary insurance companies, and a considerable amount of difficulty had had to be overcome in the preparation of the necessary documents with which the company had to be fully fortified before it could commence its business. Policies of insurance and proposal forms had to be prepared. In the starting of a life office, or a new fire office, one could take the policies already in use by other offices and adapt them to one's own requirements, but in the case of this particular company they had had to frame an entirely new set of rules, regulations, and policies. That was easy to understand, because the nature of the business in which they were interested was of an entirely different nature from that of ordinary insurance companies, and their lawyers and the best counsel they could obtain had been using their brains with a view to safeguarding the interests of the company, while bearing in mind the interests of those desiring to take out policies. The great advantage of a company of their sort was that it was of an international character. Policies of insurance to protect patents from infringement, policies of utility in the case of patents, and to insure inventors against infringement required most careful investigation. The efficient staff which they had and the expert advice which they were able to consult placed them in a position in granting their policies to see first of all that the company, as well as the insured person, was thoroughly secured. The company would be a great advantage to inventors and also to those who were in the habit of investing money in new inventions, because, on applying to the company for a policy of insurance they might feel certain that it would not be granted in any circumstances until the company had thoroughly enquired into the nature of the patent, its validity, and the possibility of its being infringed; in other words, making a most careful enquiry into the whole question before the policy was issued. In illustration of that he might mention a case in which they had enquired about the validity of some patents on which a prospective client proposed to take out a policy, on the understanding that if they found that the patents were valid they would make no charge for the enquiry; whilst, on the other hand, if they found that the patents were not valid a charge would be made. As a result of their enquiry they had found that the patents in question were absolutely worthless, and the prospective client had paid the sum charged, and thanked them, because the result of their investigation had saved him from the loss of a considerable sum of money which he had contemplated spending in connection with those patents. Although he (the chairman) did not wish to appear unduly optimistic, he was of the opinion that they had a successful future. He personally was interested in the company to a considerable amount, and it was owing to the amount of money which he personally had lost in connection with worthless patents that he had decided to take a hand in the business. He thought that there was every possibility of success for a business which could safeguard people who invested money in patents—both those patents which were successful and those which might be infringed. He might add that they had now given up their temporary offices, and obtained others in Lincoln's Inn, which, he thought, was a neighbourhood which would be particularly suitable for them. They had a considerable number of proposals before them, and he had every confidence in the success of the company.

Luce (C. A.) and Co. Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of coal exporters and factors, colliery agents, &c. First directors: J. G. Jeffreys and C. A. Luce. Qualification, 100 ordinary shares.

Macdonald and Morrison (Inverness) Limited.—This private company has been registered in Edinburgh, with a capital of £5,000 in £1 shares, to acquire and carry on the business of Macdonald and Morrison, coal merchants, &c., Inverness. Table A mainly applies.

Neilson and Cleland Limited.—This private company has been registered in Edinburgh, with a capital of £20,000 in £1 shares (£6,000 preferred), to carry on business as iron, steel and metal merchants and founders. First directors, G. Neilson, A. Cleland and A. Neilson Qualification, 250 ordinary shares. Registered office, 122, Main-street, Coatbridge.

Parsons' Marine Steam Turbine Company Limited—The annual report states that the profits for the year amount to £27,711 2s. 9d. The amount brought forward from the last balance-sheet is £17,508 19s 7d., and the total amount available for distribution is thus £45,220 2s. 4d. This the directors recommend should be appropriated as follows: (1) In payment of a dividend at the rate of 10 per cent. per annum (free of income-tax), of which an interim dividend of 5 per cent for the six months to December 31, 1911, was paid on January 27 last; (2) in payment of a bonus of 2½ per cent. (free of income-tax); leaving a balance to be carried forward of £18,810 2s. 4d.

Platers Engineering Company Limited.—This private company has been registered, with a capital of £5,000 (4,950 preferred ordinary shares of £1 each and 1,000 deferred ordinary shares of 1s. each), to carry on the business of engineers, founders, boilermakers, manufacturers of agricultural and other implements, &c., and to adopt an agreement with W. H Cochrane. First directors: J. Lake and W. H. Cochrane.

Powell Duffryn Steam Coal Company Limited.—The directors recommend the issue of about 100,000 ordinary shares of £1 each at a premium of £1 per share, the shares to be offered *pro ratâ* to the ordinary shareholders.

Smith (D J) and Co. Limited—This private company has been registered, with a capital of £3,500 in £1 shares, to take over the business carried on by D. J. Smith and D. W. Hamilton as David J. Smith and Co. at 58, Compton-street, and 11 and 12, Allen-street, E.C., and to carry on the business of mechanical engineers, &c. First directors, D J. Smith and D. W. Hamilton, each of whom may retain office while holding 100 shares. Secretary, G R S. Andrews.

Standish and Mitchell Limited—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of metal merchants, &c, and to adopt an agreement with J. G. Standish and E. V. Mitchell. Table A mainly applies.

Team By-product Coke Company.—This company has been registered, with a capital of £170,000 (£1), as manufacturers of and dealers in coke and all products and substances allied to or found in the manufacture or preparation of coke by any process, &c., and to adopt an agreement with H. G. Fenwick and A. Leith. First directors: B. Cochrane, H. G Fenwick, J. F Laycock, C. A. Liddell, and J. E Tully. Registered office, Milburn House, Newcastle-on-Tyne.

Vulcan Foundry Company Limited.—The report shows that during the year ended June last £18,436 was written off for repairs, renewals, and depreciation of premises and plant. The board recommend a dividend of 10 per cent on the ordinary shares for the year. The revenue reserve, after payment of the dividends declared at the last annual meeting, amounted to £78 768 and when credited with the profits of the past year, and debited with the present dividends, it will be increased to £90,107. The net profits amounted to £39,151

Welding (H. D. R.) Engineering Company Limited.—This private company has been registered, with a capital of £5,000 in £1 shares, to take over the welding and engineering business carried on by C. W. T Harmer and others at 584, Holloway-road, London. Table A mainly applies.

Wilsons and Clyde Coal Company Limited.—After providing £22,099 for depreciation the directors recommend a further dividend on the ordinary shares of 12s. per share, less tax, making 15s. per share for the year, and leaving £15,686 to be carried forward. This compares with a dividend of 8s. per share in the previous year, £15,324 carried to depreciation, and £9,116 carried forward.

Works Control Limited.—This private company has been registered, with a capital of £150 in £1 shares, to carry on the business of manufacturers of and dealers in recording apparatus and instruments necessary for the control of machinery of every description, electrical, mechanical and general engineers, tubemakers, &c. First directors, P. de Bruyn, K Huessener and C. E. de Bruyn.

Wright Briquette Company Limited.—This private company has been registered, with a capital of £1,500 in £1 shares, to take over an invention for improved perforated coal briquettes. First directors: C. Wright and H Faraday. Registered office, 40, Brazennose-street, Manchester.

Yates and Thom Limited.—The profits for the year ended August 10 were £16,172, and £8,529 was brought forward. Debenture interest absorbed £4,040 and depreciation £5,000. A dividend of 2½ per cent. is proposed on the ordinary shares, leaving £6,621 to be carried forward.

THE FREIGHT MARKET.

Outward chartering on the north-east coast has been quiet this week. Typical rates for Tyne loading are as follow:—London, 4s.; Hamburg, 5s.; Bordeaux, 7s. 6d. to 7s. 9d.; Cronstadt, 6s. 6d.; Libau, 7s. 4½d. to 7s. 6d.; and Genoa, 13s. 3d. At South Wales there has been a moderate volume of business done. Charters are difficult of arrangement, owners holding their tonnage for higher figures, and the tendency of prices is to advance. At the Clyde business is quiet, at generally steady figures. At the Humber the market is firm, without much doing. Homewards, there is an active demand for tonnage from the Far East, and rates are well maintained. There is a brisk enquiry and an improved tone at the River Plate. At the Black Sea, the Balkan trouble is responsible for a steady advance in rates. Figures are very difficult of quotation, although, for Odessa-Nicolaieff-Kherson loading, 25s. would be readily conceded, whilst the Azof is worth 26s. 3d. America is firm, with grain charterers booking freely but cotton holding back. Cotton is seriously in want of later tonnage to move the large crop now in sight, however. The Mediterranean and ore trades are quietly firm, as is also the Baltic.

Tyne to Algiers, 3,000, 11s. 3d.; Ajaccio, 1,300, 15s.; Bordeaux, 2,400, 7s. 6d. from Dunston; 3,200, 7s. 9d.; Barcelona, 2,000, 13s., 400; Bastia, 1,200, 16s.; Cadiz, 1,500, 13s.; Carthagena, 1,300, 14s.; Cronstadt, 3,800, 6s. 6d, berth guaranteed; Genoa, 3,200, 13s. 3d.; Hamburg, 1,500, 5s. 9d., from Elswick; 2,700, 5s.; Las Palmas, 4,400, 11s. 10½d., from Dunston; Libau, 2,800, 7s. 6d.; 2,800, 7s. 4½d.; London, 1,800, 4s; Marseilles, 4,200, 12s. 3d.; Naples, 3,000, 13s., 700; 5,000, 13s., from Dunston; Nantes, 1,600, 8s.; Oran, 2,900, 11s. 3d.; Porto Ferrajo, 7,000, 12s. 3d.; Port Vendres, 1,900, 15s. 6d.; Port Said, 5,500, 12s. 6d.; Rouen, 1,600, 7s.; Riga, 1,300, 6s. 10½d., fixed abroad; Stockholm, 3,500, 6s. 6d., 800; Stettin, 2,500, 6s. 6d.; Sundswall, 400, 7s. 9d.; Ystad, 2,000, 8s.

Cardiff to Alexandria, 5,000, 12s. 9d. 500, ppt; 3,000, 12s. 9d., ppt.; Augusta, 4,400, 12s. 9d, option 12s 6d. if 800, Genoa terms, ppt.; Algiers, 4,000, 12½ fr., 600, spot; Bahia Blanca, 22s. 6d, 200, end October; Beyrout, 3,000, 16s. 9d., fuel, October 22; Bordeaux, about 2,000, 9½ fr.; Campana, 23s., ppt.; Calais, 2,000, 6s. 3d., ppt.; Catania, 5,000, 13s. 3d.; Cape Verde, 1,800, 12s., October 30; Dieppe, 1,150, 7s.; Genoa, 5,100, 12s. 9d., October 20; Havre, 1,400, 6s 4½d; Islands, 4,200, 11s. 3d., October 24; Lisbon, 2,000, 9s. 6d., 350, ppt; Las Palmas, 5,200, 11s. 6d.; Leghorn, 3,200, 12s 9d., ppt; La Pallice, 2,000, 8½ fr., ppt.; 2,300, 8½ fr., with options; Lamlash, 2,200, 4s., Admiralty; Malta, 10s. 9d., free brokerage, ppt.; 3,500, 10s. 9d., October 19; 2,800, 10s. 9d., October 22; Messina, 5,000, 13s. 3d.; Marseilles, 2,800, 14 fr., ppt.; Monte Video, 20s., 5,000, 22s., October; Naples, 4,400, 12s. 7½d.; 4,000, 12s. 7½d., spot; Oporto, 950, 10s. 9d.; 1,450, 10s. 6d., ppt.; Portsmouth, 3,400, 4s., Admiralty; Palermo, 5,000, 13s. 3d.; Rio de

ober, reported ; 6,400, 23s., ppt. ; River
tober ; Spezzia, 5,100, 12s. 9d., October
0. 4s 4½d , Admiralty ; Sicily, 3,500,
St. Vincent, 1,900, 11s. ; 2,000, 11s.,
Savona, 5,100, 12s. 9d., October 20 ;
½d , 200, ppt. ; Tarragona, 1,200, 13s.,
3s , October 25 ; Villa Constitucion, 23s.,

rres, 5,000, 22s., November 10 ; Cron-
pot ; Riga, 2,000, 6s 9d., ppt.
, 2,700, 13s. 3d. ; Savona, 2,700, 13s. 3d. ;
. 3d ; North Norway, 1,600, 7s. 9d. ;

illes, 3,900, 14 fr., ppt. ; Oporto, 950,
50, 14s., ppt. ; Plymouth, 2,500, 5s. 6d.,
2s. 4½d.
nte, 1,000, 13s. 9d. ; 1,150, 13s. 6d.,
ux, 2,100, 9¾ fr. ; Rouen, 1,200, 7s. 9d.,
1,450, 7s. 3d. ; Bahia, sail, 19s. 3d. ;
., 13s 9d. ; Havre, 700, 7s.
,500, 6s. ; 600, 7s 3d. ; Bergen, 1,350,
00, 6s. 6d. ; Helsingfors, 1,300, 7s. 9d. ;
merfest, 1,400, 8s. coal, 10s. 6d. coke.
nes, 1,700, 14s. 3d., 300 ; Genoa, 3,800,
00, 12s. 9d. ; Spezzia, 3,800, 12s. 9d. ;
. 3d.
, 1,200, 6s. 6d. ; Rio de Janeiro, 5,000,

,500, 5s. 3d. ; Guernsey, 370, 8s.
ica, 5,500, 14s. 3d. coal, 16s. 3d. coke,
ogne, 1,500, 6s. 6d., two voyages, end
50, 7s. 3d., October 11 ; Algiers, 3,900,
0 tons fuel, October 25 ; Ergasteria,
d coke ; St. Nazaire, 3,400, 7s 4½d.,
. ; Genoa, 2,600, 12s. 3d., including
Bordeaux, 3,500, 7s. 6d. ; Chantenay,

ar, 1,800, 10s. 6d. ; Cronstadt, 1,500,

dney, N.S.W., sail, about 77s. 6d.,
sail, 200 stds., 100 fr. per std., box-

sail, 20s. 6d., fuel, December ; Mejil-
November ; West Coast South America
Kingdom-Continent, sail, 46s. on the
sail, 17s. 6d.
tadt, 7s. 9d. ; Monte Video, sail,

nstadt, 2,500, 8s.
800, 14s. 6d.
. 700, 7s. 3d , spot
sail, 1,807 reg., 31s. 3d , coke.
.—Azof, 4,200, Marseilles or Tunis,
est Italy, 26 fr. one port, 26½ fr. two
rts, October ; 6,500, Rotterdam 25s.,
nden or Weser 25s. 6d. ; Hamburg
ember ; 4,600, Piræus, 26 fr., option
; 4,600, West Italy, basis 30 fr., ppt. ;
. for 2 000 tons, ppt. ; 5,200, 22s. 6d.
3d. less barley, October ; 1,951 net,
ctober ; Kherson, Nicolaieff or Odessa,
. 6d., Hamburg 21s., October ; 6,200,
lon 23s., ppt. ; 4,900, Rotterdam 22s.,
tober ; 4 100, 21s. 6d. n.o. or any, 22s.
,700, 24s. 6d n.o. or any, 25s. Ham-
laieff, 6,900, Hamburg, 21s., ppt. ;
United Kingdom-Continent, 40s.,
Kurrachee, 5,000, United Kingdom-
1½d., October-November ; 24s., net
00, 24s., November-December ; 2,433
4,779 net, Hull or Antwerp, 23s. 4½d.
th ports, 1,500 tons light guaranteed,
236 net, United Kingdom-Continent,
ber ; 2,290 net, Antwerp, 22s. 6d., less
er-December ; Persian Gulf, 145,000
stralia-New Zealand, five ports, 1s. 6d
November-December ; Pensacola, 700
est Italy, 162s. 6d , November ; 959
. Nazaire, Brest, Fecamp, 145s. one
s, option completing Bristol Channel
nuary ; Gulf timber port, 1,150 stds ,
nd London, 143s. 9d., October 15-31 ;
, United Kingdom-Continent, 25s. o.o.,
cember ; 4,200, 25s. 6d. o.o , less 6d.,
2,395 net, 27s. 3d. o.o., less 6d.,
r cent , 26s. o.o., less 6d., November-
per cent., 24s. 6d. o.o., less 6d.,
per cent., 27s. 6d. o.c., no reduction
; 5,200, 10 per cent , 25s. 6d. o.o., less
mber 25 ; 5,500, 10 per cent , 24s. 6d
10-January 10 ; 24s. o.o., December-
ail, 35s., United Kingdom-Continent,
36s., with options, January-February ;
United Kingdom-Continent, 36s. 3d.,
e charter, Transatlantic trade, 6s 6d ,
livery and re-delivery United King-
tes ; nitrate ports, 37s. 6d., United
6,000, 10 per cent., United Kingdom-
, less 6d., option La Plata 6d more,
Carteret, 10s. 4½d , Tinto terms,
2,950, Rotterdam, 7s. 3d., October ;
s., 10 per cent., Rotterdam, 3s. 9d.,
ovember ; 3s. 9d. heavy grain, 4s. 3d.
, p.p. United Kingdom-Continent,
il, 19s. 9d , United Kingdom-Con-
mber ; Baltimore, 3s., p.p. United
ts, January ; Nicolaieff, 10,000, Ham-
ssisk or Theodosia, 6,000, Rotterdam,
Saigon, 5,500, Havre, Nantes, St.
one port to two ports, 42s. 6d. two
er ; 5,800, France, basis 38s. 6d. rice,
ber ; 41s. 6d., Marseilles, Havre, or
bay, 2,378 net, Genoa and Antwerp,
Bilbao, 2,900, Rotterdam, 7s , end
, ppt. ; West Australia, sail, 36s.,
ntinent, with options, January-
arley, December ; time charter, 7,500,
Cont., 12s. ; Galveston, 62s. 6d. Liver-
9d. Havre ; Halifax, 10,000 barrels
on Hamburg 3s. 3d ; nitrate ports,
United States ; South Russia, 6,200,
s., Weser or Hamburg 25s , October ;
o or Rotterdam, 25s., cancelling
nzo, 4,500, 10 per cent., United
3d. o.c., less 6d., December-January ; 4,500, 10 per cent , 27s. 6d. o.c., less 6d , November 1-20 ; 4,200, 10 per cent., 26s. o.o., less 6d., December-January ; Gulf, 2,451 net, United Kingdom-Continent, 23s., net form, November-December ; Buenos Ayres or La Plata, 5,500, 10 per cent., United Kingdom-Continent, 25s. o.o , less 6d., November 1-30 ; Alexandria, 3,000, 10 per cent., United Kingdom f.o., 16s. 6d., direct port 15s. 6d., Southampton or Bristol Channel 15s., November ; New York, 1,938 net, Algiers and/or Tunis, 5s. 9d , November ; Philadelphia or Baltimore, 2,580 net, Rotterdam 3s , p.p. 3s. 1½d , oats, early November ; Gulf timber ports, 850 stds., 10 per cent , North French ports, 145s. one port, 147s. 6d. two ports, option completing Bristol Channel 147s. 6d., November-December ; Portland, Or., sail, basis 42s. 6d., United Kingdom-Continent, January ; 45s. wheat, 45s. 6d. barley, end December ; Puget Sound, sail, 83s. 9d., direct port South Africa ; Bremen, 12s., Norfolk, Va., ppt ; Baltimore and Virginia, 3s., p p United Kingdom-Continent, oats.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Abstracts of Contracts Open.

Beckenham, October 28.—For Midland small coal, for the Urban District Council.

Brierley Hill, October 19.—For best Staffordshire Thick coal and best Cannock house coal, for the Urban District Council.

Downham Market (Norfolk), October 25.—For about 30 tons of Annesley hard hand-picked coal or Portland hard hand-picked coal, for the Commissioners of the Downham Fen Drainage.

Huddersfield, October 31.—For slack, for the Corporation.

Neath, October 31.—For through-and-through or small steam coal, for the Rural District Council.

Skirbeck, November 5.—For 40 tons of Bonds' main best Silkstones, for the Trustees of Skirbeck Quarter Charity Trust.

Smethwick, October 22.—For about 10,000 tons of gas coal and nuts, for the Corporation.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Adelaide (Australia), November 27.—*Insulated Cable, &c.*—Tenders will be received at the office of the Deputy Postmaster-General, Adelaide, for the supply of about 18 miles of paper insulated lead covered cable, 1,100 yards of silk and cotton insulated switchboard cable, and 155,000 paper jointing sleeves (Schedule No. 248). For copies of the specifications, &c., application must be made to the High Commissioner in London for the Commonwealth of Australia, 72, Victoria-street, S.W.

Barnsley.—*Water Pipes.*—For about 30 tons of 6 in. metal-socketed water pipes, for the Corporation.

Barrow-in-Furness, October 29.—*Turbo-alternator, &c.*—For (*a*) one 1,000 kw. turbo-alternator, (*b*) rotary converters and transformers, (*c*) high and low-tension switchgear, (*d*) condensing plant, (*e*) steam and exhaust pipes, (*f*) water-tube boiler, (*g*) mechanical stoker, (*h*) coal conveyer, weighing, machine, &c., (*i*) ironwork, for the Corporation (Contract No. 17). Forms may be obtained from Mr. H. R. Burnett, Electricity Works, Barrow-in-Furness, on payment of a deposit of £1 1s. (returnable).

Glastonbury, October 31.—*Pumping Machinery.*—For pumping machinery, for the Corporation.

London, October 21.—*Steel Tyres.*—For 500 steel tyres for carriages and wagons, for the board of directors of the Burma Railways Company Limited.

Manchester, November 1.—*Motor Fire Pumps.*—For two four-cylinder petrol-driven motor fire pumps, capable of delivering 350 gallons per minute at a pressure of 120 lb., also one four-cylinder petrol-driven motor hose carriage, for the Corporation.

Marple (near Stockport), October 30.—*Pipes and Specials, &c.*—For 900 yards of 4 in. "S and S" pipes and specials, with open joints, for the Urban District Council.

Rochdale, October 23.—*Turbo-alternator.*—For a steam turbo-alternator (A. 67) and condensing plant and pipework (A. 68), for the Electricity Committee of the Corporation.

Stourbridge, October 28.—*Boilers, &c.*—For two Lancashire boilers, each 7 ft. diameter and 24 ft. long, for a working pressure of 185 lb. per square inch, together with superheaters and economiser, for the Stourbridge and District Water Board.

Tanjong Pagar (Straits Settlements), October 28.—*Cast Iron Pipes.*—The Municipal Commissioners invite tenders for about 550 tons of cast iron sewer pipes, together with bends, junctions, &c. The diameters of the pipes required range from 30 in. to 9 in. The British agent for the Commissioners is Mr. C. C. Lindsay, 180, Hope-street, Glasgow.

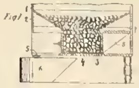
Tonbridge, October 28.—*Diesel engine, &c.*—For (*a*) one 100 kw. Diesel engine and generator, (*b*) alterations and additions to switchboard, for the Urban District Council.

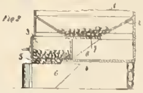
Volksrust (South Africa), November 5.—*Structural Steelwork.*—Tenders are invited by the South African Railways Administration for the supply of the whole of the structural steelwork required for a coaling plant at Volksrust, Transvaal. Particulars can be seen by British manufacturers and contractors at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C., and can be obtained from the office of the High Commissioner for the Union of South Africa, 32, Victoria-street, London, S.W.

Yorkton (Canada), October 31.—*Diesel Engine, &c.*—The city authorities of Yorkton, Saskatchewan, will receive tenders for a 500-b.h. Diesel engine, coupled direct to alternator and exciter, and one switchboard with auxiliary panel and series tungsten street lighting apparatus. A copy of the specification will be available for inspection by British manufacturers at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

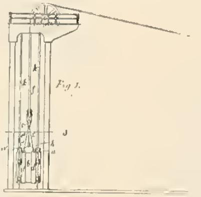
ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

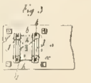
1158 (1912). *Improvements in Apparatus for Delivering Measured Quantities of Coals and the like.* E. Lachmund, of Neurode, Germany.—This invention relates to a device by means of which materials, such as coals and the like, can be measured simultaneously with their delivery from a storage receptacle. The device belongs to the type in which a measuring frame moves between two bottom plates, and is adapted, in one position, to receive, through an aperture in the upper bottom plate, the materials from the storage receptacle, and to deliver the same in another position through an aperture in the lower bottom plate, the frame having a rearwardly extending plate which covers the receiving aperture when the frame is in discharging position. The invention consists in the provision of a knife-edge for separating the materials in the receptacle from those in the frame, such knife-edge being formed on the covering plate, which for that purpose is slightly projected into the frame. Fig. 1 represents a sectional view of the device with the measure in receiving position, and fig. 2 a similar view with the measure in discharging position. (One claim.)

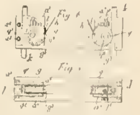




2684 (1912). *Improvements in Safety Appliances for Pit-cages and other Lifts and the like.* F. Reynolds, of 27, Incline Top, Penydarren, Merthyr Tydfil, Glamorgan.—This invention relates to pit-cages, of the type having eccentrically mounted spring operated brake members connected with the winding rope. In carrying out this invention, the pit-cage is provided with two pairs of bearers extending across and attached to the top thereof. These bearers are provided with upstanding cheeks between which are mounted the brake members on axles and also fixed thrust blocks against which the guide ropes are forced by the brake members when the winding rope breaks, thereby causing the pit-cage or the like to be arrested in its descent. In order to bring the brake members more quickly into contact with the guide ropes, flat or leaf springs are provided bearing on their upper portion at points inside a vertical line passing through their axes of revolution. Fig. 1 shows in side elevation a portion of the winding gear and its supports as ordinarily constructed, together with a pit-cage provided with the improved safety appliances ; fig 3 is a plan below line 3—3 of fig. 1 ; figs. 5 and 6 show the bearers in plan and end elevation respectively. (One claim.)







5549 (1912). *Improvements in Valve Apparatus for Percussive Rock Drills Tools and the like.* G. Rayner, of Grange Farm-House, Carterknowle-road, Abbeydale, Sheffield.—This invention relates to that class of valve mechanism in which the valve has three collars or pistons which provide two annular recesses or chambers, the middle collar serving to divert the supply of compressed fluid to each end of the main cylinder alternately and the end collars or pistons controlling exhaust outlets. The invention has for its object a valve mechanism in which the difficulty of securing accuracy of fit between the small plungers and their cylinders as well as between the valve collars and the chest is obviated, while securing the improved locking action of such plungers and cylinders. The small plungers are detached and free to move independently of the valve and

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Registered No. Please quote when ordering		
H.O., 511	Explosives in Coal Mines Order of 21st May, 1912 (revoking all previous "Explosives" Orders). Pamphlet Form .	4d. each. By post 5d.
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H.O., 11A	Electricity Rules: Daily Log Sheet	1s. 6d. per 100
H.O., 11B	Do. Do. Book	4s. each. By post 4s. 8d.
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Continued on Page 807.

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g fixed either to the ends of the chest the valve; accurate workmanship is litated as the valve may be fitted s of the valve chest without regard to

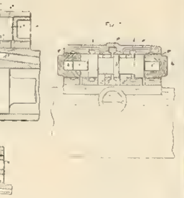
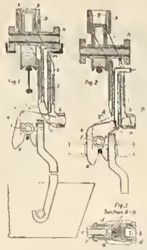


Fig. 1 is a section of a rock-drill valve, a valve suitable for hand tools, and n of fig. 1. (Three claims.)

provements relating to Fuel Blocks or Hoering, 2, Ahornstrasse, Berlin. anks of many rivers in hot countries, Nile, there grow enormous quantities hitherto have found but little industrial ts to utilise the reeds for the manu- suitable for transport appeared to be success, because the reed stems, an (*papyrus* and *um soof* from the onsiderable armour of silicic acid and matter. Experiments made partly in elded the result that, under certain ay be converted into solid heavy derable heating power without the n of any binding substance. For this m must first be sufficiently cut up s, for instance a machine having a shaft provided with radial arms or beaters enclosed in a cylindrical casing having in the upper half of its circumference numerous sharp-edged bars parallel to the axis of the shaft, while the sides of the casing facing the radial arms are armed with annular cheeks provided with sharp-edged radial grooves. This comminution should be as uniform as possible, the fine pieces of reed thus produced must be at least 1 to 3 centimetres long, in order that the fibrous particles may interlock under pressure, as is the case with woollen fibres in the manufacture of felt. Moreover, the quantity of water in the raw material plays an important part; for producing good fuel blocks the quantity of water contained in the reed mass to be pressed should be about 8 per cent. As a rule the air-dried reed mass from the Soudan has the necessary percentage of water, owing to the degree of moisture, contained in the air of that country. The suitably comminuted mass containing the desired proportion of moisture is moulded in suitably constructed presses; it yields durable briquettes having a specific gravity of 1·0 to 1·3, that is about the density of coal. The heating value was found to be from 3,500 to 4,000 German calories per kilogramme, or 13,800 to 15,800 B.T.U. per pound. (Two claims.)

21019 (1911). *An Improved Hauling Rope Grip for Rope Railways.* M. A. Bleichert and M. P. Bleichert, of Leipzig-Gohlis, Germany.—With the known haulage rope grips which are actuated by the weight of the load the grip is unable to open downwards, since the weight of the haulage rope and the downwardly directed components of the rope tension occurring at variations of the gradient have the tendency to drag the rope away from the grip. On the other hand, grips opening upwards have certain constructional disadvantages. The object of this invention is to remove the aforesaid disadvantages of downwardly opening grips by providing an automatic device whereby any tendency to drag the rope out of the grip increases the force with which the grip holds the rope. The invention is illustrated in the accompanying drawing, which shows an example in which the same is applied to a rope railway with the hauling rope below the carrying rope, figs. 1 and 2 being vertical sections, showing the grip open and closed respectively, and fig. 3 being a plan view, partly in section. The grip operates in the following manner:—When the car leaves the station with the hauling rope gripped, the part *m* runs off the coupling rails and the wedge drops between opposite surfaces of the parts *c* and *e*. The wedge surface is so inclined that a perpendicular on the surface *n*, taken at the place of contact, lies above the pivot *f*, so that clockwise rotation of the lever, tending to open the grip, is prevented. If from an accidental cause, such as vibration, or by reason of pressure applied to tighten the grip, the lever rotates in the opposite direction, the wedge drops farther down, and the grip is increased. (Eight claims.)



21111 (1911). *Improvements in and relating to Rotary Pumps, Compressors and the like.* The Hon. Sir C. A. Parsons, K.C.B., and A. Q. Carnegie, both of Heaton Works, Newcastle-on-Tyne, Northumberland.—This invention relates to rotary pumps of the type in which an impeller driven by a liquid directs the latter into a number of discharge passages where the fluid to be dealt with is entrained between a series of liquid pistons before being discharged to a single delivery pipe. The invention consists in a pump of the above type in which the impeller is driven by the reactive effect of the entraining liquid, and

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Continued from Page 806.

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Authority to Fire Shots and carry and use Detonators. Books of 100 Forms, with rules on back	8s. each.	By post 8s. 6d.
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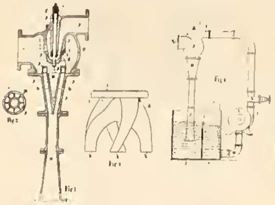
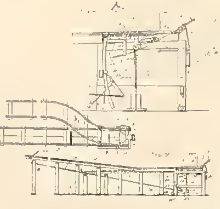
in which the discharge passages converge into a single delivery pipe, which terminates in a divergent nozzle for increasing the delivery pressure. Fig. 1 is a central sectional view of one form of pump according to the invention; fig. 2 is a sectional view on the line A—A of fig. 1; fig. 3 is an enlarged view in elevation of the impeller shown in section in fig. 1; fig. 4 is a view of an installation in which the pump is applied. (Two claims.)

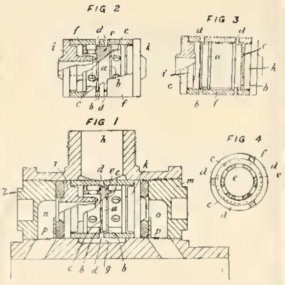


22314 (1911). *Improvements in Dumping Apparatus for Coal Cars.* H. H. Bennett, of Harlan, Kentucky, and formerly of Morley, Campbell County, Tennessee, U.S.A.—This invention relates to dumping apparatus for coal cars or the like. The object is the provision of a device of this character, whereby the car will be impelled by its own weight to a desired dumping point and automatically dump, and after which be returned automatically to the starting point. Fig. 1 is a plan view of the dumping mechanism; fig. 2 is a longitudinal sectional view taken on the line *a*—*a* of fig. 1; fig. 4 is a side elevation of the invention. In the operation of the device the car is impelled by its own weight, after the brakes have been released, down the main track 2, to the tilting platform 4, where the projection 17 on the forward end of the car engages the extension 16 of the U-shaped member 10. This latter member is forced forwardly along the supporting shaft *b* mounted in the bearings 5, and this causes a pull to be exerted upon the cables 13 and the weights 11 to be raised. When the limit of this movement is reached, the wheels of the car are in contact with the bent-up portions of the track, and the whole is tilted about the shaft *b* as a pivot, thus allowing the load to be dumped.

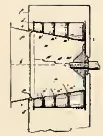


The hindmost wheels of the car having cleared the switch points, the latter will assume a position which will permit the car to run into the siding. The curved bar carried by the rear end of the platform will obviously be raised, while the teeth on its rear edge will be engaged by the pawl, retaining the platform in its tilted position. The next car, upon descending to the dumping point, will manifestly release the pawl through the medium of the trip arms 25 and 27, allowing the platform to return to its horizontal or normal sliding position; the U-shaped member at the same time, and by means of the weights 11, being drawn inwardly, which operation will start the empty car on to the siding in the direction of the starting point. As the second mentioned car reaches the platform 4, the said platform will be tilted in the previously described manner, and upon the descent of the next car the operation will be continued as before. (Three claims.)

23103 (1911). *Improvements relating to Rock Drills.* G. H. Rayner, of Grange Farm House, Carterknowle-road, Abbeydale, Sheffield.—This invention relates to the valve arrangement described and shown in previous Specification No. 24133 of 1910, and has for its object improvements whereby to increase the efficiency by reducing the air consumption and to render the action of the valve more certain when working under unfavourable conditions. It has been found in practice that the small auxiliary supply ports or passages, which are provided to conduct air to the ends of the valve chest, may be made extremely small in area, but owing to the risk of grit, dust or other foreign matter clogging or choking the holes, it was not advisable to reduce the area of the auxiliary ports in the arrangement shown in said specification to the smallest allowable. By means of the new construction and arrangement, the auxiliary ports above referred to are dispensed with and others substituted which by reason of their shape and position may be reduced in area to the smallest allowable for effecting the working of the valve without risk of becoming clogged or choked. According to the invention, the cylindrical body or disc of the valve is formed with an annular or peripheral groove or grooves, which is or are always in communication with the main supply port or ports, and small notches or ports are provided to permit the air to leak from the groove or grooves to both ends or sides of the valve. Preferably, the main supply port or ports is or are formed as annular slots which are comparatively narrow, and this construction reduces the distance travelled by the valve and also reduces the loss of air (due to the temporary connection of the main port with the atmosphere through the valve chest, cylinder and exhaust) by reducing the time during which such temporary connection exists as the annular construction gives a large area of feed with a small opening. Fig. 1 is a longitudinal sectional view of a rock drill valve and chest; figs. 2 and 3 are modified constructions of valve; and fig. 4 is a cross section of the valve and chest lining shown in fig. 1. (Three claims.)



25646 (1911). *Improvements in or relating to Centrifugal Fans, Pumps or like Appliances for Exhausting or Compressing or for Generally Operating upon or Imparting Motion to Fluids.* O. B. Jacobsen, of 24, Cecil-road, Erdington, Birmingham.—This invention has for its object to provide an efficient and satisfactory method of evenly distributing the fluid throughout the entire axial width of the rotor so that the blades thereof receive substantially the same quantity of fluid throughout their length from side to side of the rotor chamber. According to the invention each or certain of the fan blades or vanes are provided with a step or series of steps, each of which steps offers an obstruction to the fluid rendering it necessary for the said fluid to mount or ascend the said step, after which the fluid may again pass longitudinally of the blade; as that part of the blade which engages with the fluid after it has ascended the step is on a level or in alignment with the top of the step, the fluid is effectively operated upon by the blade immediately after it has ascended the step, and the result is thus, that a fan blade is produced having the three following advantage:—firstly, that it impedes the progress of the fluid longitudinally along the length of the fan; secondly, that all parts of the blade effectively operate upon the fluid; and thirdly, that while the blade impedes longitudinal progress of the fluid in relation to the blade, it nevertheless permits of a certain degree of this displacement longitudinally of the fan blade, the fluid, as aforesaid, being operated upon effectively and continuously by the blade notwithstanding any progress which it makes in a longitudinal direction by ascending the step or steps. At each step a tongue member may be provided extending or projecting into the interior part of the rotor. A series of such tongue members may, however, be used in lieu of the steps in a modified form of the invention, the tongue members having in common with the steps the advantage that while they impede or obstruct the progress of the air in an axial direction across the rotor, nevertheless they permit of this axial progress or displacement of the fluid in a certain degree. The accompanying drawing shows a diagrammatic part sectional elevation of a fan, the upper half of the drawing showing one arrangement according to the invention, and the lower half of the drawing showing a modified form. (Three claims.)



Worsbro' Education Sub-committee on Saturday decided to abolish mining classes which are held on Sunday mornings.

NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

22772. Spring buffer for dock entrances, docksides, quaysides, wharfs, landings, and the like. A. E. Boyce.
22792. Machine for testing the physical properties of metals. G. B. Richards and E. Bradley.
22830. Reciprocating pumps. W. H. Martin.
22831. Wind-motor arrangements for pumping and other driving purposes. W. Beadle.
22845. Safety appliances for mine cages, skips, and the like. R. R. Alexander, J. A. Rolando, P. D. V. Alexander, and C. H. Hilditch.
22847. Volatilising roasting of antimonial and arsenical gold and other ores. J. Sackett and S. A. Cobbett.
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16275. Process of extracting iron and steel. Hiorth.
17542. Alternating clack-valves for regenerative furnaces. Maerz.
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Edward Medal.—Four of the rescuers on the occasion of the Markham Colliery disaster, which occurred in May of this year, were on the 10th inst. presented by King George at Buckingham Palace with the Edward Medal of the Second Class for their gallant efforts to save life. The names of the recipients were:—Messrs. W. D. Woolley, Arthur Thomas Wimborne, James Leach, and Llewellyn Howells, of Tredegar. Mr. Woolley is the manager of the colliery, Sergeant Wimborne is the instructor of the mines rescue station at Crumlin, and the other two are members of the rescue brigade. After the explosion occurred, by which five men lost their lives, these brave men descended the shaft in a "bowk," or temporary cage, and after three or four efforts were successful in bringing a man up from a depth of 350 yards. They encountered foul gases, and the shaft was in such a condition as rendered the descent a most difficult one.

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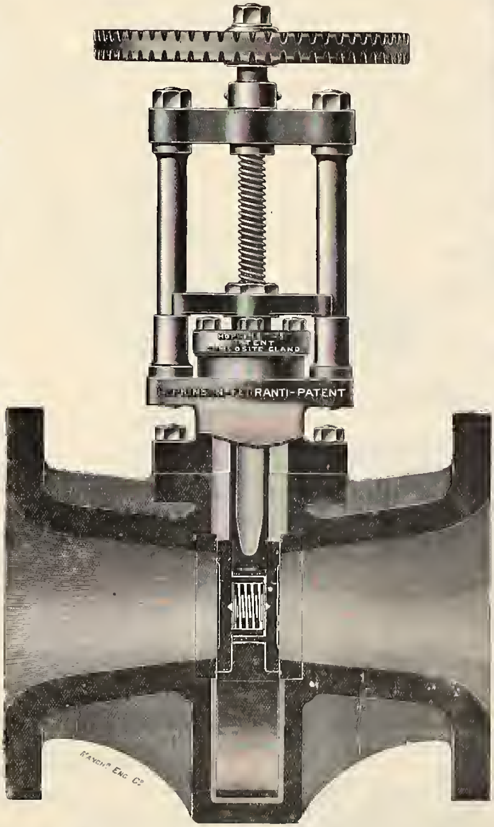

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GOVERNMENT PUBLICATIONS.

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East India: Sanitary Measures, 1s. 2d.; Trade Review, 1s. 4d.

Colonial Reports: Gilbert and Ellice Islands Protectorate, 1d.; Somaliland, 2d.

PUBLICATIONS RECEIVED.

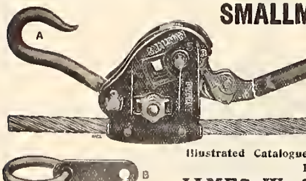
The Physics and Chemistry of Mining. By T. H Byrom, F.I.C. Second edition, revised. London: Crosby Lockwood and Son. Price 3s. 6d. net.

Memoirs of the Geological Survey, England and Wales. "The Water Supply of Surrey." By Wm. Whitaker and H. R. Mill. London: H. M. Stationery Office. Price 7s.

Union of South Africa, Mines Department: Annual Report for 1911. Pretoria: Government Printing and Stationery Office. Price 7s. 6d.

"United States Geological Survey" (Bulletin 498), "Headwater Regions of Gulkana and Susita Rivers, Alaska, with Accounts of the Valdey Creek and Christochina Placer Districts," by F. H. Moffit; (Bulletin 508), "The Onondaga Fauna of the Allegheny Region," by E. M. Kindle; (Bulletin 516), "Results of Spirit Levelling in Florida, 1911," by R. B. Marshall; (Bulletin 517), "Results of Spirit Levelling in Alabama, 1911," by R. B. Marshall; (Professional Paper 69), "The Earthquakes at "Takutat Bay, Alaska, in September 1899," by R. S. Tarr and Lawrence Martin, with a preface by G. K. Gilbert; "Reports on the District of Patricia: Ontario Bureau of Mines Report, 1912," Vol. 21, Part 2 (by W. G. Miller); "Quarterly of the Colorado School of Mines" (July 1912, Vol. 7, No. 2); ditto (October 1912, Vol. 7, No. 3); "Mining Institute of Scotland" (List of Members, 1911-1912).

Messrs. Pearson and Knowles.—The annual meeting of Messrs. the Pearson and Knowles Coal and Iron Company Limited was held at Warrington on the 30th ult., Mr. J. S. Harmood-Banner, M.P., presiding. Speaking of the minimum wage, the chairman said the minimum wage imposed considerable labour on their staff, but there were not the discrepancies to the same extent between the wages and demands of the men in the Lancashire district, and, where rates had been levelled up to the amounts they were already paying, they gained some advantage in sales by equalising cost with their competitors. The coal trade benefited by the strike, but there was a great dislocation of the iron trade. The reserve fund now amounts to £352,500; The directors had thought it wise to call the shareholders' special attention to the heavy charges which the ordinary shareholders had to pay in taxes, rates and workmen's compensation in order that they might emphasise the further burden the ordinary shareholders have to bear under the working of the National Insurance Act. The effect of the Act represented a new tax of over 1 per cent. per annum upon the amount of the ordinary capital, which is £610,000; in addition to which there would be heavy charges for extra clerks' time in order to keep up the immense amount of bookwork required The point which must appeal to all employers was the unfair and inequitable burden placed upon the industrial companies who employed large numbers of men and had heavy wages lists. The average of profits was based to such a large extent upon the total cost of an article sold, and not upon the wages only of the employed, that when the value of the raw material was large, and wages small, the Insurance Act would fall much lighter than in those cases where the value of the raw material was low, and wages were high, and there the burden was very extreme. Next year the company will be paying in taxes, rates, workmen's compensation and National Insurance over £40,000 a year. At the present time neither Great Britain nor its Government assisted any industrial concern or individual to recoup the heavy charges which they so constantly imposed. Discussing the prevention of strikes and labour difficulties, Mr. Harmood-Banner said co-partnership was easy where big dividends were possible, but from observation of their average rate of dividends upon their ordinary shares, he did not think they would see much room for forming a basis upon which to suggest co-partnership. At present the total wages paid was £658,158, whilst the dividend to the ordinary shareholders was £30,500, less tax.—Mr. John J. Bleckly referred to the death of his brother, Mr. W. H. Bleckly, and said it had a melancholy significance for him—that he stood there as the last of those eight men connected with the board who were responsible for the launching of the company in 1873. They had all died in harness in the service of the company, except Mr. Beck, who retired some five years ago, and was still enjoying a well-earned rest. Continuing, he said it was estimated that the strike cost the iron department £15,000, and while it was in progress it added very largely to the work of the officials, who already had trouble enough. Still, they assisted in the domestic affairs of from 1,000 to 1,500 people in connection with the soup kitchen, to the maintenance of which the company subscribed, but the officials did the work. Money was lent to over 1,000 of the men who were to be trusted, and to their honour and credit be it said that he believed every farthing had been repaid. —Mr. W. Peter Rylands also commented upon the burdens imposed upon the great producing companies. It was essential in considering the effects of the taxes and of legislation and its wisdom to bear in mind the distinction between those industries which were in the nature of a monopoly, and in the case of which the burdens could with ease be passed to the consumer, and those producing firms which were subjected to keen foreign competition like the steel and iron trades. But the directors and shareholders knew that the property on the asset side of the balance-sheet could not be replaced by a new company, whose ambition it might be to build up a concern exactly like theirs, without an expenditure of capital of at least £1,000,000 more than the capital of the Pearson and Knowles Company. The fact was that during the last few years he could not call to mind one single new company carrying on a similar business being started in the iron and steel trade. Two or three companies had closed down during the last few months, tired of struggling, and had gone into voluntary liquidation. No new company could start with any hope of success under existing conditions, and when investors could get 4, 5, or 6 per cent. on their money when invested abroad, without any anxiety whatever, and with absolute security, there was no inducement to them to put their money into such a perilous business as a great producing undertaking like that which receives all the kicks and blows of the community and very little encouragement indeed. The result was that as time went on their competitors who were not fit must fall by the way.



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"The South Wales Coalfield," Part I., by Mr. H. K. Jordan, published in 1903, price £2 2s., dealt with the eastern half of the Coalfield, and may be obtained from the Secretary.

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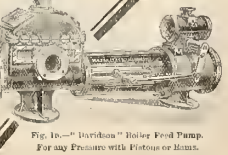

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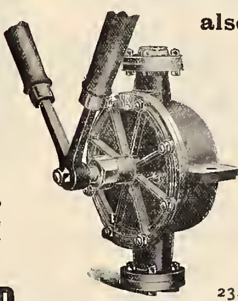

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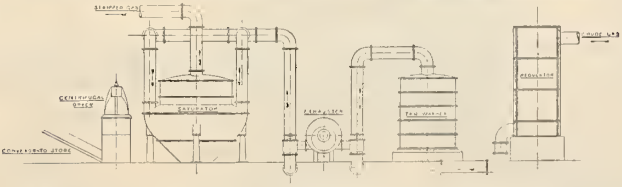

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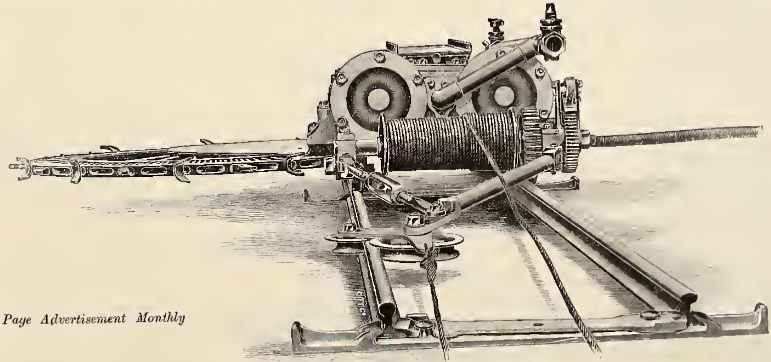

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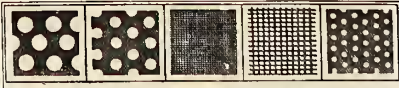

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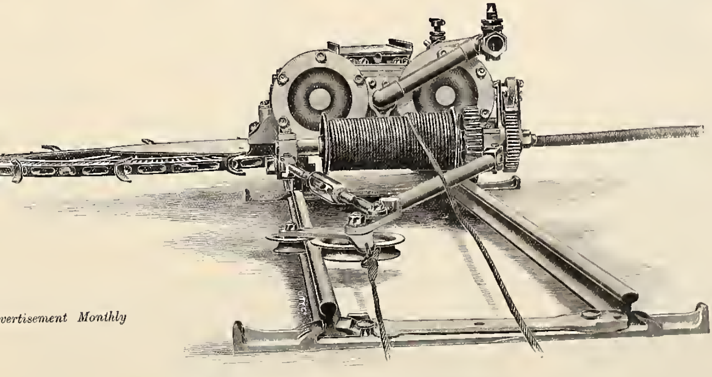

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Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld. Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, H. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Fuel Economisers
Fell, C. A., Dronfield, near Sheffield
Pillatt and Co., Stapleford, Nottingham
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld., Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Pillatt and Co. Ld., Stapleford, Nottingham
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall

Fuses (Safety)
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Bricks

Gas Engines
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Glover, M., and Co., Holbeck-lane, Leeds
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Gas Exhausters
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Gas Plant
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Tipton

Gas Valves
Haslam and Schontheil Ld., Bristol

Gauge Glasses
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gear (Special for Motor Lorries Cars &c.)
Brown, David, & Sons (Hudd.) Ld., Huddersfield

Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroen, Andre, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Nuneaton Engineering Co. Ld., Nuneaton.
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Rods Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, H., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, H. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hoists
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

Hooks or Links (Safety)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Loampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Hydraulic Jacks
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Hyland-street Works, Birmingham

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Ryland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hydrometers
Davis, John, and Son (Derby) Ld., Derby

Incline Rollers
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Reddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

Jointing Cement
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

Jointing (Sheet)
Thomas and Bishop, 119-125, Finsbury Pav., E.C

Joists (Rolled Steel)
Heenan and Froude Ld., Worcester
Benton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Keps (for Winding Cages)
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Lamp Cleaning Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Gauze Brushes
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Glasses
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Oil Filling Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Re-Lighting Apparatus (Underground)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Arc)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Lamps (Electric)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

Lamps (Electric Safety)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent
Photos Miner's Electric Lamp Ld., Queen's-road, Battersea
Wolf Safety Lamp Co. Ld., 37, York place, Leeds

Lamps (Miners' Safety)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Outdoor)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

Lathes
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

Leather Appliances

Lessons by Post
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

Lifting and Hoisting Tackle
Benton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

Lightning Conductors
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Shaw, John, Ld., Sheffield
Theedam, E. C., Ld., Dudley

Locknut Washers
Benton, B. M., and Co., Sheffield

Loose Collars
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster S.W.

Lubricators
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Machinery (Second-hand)
Bute Works Supply Co. Ld., Cardiff
Foot, B. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Benton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

Machine Tools
Foot, B. G., & Co., 11, Queen Victoria-street, E.C.
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

Mathematical Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mechanical Stokers
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

Metal Perforators
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

Metallic Packing
United States Metallic Packing Co. Ld., Soho Works, Bradford

Meteorological Instruments
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mills (Grinding)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

Mining Dials
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C
Thornton, A. G., Ld., King-st. West, Manchester

Mining Machinery
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Mining Tools
Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

Motors
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

Motor Starters
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Motor Vans and Wagons
Avonside Engine Co. Ld., Bristol
Foot, B. G., & Co., 11, Queen Victoria-street, E.C.

Nails Spikes, &c.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Frost, Albert, and Co., Howard-street, Sheffield
Benton, B. M., and Co., Midland Works, Sheffield

Office Furniture and Appliances
Glover, M., and Co., Holbeck-lane, Leeds
Thornton, A. G., Ld., King-st. West, Manchester

Oil Bottles
Baker, John, and Son, Bilston, Staffs
Theedam E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Cabinets
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Switches
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Oils and Lubricants
Ackroyd and Best Ld., Morley, nr. Leeds
Asbestos and General Paint Co. Ld., Birmingham
Gaunt and Hickman, Oil Works, Wolverhampton
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., & Co. Ld., 23, Southwark-st., E.C.

Overhead Travellers
Spencer and Co. Ld., Melksham, Wilts
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Overwinding Gear
Barclay, Andrew, Sons and Co. Ld., Kilmarnock,
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Oxygen Manufacturers
British Oxygen Co. Ld., Elverton-st., Westminster
Knowles Oxygen Co. Ld., Wolverhampton

Packing (Engine)
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Green and Boulding Ld., London, E.C.
Greene, Tweed and Co., Westminster
Lancaster and Tonge Ld., Pendleton, Manchester
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. H., & Co. Ld., 23, Southwark st., S.E

Paint
Asbestos and General Paint Co. Ld., Birmingham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Kalbitum Paint Co. Ld., Belvedere, Kent
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

Paint (Fireproof)
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent

beck-lane, Leeds

d.,1, Pearson-pl., Cardiff
ds
gineering Co. Ld., Notts
Midland Works, Sheffield
l Co. Ld., Stoke-on-Trent
bion Works, Sheffield

EL)
Co. Ld., Chorley, Lancs
Nile-street, Birmingham
Ld., Great Bridge, Tipton

. Little Hulton, Bolton
ectric and Manufacturing

d., Hednesford, Staffs.
elfast
Worcester
leford, Nottingham

d., Sheffield

ford
Co. Ld., Chorley
d., Sheffield
oor Ironworks, Bradford
Midland Works, Sheffield
Ld., Newport
d., Wigan
, Tipton
l, Sheffield

Ld., Bradford, Yorks.
., Castleton, Manchester
Ld., St. Helens, Lancs.
London Wall Bldgs., E.C.
Ld., Nailsworth, Glos.
Co. Ld., Wakefield
Tipton
wich
, Pendleton, Manchester
dley
Ironworks, Wigan
) Ld., Wigan
, Brook Foundry, Wigan
, Tipton

ar Sheffield
rd. Nottingham
, Dept. 11, Blackburn
l., Bradford

pecar Foundry, Leeds
. Ld., Newport
hion-place, Leeds

., Little Hulton, Bolton
leford, Nottingham
Ironworks, Wigan

orcester and Manchester
Ironworks, Wigan
d., Wigan

d., Tuckingmill, Cornwall

d., Tuckingmill, Cornwall
2, Queen Victoria-st., E.C.
, Cannon-st. House, E.C.
erby) Ld., Derby
atus Co. Ld., Cinderford
d., Glasgow

Elverton-st., Westminster
ectric and Manufacturing

beck-lane, Leeds
gineering Co. Ld., Notts
oln
Works, Birmingham

en and Bye-Product Co.,

ectric and Manufacturin

en and Bye-Product Co.,

anchester

Co., 10, Victoria-street,

Morley, Leeds
erby) Ld., Derby
s
Wolverhampton
Birmingham & Glasgow
Ld., Great Bridge, Tipton

Ld., Bristol

Leeds
erby) Ld., Derby
und-pl., Aldersgate, E.C.
d., Huddersfield
dley
& 12, Vauxhall-rd., L'pool
RS
Leeds
d., Huddersfield
dley

Leeds
, 28, New Bridge-st., E.C.
d., Huddersfield
., Bradford
OR LORRIES CARS &C.)
Hudd.) Ld., Huddersfield

elsby Cables Ld., Prescot
Hudd.) Ld., Huddersfield
d., Hednesford, Staffs.
27, Queen Victoria Street
Ld., St Helens, Lancs.
street, Nottingham
., Pendleton, Manchester
Co. Ld., Nuneaton.
Ld., Burton-on-Trent
) Ld., Wigan
., Brook Foundry, Wigan
EL)
Ld., St. Helens, Lancs.
lane, Leeds
Manchester
verpool
ort, Mon
Midland Works, Sheffield
ls Steel Works, Leeds
Coal Co. Ld., Stoke-on-
l, Albion Works, Sheffield
TUBE RODS ENAMELS)
and-pl., Aldersgate, E.C.

Purchasers' Guide to Advertisers' Specialities. (continued).

GOVERNORS (ENGINE)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

GOVERNORS (HYDRAULIC)

GREASE
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

GRINDING MACHINERY
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

GRINDSTONES

GUNPOWDER
Curtis's and Harvey Ld., Cannon-st. House, E.C.

GUTTA PERCHA
Cort, Arthur, & Co. 303½, Camberwell-rd., London

HARNESS

HAULING DRUMS
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, H., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

HEADGEARS
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

HEADING MACHINES
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

HEAPSTEADS
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

HOISTS
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Ransome and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

HOOKS OR LINKS (SAFETY)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

HOPPERS
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Loampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

HOSE
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Norton's (Tividale) Ld., Tipton
Beddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

HUMIDIFIERS
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

HYDRO ELECTRIC PLANTS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

HYDRAULIC JACKS
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Hyland-street Works, Birmingham

HYDRAULIC MACHINERY
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Hyland-street Works, Birmingham

HYDRAULIC REDUCING VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow

HYDROMETERS
Davis, John, and Son (Derby) Ld., Derby

INCLINE ROLLERS
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

INDIARUBBER GOODS
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Beddaway, F., & Co. Ld., Pendleton, Manchester

INDICATORS (STEAM ENGINE)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

INDUCED DRAUGHT FANS
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

INJECTORS AND EJECTORS
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

INSTRUCTION (POSTAL)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

INSTRUMENTS
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

IRON AND BRASS FOUNDERS
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

IRON AND STEEL
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

JACKS (HYDRAULIC)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

JIGS
Ormerod, Edward, Atherton, near Manchester

JIM CROWS
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Hyland-street Works, Birmingham

JOINTING CEMENT
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

JOINTING (SHEET)
Thomas and Bishop, 119-125, Finsbury Pav., E.C

JOISTS (ROLLED STEEL)
Heenan and Froude Ld., Worcester
Renton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

KEPS (FOR WINDING CAGES)
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

LAMP CLEANING MACHINES
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP GAUZE BRUSHES
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP GLASSES
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP OIL FILLING MACHINES
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP RE-LIGHTING APPARATUS (UNDERGROUND)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMPS (ARC)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schonthell Ld., Cardiff
Theedam, E. C., Ld., Dudley

LAMPS (ELECTRIC)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schonthell Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

LAMPS (ELECTRIC SAFETY)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent
Photos Miner's Electric Lamp Ld., Queen's-road, Battersea
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMPS (MINERS' SAFETY)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMPS (OUTDOOR)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

LATHES
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

LEATHER APPLIANCES

LESSONS BY POST
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

LIFTING AND HOISTING TACKLE
Renton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Hyland-street Works, Birmingham

LIGHTNING CONDUCTORS
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Shaw, John, Ld., Sheffield
Theedam, E. C., Ld., Dudley

LOCKNUT WASHERS
Renton, B. M., and Co., Sheffield

LOOSE COLLARS
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster S.W.

LUBRICATORS
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

MACHINERY (SECOND-HAND)
Bute Works Supply Co. Ld., Cardiff
Foot, R. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Renton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

MACHINE TOOLS
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

MATHEMATICAL INSTRUMENTS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

MECHANICAL STOKERS
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

METAL PERFORATORS
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

METALLIC PACKING
United States Metallic Packing Co. Ld., Soho Works, Bradford

METEOROLOGICAL INSTRUMENTS
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

MILLS (GRINDING)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

MINING DIALS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C
Thornton, A. G., Ld., King-st. West, Manchester

MINING MACHINERY
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

MINING TOOLS
Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

MOTORS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

MOTOR STARTERS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

MOTOR VANS AND WAGONS
Avonside Engine Co. Ld., Bristol
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.

NAILS, SPIKES, &C.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Frost, Albert, and Co., Howard street, Sheffield
Renton, B. M., and Co., Midland Works, Sheffield

OFFICE FURNITURE AND APPLIANCES
Glover, M., and Co., Holbeck-lane, Leeds
Thornton, A. G., Ld., King-st. West, Manchester

OIL BOTTLES
Baker, John, and Son, Bilston, Staffs
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

OIL CABINETS
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

OIL SWITCHES
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

OILS AND LUBRICANTS
Ackroyd and Best Ld., Morley, nr. Leeds
Asbestos and General Paint Co. Ld., Birmingham
Gaunt and Hickman, Oil Works, Wolverhampton
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., & Co. Ld., 23, Southwark-st., E.C.

OVERHEAD TRAVELLERS
Spencer and Co. Ld., Melksham, Wilts
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

OVERWINDING GEAR
Barclay, Andrew, Sons and Co. Ld., Kilmarnock,
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

OXYGEN MANUFACTURERS
British Oxygen Co. Ld., Elverton st., Westminster
Knowles Oxygen Co. Ld., Wolverhampton

PACKING (ENGINE)
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Green and Boulding Ld., London, E.C.
Greene, Tweed and Co., Westminster
Lancaster and Tonge Ld., Pendleton, Manchester
Beddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E

PAINT
Asbestos and General Paint Co. Ld., Birmingham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Kalbitum Paint Co. Ld., Belvedere, Kent
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

PAINT (FIREPROOF)
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent

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CONVEYORS
For Coal Faces, Gateways, and General Work.

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For instantaneous extension of rope to replace horses.

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Simple, safe and sure.

WIRE BELTING for Conveyors.

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And other COLLIERY MACHINERY.

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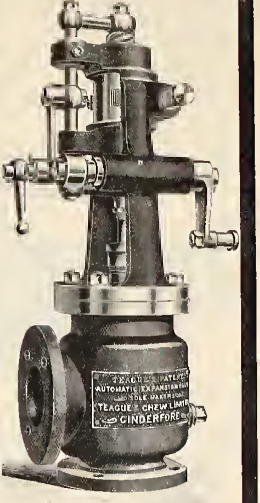
HORBURY, nr. WAKEFIELD, ENGLAND.



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Generating,
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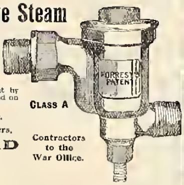

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APPLETON & HOWARD
Brassfounders & Engineers,
ST. HELENS, LANCS.

CLASS A

Contractors
to the
War Office.

Purchasers' Guide to Advertisers' Specialities—(*continued*).

Smiths' Tools
Hardy Patent Pick Co. Ld., Sheffield

Smith Work
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Wright, Joseph, and Co., Tipton

Smoke Helmets
Siebe, Gorman and Co. Ld., Westminster, S.E.

Speed-Reducing Gears
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Sphincter Grip Armoured Hose
Reddaway, F., & Co. Ld., Pendleton, Manchester

Springs
British Wagon Co. Ld., Rotherham
Lancaster and Tonge Ld., Pendleton, Manchester
Skinner, J. P. and Co. Ld., Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Stampings
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Steam Experts
Fell, C. A., Dronfield, near Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan

Steam Fittings
British Mannesmann Tube Co. Ld., London Wall
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Russell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staffs.

Steam Mains and Pipe Installations
Stewarts and Lloyds Ld., Birmingham & Glasgow
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

Steam-Saving Appliances
Pillatt and Co. Ld., Stapleford, Nottingham
Yorkshire Boiler Co. Ld., Bradford

Steam Traps
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster & Tonge Ld., Pendleton, Manchester
Stewarts & Lloyds Ld., Birmingham and Glasgow
United States Metallic Packing Co. Ld., Soho Works, Bradford
Wright, Joseph, and Co., Tipton

Steam Winches
Bridge, David, & Co. Ld., Castleton, Manchester
Clarke, Chapman & Co. Ld., Gateshead on Tyne
Phillips, C. D., Newport, Mon.
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Steel
Cooke, William, and Co. Ld., Tinsley, Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Latch and Batchelor Ld., Hay Mills, nr. B'ham
Mining Engineering Co. Ld. (The), Sheffield
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Stewarts & Lloyds Ld., Birmingham and Glasgow
Thompson and Co., Wigan
Waterfall, H. & R., & Barber, Bridge-st., Sheffield

Steel Blooms Billets
Renton, B. M., and Co., Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Plate and Rounds
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Tinbars
Scott, Walter, Ld., Leeds Steel Works, Leeds

Stone Breakers
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln

Structural Steel Work
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Wright, Joseph, and Co., Tipton

Sulphate of Ammonia Plant
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Sulphur Recovery Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Superheaters
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
Pulsometer Engineering Co. Ld., Reading
Stringer, John, and Son, Dept. 11, Blackburn

Surgical Appliances
White & Wright, 93, Renshaw Street, Liverpool

Surplus Steam Valves (Full Bore)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Hopkinson, J., and Co. Ld., Huddersfield

Surveying (Books on)
Thomas, Wm., Cambrian Mining School, Porth

Surveying (Instruction)
Thomas, Wm., Cambrian Mining School, Porth

Surveying Instrument Makers
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavement, London
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Switch Boards
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Switch Gear
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Swivels (Ball-Bearing)
Bridge, David & Co., Ld., Castleton, Manchester
Youngs, Ryland-street Works, Birmingham

Tamping Plugs

Tanks
Bagnall, W. G., Ld., Stafford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Harvey, G. A., and Co. Loampit Vale, Lewisham
Isca Foundry & Engineering Co., Newport, Mon.
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Volor Co. Ld., Rocky-lane, Aston Cross, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan
Yorkshire Hennebique Contracting Co. Ld., Leeds

Tanks (Ferro-Concrete)

Tar Distilling Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Technical Education
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Telephones
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Timber (Colliery)
Baird, J. W., and Co., West Hartlepool
Osbeck and Co., Newcastle-on-Tyne

Tipplers.
Bagnall, W. G., Ld., Stafford
Cantrell, W. E., and Co. Ld., Beeston, Notts
Heenan and Froude Ld., Worcester
Spencer and Co. Ld., Melksham, Wilts
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

Tools
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Tram and Wagon Corner Plates
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Theedam, E. C., Ld., Dudley

Transformers (Electrical)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Transport Plant
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Trommels
Borns, W., and Son, Globe Works, Holloway
Heenan & Froude Ld., Worcester and Manchester
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts

Truck Shunting Plants
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Tubbing and Well Cylinders
Head, Wrightson and Co. Ld., Stockton-on-Tees
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Tub Drawbars
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Ormerod, Edward, Atherton, near Manchester
Renton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

Tube Expanders
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

Tube Fittings
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Wednesbury
Stewarts & Lloyds Ld., Birmingham and Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tubes (Iron and Steel)
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Lewis, William, and Son, Bilston
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tub Greasers and Controllers
Theedam, E. C., Ld., Dudley

Tubs (Colliery)
Allen, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Humble, Stephen, 9, Victoria-st., London, S.W.
Longbotham, R. H., and Co. Ld., Wakefield
Theedam, E. C., Ld., Dudley
Wigan Wagon Co. Ld., Springs Branch, Wigan
Wright, Joseph, and Co., Tipton

Tunnel Segments
Railway and General Engineering Co. Ld., Notts
Tickle Brothers, Vulcan Ironworks, Wigan

Turbines
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester

Turbines (Exhaust)
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Turbo Compressors
Tickle Brothers, Vulcan Ironworks, Wigan

Turntables
Heenan and Froude Ld., Worcester
Isca Foundry & Engineering Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Tuyeres
Baker, John, and Son, Bilston, Staffs
Railway and General Engineering Co. Ld., Notts
Russell, John, and Co. Ld., Walsall
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C. Ld. Dudley

Valuers
Bedford, B. H., Son, and Squire, Sheffield
Stringer, John, and Son, Blackburn

Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Green and Boulding Ld., 28, New Bridge-st., E.C.
Haslam and Schontheil Ld., Cardiff
Hopkinson, J., and Co. Ld., Huddersfield
Mather and Platt Ld., Manchester
Russell, John, & Co. Ld., Alma Tube Works, Walsall

Vices
Frost, Albert, and Co., Sheffield
Glover, M., and Co., Holbeck-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

Vulcanised Fibre
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Washers
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Jardine, John, Deering-street, Nottingham
Renton, B. M., and Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Water Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

LIFFE'S SPECIALITIES.

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l Faces, Gateways, and General Work.

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stantaneous extension of rope to replace horses.

SON'S NON-OVERWIND

, safe and sure.

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And other COLLIERY MACHINERY.

CHARD SUTCLIFFE,

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Electric-Generating,
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Washery
Engines.

A saving of 30 % to 50 % in steam guaranteed.

A free trial given if desired.

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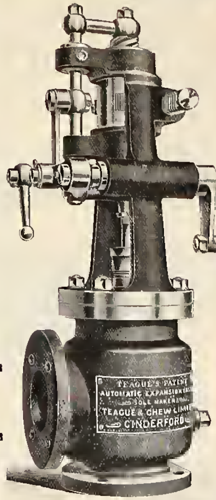

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founders & Engineers.

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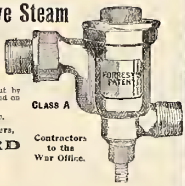

Purchasers' Guide to Advertisers' Specialities—(continued).

Oo. Ld., Sheffield

on, Bilston, Staffs
Ld., Rotherham
s Ld., Worcester
Lowmoor Ironworks, Bradford
d Co., Tipton

Co. Ld., Westminster, S.E.

EARS
o. Ld., Castleton, Manchester
ons (Hudd.) Ld., Huddersfield
ulcan Ironworks, Wigan
Sons Ld., Wigan

MOURED HOSE
o, Ld., Pendleton, Manchester

Ld., Rotherham
ge Ld., Pendleton, Manchester
Co. Ld., Sheffield
Ld., Springs Branch, Wigan

on, Bilston, Staffs
agon Co. Ld., Chorley
Co. Ld., Sheffield
Lowmoor Ironworks, Bradford

ld, near Sheffield
ulcan Ironworks, Wigan

an Tube Co. Ld., London Wall
g Ld., 28, New Bridge-st., E.C.
Co. Ld., Huddersfield
Co. Ld., Alma Works, Walsall
, Tube Works, Wednesbury
s Ld., Birmingham & Glasgow
orks Ld., Great Bridge, Staffs.

PIPE INSTALLATIONS
s Ld., Birmingham & Glasgow
ulcan Ironworks, Wigan
orks Ld., Great Bridge, Tipton

LIANCES
, Stapleford, Nottingham
o. Ld., Bradford

, Whitevale Foundry, Glasgow
Co. Ld., Salford, Manchester
Co. Ld., Huddersfield
Ld., Pendleton, Manchester
Ld., Birmingham and Glasgow
tallic Packing Co. Ld., Soho
rd
d Co., Tipton

o. Ld., Castleton, Manchester
Co. Ld., Gateshead on Tyne
wport, Mon.
ulcan Ironworks, Wigan
ons Ld., Wigan

d Co. Ld., Tinsley, Sheffield
Co. Ld., Sheffield
r Ld., Hay Mills, nr. B'ham
g Co. Ld. (The), Sheffield
& Coal Co. Ld., Stoke-on-Trent
Ld., Birmingham and Glasgow
Wigan
& Barber, Bridge-st., Sheffield

LETS
Co., Sheffield
Leeds Steel Works, Leeds

OUNDS
Leeds Steel Works, Leeds

STEEL TINBARS
Scott, Walter, Ld., Leeds Steel Works, Leeds

STONE BREAKERS
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln

STRUCTURAL STEEL WORK
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Wright, Joseph, and Co., Tipton

SULPHATE OF AMMONIA PLANT
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

SULPHUR RECOVERY PLANT
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

SUPERHEATERS
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
Pulsometer Engineering Co. Ld., Reading
Stringer, John, and Son, Dept. 11, Blackburn

SURGICAL APPLIANCES
White & Wright, 93, Renshaw Street, Liverpool

SURPLUS STEAM VALVES (FULL BORE)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Hopkinson, J., and Co. Ld., Huddersfield

SURVEYING (BOOKS ON)
Thomas, Wm., Cambrian Mining School, Porth

SURVEYING (INSTRUCTION)
Thomas, Wm., Cambrian Mining School, Porth

SURVEYING INSTRUMENT MAKERS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavement, London
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

SWITCH BOARDS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

SWITCH GEAR
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

SWIVELS (BALL-BEARING)
Bridge, David & Co., Ld., Castleton, Manchester
Younge, Ryland-street Works, Birmingham

TAMPING PLUGS

TANKS
Bagnall, W. G., Ld., Stafford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Harvey, G. A., and Co. Loampit Vale, Lewisham
Isca Foundry & Engineering Co., Newport, Mon.
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Valor Co. Ld., Rocky-lane, Aston Cross, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan
Yorkshire Hennebique Contracting Co. Ld., Leeds

TANKS (FERRO-CONCRETE)

TAR DISTILLING PLANT
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

TECHNICAL EDUCATION
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

TELEPHONES
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

TIMBER (COLLIERY)
Baird, J. W., and Co., West Hartlepool
Oshook and Co., Newcastle-on-Tyne

TIPPLERS.
Bagnall, W. G., Ld., Stafford
Cantrell, W. E., and Co. Ld., Beeston, Notts
Heenan and Froude Ld., Worcester
Spencer and Co. Ld., Melksham, Wilts
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

TOOLS
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

TRAM AND WAGON CORNER PLATES
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Theedam, E. C., Ld., Dudley

TRANSFORMERS (ELECTRICAL)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

TRANSPORT PLANT
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

TROMMELS
Barns, W., and Son, Globe Works, Holloway
Heenan & Froude Ld., Worcester and Manchester
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts

TRUCK SHUNTING PLANTS
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

TUBBING AND WELL CYLINDERS
Head, Wrightson and Co. Ld., Stockton-on-Tees
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

TUB DRAWBARS
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Ormerod, Edward, Atherton, near Manchester
Renton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

TUBE EXPANDERS
Hardy Patent Pick Co. Ld., Sheffield
Younge, Ryland-street Works, Birmingham

TUBE FITTINGS
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Wednesbury
Stewarts & Lloyds Ld., Birmingham and Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

TUBES (IRON AND STEEL)
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Lewis, William, and Son, Bilston
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

TUB GREASERS AND CONTROLLERS
Theedam, E. C., Ld., Dudley

TUBS (COLLIERY)
Allan, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Humble, Stephen, 9, Victoria-st., London, S.W.
Longbotham, R. H., and Co. Ld., Wakefield
Theedam, E. C., Ld., Dudley
Wigan Wagon Co. Ld., Springs Branch, Wigan
Wright, Joseph, and Co., Tipton

TUNNEL SEGMENTS
Railway and General Engineering Co. Ld., Notts
Tickle Brothers, Vulcan Ironworks, Wigan

TURBINES
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester

TURBINES (EXHAUST)
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

TURBO COMPRESSORS
Tickle Brothers, Vulcan Ironworks, Wigan

TURNTABLES
Heenan and Froude Ld., Worcester
Isca Foundry & Engineering Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

TUYERES
Baker, John, and Son, Bilston, Staffs
Railway and General Engineering Co. Ld., Notts
Russell, John, and Co. Ld., Walsall
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C. Ld. Dudley

VALUERS
Radford, R. H., Son, and Squire, Sheffield
Stringer, John, and Son, Blackburn

VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Green and Boulding Ld., 28, New Bridge-st., E.C.
Haslam and Schontheil Ld., Cardiff
Hopkinson, J., and Co. Ld., Huddersfield
Mather and Platt Ld., Manchester
Russell, John, & Co. Ld., Alma Tube Works, Walsall

VICES
Frost, Albert, and Co., Sheffield
Glover, M., and Co., Holbeck-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley
Younge, Ryland-street Works, Birmingham

VULCANISED FIBRE
Cort, Arthur, & Co., 303½, Camberwell-rd., London

WASHERS
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Jardine, John, Deering-street, Nottingham
Renton, B. M., and Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

WATER REDUCING VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow

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Koppers' Coke Oven

has been proved to be the most successful on the market, as is evidenced by the fact that in the comparatively short period of nine years orders for over **9,000** Ovens have been placed with us, of which number over **4,250** are repeat orders. These orders represent a capital cost of over

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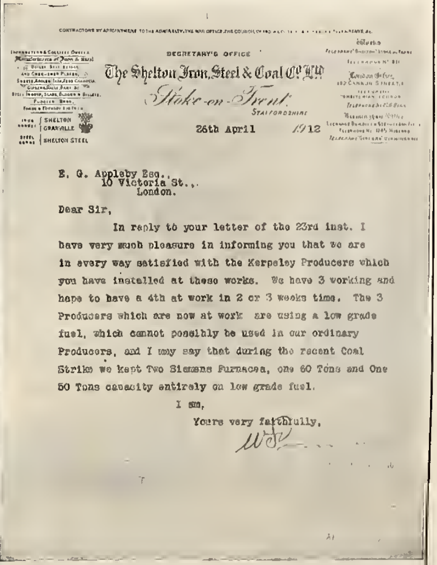

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The Shelton Iron, Steel & Coal Co. Ltd.

Stoke-on-Trent.

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Shelton

Granville

Shelton Steel

26th April 1912

E. G. Appleby Esq.,
10 Victoria St.,
London.

Dear Sir,

In reply to your letter of the 23rd inst. I have very much pleasure in informing you that we are in every way satisfied with the Kerpeley Producers which you have installed at these works. We have 3 working and hope to have a 4th at work in 2 or 3 weeks time. The 3 Producers which are now at work are using a low grade fuel, which cannot possibly be used in our ordinary Producers, and I may say that during the recent Coal Strike we kept Two Siemens Furnaces, one 60 Tons and One 50 Tons capacity entirely on low grade fuel.

I am,

Yours very faithfully,

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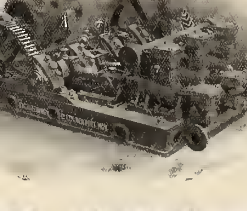

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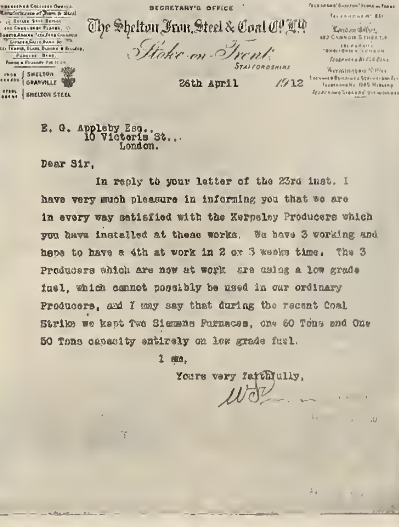

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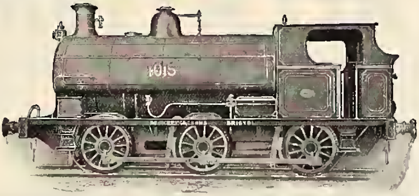

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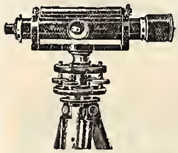

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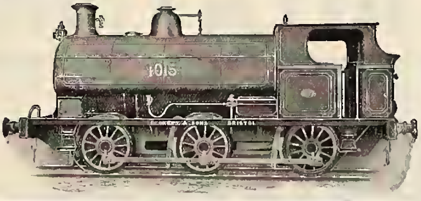

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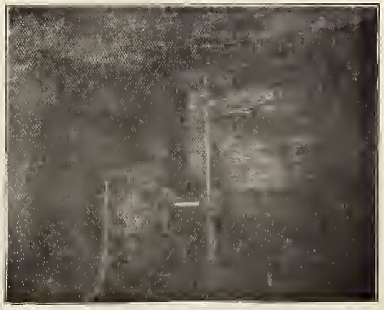

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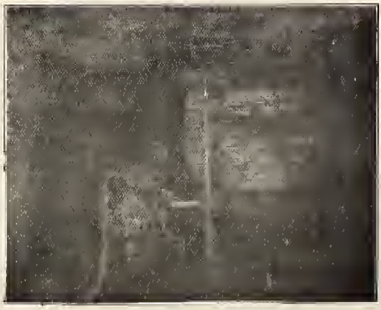

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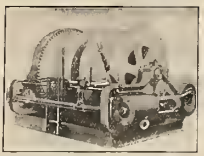

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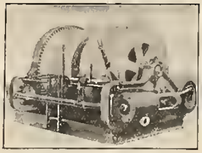

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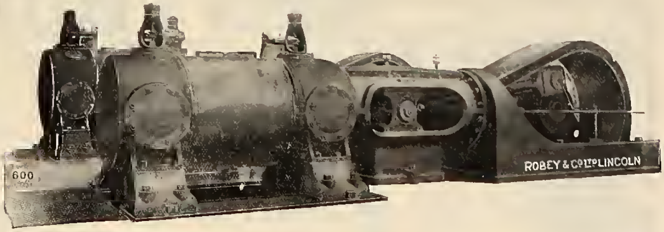

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NOTICE is hereby given, that in an action for Infringement of Blackett's Patent No. 14,953, of 1904, raised in the Court of Session, Edinburgh, at the instance of the Patentee, William Cuthbert Blackett, Mining Engineer, of Acorn Close, Sacriston, in the County of Durham, Complainer, against Dickson & Mann Limited, Engineers and Steel Founders, incorporated under the Companies' Acts, and having their registered office at Bathville Steel Works, Armadale, in the County of Linlithgow, Respondents, the Lord Ordinary (Lord Guthrie) by his Interlocutor or Order dated 17th November, 1908 (*inter alia*) certified the validity of the said Patent, in terms of section 35 of the Patents and Designs Act, 1907.

The Patentee hereby WARNS the trade and the public generally against making, selling, buying, dealing in or using Conveyors made in infringement of the said patent, which it is his intention to support and vindicate by all necessary means including legal proceedings. And further CAUTIONS infringers that they render themselves liable to an injunction or interdict with costs or expenses as well as to damages and delivery up of all infringing apparatus.

Dated this 28th day of January, 1909.

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For the Prevention of Overwinding.
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Bridge Street,
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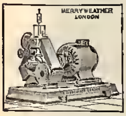
Merryweathers' Patent
"HATFIELD" PUMP



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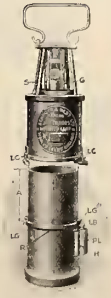

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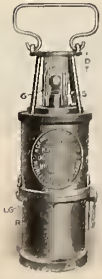

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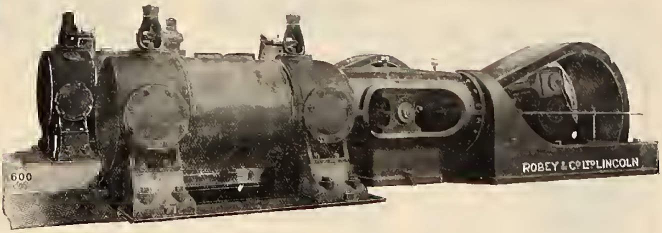

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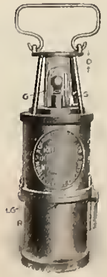

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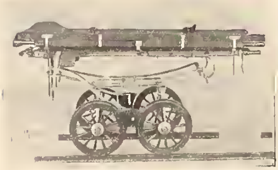

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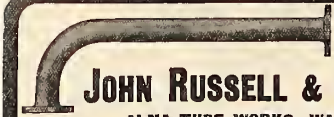

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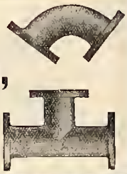

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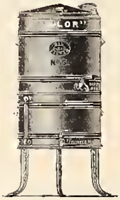

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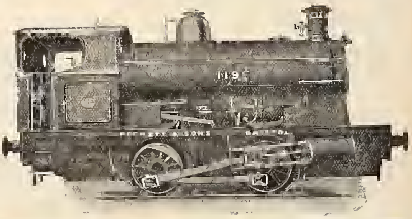

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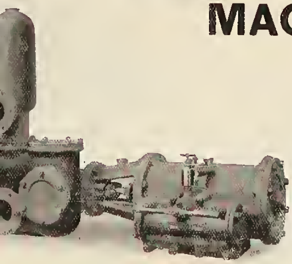

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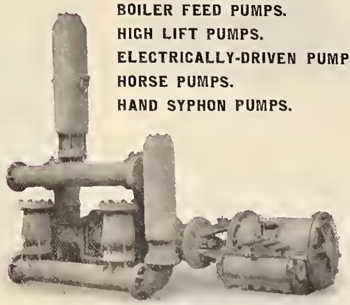

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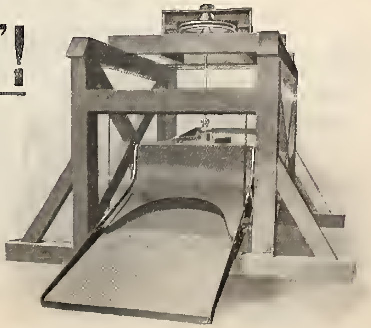

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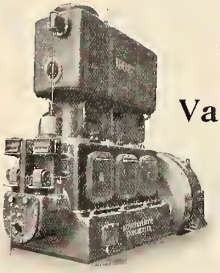

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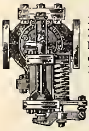

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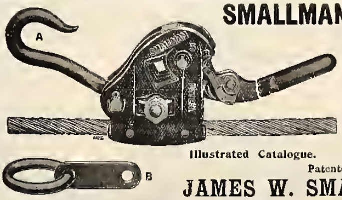

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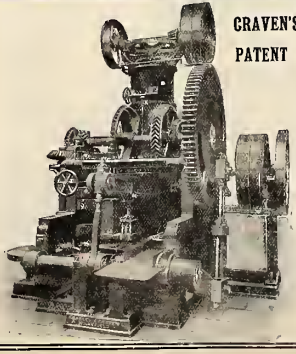

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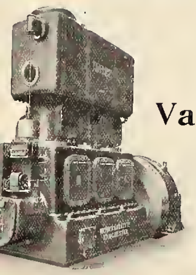

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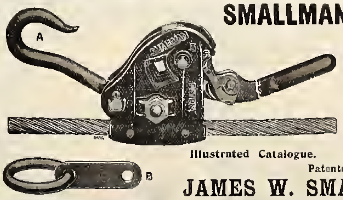

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Height 11 in.

Weight, 5 lb.

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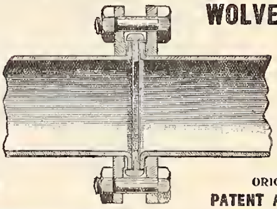

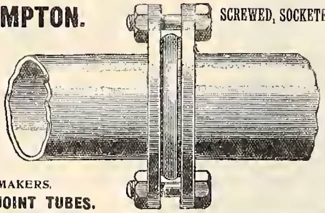

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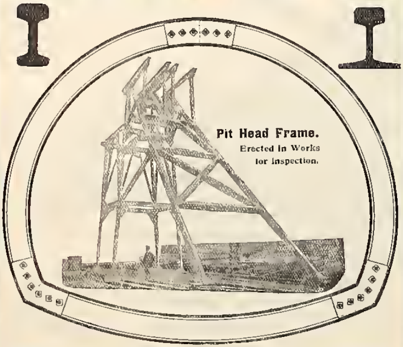
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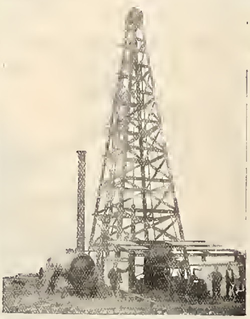

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SHELTERED SEAT TRYCOCK
— For —
WATER GAUGES.
Fig. 6685.

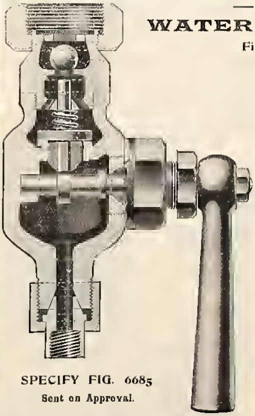

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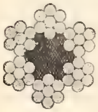
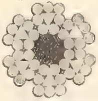
Fig. 2. HAULING.



Lang's Lay Ropes.

Fig. 26. WINDING.

Fig. 1. HAULING.



Patent Flattened Strand Ropes.

Fig. 4. WINDING.

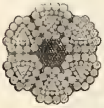
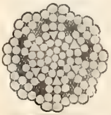


Fig. 13a. SINKING.



Advantages of Patent Flattened Strand Ropes.

1. Greater wearing surface, therefore longer life of rope and less wear upon pulleys.
2. Greater strength, thereby admitting of smaller ropes being used for existing loads, or of increased loads without increase in size of rope.
3. Spliced easily and more effectively.
4. Less tendency to twist and stretch in working.

Fig. 13a for Sinking and Fig. 11b for Cranes, &c., are non-twisting.

Fig. 11b. CRANE, &c.

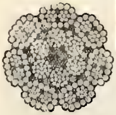
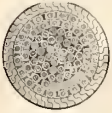


Fig. 15a.



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Entirely free from twist.
Smooth surface reduces wear to a minimum.
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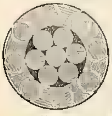
Fig. 20.



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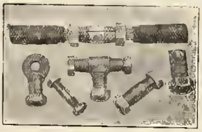
ALPHA Patent No. 3049/08. CABLE CONNECTOR



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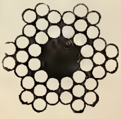

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THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

7, FRIDAY, OCTOBER 25, 1912 No. 2704.

RDSHIRE AND WARWICKSHIRE
DF MINING ENGINEERS.

Annual Meeting.

nnual meeting of the above institute
mingham University on the 21st inst.,
, the retiring president, being in the
a large attendance of members.
nnual report of the council for the
31, 1912, stated that the membership
ht increase, the number now being
last year. The receipts for the year
1s. 10d., and the expenditure for the
7 17s. 9d., leaving a balance of income
of £29 4s. 1d.; there were, however,
had since been paid amounting to
g a net balance of £3 6s. 7d. During
il and five general meetings had been
ingham and one at Walsall. On the
council, the annual meeting of the
ng Engineers was held in Birmingham
12 and 13. The meeting was very
arrangements made by the Reception
uch appreciated.
report showed that the following
been elected :—President: Dr. J.
ersity, Birmingham; vice-president:
Brereton Hall, Rugeley; members of
I. W. Hughes and C. Tryon.
ntlemen having been approved by the
d :—As honorary member: Alderman
(Lord Mayor of Birmingham), the
Birmingham; as members: Mr. J.
Joseph Evans and Son, Wolver-
A. Campbell, Creekemouth, Barking;
Public Works Department, Trinidad;
son, Brownhills, Cannock; Mr. F. H.
t, Hednesford; Mr. W. C. F. Rankin,
and, Australia; Mr. J. Smithurst,
liery, Hednesford; Mr. M. B. Wild,
hells, Birmingham; Mr. E. Wilkes,
near Walsall; as associate member:
Cheslyn Hay, near Walsall; as
H. Bradley, 40B, Burnt Tree, Tipton;
K. N. Moss, Fieldgate, Walsall;
A, Mesnes-street, Wigan; Mr. F. S.
street, Birmingham.
said it was his very pleasing duty to
ir and ask Dr. Cadman to take his
for the ensuing year.
ho had a hearty reception, said it was
leasing duty to ask them to record a
anks to the retiring president, Mr.
efore in the history of the South
tute had a more successful meeting
of Mining Engineers been held in
for that success Mr. Forrest was
nsible.
INSTONE, H.M. inspector of mines,
of thanks.
SMITH supported, and the resolution
cclamation.
EST, in acknowledging the vote, said
a very much lightened by the work of
n, to whom he proposed a very hearty

ARK seconded the vote, which was

acknowledging his election to the
e was fully cognisant of and highly
nour bestowed not only upon himself
on the University department which it
o control. At the annual meeting it
ir president to deliver an address, but
ured that ordeal in that they were
ve present Dr. Haldane and Dr.
n he extended a hearty welcome.
apers were on the programme to be
:—(1) "The Effects of Air Vitiation
n by a Safety Lamp," by Drs. J. S. Haldane and T. L. Llewellyn, and (2) "Illumination of the Coal Face, with special reference to the Incidence of Miner's Nystagmus," by Dr. T. L. Llewellyn. In view of the fact that both papers dealt with kindred subjects, it was decided to read them consecutively and discuss them jointly.

Dr. HALDANE briefly presented his paper, calling special attention, by means of diagrams, to the effect upon lamps by air vitiation. Practical demonstrations were also given with a number of lighted lamps.

The Effects of Deficiency of Oxygen on the Light of a Safety Lamp.

So far as the writers are aware, no exact observations have hitherto been made on the effects of impurity of the air on the light given by a safety lamp, although it is well known that these effects are very marked. The observations described were made in the Physiological Laboratory, Oxford, in an airtight chamber of a capacity of about 70 cubic feet, the air being allowed to become vitiated by the respiration of the observer inside and the burning of oil in the lamp. In this way a vitiation was produced similar to what occurs in a mine through formation of blackdamp. The experiments were made as follows:—One observer went into the chamber with a photometer, a safety lamp, dry and wet bulb thermometers, and an electric fan for keeping the air thoroughly mixed and causing a current of air to play over the thermometers. Through the wall of the chamber a capillary glass tube was passed, connected with the burette of the larger form of Haldane gas-analysis apparatus, and through this tube the other observer took samples of the air for analysis, simultaneously with the photometer and thermometer readings. The lamp used was an ordinary Patterson safety lamp, burning the ordinary mixture of colza and paraffin; and the photometer was the form of Trotter photometer used by Dr. Llewellyn in all his experiments, the readings being standardised, just before the experiments, against a Board of Trade standard candle. After the initial observations had been made with the door wide open and fan running, the door was closed airtight and observations made at intervals until the lamp was finally extinguished by the vitiated air. From the time when the door was closed about two hours were required for this.

In the first set of observations the flame was set to the height customary when lamps are supplied at a lamp-room, the height being well below the point at which smoking begins; and throughout the observations the flame was not regulated in any way. The results are shown in Table I. The door was closed at about 12.5, and the lamp burnt out at 2.3 p.m.

TABLE I.—FIRST SET OF OBSERVATIONS.

Time.	Light, in candles.	Percentage of Oxygen.	Percentage of Carbon dioxide.	Temperature. Dry bulb. Degs. F.	Temperature. Wet bulb. Degs. F.	Calculated percentage of moisture by volume.
11.50	0·405	20·90	0·05	65·3	56·3	1·15
12.13	0·37	20·66	0·25	69·0	59·2	1·25
12.28	0·315	20·34	0·52	70·7	65·3	1·8
12.43	0·27	19·88	0·88	72·5	67·1	1·8
1.3	0·17	19·34	1·26	74·3	69·0	2·0
1.23	0·11	18·92	1·71	75·6	70·2	2·2
1.45	0·045	18·28	2·17	77·0	73·2	2·5
2.3	0·00	18·01	2·40	77·0	75·2	2·8

In considering these results, several factors have to be taken into consideration. In the first place it must be remembered that the percentage of oxygen and carbon dioxide, as given by the gas analyses, are for dry air. The light given, and the point of extinction of the flame are, however, considerably affected by the percentage of moisture present. The *actual* percentage of oxygen in the air is also diminished by the dilution of the air with aqueous vapour. The effect of moisture on the light given by a safety lamp has not yet been experimentally determined; but recent very careful determinations have shown that the light given by the standard Harcourt pentane lamp, and the standard Hefner amylacetate lamp is diminished by 6·25 per cent. and that given by a spermaceti candle by 5·0 per cent. for every increase of 1 per cent. in the moisture percentage of the air.[*] An addition of 1 per cent. of moisture diminishes the true oxygen percentage in pure air by 0·21; it will be seen from Table I. that a diminution of the dry-oxygen percentage by 0·21 per cent. produces an almost exactly corresponding effect on the light. It may be provisionally assumed, therefore, that moisture acts on the safety-lamp flame to an extent corresponding roughly to the diminution produced in the true oxygen percentage by adding the moisture. In the results given in Table I. the percentage of moisture increased during the experiments by 1·65, corresponding to a diminution of 0·35 in the oxygen percentage. It may be assumed, therefore, that had there been no increase in the moisture the flame would not have been extinguished until the oxygen fell to 17·65 per cent. On the other hand, it must be remembered that as a general rule the moisture in the air of a mine increases as the oxygen percentage falls—sometimes to a less extent, but sometimes also to a greater extent than was the case in the chamber. The results in the chamber thus represent fairly closely the results obtained under practical conditions in a mine.

In a mine the barometric pressure is usually greater than at sea-level. This causes a slight increase in the light given. Butterfield, Haldane, and Trotter (*loc. cit.*) found that with a spermaceti candle the light was increased or diminished about 1 per cent. by an increase or diminution of 0·8 in. in barometric pressure. For mines near sea-level the effects on the light, or the extinction-point, are therefore so small as to be of little importance. In mines at high altitudes, however, the effects would be considerable; and a given *pressure* of aqueous vapour in the air would correspond to a higher *percentage* of moisture, and thus affect a flame much more seriously. The extinctive percentage of oxygen might thus be raised to over 19.

Considerable confusion has arisen through attributing the effects of vitiated air on a flame to increase in the percentage of carbon dioxide instead of to diminution in the oxygen percentage. It is true that when the oxygen percentage is diminished by adding carbon dioxide to the air, the effect on the flame is somewhat greater than when the oxygen is diminished by simply abstracting it, or (what comes to the same thing) by adding nitrogen. Air in a mine is, however, hardly ever vitiated by simple addition of carbon dioxide; and the ratio between abstraction of oxygen and addition of carbon dioxide is variable, in accordance with the variable composition of blackdamp.[*] For all practical purposes, it is the variation in the true oxygen percentage which alone matters. There is, however, one very important exception to this rule, as shown in the paper by Dr. Llewellyn. If the oxygen percentage is diminished by simple addition of a combustible gas, such as firedamp, the light given is at first *increased*, although of course the flame will be extinguished when the firedamp percentage rises to about 5·5, corresponding to an oxygen percentage reduced to 19·8. In a mine, however, the percentage of blackdamp nearly always rises with the percentage of firedamp, and the actual effect of the mixture on the flame cannot be predicted from the mere percentage of firedamp, although a moderate percentage of firedamp in the air will, other things being equal, always cause the lamp to give a better light than if the firedamp were absent.

To render our results more readily intelligible, the writers have prepared Table II., showing the observed percentage diminution of the light with observed percentage diminutions of the oxygen:—

TABLE II.—OBSERVED PERCENTAGE DIMINUTION OF LIGHT WITH OBSERVED PERCENTAGE DIMINUTION OF OXYGEN.

Light given	Oxygen percentage.	Light percentage diminished.	Oxygen percentage diminished.
100	20·93	0	0·00
90	20·66	10	0·27
77	20·34	23	0·59
66	19·88	34	1·05
41	19·34	59	1·89
27	18·92	73	2·01
11	18·28	89	2·65
0	18·01	100	2·92

It will be seen that, roughly speaking, every diminution of 0·1 per cent. in the oxygen caused a diminution of 3·5 per cent. of the value of the light in pure air or for every 17 per cent. of diminution in the value of the light in fresh air there was a diminution of about 0·029 per cent. in the oxygen. With the oxygen reduced to 19·0 per cent., the minimum percentage allowed by the Coal Mines Act for purposes of ordinary work, the light would be diminished by 70 per cent. under the conditions of the experiment.

---

[*] Paper read at International Photometric Commission, Zurich, 1911.

[*] The Reports of Dr. Cadman and Mr. E. B. Whalley to the Royal Commission on Mines, 1909 [Part 7 Paper, Cd. 4,551], show that pure blackdamp consists of nitrogen mixed with from 3 to about 21 per cent. of CO_2. The artificial blackdamp of the writers' experiments contained 18 per cent. of carbon dioxide—a common enough proportion in mines.

The extinctive percentage of oxygen is considerably higher than the values sometimes quoted. Thus, for a mixture of air and nitrogen, and a flame burning colza and paraffin, Clowes[*] gives 16·4 per cent. of oxygen as the extinctive limit, and Haldane and Atkinson[†] found 17·23 per cent. in experiments in a mine. In Clowes' experiments, however, the flame was extinguished in a few seconds, and in Haldane and Atkinson's the flame was, the writers believe, turned up, although the extinction was gradual. In both series the percentage of moisture must also have been considerably lower than in the writers' experiments There is probably, therefore, no real disagreement. Under practical conditions in a mine, the flame of a lamp will nearly always be turned up more or less, when the light begins to fail, owing to bad air. Probably the flame will be turned up to about the smoking point, and for a time a better light will thus be obtained, although the light will soon begin to fail again, owing to smoking of the glass, clogging of the gauze, and crusting of the wick.

To obtain some idea of the effects of turning up the flame, the writers made a second series of experiments, starting with the flame turned up to just under the visible smoking point, and afterwards turning up the flame at intervals, so as to get about the maximum amount of light despite of some smoking. At the end of the series, when the flame finally left the wick and was extinguished, the air of the chamber was smoky and unpleasant, and the wick much crusted. The results are shown in Table III. The door was closed at 5.57.

TABLE III. SECOND SERIES OF EXPERIMENTS.

Time.	Light in candles.	Percentage of Oxygen.	Percentage of Carbon dioxide.	Temperature Dry bulb. Degs. F.	Temperature Wet bulb. Degs. F.	Calculated percentage of moisture by volume.
5.50	0·585	20·92	0·05	64·7	57·2	1·3
6.12	0·45	20·16	0·36	70·7	65·3	1·75
6.38	0·32 0·45*	19·79	0·95	73·1	69·0	2·1
6.53	0·38 0·45	19·35	1·28	75·2	70·0	2·2
7.13	0·41*	18·84	1·74	76·0	71·6	2·3
7.33	0·25*	18·33	2·11	76·5	73·4	2·5
7.48	0·18*	17·89	2·14	—	—	—
8.5	0·00	17·48	2·77	77·0	75·2	2·8

* Flame raised to optimum first before photometer reading.

It will be seen from these observations that by raising the wick (1) the flame was made to last until the oxygen fell to 17·48, or 0·53 per cent. lower than in the previous experiment; (2) the light could be increased to 70 per cent. of its initial value in spite of a fall in the oxygen percentage to 18·84, at which point the light would only have been about 25 per cent. of the initial value had the flame not been adjusted. Probably, however, the light would not have lasted long at its improved value if the oxygen had remained steady. The wick was crusting rapidly, and at the end of the experiment was much above the metal holder. Up to the third observation the wick was not turned up any higher than at first; and the light had fallen proportionally more than in the first experiment for the same oxygen percentage.

Safety Lamps and Nystagmus.

Dr. LLEWELLYN prefaced his paper with an expression of thanks to Dr. Haldane, under whose advice, he said, he had taken up the study of the question dealt with. He had also received from the doctor a great amount of assistance. He must also express his indebtedness to Mr. Trotter, whose improvements of the photometer had facilitated those investigations. Dr. Llewellyn proceeded to explain the principal features of the photometer and its method of operation. It was possible, by an adjustment of standardised electric lights, with the aid of a screen and mirror, to register the light with great accuracy. His plan had been to take the photometer down into the coal face of the mine and examine the light actually falling on the coal face, and then he had taken actual measurements of light along specified surfaces of the coal face.

At the outset of his paper the author observed that the illumination at the coal face depends mainly on four factors:—(1) The candle-power of the source of light used; (2) the distance at which this light has to be placed from the coal face; (3) the character of the surroundings; and (4) the composition of the air at the coal face.

The Candle-power of the Source of Light Used.—In open-light pits wax or tallow candles are used at the coal face, and small oil lamps in the main roads. The writer has tested the candles used in several pits, and has found that the wax candles are equal to a standard candle. They remain constant throughout the day, and need no attention. The tallow candles give more light, but require more attention, and do not remain constant for any length of time if left to themselves. It is the custom in several districts to spread out the strands of wick so as to obtain a large flame, and the writer has been able, after a little practice, to obtain a flame 4 in. high and ¾ in. wide. The flame of the standard candle is 2 in. by ½ in. When the wick is spread in this manner, the candle-power may be as high as 2. When untouched, the candle-power is generally over 1. If the wick is allowed to char, the candle-power may fall below 1. Candles may be said to give at least 1-candle power.

The small oil lamps used in the main roads give from 2 to 4 candle-power. The larger lamps are used chiefly by the hauliers. The safety lamps used very rarely give more than 0·5 of a candle-power. Oil safety lamps soon become dirty, and a lamp at the end of a shift may only give a third of its original light. The writer has taken measurements of a large number of safety lamps, and his results are given in the following Table I.:—

CANDLE-POWER OF VARIOUS TYPES OF SAFETY LAMPS.

Number tested.	Lamp.	Candle-power.
1	Cambrian fireman's (like a Davy)	0·165
40	„ (old type)	0·235-0·27
3	„ (newer type)	0·35
20	„ (latest type)	0·4
1	„ (new)	0·6
60	Ackroyd and Best	0·4
80	Patterson	0·42
1	Wolf	0·8
3	Pape electric	0·6
2	Float primary electric	0·9

The writer has also taken photometric measurements of a large number of safety lamps at the face. The measurements were much lower, and varied from 0·1-candle power to 0·36-candle power. Only one lamp gave more than 0·36-candle power, and in this case the lamp was clean and new. The oil safety lamp at the coal face rarely gives more than a third of a candle-power when clean, and much less when dirty.

In addition to the candle-power given by a source of light in the horizontal direction, the total amount of light given in all directions is of importance. The candle gives light in all directions, the safety lamp only in a limited field. The writer has taken measurements of the total amount of light given by a standard candle and a modern Patterson lamp, and the results are as follow:—Patterson's safety lamp, 0·14; standard candle, 0·635. The total amount of light given by a standard candle is more than four and a-half times the amount given by a modern oil safety lamp. The figures tabulated above are only relative.

The Distance of the Source of Light from the Coal-face.—The safety lamp must be placed out of reach of the pick, and often can only be placed on a post some distance away. The candle can be placed anywhere, even on the coal-face itself, and no harm results if it is knocked over by a blow from a pick. Candles are rarely placed more than 4 or 5 feet away from the coal-face; safety lamps are rarely placed less than the same distance away. The candle can be easily and quickly moved from place to place, but the safety lamp requires time and care. There is a tendency, when the miner is working with a lamp, to cut coal over a large area without moving the lamp from its first position.

The Character of the Surroundings.—Illumination in a confined space is largely dependent upon reflection from the containing boundaries. Diffused reflecting power is practically absent at the coal face. The coal itself is black, the floor is covered with coal or coaldust, the roof, owing to the shadow cast by the bonnet of the lamp, is in darkness, while any reflection from the gob is stopped by the back of the miner himself The diffused reflecting power of any substance is obtained by measuring the amount of light reflected from its surface, its *surface brightness*, and comparing the amount with that reflected from a standard white screen placed in the same position relative to the source of light. To measure the reflecting power of coal, a reading is taken of the light reflected from its surface, and this reading is compared with the reading of the amount of light reflected from a standard white screen placed against the coal face, at the same distance from the source of light. It will then be seen that the coal absorbs a very large amount of the incident light, as for example:—

Reading of light reflected from screen	0·070
„ „ „ coal	0·005
Absorption =	0·065

which is equivalent to over 90 per cent. The results arrived at by the writer have all been stated in terms of absorption. The readings are very difficult to obtain, and should be taken as only approximately true. The writer has used a big surface-brightness attachment with a large field, and, even with this help, the readings are not always consistent. It is clear, however, that the coal absorbs almost all the light which falls upon it. A few readings are given below:—

	Readings. Per cent. absorbed.
House coal colliery—	
Damp fresh coal	94·5
Dull coal slip	96·8
Staffordshire colliery—	
Freshly fractured surface	93·96–96
Midlands—	
Bright coal	86·92
Dull coal	88·96
South Wales—	
House coal up to	97
Steam coal „	97
Anthracite „	95

The writer has also taken a few readings of several kinds of ores for comparison, as follows:—Quartz, 73 per cent. absorbed; gold quartz, 77 per cent.; tin ore, 80 per cent.; copper ore, 80 per cent.; hæmatite, 80 per cent.

The Composition of the Air at the Coal Face.—The three chief factors to be taken into consideration are (*a*) the oxygen percentage, (*b*) the amount of moisture present, and (*c*) the presence of gas.

As regards (*a*), the paper by Dr. Haldane and the author supplies figures which show that the light of a safety lamp falls off very rapidly as the oxygen percentage of the air diminishes.

In regard to (*b*), Dr. Haldane, Mr. Trotter, and Mr. Butterfield have shown that, with each increase of 1 per cent. of the aqueous vapour of the air, there is a reduction of from 6·25 to 6·6 per cent. of the illuminating power of the Harcourt lamp. The oil safety lamp is affected in the same way. The three following readings of the same lamp were taken within a short time of one another:—

	Readings.
Lamp in main intake	0·05
„ hot conveyor face	0·035
„ cool Barry face	0·048

The presence of gas up to 4 per cent. increases the illuminating power of the lamp; after 4 per cent. the lamp rapidly becomes dim. In one case an increase of brightness was seen up to 4½ per cent. The readings shown on the graph were taken in an Oldham gas chamber, which, for the purpose of the experiments, was divided into two sections below by a black piece of cardboard. The same percentage of gas was present in each section. In one section the lamp under observation was placed, in the other a lamp with the flame turned low was used as a check to test the amount of gas present in the chamber. The readings shown in the graph are relative only: they are the actual readings taken at the time; but, as the screen was only about 5 in. away from the lamp, the real candle-power readings would be about a quarter of the amount shown. The actual candle-power is of no importance. The practical importance of the subject will be realised when it is seen that the behaviour of the safety lamp gives a good indication of the condition of ventilation present. The writer has taken several measurements in the various districts of different pits, in order to determine the influence of bad air on the safety lamp. He tested the constancy of several lamps beforehand, and after several experiments found that a Patterson fireman's lamp, with the lower air-feed shut, gave a practically constant reading for a period of three hours. In the trial experiments, readings were taken every five minutes for three hours, and in the intervals the lamp was swung about or carried from place to place. The lamp was irregular until it had warmed up, and when the flame was high at the start; but when a small flame was used, there was only a variation of 0·002 candle power during the whole time. The writer also tried a standard candle in a safety lamp, but with very irregular results.

In all the following readings, the lamp was untouched throughout, and the variations shown are held to be due to the altered conditions, and not to the lamp itself. All the readings are relative only, and the actual candle-power of the lamp is of no importance.

House Coal Pit with Open Lights.—The pit was an old one and poorly ventilated; there were very few splits in the air current. At the time of the visit the barometer was low.

	Main intake.	Main return.	Last stall in return.	Main intake.
Safety lamp	0·21	0·135	0·085	0·25
Standard candle	1·25	0·75—0·77	0·7	1·1
Time	12 noon	12.15 p.m.	1 p.m.	1.30 p.m.

All these measurements were taken at 1 ft. The first two measurements were taken too soon after the writer descended the pit, and before he had obtained "his sight," and the candle flame could not be kept steady. The second series of readings in the intake may be regarded as reliable, and are as follow:—

	Readings.		
Well-ventilated open-light colliery—			
Main intake	0·045	taken as unity	1·0
Main return	0·0375	do.	0·8
Coal face	0·0375	do.	0·8
Well-ventilated safety lamp colliery—			
Main intake	0·07	do.	1·0
Main return	0·055	do.	0·8
Coal face	0·045	do.	0·64
Poorly-ventilated safety lamp colliery—			
Main intake	0·06	do.	1·0
Coal face	0·025	do.	0·4
Main return	0·04	do.	0·66
Main intake (2 hours later)	0·065	do.	1·0
Well-ventilated steam coal colliery—			
Main intake	0·05	do.	1·0
Main return	0·045	do.	0·9
Coal face	0·035	do.	0·7
Well-ventilated steam coal colliery—			
Main intake	0·05	do.	1·0
Main return	0·05	do.	1·0
Coal face (conveyor)	0·035	do.	0·7
Do. Barry-road	0·048	do.	0·96

The author next gives a number of measurements of actual readings at the coal face. The amount of light falling on the coal face has been measured by placing a screen against the surface and taking a reading. All measurements are given in foot-candles. These may be summarised as follow:—

Naked-light Pits.—(*a*) Collier cutting coal at the rib in a seam 4 ft. thick. The candle was 24 in. away. A safety lamp could not be placed nearer than 33 in.

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[*] *Proc.* Royal Society, 1894, vol. lvi., page 2.

[†] *Trans.* Inst. M. E., vol. viii., page 557.

l face.	Readings.	
	Candle.	Safety lamp.
e floor ...	0·185 ...	0·025
„ ...	0·17 ...	0·03
„ ...	0·075 ...	0·03
„ ...	0·055 ...	0·02

g on working face 3 ft. 8 in. away from a
placed 33 in. above the ground. A safety
aced in the same position, and corre-
taken.

	Readings.	
	Candle.	Safety lamp.
a the gronnd	0·06 ...	0·006
ft above gronnd...	0·12 ...	0·024
ft. from candle ...	0·1 ...	0·065
„ „ ...	0·04 ...	0·03
„ „ ...	0·05 ...	0·055

tion at working-face, 0·056 of a foot-

n.—Colliers holing in an 18 in. seam, with
18 to 36 inches away from the face.
coal face, 0·14 of a foot-candle.

n (*Same Colliery*).—In this seam the
dles from the face was from 2 to 4½ feet.
coal face, 0·14 of a foot-candle.

Pit (*South Wales*).—Average reading at
f a foot-candle.

(*a*) *Midlands*.—Average reading, 0·022 of
rage reading of lamps used, 0·25 candle-

(distance from 2½ to 8 feet).—Average
foot-candle; average reading of safety
-power.

Conveyor-face.—Average over the three

rry face, 5½-ft. seam).—Average through
average of 78 readings taken in this pit,
dle.

rements were taken in the holidays, and
e absence of dust. The face was the
intake. The lamp used was a new clean
adings are high. Average of 34 readings
stall, 0·0214 of a foot-candle; average
in a second stall, 0·022 of a foot-candle.
nts will be given of the illumination
her than the coal-face:—Collier ripping
Width of road, 8 ft., coal 3 ft., 4 ft. of
lown; lamps 6½ ft. from middle of area
eading, 0·0187. Collier setting pair of
p of neck strap: Average illumination,
Haulier spragging off in parting, lamp in
on wheel, 0·075 foot-candle; shackling,
Repairer with lamp on neck strap wedging
roof, average 0·05 foot-candle. Timber-
, 0·035 foot-candle. Roadman cutting
andle.

v drawn to the relation between the
nystagmus and the amount of illumina-
coal face. In the first place the following
nce the two chief factors in the produc-
Manifest nystagmus is nystagmus with
guished from latent nystagmus:—

MINERS' NYSTAGMUS AND AMOUNT OF ILLUMINATION.

ht used.	Nature of surroundings.	Prevalence of manifest nystagmus.
rarely equal 0·5-candle er	Marked blackness	Common.
rally 1·0- lle power	Marked blackness	Rare.
rally 1·- lle power	Blackness absent	Unknown.

ctically unknown in the purely naked-
e Black Country, the Forest of Dean,
e in the naked-light pits of South Wales.
e most of the men had worked at one
nps, and it is quite common for men to
an open-light pit after they have failed
lamps.

ideration the number of men employed,
, using safety lamps three times more
otland, have four times the number of

	Scotland.	Rest of kingdom.
ystagmus	65	... 1,563
o men underground...	0·05	... 0·21
lamps used	28·2	... 91·6

given which were obtained by the
mbers of the South Staffordshire and
ute of Mining Engineers, through the
ouglas Smith. These show the greater
mus at pits using safety lamps.
es most of the men had worked with
used safety lamps almost continually.
ive cases, 591 had worked with safety
th candles alone; 23 of his cases came
, and of these 14 had worked at one

parated the cases in his own district
e has seen elsewhere, because, in this
that has been certified has come under
knows the relative number of men
employed in the open-light and safety-lamp pits respectively. He has also taken measurements of the illumination present in these pits. The results are shown in the following table:—

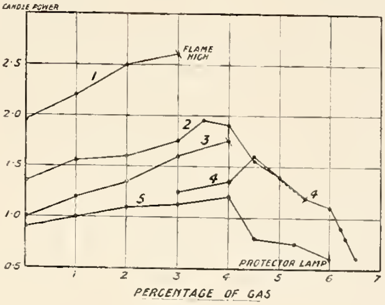
Light	Safety lamps ...	Candles
Men ...	88 or 7·3 ...	12 or 1
Proportion of certified cases of nystagmus...	46 ...	1·1
Relative proportion ...	6·3 ...	1·0
Average illumination at the coal face in foot-candles	0·018 or 1·0 ...	0·09 or 5·0

A series of tests of the lamps of all the collieries in a certain district has also been made by the writer. In all cases the clean and dirty lamps were examined, and every effort was made to obtain similar conditions; 680 lamps were examined, 480 of these being trimmed by the manager of one of the pits. Each lamp was trimmed to the height at which it would be used in work. The five pits, A to E, are consecutive pits in the same valley. A is the highest in the valley, and consequently the oldest and least up to date in the matter of lamps and ventilation. Up to three years ago a sister colliery, A', was worked with A, both pits having the same upcast. A' employing 377 men, was stopped, and most of the men were given work in A and B. A certain number of men made their way down the valley and obtained employment in pits C, D and E, especially in the nearest pit C. There has been a steady flow of men from the upper pits to the lower for some time. The ventilation in pits A and A' has been very poor, and the lamps are old and out of date. The writer has traced 16 cases of nystagmus from pit A' to the lower pits, three cases are still latent, and the others are distributed as follows:—A, 5; B, 6; C, 3. Six cases of nystagmus in pit C have come from the upper district.

The following shows the number of men and cases of nystagmus in these pits:—

Pit.	Number of men employed.	Number of cases of nystagmus.	Per cent.	Candle-power of clean lamps.	Candle-power of dirty lamps.
A	450	9	2·0	0·235	0·22
B	1,400	22	1·57	0·27	0·2
C	1,500	10	0·66	0·33	0·25
D	2,500	14	0·56	0·4	0·28
E	1,900	8	0·42	0·42	0·27

The results are also shown graphically in fig. 2.



PHOTOMETER READINGS.

FIG. I.

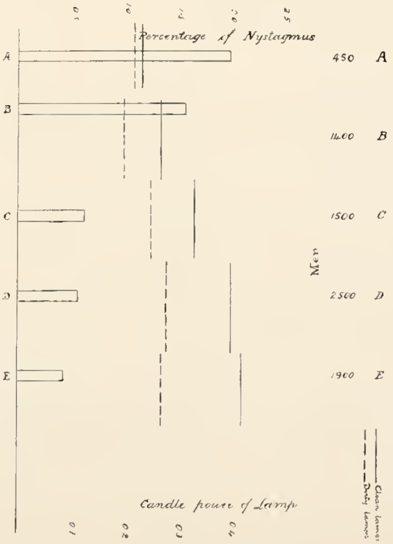


FIG. 2.

Conclusions.—The light given by the modern oil safety lamp at the coal face is often less than a third of a candle-power, and is never more than half a candle-power.

The illumination falling on the coal face in an open-light mine is about five times the amount obtaining in a safety-lamp mine.

The incidence of nystagmus in an open-light pit is about a sixth of that in a safety-lamp pit.

The incidence of nystagmus is inversely proportional to the amount of illumination at the coal face.

The final conclusion is that the light given by the modern oil safety lamp is insufficient.

Discussion.

The President said they were very fortunate in having two such classical papers presented, and that gave them a very excellent opportunity for full discussion.

Mr. J. C. Forrest asked whether Dr. Llewellyn had taken the "Wolf" lamp as the best light. Most of the lamps used in their own district were "Wolf" or "Protector" lamps.

Mr. A. Sopwith wished to know whether Dr. Llewellyn had statistics with regard to nystagmus in low mines, where men had not to strain their eyes by cutting up at a height. Then did Dr. Llewellyn, in his statistics with regard to the proportion of nystagmus cases, differentiate between certain seams worked with safety lamps where the men had to work in a strained position, and those where this was not the case?

Mr. S. F. Sopwith remarked that Dr. Llewellyn had stated that the electric safety lamp, as soon as it was broken, went out. That was quite true; but after the bulb was broken it took some time for the filament to lose its incandescence. Was it a fact that an electric lamp, when broken in an explosive or inflammable mixture, was absolutely safe?

Mr. F. J. Turquand asked whether either of the readers of the papers had noticed any difference between the reflectors used, as to whether a metallic reflector or a white surface gave the most light.

Mr. F. A. Grayston said he would like to point out that doctors differed as to the cause of nystagmus. Many, no doubt, followed the theory maintained by Dr. Llewellyn; but he found there were other doctors who took a different view. They knew that there were cases where a great number of men had worked for a long time with safety lamps, and that none of them, or only a very small proportion of them, had shown signs of nystagmus. He thought if working with safety lamps really caused nystagmus, they would have heard of a great many more cases.

Mr. F. B. Clarke wished to ask Dr. Llewellyn whether he had not in some way neglected the strained position of the eyes. He (Mr. Clarke) had consulted several doctors who had dealt with miners' nystagmus. One had mentioned the case of an ordinary type-setter who got nystagmus from a strained position of the eyes in putting in type, looking up and looking down. The light was extremely good in this case.

Mr. J. C. Forrest asked whether or not the conditions which compelled them to use safety lamps were not in themselves conditions which tended to cause nystagmus, quite apart from the quality of the light. That was only carrying Mr. Clarke's point a little further. A doctor in their district who had most of the cases at his colliery had come to the conclusion that coloured lamps would be advisable in the pit in which they were obliged to have safety lamps.

Mr. A. Sopwith said that at his colliery they had two rather interesting cases which led him to wonder whether there were herditary weaknesses or predispositions which would make some men more liable than others to nystagmus.

Mr. T. H. Bailey asked Dr. Llewellyn whether in the pit employing 450 men the air was analysed to get some idea of the percentage of oxygen in the atmosphere.

Mr. W. F. Clark said that he should like to follow up what Mr. A. Sopwith had said as to the possibility of a predisposition to nystagmus. Unfortunately, there were a great number of nystagmus cases, and at his colliery it was his duty to try to settle with these men. He had looked at their eyes—though, of course, not as an expert—and it seemed to him that many seemed to have little weaknesses of the eyes, something which might develop into nystagmus rather rapidly. If that were so, did Dr. Llewellyn think it possible to have some means of testing men's eyes before the men went underground, so that they might decide whether or not it was advisable to employ a man who was likely to develop nystagmus?

The President, concluding the discussion, said that before proposing that their heartiest thanks be given to Dr. Haldane and Dr. Llewellyn for their papers, he would like to emphasise points raised during the discussion, especially by Mr. Clark. They would really like to know the actual character of nystagmus, and perhaps Dr. Llewellyn would be good enough to tell them precisely its nature, and whether there were any varieties of the disease covering the range suggested by Mr. Clark. The authors of these two papers had brought before them a subject of the utmost importance to coalmining in this country, and as an institute they were to be congratulated for being the first branch to have an opportunity of hearing from such authorities the results of such an important piece of research. To have to admit that less than ½-candle power was the average light given to coalminers using safety lamps was a deplorable admission, and it called for urgent and active research in order to bring about reform. It was idle to say that such a state of affairs should be remedied at once. What was the remedy? Electric lamps at the working face would do much, no doubt, and might be a solution, but electric lamps had only within the last few weeks become perfected, and even now there was much to be done in improving this class of lamp. Anyone who worked with an electric lamp would know perfectly well its peculiarities, and they had had a good deal to do with it at the University. At first it gave a most beautiful light, appeared to be in perfect condition and looked very simple in operation; but after they had been worked for a few weeks or months the internal condition of the lamp was totally different, and a great deal still remained to be done in the direction of improvement. There was still room for attention to the ordinary safety lamp. Better construction and proper ventilation, and the use of oil under pressure would no doubt increase the present meagre candle-power. It was gratifying to the district, working largely with candles in mines where inflammable gas was almost unknown, to hear a good word for the candle. A clumsy and barbarous means of light, no doubt, but more of a light than the glimmer of the safety lamp, which at one time threatened the coalfield. The importance of finding a better light for mining was unquestionable, and the light thrown upon the subject by the present writers would do much to stimulate investigation in finding a safe and efficient light for mines.

Mr. A. Sopwith, in seconding the vote, said that the subject was extremely interesting, especially in times like the present, when every colliery manager was required to know something about everything. It was quite certain that when the Compensation Act came into operation the mining manager knew a great deal more about nystagmus than he ever knew before, and he doubted very much whether they would have known as much but for the operation of that Act.

The President put the resolution, which was heartily carried.

Authors' Reply.

Dr. Llewellyn, having acknowledged the vote of thanks, proceeded to deal with the questions. He said that he wanted first of all to call attention to the fact that the paper he had given was really a paper on illumination on the coal-face with reference to miners' nystagmus. Therefore he, of course, had to leave out a number of things and a number of his arguments with reference to nystagmus generally. He was glad, however, to find that so much interest had been taken in the paper, and, if he might do so, he would add that he had written a book on *Miners' Nystagmus*. This was shortly to be published, and he should be very pleased if any of them would buy it and see what he had to say. Mr. Forrest had asked whether he had instanced the "Wolf" lamp as being the best. In the district in which he worked they would not have the "Wolf" lamp at any price; they said it was not safe. He had made some tests, and he found that, of all the lamps he tested, the "Patterson" lamp was the best, and he believed that was made by the Baxendale Company. He had tested "Protector" lamps, but they did not give such a good light. The lamps varied very much in power, but it was rare to be able to get a lamp giving more than 0·6-candle power, and sometimes an ordinary lamp was less than half that candle-power, although they were better when they were new. In fact, one lamp that he examined in the coal face only gave $\frac{1}{10}$-candle power, while a Protector lamp also examined in the same position, gave less than 0·5-candle power. In the book he was publishing a table was included, giving results with several different kinds of lamps. A further question had been asked as to whether the conditions causing the presence of gas, and so rendering necessary the use of safety lamps, were also responsible for the conditions producing nystagmus. Well, to a certain extent he believed they were, because nystagmus was to a great extent a nervous disease, and the hurry and scurry of the safety-lamp pit certainly would aggravate that nervous condition. No doubt that condition involved a greater strain on the nervous organism than would arise in naked-light pits. In South Wales there were two distinct classes of men as between the house coal pits and other descriptions. In the slower pits they had time to do their work with more deliberation. But in the safety-lamp mine the men were kept on the go the whole time.

Another question related to the possible use of coloured glass as a means of protection for the eyes. He thought coloured glasses would be a very bad thing, because it would stop a large percentage of the light passing through the glass, and so would still further diminish insufficient light. Mr. Sopwith had asked a question which really amounted to an enquiry as to whether nystagmus was more frequent in thin seams than in thick seams. He (Dr. Llewellyn) recently visited some pits in Somersetshire where the seam was only 18 in. thick. In that pit there had never been known a case of nystagmus, although the men had to do all their work in a strained position. There had been a question asked about that, and he thought he had been somewhat misunderstood. He did not mean to convey that the eyes were in a strained position. What he meant to say was that the eyes were not directed upwards, as most of the authorities who had dealt with that subject appeared to convey, especially Dr. Snell. It was not correct that in a thin seam the holer had to direct his eyes obliquely upwards. In almost every case the eyes were directed downwards. The only exceptions were in the thick seam pits. He had taken statistics of cases with regard to the thickness of seams, and, as far as he could say, there was no distinct connection between the thickness of seams and the existence of nystagmus. Nevertheless it was true that in Belgium nystagmus was very common.

Another question related to reflectors. From measurements he had taken, the use of a back reflector increased the light by about 12 per cent. He had tested two kinds of reflectors, but he did not think that there was very much difference between the two. With regard to the causes of nystagmus, accident was a very potent factor in the causation of the disease. In 600 consecutive cases which he had seen, there were over 90 cases in which there was a distinct connection between accident and the onset of the disease. It was said that in a large number of cases the workmen using safety lamps did not suffer from nystagmus, but that was a matter which could only be settled definitely by an examination. There were really two kinds of nystagmus; there was the form of the disease which was immediately manifest, but there was also a latent form to be found in many pits, and he had found some pits in which 25 per cent. of the men were suffering from the disease in a latent form.

The famous case of the type-setter referred to by Dr. Snell had been once more quoted. That case had been used for much more than it was worth. It was really not a case of ordinary nystagmus, but it was quite true that there were very many conditions producing nystagmus which had nothing to do with mining. For instance, he was told of a case where a lady had to execute a mourning order under very great urgency. For three or four days she was working a great number of hours per day with her eyes continually fixed on the black surface, and she developed nystagmus simply from having to fix her eyes uniformly on that black surface. He had personally seen many cases of nystagmus which had never been down a pit.

With regard to the question of family history, he had found 12 cases in 600 in which there was evidence of hereditary predisposition. He found that 83 per cent. of the men suffering from nystagmus had errors of refraction, and he believed that if they could examine the men before allowing them to go underground, they would find a considerable number suffering from errors of refraction—in other words, suffering from short sight or long sight—and if such men were excluded they would probably reduce the number of cases of nystagmus in the mines by 50 per cent.

Mr. Bailey had asked a question about the pit given in a table which had the greatest proportion of nystagmus. That was the pit employing 450 men. An analysis of the air was not taken, but he had taken measurements of the air at the coal-face and in the intake. In the intake the illumination was equal to 1-candle power, and in the coal-face it was 0·4, and if they followed out that calculation on the basis of Dr. Haldane's diagram, they would find that probably the proportion of oxygen in that pit would be about 19·25.

In conclusion, he would once more remind them of a number of photographs which he had taken, and which would be found published in the book he had already referred to.

Dr. Haldane, also replying, said the president had invited him to brush up any fragments that might remain from the discussion. He did not think any fragments still remained, as Dr. Llewellyn had dealt with all the points raised, but he would like to add that all those points would be found to have been dealt with most fully in the book by Dr. Llewellyn about to be published. He knew a good deal about what was in that book. He had followed to some extent the development of that work by Dr. Llewellyn, and the doctor had gone into a great number of points of the kind raised in the discussion, and those who bought that book would get their money's worth. They were

in the Royal Society, when they were
the Tyndall studentship, in securing
as their first student. He wished to
lf of Dr. Llewellyn and himself, their
for the way in which they had received
and especially the one by Dr. Llewellyn.

Electric Lamps.

NT called attention to the exhibit of
ch was now open to inspection, and in
ld call attention to the model furnished
man and Froude, of Worcester, of the
overwinding prevention gear. There
y comprehensive exhibit of mining
furnished by Messrs. Davis, of Derby.
pointed out that there was a new lamp
he prize offered through the Home
hur Markham, and kindly lent by him.
oming into use, and was being intro-
y large scale at collieries with which
connected near Doncaster. It was
l trial on a very large scale, and they
le to find out how far it was going to
ve a very good light, and generally
ood sort of lamp. There was now a
cumulated experience with electrical
was not quite evident that they would
ght with that as with a good tallow
g that it might be suggested that was
uch for electricity. He (Dr. Haldane)
eople who had supported candles, and
e of candles before the Mines Com-
was not ashamed to say so. He had
ngly against the total abolition of
d lights, and he was pretty sure that
d a great deal to do with nystagmus.
her doctors before Dr. Llewellyn had
very strong evidence that nystagmus
e character of the light, and Dr.
rches had now clinched the matter
ively. In his (Dr. Haldane's) opinion
deal to be said for the use of candles.
the Mines Commission said that he
and therefore prejudiced, and so on.
he was fighting for his own country,
fighting in the pure cause of science,
partial. At the same time if he had
and sent in a report in favour of the
tion of safety lamps he would probably
pieces.
the proceedings.

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tion in the Midlands.—The owners of
ershire and South Derbyshire, having
colliery rescue station, selected Ashby-
purpose, as midway between the two
ined an excellent site off Packington-
railway bridge, near the Midland Rail-
rescue station, which is nearing com-
frontage to the road, a main entrance
board room, waiting room and store
ith hot water radiators and fireplaces.
provided upstairs for the use of those
uction classes, baths also being arranged,
ries, &c., heated with hot water pipes.
r is a small dressing room with a bath
ngaged in the work at the station. The
de by 56 ft. long, with working galleries
t one end, which, for the purposes of
fitted with colliery tubs, rails and other
ll be several emergency doors from the
the drill hall. Either or all of the
rged with gas or foul air, and at the
the gases may be drawn up a 36 ft.
e end of the hall, a small motor engine
ase the draught is insufficient. The
are air and gas tight, and those under
mes whilst working with a breathing
ithin view from the hall through a
g. The front is built of heather red
ered with hand-made red tiles, three
s appearing in the front roof. For the
tended to instal a motor car. A local
arranged, but rescue apparatus will be
ediate action in cases of necessity in
ne parties at the colliery to which aid
Several collieries in the locality are
apparatus, and telephonic communica-
d between the rescue station and all the
thus avoiding loss of time. Mr. B. L.
inted resident instructor. Mr. Wilson
he Notts and Derbyshire coalfields as
since then has gained wide knowledge
ast and west, and in South African
ned valuable experience under the
neers, Messrs. Coke, Mills and Coke,
rs' Association of Leicestershire and
im to proceed to Birmingham Univer-
ctures and experiments under Prof.
work has been carried out from the
supervision of Messrs. Goddard and
ville.

COALMINING IN INDIA IN 1911.

(Continued from page 788.)

Health and Sanitation.

A committee, known as the Jharia Sanitation Committee, controls operations connected with sanitation in the Jharia coalfield. The chief work which devolved on the committee in 1911 was the combating of plague, the first case of which occurred on September 23 in the Jharia bazaar. Altogether there were 78 deaths, 12 of which occurred in Jharia, three in other parts of the coalfield, 20 at Dhanbaid, 18 at Gobindpur, and 25 at Chirkunda and neighbourhood. The last case of all reported was on March 29, 1912, at Chirkunda. Eight meetings of the committee were held during the year. The expenditure incurred is borne by the Local Government, the Indian Mining Association and the Rajah of Jharia in equal shares. The committee will cease to exist when the Bengal Mining Settlements Act (Act II. of 1912) is put into force.

An outbreak of cholera occurred in September at Jamadoba coalmine in the Jharia coalfield. A workman was attacked and was taken home, his death taking place the same day. On enquiry it was found that this man had been drinking soda water purchased in the Bhaga bazaar. The remaining contents of the bottle from which he had been drinking was analysed by the company's medical officer, Dr. Simpson. The result of the analysis in Dr. Simpson's own words is as under:—

"The resultant analysis reveals a most terrible condition of affairs, and of all the unfiltered effluents of mines, tanks and rivers that I have examined, none have given such a result as this." The hookman evidently contaminated the mine water from which the Jamadoba filters received part of their water supply, as during the first week following the outbreak, wherever there was a filtered water hydrant, cholera broke out. Altogether there were 46 seizures and 29 deaths, the last case being on October 15. Since the outbreak only river water has been used in the filters. The plans drawn up by the sanitary engineer, Bengal, for a water supply to the Jharia coalfield have been completed and are under consideration.

The total rainfall at Jealgora in the Jharia coalfield was 41·82 in. At Sitarampur in the Raniganj coalfield it was 54·48 in., being 3·39 in. in excess of the previous year. Rain fell here on 87 days, and was not so well distributed as in the previous year. On six days it exceeded 2 in. At Giridih the rainfall was 50·51 in., rain falling on 72 days.

Ambulance Work.

As foreshadowed in the last annual report, the scheme for placing ambulance work throughout the Bengal coalfields on a permanent basis has become an accomplished fact. An influential central committee has been formed to direct and control the local centres. It was agreed that the first necessity was the possession of funds, chiefly in order that the services of lecturers and examiners could be recognised, and accordingly an appeal was made to all colliery owners for subscriptions. This met with a very generous response, the sum of Rs. 1,840 being received. Mr. S. Heslop, past president of the Mining and Geological Institute of India and superintendent of the New Beerbhum Coal Company Limited, has very kindly offered a challenge shield to be competed for by teams from the various centres. Ten classes have been started, viz., two at Dishargarh, three at Charanpur, two at Jharia, one at Sijua, one at Raniganj, and one at Mugma. Instruction is still in progress at Raniganj and Mugma, where the classes are attended by 60 members. The other classes had a roll of 392 members, of whom 122 sat for examination and 110 succeeded in gaining certificates of proficiency. The examination of the class at Giridih since the issue of the last annual report resulted in the success of 22 candidates out of 25 examined. Preparatory classes under the control of the colliery managers, directed by sub-committees, are about to be started at the large collieries for the purpose of training sirdars and important workmen in the practical operations of stopping bleeding, fixing splints, tying bandages, carrying the injured and restoring the apparently drowned. The students will be admitted to the classes at the reorganised centres as soon as they have proved themselves efficient in this training.

Sibpur College Mining Department.

Mr. E. H. Roberton, the Professor of Mining Education at Sibpur College, has reported that the session of 1911-12 commenced with a total roll of 16 students, of whom nine were studying Course I., three being special students (scholarship holders), and seven studying Course II., four being special students (scholarship holders). In Course I. six students qualified to sit for the annual examination leading to Course II., and three only were successful, one being a special student. The other two special students, having passed in the mining subjects, were allowed to study in Course II., but, through failure in subsidiary subjects, could not qualify for the diploma. At the diploma examination five were successful, one being a special student.

The lack of elementary education in the special students, who are holders of scholarships and who are recruited from the young employees in the mines, was brought last year to the notice of the Local Government in a report by the Professor of Mining. The Local Government and the Indian Mining Association, in whose joint gift the scholarships were, decided therefore to abandon them. There were a considerably larger number of applications this year than formerly for these scholarships, and it is a significant fact that, on being informed that no scholarships were available, five of the applicants announced their intention of joining the college as special mining students without scholarships. A suggestion has been made that, in lieu of the special scholarships that have been abandoned, scholarships should be instituted in favour of students who have gained their diplomas, to enable them to go to England and spend two years as articled pupils in a mine. That such a scheme would be acceptable is borne out by the fact that two old Sibpur mining students have gone to England to enhance their qualifications, one having been sent by the company employing him, and one having gone at his own expense and obtained employment in a mine in Scotland as a working miner, while a third (the special student who gained his diploma this year), is on the point of sailing at his own expense to become articled to the manager of a colliery.

The proposed removal of the mining department of Sibpur College, and its incorporation into a mining and technical institute at Asansol, or some other mining centre, is occupying attention at the present time, and appears to have obtained general commendation. The increased facilities of teaching a technical subject in the midst of a country full of examples of that subject are apparent to all; the fear of limitation of numbers due to want of accommodation would no longer exist; workers in the coalfields would have at hand a means of giving their sons a sound technical education, while the backbone of the institute would probably be the "special student" class—men who do not fear to give up wholly or in part their employment, in order to qualify themselves for posts of higher responsibility.

Mining Education.

As stated in the last annual report, the lectures in the coalfields are now delivered by colliery managers who have been appointed by the Local Government for the purpose, on the recommendation of the Mining Educational Advisory Board. The Board was formerly known as the Mining Advisory Board of the Civil Engineering College, Sibpur, but in 1911 its title was altered to that stated above, and it was reconstructed, its members now being as follows:—(1) The Chief Inspector of Mines in India, *ex-officio* chairman; (2) the Principal, Civil Engineering College, Sibpur; (3) the Inspectors of Mines in India; (4) the Professor of Mining Engineering, Civil Engineering College, Sibpur; (5) two representatives of the Indian Mining Association; (6) the President of the Mining and Geological Institute of India; and (7) the Superintendent of Industries (*ex-officio* secretary).

Certain powers were also conferred on it for the conduct of lectures and consequent examinations. Two meetings of the Board were held during the year. The lecturers appointed were as follow:—Jharia and Sijua Centres, Mr. S. McMurtrie; Charanpur Centre, Mr. H. C. Read; and Dishargarh Centre, Mr. L. A. Jacobs. The lecturers have reported that the total number of names on the registers for the session 1910-1911 was 237. The examiners report that, generally speaking, the examination has not revealed a very high standard of mining knowledge. The answers were wanting in detail, expression was faulty, and the sketches were poor and few. Arithmetical questions were in a great measure ignored, though they were not difficult, which points to deficient elementary education. Notwithstanding the foregoing remarks, they think there is no doubt that the classes are performing a very useful work in the coalfields.

True Meridian Lines in Bengal Coalfields.

In the last annual report attention was drawn to true north lines, which had been laid down at six places in the Bengal coalfields. These have already proved of great service and, in order that those who do not live in their immediate neighbourhood may readily find them, their exact location is marked on plans attached to this report.

Mining and Geological Institute of India.

The total membership of the institute at the end of the year, including subscribers, was 290. Five meetings were held during the year, there being a large attendance at each. The Government prize for the best paper read during the year was divided between Messrs. C. H. McCale and S. McMurtrie. Branches, for the purpose of holding branch meetings for the reading and discussing of papers, have been formed for the Jharia and Raniganj coalfields respectively.

Board of Examiners

During the year a change occurred among the non-official members through the resignation of Mr. J. J. Turnbull, who was succeeded by Mr. R. J. Browne. The Board therefore consisted at the end of the year of:—The Chief Inspector of Mines in India (*ex-officio* president), and Messrs. S. Heslop and R. J. Browne. There were eight applicants for first-class Indian certificates of competency in lieu of English certificates, all of whom were furnished with Indian certificates. An examination for certificates of competency as colliery managers was held at Dhaubaid in the office of the Department of Mines on February 23 and 24, 1911, at which 31 candidates competed for first-class certificates, and 51 for second-class certificates. Out of the above numbers, only three were successful in obtaining first-class certificates and six in obtaining second-class certificates.

Official Duties.

Mr. G. F. Adams was Chief Inspector of Mines in India. Mr. R. R. Simpson was Inspector of Mines for No. 1 Circle. Mr. G. C. Leach was Inspector of Mines for No. 2 Circle. From January 1 till March 7, 1911, he had charge of No. 3 Circle in addition to his own duties. On March 8 Mr. C. J. E. David was appointed Inspector of Mines for No. 3 Circle. During the year the circles of the inspectors of mines were rearranged.

NORTH STAFFORDSHIRE INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

Presidential Address.

We give below the text of the address delivered by Mr. Hugh Johnstone, H.M. inspector of mines, at the annual meeting of the above institute, held at Stoke on the 14th inst.

Mr. Johnstone said the difficulty in choosing a subject for the presidential address would not on the present occasion have been a serious one had anyone else been selected as president; but it was very much accentuated in his own case because a great many of the matters which at the present moment were exercising the minds of the members and of the mining public generally were subjects with which he could hardly be expected to deal. For example, there was perhaps no subject which, at the present time, was more discussed amongst them in ordinary conversation than the influence of recent legislation upon the safety of the mines and generally upon the industry. A great deal had been said on this subject already, and probably a great deal more remained to be said. There were many points in the Coal Mines Regulation Act of 1908, the Minimum Wage Act, the Coal Mines Act, 1911, and the Insurance Act, which might be discussed profitably, and perhaps endlessly; but he need hardly point out that it would be highly improper for him to initiate or take part in public discussion upon any of them. He proposed, therefore, instead of giving a formal address, to deal rather somewhat informally with some matters the ventilation of which might possibly benefit the institute.

Continuing, the president said there had been a great deal of discussion in recent years as to the desirability of improving the status of the mining institutes throughout the country, and as to the best means of doing so. The improvement, however, progressed more slowly than they could desire. So far as this particular institute was concerned, it had always appeared to him that the first step to be taken to ensure its exercising its due influence in the country was to secure a considerable accession to its membership. On the other hand, the experience of the larger institutes had shown that, to secure and maintain the interest of the members generally, a certain amount of research or experimental work was sometimes of very great value. Unfortunately, such work involved considerable outlay, and unless an institute was strong financially it could not undertake it.

But if they were to attract new members, and to retain those they had, it could only be by making their meetings interesting and their *Transactions* valuable as works of reference; and this could only be done by the members realising that it was their duty to give to the institute of their best, and not to content themselves with merely receiving and criticising the contributions of others. Having urged both the experienced and the younger members of the institute to contribute papers, the president said it seemed that many, if they could not see their way to produce a paper which would be strikingly original and epoch-making, would rather not write at all. There were many points of a less ambitious nature which it would be most profitable to have brought before the institute. There were few mining engineers, however limited their experience, who, in the course of their work, had not come across phenomena which were difficult to understand or explain. Short papers, accurately recording the observed facts, would be most interesting and valuable. The discussions would bring to light other similar facts, and although no satisfactory explanation or solution might be forthcoming at the moment, the records would be of very great value to future investigators. Again, some of their members had travelled more than others, and in other districts or countries had seen appliances or methods which, although perhaps well known in that particular locality, might be unknown to many of their fellow members. Short descriptions and sketches of those would again be of considerable value.

Mr. Johnstone proceeded to suggest a few subjects which he thought might be dealt with profitably, either in papers to be read at the ordinary meetings, or in discussions at informal meetings. Recent legislation, he said, had for the first time required that at all new mines the screens must be situated not less than a prescribed distance from the downcast shaft. There was room for a paper upon the best banking and screening arrangements to permit of the expeditious and economical handling of a large output under those conditions. Automatic drop cages for lowering the full and raising the empty tubs were frequently required in connection with such arrangements, and some very clever appliances for this purpose were already in use at various mines in the district. A short paper illustrated by sketches showing the details of these appliances might be of great use to many of the members.

Another new feature which had been introduced by the new Mines Act was the provision of appliances for reversing the direction of the ventilating currents in mines. This was a subject upon which great diversity of opinion existed. Many of the details in connection with it required very full consideration, and it would be of great advantage to the members generally if someone would deal with it with a view to its being thoroughly discussed. Various plans had been put before him officially, which, while generally similar in principle, differed very considerably in detail, and a discussion of these details might be of advantage to many of the members who had met with difficulties in the matter.

Again, the question of baths for miners had been brought prominently before the mining public recently, and would probably have to be dealt with sooner or later—in some cases probably in the immediate future. Precise information as to the best and most economical methods of construction and maintenance would be of considerable value.

In reading reports upon various mining disasters which had occurred from time to time, one must have been struck with the difficulty which was experienced in obtaining absolutely accurate information as to the number of men who were underground when the disaster occurred; and now and again one heard of isolated cases in which individuals had been accidentally killed towards the close of the shift, and the occurrence of the accident only discovered, it may be, some hours afterwards. It would be of considerable value to the members to have an opportunity of stating their experience with regard to this and of discussing the question with a view to ascertaining the best system for recording and checking the descent and ascent of the men, so that at any moment one could determine accurately who remained underground.

The Coal Mines Act, 1908, had demonstrated the necessity for the caging, lowering and raising of the men with the utmost possible despatch consistent with safety; and a comparison of the various means adopted for this purpose would be useful. A similar discussion on the best and most expeditious means of distributing and collecting explosives would also be of value. Then again, there was perhaps no department in mining engineering which had developed more rapidly during the last 20 or 30 years than that of shaft sinking. They were now sinking much larger shafts to much greater depth, and the work was now being carried on much more expeditiously than in former years. A most interesting paper could be written upon the modern methods of sinking and fitting up such shafts; and perhaps the most interesting and valuable portion of such a paper would be that dealing with the details of the appliances, such as kibbles, water tanks, landing platforms and banking arrangements generally, and riders suitable for using with detaching hooks.

Deep-mine pumping also had been revolutionised during the last quarter of a century, and detailed information as to modern pumps, valves, packing and jointing suitable for the high pressures which now obtain would be of great value. Another subject which might be dealt with profitably was that of ferro-concrete in its application to the lining of shafts and insets. It is gradually making its way, and he had no doubt would in the future demand much more attention than it had received in the past. Then a great deal had already been written upon the construction and maintenance of winding ropes, cappings and tacklers, but he did not think that the subject had been by any means exhausted.

Under the new Mines Act, the use of gates on cages used for lowering and raising men had for the first time become compulsory, and the introduction of these gates had in some cases necessitated the modification of the general design of the cage. There was room for a paper dealing with the best design for such cages and the best and most convenient form of gate, and such a paper might usefully deal with the advantages and disadvantages of self-tipping cage bottoms. Such cage bottoms were now frequently used in different parts of the country, although, so far as he was aware, they had not been introduced into North Staffordshire. Then again, there was room for a paper upon the best form of cage guides, comparing the first cost and maintenance of ordinary wood guides, wire ropes or rods, and steel rails, and dealing with the best methods of jointing and securing them, and also with the best method of inspection. His experience throughout the district was that the work of inspection was too often done in a very perfunctory manner. He referred more especially to the inspection of ordinary wire ropes or rods. These become coated with grease to an extent which, while it was necessary for smooth running and maintenance, rendered thorough inspection a matter of some difficulty and requiring more time than was frequently given to it. Again, he did not think they had yet attained to perfection with regard to self-recording shaft signals. Many attempts had been made to introduce a reliable self-recording arrangement, but he did not think they had yet obtained one which was absolutely satisfactory in its working. Those of their members who were mechanical engineers might with advantage give some consideration to this. They also wanted a reliable means of interlocking the signalling appliances and the fencing arrangements at mid-landings. This had been done very satisfactorily in some parts of the country, but except in isolated instances, was not made use of in that district. The gates for these landings were also usually left to be operated by the person in charge of the landing, and it was not infrequently maintained that the attendance of this person constituted the "proper precaution" which is required by section 37 (3) of the Coal Mines Act, 1911, before the fence could be temporarily removed for the purpose of repairs or other alterations. He (Mr. Johnstone) did not see any insuperable difficulty in making such gates automatic in their action, and this was another problem the solution of which he would commend to their mechanical engineers.

He had already suggested that there was room for a paper dealing with the banking arrangements for handling expeditiously a large output, and this was equally true with regard to the shaft bottom arrangements. One frequently saw shaft bottoms in which the arrangements were by no means perfect, and this, perhaps, was not to be wondered at, as the pit might have been originally laid out for a much smaller output, and the alteration and enlargement of a shaft bottom was a very difficult and expensive business.

With regard to haulage matters, they were now, or would in the near future, be required for the first time to have the tubs "so constructed and maintained as to prevent, as far as practicable, coaldust escaping through the sides, ends and floor." A very practical paper might be written upon colliery tubs, dealing with their design and construction with a view, not only to efficiency and first cost, but also to repairs and maintenance, which was a very important item in the working costs of a colliery. Such a paper might also very profitably deal with the question of lubrication, upon which he did not think the last word had yet been said. Then again, a great variety of opinion existed as to the best form of haulage clip. Of course, one understood that the design of a haulage clip must have a strict relationship to the conditions under which it was to work, but it would be of value to the members to have an exhaustive discussion upon the whole subject with illustrations of the various clips in use, and details as to their actual working conditions. A good deal might also be said as to the best form of backstay or "now" or "fork" to be used behind ascending tubs on steep inclines, and generally as to the appliances required to be used on such inclines by section 46 (4) of the new Act.

A very important subject which would have to be faced by the mining engineer of the future, and the consideration of which was in fact already forcing itself upon the attention of some mining engineers of the present day, was that of the working conditions in mines of great depth; he meant in mines the depth of which exceeded, say, 1,000 yards. Some of them were already working under these conditions, and there could be no question that in future many others would have to face them. New difficulties with regard to ventilation, temperature, weight and pressure, timbering and gobbing, would arise which would tax the capabilities of the very best engineers; and it would be of immense value to the members generally if some of those who had been already called upon to some extent to face such conditions would take up this subject and place their experience upon record, with a view to showing, not only what should be done or aimed at, but what was of perhaps even greater importance—what should be avoided.

There was another subject in connection with methods of working which should be of special interest to that institute, and that was the problem of the best and safest means of working "rearer" seams under a deposit of alluvium which was more or less saturated with water. The problem was a very difficult one, and it was very unlikely that they would all come to the same conclusion in the matter; but a full discussion would be of very great value.

In North Staffordshire they had longwall workings in thicker seams and at greater inclinations than was perhaps usual in most of the other coalfields; but in many of these workings a considerable portion of the upper part of the seam had to be left in over the packs. So far as he was aware, no attempt had ever been made to work any of these seams in two or more leaves or sections, one working face following another, as was done, for example, in some mines in South Staffordshire and in Warwickshire and elsewhere. It would be most interesting to have a discussion upon the merits and demerits of such a system. Again, one had heard a good deal about the system of hydraulic packing or gobbing, which has been practised to a large extent in some parts of America and of the continent of Europe, and one had heard very diverse views expressed as to its applicability to the mines in this country and as to the cost of installing and working it. Very few of them had had an opportunity of actually witnessing the operations or studying them at first hand, but it would be a great advantage and of very considerable value to the members if information upon the subject could be collected, condensed into a paper, and fully discussed by the members.

Another subject, which was of special interest in that district, was that of underground fires, spontaneous or otherwise, and the subsequent recovery work. A great deal had been written upon this subject already, and some valuable papers were recorded in their *Transactions*, but he did not think the subject had been by any means exhausted. Knowledge of the causes of and experience in the methods of dealing with such fires had been accumulating, and the appliances now in use in recovery work were not available when the papers referred to were written. A record of more recent experience would, therefore, be of great interest and value, and in this connection the general question of rescue work could be dealt with. The staff in connection with the North Staffordshire Central Rescue Station had already done splendid work, and had acquired what was, perhaps, a record experience, and it would be a very great misfortune indeed if this experience were not placed on record, and thus rendered available for the guidance of future workers. In these operations, perhaps, more than in most others, it was essential to know, not only what could be and had been done, but what one should not attempt to do.

Something might also be said about the use and handling of the various explosives, not only in shaft sinking, but in ordinary mining work, and as to the most effective and safest methods of electric shot-firing, with a view specially to minimising the risks from missed or hanging shots

Concluding, Mr. Johnstone said: "My object has been to endeavour to show that every individual member of the institute may have some knowledge or experience which he can and ought to render available to his fellow members, and that amongst the multiplicity of subjects which I have mentioned, he may find at least one with which he is specially fitted to deal. In addition to these, there are many other subjects which will doubtless suggest themselves to the members; papers upon them need not be long or elaborate, and their value will depend very largely upon the accuracy with which the facts are observed and recorded. Many of us recall instances, for example, in reports upon the investigation of colliery explosions which occurred many years ago, in which the reporter was unable to make proper use of his facts on account of the want of present-day knowledge, but even in cases where his conclusions have been obviously wrong, the recorded facts have been of the greatest value in enabling modern investigators to determine the real cause and point of origin of the explosion."

Mr. E. B. Wain proposed a hearty vote of thanks to the president for his address, and trusted that the members would do as Mr. Johnstone had suggested, and contribute many practical papers.

Mr. R. H. Cole, in seconding, said Mr. Johnstone was precluded from dealing explicitly with recent legislative enactments, but he had directed attention to points the observance of which would lead to those Acts being more effectively employed.

The vote was heartily accorded.

Satisfactory progress has been made with the new colliery at Rossington since the first sod was cut in June. Two shafts 20 ft. in diameter on the clear, are being sunk. There has been no difficulty with the top water, which has been satisfactorily dealt with, and the sinking has reached a depth of 75 ft. The sinking plant is nearly completed, and it is anticipated that very shortly the pit will be going down at a rapid rate, work proceeding at both shafts. The site of the new colliery village will cover some 70 acres of land, and already some of the permanent buildings, including the manager's house, are in course of erection. The plans show a compact village, radiating round one central point, where space will be reserved for a church and other important buildings. Football and cricket grounds and an institute are included, and dwellings of an up-to-date character, with all modern conveniences. At Dinnington the same company have erected some 500 houses on the plan that is to be adopted at Rossington, with a park and institute, and at Maltby, where 1,000 houses are being built, the arrangement is similar.

NORTH OF ENGLAND INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

(Continued from page 786.)

South African Winding Engines.

Mr. A. W. Brown, A.M.I.E.E., read a paper on "Electrically-driven Winding Engines in South Africa."

He stated that, during a recent stay on the Rand, he had good opportunities for observing the progress of the electrification of many of the winding engines which served the various goldmines and also the installation of several entirely new electric winding engines. Although the conditions of winding differed from those in this country, there was something of general interest. Perhaps the first point to be noticed was the use of the rectangular shaft, generally served by two, and frequently three, double-drum winding engines. These shafts were divided for the entire length of the shaft by the timber-shaft framework into compartments, one for each drum and one in addition. There were three general classes of shafts sunk, depending upon the occurrence of the ore body or vein in relation to the shaft mouth. These were:—(1) The inclined shaft, usually sunk in outcrop mines, the shaft following the ore. The inclination was not constant but varied in accordance with the dip of the vein. (2) The vertical shaft, sunk when the ore lay nearly vertically or horizontally or was inclined but at a considerable distance below the surface. (3) The compound shaft, comprising, usually, a vertical shaft, which was sunk when the ore was reached, and an inclined shaft which followed the dip of the ore. In such shafts the ore was brought to the surface from the stations on the incline in a single wind.

The depth or length of wind did not at present greatly exceed 4,000 ft. for vertical shafts, 5,000 ft. along inclines or 3,500 ft. in compound shafts. The limits of depth did not appear to have been yet reached, and the economical limit of depth for a single wind was a subject too involved to be discussed fully in that paper. It was fixed in part by the strength of the rope, in part by the dimensions of the winding drums which could be installed, and by other conditions depending upon the output of the mine, cost of power, &c. On the Rand, a rope safety factor of 6 was required by the Government, which permitted of a greater depth than the safety factor of 10 which was usual in England. In recent communications of the South African Institute of Engineers, an even lower safety factor was recommended, which would still further increase the permissible depth. The low safety factor, however, was somewhat discounted by the practice of employing several layers of rope on the drum in order to keep the dimensions of the drum as small as possible.

In the majority of mines, hoisting had to be carried out from several different levels in the shaft, necessitating the use of double-drum hoists with clutched drums, so that the length of the ropes might be adjusted to suit each level and so permit of balanced hoisting from each station. That alteration of the rope lengths, combined with the timbers between shaft compartments, prevented the use of a tail rope to compensate for the changing balance of the hoisting rope. However, in some of the deep-level shafts, such as Brakpan, City Deep and Village Deep, hoisting was carried on from only one level, and tail ropes might be and were used. In other deep shafts, notably at the Rand Collieries and Cinderella Deep, the changing weight of the winding rope was compensated for by the use of a partly conical and partly cylindrical drum. The winding drums themselves were generally of cast iron or steel, with cast cleading provided with turned grooves to accommodate the first layer of rope. Small drums frequently had cleading of rolled mild steel plates without grooves. Wooden lagging was not often used, nor were there many drums built up of channels, girders and plates, such as were frequently encountered in England and Wales. The ore was brought to the surface in self-tipping skips, which delivered their contents into bins fixed in the headgear. That was impracticable in most coalmines at present, but would be an excellent system for any coalmine in which the entire output could be utilised at the pit mouth for coking and electric power generation.

The headgears of the modern mines were usually of steel. In inclined shafts the skips ran on rails, and in vertical shafts either steel or wooden guide rails were used, but never guide ropes. The speed of winding varied between 2,009 ft. per minute in inclined and compound shafts (slowing to 1,000 ft. per minute around curves at the changes of incline) to 3,500 ft. per minute in vertical shafts. Although these speeds were by no means low, they were not as high as those obtaining in many British mines. In the electric winders the drums were driven according to circumstances, either by direct-coupled slow-speed motors, or by medium-speed motors through gearing. When gearing was used the tendency was to employ a single reduction, with either Citroën or power plant double helical teeth. Good results had been obtained with these gears with powers as high as 1,000 to 2,000 brake-horse-power, and ratios up to 5·6 : 1. The pitch-line speeds in some cases exceeded 2,600 ft. per minute. The advantages of the gear-drive were very striking in the case of the alternating-current hoists, as they permitted of the use of smaller motors, with higher power factors and efficiencies, and lower prices than those of motors suitable for direct coupling. The gear losses were practically compensated for by the gain in motor efficiency

The majority of the electric winders on the Rand were supplied with power by the Victoria Falls and Transvaal Power Company Limited, their usual supply being three-phase at 50 periods and 2,100 volts. The generating stations of that company at present had an aggregate capacity of over 130,000 kw., and were consequently capable of carrying any peak which could be imposed upon them by any winders yet installed. No equalisers were used, and all the hoists were driven either by alternating-current motors taking power directly from the line and controlled by means of resistances in the rotor circuit or by direct-current motors controlled on the Ward-Leonard system. Both the Ward-Leonard and the alternating-current rheostatic systems had their advocates on the Rand; and whilst all agreed that each system had its own sphere of economical application, there was much diversity of opinion as to what actually constituted economical operation. Some engineers were content to pay the greater first cost in order to obtain the easy and certain control of the Ward-Leonard system, whilst others based their choice upon the simplicity and greater reliability of the alternating-current hoist.

Mr Brown proceeded to give detailed accounts of several electric hoists in use. In conclusion, he said that the number of new winders that had been installed, the number of conversions that had been made, and the repeat orders that had been placed all showed the favour in which the electric winders were held It was very unlikely that any large steam winders would be installed on the Rand in the future. Electric winders could be adapted to suit any conditions of winding and any location of engine room. They were cleaner and more convenient than steam winders, and could frequently be used where steam winders could not. With electricity in many cases cheaper in Great Britain than on the Rand, the advantages were even greater than could be shown in Africa, and Great Britain should lead, instead of follow, South Africa in the number and size of electric winders installed.

A short discussion followed, and Mr. Brown received the institute's thanks for his paper.

Copying Out Pay-notes.

Messrs. T. V. Simpson and G. W. Bell contributed a paper on "A Photographic Method of Rapidly Copying Out Pay-notes, in Use at Throckley Collieries." They stated that, owing to the largely-increased clerical labour entailed by the Coal Mines Act, 1911, through having to supply workmen with detailed pay-notes and the introduction of weekly instead of fortnightly pays, they had evolved a system by which it was possible to copy rapidly the details for pay-notes from the pay-bills themselves. The bills were, in consequence, at once liberated for use in making up the accounts and in preparing the next week's bill. At the same time, the arrangement ensured the current pay being carried out accurately and independently of the bills after they had once been checked.

That object was achieved by the pay-bills being made out on single sheets of suitable paper, and a copy taken from them by means of a photo-copier. The information contained on each line of the copy was the detail required for a pay-note. The lines were cut off and attached to slips, the printed heading on each of which was the same as the bill-heading, so far as the calculation of wages was concerned. The pay-bills were re-drafted, in order that all the details of each individual piece, and datal-worker's wages should appear on one line, thus allowing the workman to see exactly how the amount of his wages was arrived at. For example, on the hewing bill the tonnage rate was shown after the number of tons, instead of, as formerly, at the top of the bill, so that the information appeared on each completed pay-note. All particulars required by the owners were placed to the left of the man's name and were not photo-copied. In order to save space, the headings giving the different classes of work were printed vertically in a narrow column.

The paper used for the pay-bills was an extra strong "bank" paper, sufficiently transparent for copying, but thick enough to allow errors to be erased. The printing was contained on one side of the paper and only inserted on every other line, and, as the lines were $\frac{3}{16}$ in. apart, each photo slip was $\frac{3}{8}$ in. in width. The particulars should be written with an opaque ink, in order to give well-defined copies; after experiment it was found that Stephens' black drawing-and-ticketing ink, diluted with water to the required consistency, suited the purpose admirably. The abstract was printed on ordinary stout paper, and was used as a backing for the loose sheets. An extra width of margin on the left hand folded over, and allowed of the whole being fastened together with wire staples. The headings and columns on the slips to which the photo copies were attached were a duplicate of the particular part of the bill relating to the man's name and the details of his wages. The yard-work prices could either be printed on the headings or put on with a rubber stamp. In addition, a perforated receipt slip was attached, which must be signed and handed in at the pay-office before the wages were paid.

The photo-copier consisted of two semi-cylindrical plate-glasses, each measuring 53 in. in length and 31 in. round the bend, fitted into a ring at top and bottom, thus forming a cylinder. To the cylinder were fitted trunnions, which fitted into an iron stand, thus giving a free motion and allowing the cylinders to swing around to either a vertical or a horizontal position. Over each glass was a canvas cover, which was drawn tightly over. An enclosed arc lamp, drawing about a 2 in. arc on a direct-current voltage of 220 to 250 (which was most suitable) and giving a powerful light of about 2,000-candle power, was suspended on a steel rope which travelled over pulleys fixed to a bracket attached to the wall, which allowed the lamp to be raised or lowered within the cylinder by means of lowering gear, which could be regulated to any desired speed.

The copying of the pay bills was a very simple operation. The cylinder was turned into a horizontal position and the canvas cover over one of the semi-cylindrical glasses was thrown back. The bills to be copied were placed on the face of the glass, a sheet of ferro-prussiate paper was laid on top of them, and the canvas cover again tightly stretched into position. The process was repeated on the other side and the frame turned into a vertical position. The arc lamp was switched on and lowered down the centre at such a speed as to give the correct exposure. The machine printed four sheets of the bill at one exposure, the time being approximately four minutes, but the duration of the exposure varied, of course, with the thickness and transparency of the paper used.

The prints were washed by running water over them in a trough made for the purpose, the operation taking only a moment or two. They were then "squeegeed," clipped on to wooden drying rods, and hung in an oven to dry. Afterwards, their backs were coated with a solution of gum arabic, which was quickly dried in the oven, and the copies were cut into strips as previously mentioned. The whole process was carried out by two boys. The time taken up by that method of preparing the pay-notes was, with practice, about a quarter of that which would be taken up were they written in the ordinary way. A decided advantage was that the pay-bill was only detained for a few minutes, thus leaving it free for other office use. A further advantage was that, if the bill was checked before being copied, errors could not occur on the pay-note. The cost of the new bills, notes and photo paper was about 25 per cent. more than the cost of the old method, but that was easily compensated for by the smaller staff required and the facility with which the office work could be carried out.

A vote of thanks to the authors of the paper terminated the meeting.

ELECTRIC SAFETY LAMPS.

The Recent Competition.

The Home Secretary desires that it should be known that the competitors who sent lamps to be tested in the recent competition for the prize for the best electric safety lamp sent them at their own risk, and that the severe tests to which they were subjected resulted in many cases in the breakage of lamps or parts of lamps While every endeavour is being made to return the lamps of unsuccessful competitors intact, neither the Home Office nor the judges can accept any responsibility for lamps or parts of lamps that may be damaged or cannot be returned. The judges cannot undertake to answer any letters on the subject of the competition.

German Competition.

The Verein für die Bergbaulichen Interessen im Oberbergamtsbezirk, Dortmund, has decided to offer a prize of 25,000 marks for a miner's electric lamp suitable for practical use and provided with a reliable firedamp indicator. Both must be safe in presence of firedamp, even if damaged, and must be capable of being used for at least 12 consecutive hours. They must also be handy, durable, simple in construction, capable of being securely fastened, easy to attend to and economical in use. The indicator must be at least equal to the benzine safety lamp in sensitiveness to methane and foul air. After burning 12 hours, the lamp must still give a light equal to 1 Hefner unit.

The adjudication is vested in a committee representative of the Government, the Westphalian miners' provident associations, and the Dortmund Mineowners' Association; and the prize may be divided if the committee so decide. If no lamp be deemed worthy of the prize, smaller sums may be awarded to those approaching the ideal standards most completely. Intending competitors will be required to forward three specimen lamps to the Verein at Essen-Ruhr, together with description, drawings and detailed instructions for use, in triplicate. All the documents must be in the German language. The closing date for sending in is October 1, 1913.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Surfacemen's Demands Rejected—Fresh Terms to Banksmen Refused—"Fighting Policy" Threatened—Delay in Drafting the Panels of Umpires—Five-day Week in South Wales and Elsewhere—Anticipation of Good Trade Ahead—War Shipments and Freight Rates—Identical Contract Form for Bunkering—Arrears Under Minimum Wage Award: 1,000 Men on Strike.

At a meeting of the Conciliation Board, held on Monday, the coalowners' representatives refused determinedly to give effect to requests which were brought to them. It will be remembered that at the Swansea conference of the Miners' Federation of Great Britain a resolution was passed desiring that negotiations should be opened in the different districts in order to bring the surfacemen under the Minimum Wage Act, and also the Eight Hours Act, by agreement with the employers; and at the meeting on Monday this request was submitted to the South Wales employers. Mr. F. L. Davis presided over the meeting on behalf of the owners, while Mr. W. Brace, M.P., president of the Federation, was the vice-chairman on behalf of the latter.

It was desired that there would be a readjustment of the hours and wages of the colliery banksmen, and also that the owners should deal with the question of surfacemen's hours and wages. The official report states

> the owners replied that in view of the obligations which the workmen's representatives had entered into under the Conciliation Board agreement, and as these demands were a breach of the agreement, the owners could not see their way to agree to any enquiry into the matter, as the standard rates and hours of this class had been fixed under the agreement.

The banksmen in this district are alleged to work long hours whilst their "standard" wage ranges from 2s. 10d. to 3s. 10d. a day; but to this, of course, the percentage has to be added. It is said that some of these men on the occasion of changes of shift, work more than 18 hours at a time.

Referring to the employers' answer, Mr. Hartshorn, who spoke on Monday evening, said that on account of the refusal the real necessity was for the Federation to perfect its organisation, and "immediately adopt a fighting policy"; for it was perfectly clear they would never get anything from the employers except what was wrung from them by the power of the organisation. It was the duty of the whole Federation to concentrate its efforts upon reforms in the conditions and wages of the surfacemen.

Some amount of unrest exists in the district owing to delay in drafting the panels of umpires who will finally determine questions at issue under the Minimum Wage Act. It is now above three months since the award was published, and no appointments are yet announced. The selection of umpires is indispensably requisite under the statutory rules. Disputes are arising almost daily in the different pits; but because the employers' chairman and the miners' president could not agree, the selection of umpires has not yet been made; and it remains for the independent chairman (Lord St. Aldwyn) to exercise his power, and himself to appoint the umpires. The sooner the better, for the avoidance of friction.

At Pencoed, in the Cribbwr drift of the Raglan Colliery, a good seam of coal, about 4 ft. thick, has been struck; and much gratification prevails locally because of anticipated developments which will afford employment for a larger number of men.

The Glyncorrwg Company have struck the No. 2 Rhondda seam in their sinking upon Ynyscorrwg Farm, within 10 ft. of its expected location. Development will at once be proceeded with, working towards Glyn Neath; and employment found for 300 to 400 additional men.

The question of reorganisation is, of course, one great subject of discussion at the present time—both in speeches and through the local Press. With it is bound up the new effort to secure shorter hours and other advantages for the surfacemen, because it is clearly recognised that upon the strength of the Federation in point of numbers depends its effectiveness in negotiation. Apart from this, the proposal of a five-day working week serves mainly to make manifest the differences of opinion among the leaders. What is urged in reference to the surfacemen's demand is that it is a national movement originating, and therefore to be pursued, just as the movement on behalf of the underground men was brought to a successful issue; that, moreover, any temporary defect of organisation is the outcome of the recent disturbances, and that there is no likelihood of the mass of miners failing to bring themselves once again into line. The demand for the surfacemen is regarded rather as an incentive to that end—really helpful in stimulating recruitment of the Federation ranks; and it is argued that the concession of a minimum wage already in effective operation has weakened the opposition to the desired extension of its principle.

Centralisation in the South Wales Federation is still strongly opposed by the anthracite men, 17,000 in number, and their agent, Mr. J. D. Morgan, addressing the Trimsaran men, explained its effect. He said that it would abolish the present districts, and then it would be impossible to deal with the innumerable disputes at the collieries by means of district committees. After careful consideration, he was convinced that it would be of great disadvantage to the anthracite district to centralise the funds. Therefore, as two-thirds of the anthracite miners voted against the scheme, also in view of the recommendation of the delegates at the last district meeting, he urged all workmen to go to the poll and give their final vote on the matter.

The president of Cardiff Chamber of Commerce, speaking at a meeting last week, said they were looking forward to a period of great prosperity, such as the district had rarely seen. One condition—of paramount importance—was that they must have industrial peace. Rumours were current of agitators among the men talking of limiting the work to five days a week; but if five days were better, why not four or three? They might congratulate themselves that whilst there were agitators there were also men of sound commonsense among the miners' leaders, and they might rely upon these to see that the work of the agitators did not bear material fruit.

Greek vessels in Cardiff were commandeered by the consul, notice having been served upon the captains that they and their crews were to consider themselves under military law; and this led to emphatic protest, two of the vessels being under charter, and heavy losses (in one case £8,000) occasioned. As a result the embargo was removed on Tuesday; and it is understood that the Greek Government will go into the open market for tonnage as required. Freights are much higher, several coal cargoes for the Piræus having been fixed at 18s. as against less than 14s. per ton previously; notwithstanding that practically no war risk exists, the Turkish fleet not venturing through the Dardanelles. Tonnage is scarce, however; and chartering clerks, of course, make the most of their opportunity. One Cardiff steamer, "14 Penpol," has been seized by Greeks in the Aegean Sea, her cargo being 3,000 tons of coal. But she is not a prize of war, her destination having been Varna, Bulgaria.

The Shipowners' Association at Cardiff has resolved to make representations to the documentary committee as to the desirability of having an identical form of contract for coal bunkering.

A thousand men came out on strike from the Ynysfeio Colliery, Treherbert, on Tuesday, their allegation being that 10 of their number had not received all that was due to them as arrears under the minimum wage award.

This question has occasioned much trouble in different parts of the coalfield, arising chiefly from the inherent complexity of the issue involved, and therefore it is all the more satisfactory to record the fact that agreement has been reached in the Rhymney and Pontlottyn area after considerable negotiation. The claims dealt with thus far are only up to July 5, some of them being of such a nature that at first there was a blank refusal to entertain them. As a result, however, of further discussion and negotiation, it was reported to the men's meeting on Tuesday that an offer had been received whereby the company would pay half what the men claimed in every instance, without putting upon the workmen the onus of proving each individual case, as is required under the award. The committee which had charge of the matter advised the workmen to accept this, for although in their opinion it would not produce quite so much money in some of the cases, "it would be

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intelligence relating to the trade
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tigation of Watkins v. the Naval
as been finally put an end to by an
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rakes gave way and the men were
bottom of the shaft. Watkins and
e killed and a number were injured.
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hat the death was caused by the
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an 20 men to enter the cage at one
ecovered £500 for the death of her
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ked that the court should make the
f Lords an order of court. This their
, and thus finally ended the litigation.

INTERNATIONAL ENGINEERING AND MACHINERY EXHIBITION.

At Olympia.

In our issue of the 11th inst. we referred to the opening of the above Exhibition on October 4, and we now give below a short notice of some of the more interesting exhibits which are in some measure applicable to the coal and iron industry.

André Citroen and Co., London, have an interesting exhibit of their gears, some of which are driven by electric motor, and comprise a set of single reduction spur gears, the ratio of which is 14 to 1, and the wheel of 5 ft. diameter, also a set of bevel gears of the type used in spinning mills. Another interesting exhibit on this firm's stand is that of a set of three rolling mill pinions, weighing 3 tons. The stand shows up well by the erection of a large 16 diameter ring-shaped spur wheel, of wood, and is cut on the face with double herring-bone teeth, 5 in. pitch and 20 in. wide on the face. Two large solid bronze spur pinions, a model bevel gears arranged to work manually, and a set of double reduction gear, consisting of bevel gears contained in a gear box—and also worked by hand—complete this firm's exhibit.

Siebe, Gorman and Co. Limited, 187, Westminster Bridge-road, London, S.E. Having in view the recent Mines Accident (Rescue and Aid) Act, the exhibits of this firm prove of special interest. The planning of the space has been well designed, and a portion of it is an air-tight chamber filled with poisonous fumes, in which periodical demonstrations are given by men equipped with the well-known "Proto" life-saving apparatus for use in mines after explosions and for work in irrespirable atmospheres generally. The men so equipped are two of the rescue party who did such heroic work at the appalling disaster at the Hulton Colliery in the Christmas of 1910. A glass-fronted tank is also erected on the stand, in which their divers give demonstrations in the use of the firm's self-contained diving apparatus fitted with submarine telephonic arrangements, electric lamps, &c., which its adaptability in flooded mines or other difficult situations where the employment of the usual tubes and air pump would of course be impracticable. The case of the flooded Severn tunnel during its construction in the year 1880 may be recalled as a practical instance where the original self-contained diving apparatus was brought into use, thereby saving the situation.

The Herbert Frood Company Limited, Chapel-en-le-Frith, and Rathbone-place, London, show their specialities of "Ferodo" linings for brakes, clutches, and friction drives of all descriptions, which prove all the more interesting owing to the fact that the majority of the examples shown have been in actual use. A post-brake lining is exhibited having been in use for six weeks, showing its practicability over wood and other linings. There is also a brake block having been run on the Underground Railways for over 1.600 odd miles.

Bonecourt Surface Combustion Limited, London, show samples of incandescent diaphragms for heating, together with several furnaces constructed on the same principle for various operations and processes such as melting, annealing, and the tempering of metals, &c. Arranged in the yard of the Exhibition, and near the stand, is perhaps the greatest feature of their exhibit and takes the form of a steam boiler, fired by gas on the Bonecourt system, which supplies the necessary steam for the Exhibition.

Alley and Maclellan Limited, Glasgow. A selection of this firm's valve specialities are being shown, a salient factor in which is that the passages are practically of full area, the steam being directed in easy curves, resulting in a very slight loss of pressure. A feature of no less importance is that ample packing is provided, thereby doing away with the frequent operation of re-packing. The valves are so designed as to provide exceptional strength, especially at the flanges, and the highest quality material is used in their manufacture. Another claim made by this firm in regard to their valves is the minimum cost for maintenance consequent on their special construction, and erosion, chattering, and water hammer are said to be practically eliminated.

W. H. Bailey and Co. Limited, Albion Works, Salford, Manchester, have their "Davidson" patent boiler feed pumps running here by compressed air. These pumps are specially designed for working against high steam pressure, and have 9½ in. diameter steam cylinder, 7 in. diameter pump cylinder, and 24 in. length of stroke. The firm also show their "Koster" patent two-stage air compressors, working and supplying compressed air to the boiler feed pump. These deal with 40 cubic feet of free air per minute, and are driven by electric motor. A new thing is their "Tell-tale" recording gauge, which instrument is a cheaper form, to meet a large demand, of Messrs. Bailey's well-known pressure recorder. It is without a clock dial, has a smaller case, and is furnished with the firm's legible straight-line diagram, 11½ in. long by 3 in. deep, which gives a clear, evenly-spaced record, intelligible to anyone.

W. Silversteen and Co., 147, Cannon-street, London, E.C. This firm's exhibits comprise various types of electro-magnets. A lifting magnet of rectangular shape, 3 ft. long by 8 in. wide by 8 in. high, is shown, and is capable of lifting iron blocks up to 36 cwt., or is equally suitable for loading and transporting iron goods in bulk. Demagnetising apparatus, electro-magnetic chucks, and electro-magnetic apparatus of various descriptions form other branches of this firm's manufactures which are also to be seen.

The British Oxygen Company Limited, Elverton-street, Westminster, London, S.W., show a wide range of their oxy-acetylene welding and oxygen metal-cutting apparatus in operation, which include blow pipes, hand and machine-controlled metal cutters. Some very interesting and useful books on the subject of oxy-acetylene welding are also to be had on application at this firm's stand.

The Power Plant Company Limited, West Drayton, Middlesex. This firm's exhibits consist of a wide range of their double helical spurs and bevels, and flexible couplings, amongst which may be mentioned their double helical spur gears with staggered teeth, produced by the firm's patent hobbing process, for which extreme accuracy is claimed. These range from the smallest model gears to a set of rolling mill gears, the width of face being 2 ft., and are capable of transmitting 600-horse power at 35 revolutions per minute. Another feature of the stand is a large range of self-contained totally enclosed speed-reducing and increasing gears, the larger type being capable of transmitting 300-horse power, with a range of 5 to 1, for driving a large factory. One set of gears, transmitting 24-horse power, when increasing from 475 to 3,000 revolutions per minute, is shown in operation, the speed of which is about 5,000 revolutions per minute, and is conspicuous by its silence and loss of vibration. Many other sets are shown, altogether forming a most interesting and instructive exhibit.

Tangyes Limited, Cornwall Works, Birmingham. This firm's exhibits consist of lathes, milling and drilling machines. These include a 5 ft. high-speed pillar type radial drilling machine, a No. 3 vertical milling machine, an 8 in. single pulley all-gear sliding and screw-cutting gap lathe, and a 10 in. centres capstan lathe.

Hans Renold Limited, Manchester. The chains exhibited by the above firm may be briefly classified under three heads—silent, roller and block. In the silent chain section there is a drive as small as 1-horse power, with a speed reduction of 1,500 to 500 revolutions per minute; chain speed 187 ft. per minute; 0·65 in. wide, ½ in. pitch, with a minimum breaking strength of 1,900 lb. In striking contrast to this is a 145-horse power drive, speed reduction 480 to 85 revolutions per minute; chain speed 1,200 ft. per minute; 12·2 in. wide, 1¾ in. pitch, minimum breaking strength 107,100 lb. Although at one time a 145-horse power chain drive might have been looked upon as something of an achievement, the drive is now quite an ordinary one, and drives of big horse-power such as this are constantly being demanded. In the roller chain section a contrast in size and strength is well struck by two chains; one a ⅝ in. pitch, with a breaking strength of 1,600 lb.; the other 3 in. pitch, with a breaking strength of 86,000 lb. In the block chain section, an adapted block chain showing elevator buckets attached to two strands of block chain serves to show the utility of this type of chain, the adaptations for which seem to be practically endless.

The Board of Trade, Exhibitions Branch, Queen Anne's-chambers, Westminster, London, S.W. This exhibit consists of a model on a scale of 1/100, and plans of the British Pavilion of the Ghent International Exhibition, 1913. Photographs are also shown of the British Machinery sections at the Brussels International Exhibition and the Turin International Exhibition, held in 1910 and last year respectively.

Messrs. **Hunt and Mitton**, of Oozells-street North, Birmingham, show engine and boiler mountings, including pressure gauges, water gauges, scum cocks, asbestos-packed blow-off cocks, parallel slide blow-off valves, check feed valves (iron or steel), parallel slide valves (iron or steel), stop valves (iron or steel), isolating valves, automatic exhaust valves, high steam and low water alarms, safety valves, injectors and indicator fittings. They also show general steam and water fittings, including gunmetal wheel valves, renewable seated wheel valves, gunmetal or cast iron cocks, asbestos-packed cocks (gunmetal and cast iron), gunmetal organ whistles, steam bulls, hummers and syrens, gunmetal or cast iron expansion boxes, cast iron sluice valves, foot valves.

John Thompson, Wolverhampton. This firm's exhibit consists of a Kennicott water-softener in operation, with a section of an up-to-date Lancashire boiler, having the "Thompson" dished ends and corrugated flues, to which is fitted a "Thompson" forced draught furnace, enabling the boiler to consume low-grade fuels. Another exhibit on this stand is that of a "Thompson-Mars" superheater with bent tubes, a "Thompson-Mars" economiser, and a vertical cross-tube boiler of the same make. Many features are put forward in favour of the dish-ended boiler, amongst which may be mentioned the absence of gusset stays and rivets, the ends being dished and so increased in thickness as to give the required factor of safety. Rivets connecting the end plates to the shell and flues are subject to shearing instead of tensile strain, and are riveted by hydraulic power. No angle rings are required, owing to the end plates being flanged to the boiler. The internal cleaning of the boiler is said to be more easily accomplished by the absence of stays, and increased heating is obtained of the surface by the corrugated flues, as the latter so baffle the flame and cause it to impinge upon them, thereby obtaining the maximum heat value. The Kennicott softener, also shown at work, is a plant of 1,250 gallons per hour normal capacity. This is fitted with revolving pipes which remove the sludge from the bottom of the plant, which does away with the necessity of opening the main tank for the removal of sludge. The proportions of lime to water is another feature of the Kennicott economiser.

Coventry Chain Company Limited, Coventry. This firm's exhibits include four noiseless chain drives running, the motive power being supplied by a B.T.H. motor. One of the drives is coupled to a chain-driven speed-reduction box, which is also shown in motion. An example of the "Coventry" shock exhaustion wheel and noiseless roller and block chains are other features on this firm's stand.

Sturtevant Engineering Company Limited, 147, Queen Victoria-street, London, E.C. Crushing and screening machinery for mine work is exhibited by this firm, among which may be mentioned their "ring-roll" mill and also their "roll-jaw" crusher. Sturtevant laboratory machinery is exhibited in operation, while also shown in operation is a dust-exhausting plant, consisting of fan piping and dust filter. A large Sturtevant fan and a number of small "Ready to Run" motor-driven fans (in operation) form other features of the stand, while a Sturtevant turbo gas exhauster is another interesting exhibit.

Letters to the Editor.

The Editor is not responsible either for the statements made or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

THE STATUS OF COLLIERY SURVEYORS.

Sir,—I am head surveyor at a large Yorkshire colliery, and in favour of the formation of an institute of mining surveyors, but would be opposed to throwing open the membership to *all* who hold a Government certificate, as I do not think the two years' qualification long enough; and if we form an institute, it should be open only to those who have had a proper training under a qualified mining surveyor (say, four years) resident at a colliery, or have served as articled pupil under an established mining engineer, and in both cases hold a Government certificate. We should then increase the value of the certificate, and membership of the institute would carry weight.

I would suggest that Mr. Lockerbie should, through the columns of your paper, call a meeting at a convenient centre—say, Leeds or Manchester. I feel sure a sufficient number would attend to get the matter into working order. Certified Colliery Surveyor.

October 20, 1912.

THE RELATIVE INFLAMMABILITY OF COALDUSTS.

Sir,—As these important results have not been brought before a scientific society, at which they might be criticised, I hope you will allow your space to be used for that very necessary function—necessary, that is, if any real progress is to be made in the prevention of exposions in mines.

The main object of the Explosions in Mines Committee is presumably to find means of how to prevent explosions, and all their methods and experiments should directly or indirectly be designed with that object.

Taking this for granted, some of the methods used, as described in the above report, are very much open to criticism.

1. *The dusts before being tested are dried in air at 100 degs. Cent. for an hour.* Anyone who knows the chemistry of coaldusts (what little is known), and particularly Bedson's and Trobridge's work on the occluded gases in coal and coaldusts, must certainly quarrel with this procedure. In the absence of any evidence being put forward that this does *not* free the coaldust from any or all its methane and oxygen and substitute carbon dioxide instead, it is as well to assume that this is what actually happens. The inflammability of some coaldusts rich in occluded marsh gas and oxygen is altered, while in other dusts it is not. Oxygen is certainly taken up very rapidly at 100 degs. Cent. by most coaldusts and by some more than others.

Why dry the dusts? or, if they must be dried, why choose 100 degs. Cent., and air under which treatment some dusts are profoundly altered? Do we ever get a mine ventilating current at 100 degs. Cent.?

2. *The source of the ignition used is a hot platinum spiral heated by an electric current.* Do we have hot platinum spirals in a mine? No. The use of such a spiral in the laboratory experiments is only legitimate if it is standardised against something liable to ignite dusts in a mine. The objection to the hot platinum is the very strong catalytic action it has in effecting combustion, and it is therefore a most objectionable source of ignition in such experiments. One dust may have constituents easily affected by such a catalytic hot surface; another dust may not, although the two may be of equal inflammability, with an ordinary source of ignition such as a big flame or a broken arc, &c.

In the case of ignition temperatures of gas mixtures, Dixon and Coward (J.C.S., 1909, 95, 514) have shown how to eliminate the solid surface influence, and a modification of this process might easily have been applied to coaldust and air ignitions.

3. The conclusion "*that the relative inflammability does not depend upon the total volatile matter, but on the relative ease with which inflammable gases are evolved*," shows that the members of the committee (or their chemists) still have their brains clogged with the old superstition that inflammable gas is necessary in order to get an explosion—a view, it is true, one hears expressed by men of great experience in explosions.

It has taken over 100 years to remove the old superstition that free gas must be present to get an explosion, and here we find how little the movement has been. We must now, forsooth, have the gas *indirectly*.

There should be no doubt in the mind of any chemist who has made a study of combustion and explosions that volatile matter in the coaldust is more chemically active (more combustible) than the same volatile matter is after conversion into free gas or vapour.

In this connection it need only further be pointed out that aluminium dust and air when ignited gives a violent explosion. Where is the volatile matter here, and where is the inflammable gas?

4. The committee appears to have overlooked what a great many chemists will consider a vital point—the quantity and quality of the gases occluded in the coaldusts tested. The Bedson test of the occluded gases, quantity and composition should certainly be done if the results are to be of any scientific or practical value in future research work. John Harger, M.Sc., Ph.D.

Chemical Laboratory, The University of Liverpool,
October 22, 1912.

PROTEST OF A COLLIERY UNDER-MANAGER.

Sir,—I beg through the medium of your valuable journal to strongly protest against Section 3, Clause (1), of the Coal Mines Act, 1911, which reads, "in every mine required to be under the control of a manager daily supervision shall be exercised by the manager and where an under-manager has been appointed by the owner or agent of the mine, also by that under-manager."

In the Coal Mines Regulation Act, 1887, Section 21, Clause (1) reads, "in every mine required by this Act to be under the control of a certificated manager, daily personal supervision shall be exercised by the manager, or by an under-manager."

An under-manager holding a second-class certificate under the 1887 Act could largely fulfil the duties of a manager where personal supervision was not every day exercised by such manager. Now, under the 1911 Act, such would not be legal. The daily personal supervision must be given by the manager, and therefore supervision by an under-manager is superfluous. The change must materially alter the commercial value of an under-manager's certificate. The holder of a second-class certificate by this recent Act is robbed of a large portion of the value of his property in a certificate for which he had given much labour in study, not to speak of expenditure.

The legal responsibility of under-managers is entirely changed. It is without precedent in legislation that the professional powers of any class of men are reduced in the lives of each member of the class by a new legislative enactment. In the 1872 Act, any man previously managing a colliery was granted a certificate of service without examination. Why could a similar procedure for under-managers not have been followed in this Act?

This letter is not to ask for favours, but a demand for common justice. R. Taylor.

Seaton Delaval Colliery.
October 23, 1912.

INCOME TAX AND MINES.

There has recently been issued the 55th report of the Commissioners of H.M. Inland Revenue for the year ended March 31, 1912 [Cd. 6344]. Under the head of estate duty, statistical analyses are given of capital values, of which the department had notice during the year in the course of administration of the Acts relating to estate duty. The figures have been arranged so as to indicate as nearly as possible the relative capital values of the several kinds of property contributing to the duty, whether in lump sums or in yearly or half-yearly instalments. From these statistics it appears that in 1911-12 property in mines, minerals and quarries subject to duty had a total gross capital value of £872,863, this covering 140 properties; the deduction therefrom amounted to £19,564, or 2·24 per cent., leaving the net capital value £853,299. The gross and net figures are higher than in the preceding year. The following shows the gross capital value in each year:—1901-02, £938,159; 1902-03, £758,554; 1903-04, £581,175; 1904-05, £1,017,158; 1905-06, £1,381,361; 1906-07, £1,501,298; 1907-08, £1,358,437; 1908-09, £469,749; 1909-10, £477,866; 1910-11, £607,319; 1911-12, £872,863.

The following shows the gross assessments of profits on mines in the year 1910-11, representing the average of the profits of the five preceding years:—

	Persons.	Firms.	Public companies.	Local authorities.
Metropolis	—	—	£15,943	—
No.	—	—	*13*	—
Rest of England	£820,484	£1,269,266	£14,808,435	—
No	*367*	*337*	*818*	—
Total England	£820,484	£1,269,266	£14,824,378	—
No.	*367*	*337*	*831*	—
Scotland	£64,896	£229,046	£2,119,545	£61
No.	*46*	*41*	*121*	*1*
Ireland	£8,301	£200	£6,570	—
No.	*15*	*1*	*7*	—
Total	£893,681	£1,498,512	£16,950,493	£61
No.	*428*	*379*	*959*	*1*

Totals:—£19,342,747; *No. 1,767.*

Owing to the delay in passing the Finance Bill for 1909-10, the figures are somewhat lower for that year, and somewhat higher for 1910-11, than they would have been in normal circumstances.

In recent years the gross assessment of mines has been as follows:—1901-02, £17,641,593; 1902-03, £20,258,907; 1903-04, £21,194,470; 1904-05, £21,235,729; 1905-06, £19,999,972; 1906-07, £16,371,678; 1907-08 (estimate for the full year; the actual figures are incomplete), £16,400,000; 1908-09, £16,614,322; 1909-10, £18,460,036; 1910-11, £19,342,747.

The profits from ironworks include the profits of that section of the iron trade which is concerned with the smelting of the ore, whether such profits arise solely from smelting or from smelting carried on conjointly with other industries. The assessments are made on the basis of the profits of the preceding year. In recent years the gross assessments on profits of ironworks have been as follow:—1901-02, £6,600,263; 1902-03, £4,020,621; 1903-04, £3,414,896; 1904-05, £3,134,867; 1905-06, £2,683,637; 1906-07, £3,030,532; 1907-08, £4,500,000 (estimate for full year); 1909-10, £3,850,141; 1910-11, £3,233,472. As regards the years 1909-10 and 1910-11 the remarks made in regard to assessments on mines for those years apply. The details for 1910-11 show that the profits of 95 concerns amounted to £3,233,472, divided as follows:—England, £2,238,573 (82); Scotland, £993,646 (10); Ireland, £1,253 (2). Otherwise divided, five persons showed profits amounting to £48,003; eight firms' profits amounting to £15,466; and 82 public companies' profits of £3,169,998.

AL AND IRON TRADES.

HURSDAY, OCTOBER 24.

and, Durham and Cleveland.

yne.

COAL.

k 137,927 tons of coal and 1,210 tons of
ed from Tyne Dock, a decrease of 22,048
56 tons of coke when compared with the
corresponding week of last year. The
s amounted to 61,349 tons of coal and
, a decrease of 2,581 tons of coal and
. The Blyth shipments totalled 96,999
oke, an increase of 8,300 tons. After all,
ppears to have fared better in the Berlin
it than was at first reported. It is stated
of Silesian coal have been taken—as an
hat 230,000 tons of good Durham sorts
at f.o.b. prices ranging from 12s. 6d. to
ivery is to be over next year, and the
inviting offers of a further quantity of
rham coal for similar shipment. Other
ntracts are as follow:—40,000 to 50,000
nd steam seconds and 20,000 tons smalls
next year at 12s. 6d. per ton, f.o.b., for
smalls; quantities of Blyth steam large
milar shipment at 13s. and 9s. respec-
s Durham coking unscreened for next
13s. 6d., f.o.b.; a large quantity of the
bought about three weeks ago, and now
of 1s. 6d. per ton; 50,000 tons ordinary
for next year's delivery, at 13s. f.o.b.;
teams, for similar shipment, at 13s.; a
verage coking coal, for shipment over the
t 14s. f.o.b.; 20,000 tons Broomhill large
Broomhill small steams, for delivery over
and 9s. 1½d. respectively; 20,000 tons
, for like delivery, at 13s.; 6,000 tons of
nkers, for 1913 shipment, at 13s.; 35,000
s coals, for the Stettin Gasworks, at an
; and several lots of Durham gas bests
delivery to one of the Metropolitan gas
remainder of the year, at a considerable
ntract rates. In addition, the gas company
d to have purchased considerable quanti-
als at lower prices than were quoted locally.
rket is very strong. Besides the contracts
ne 30,000 tons of Blyth steams (large and
o have been sold for next year's shipment
respectively, and the collieries are now
business at these figures. One of the
tated to have already sold one-third of
year. It was reported earlier in the week
9d. per ton f.o.b. for 50,000 tons of D.C.B.
ivery had been declined. The enquiries
ude the following:—Supplies for several
mpanies over next year: 10,000 tons of
rly shipment to the West Coast of South
antities of steams for early shipment to
dria; pressing enquiries for blastfurnace
supplementary supplies for some of the
nies; 100,000 tons of coking coals for
o Belgium; 120,000 tons of good Durham
Stockholm Gasworks and 40,000 tons of
the Stockholm electrical department,
year; 90,000 tons best steams for
Norwegian State Railways, delivery from
b. There has been a sharp rise in the
mpt shipment of most classes of fuel
with congested loading turns and
demand, business for early loading is
lishment. F.o.b. quotations for prompt
follow (unaltered where not otherwise
ns, Blyths (D.C.B.), 13s. 6d. to 14s. per
from 3d. to 9d. on the week; Tynes
d. to 14s., from 3d. to 6d. dearer; seconds,
up; Tynes (Hastings or West Hartleys),
higher; unscreened, 12s. to 12s. 6d., 6d.
be, 9s. 9d., stronger; Tynes, 9s. 3d. to
; specials, 10s. 6d., firmer; smithies, 14s.,
gas bests (New Pelton or Holmside), 14s.,
elaw Main or similar), 13s. 6d., from 3d.
pecials, 14s., 6d. improved; unscreened
13s. 3d. to 14s., 6d. more; Northumbrians,
1s. risen; coking coal, 13s. 6d. to 14s., 6d.
. 6d., similarly increased; households,
ndry, 25s.; blastfurnace, 22s.; and gas

COAL.

n Sunderland last week amounted to
nd 2,825 tons of coke, as compared with
and 1,880 tons of coke for the corre-
911, being a decrease of 16,205 tons of
of 945 tons of coke. The demand for
in fact, the position for all classes of
it has been at any time this year, and
re extremely scarce, sellers are asking
prices up to the end of the year. Steams
unscreened sorts for bunkering purposes

remain very strong on the sustained enquiry; there is also a keen demand for gas coals. Coke is in good request both for local use and shipment, and supplies are scarce. It is reported a contract for 50,000 tons of good bunkers has been placed at 13s. for delivery next year. Enquiries are current for a large quantity of coking unscreened for shipment to Belgium this year, while the Stockholm Gasworks require 120,000 tons of gas coals, and the electrical works 40,000 tons of steam smalls for next year; the Berlin Gasworks are also enquiring for 200,000 tons of gas coal for delivery next year. The following are about the average market quotations:—Special Wear gas, 14s. 9d. to 15s.; best gas, 13s. 9d. to 14s.; seconds, 13s. 6d.; coking unscreened, 14s.; smalls, 13s. 6d. to 14s.; smithies, 14s.; peas and nuts, 14s. to 15s.; households, 14s.; bests, 15s. 6d.; blast-furnace coke, 24s. 6d.; foundry coke, 26s.; gashouse coke, 22s. 6d. Bunker quotations are: Ordinary kinds, 13s. to 13s. 9d.; bests, 14s. to 14s. 3d.; superiors, 15s. Owing to the difficulty in securing loading turns business has been somewhat restricted. Mediterranean is stronger, fixtures are: Genoa 13s. 6d., Venice 15s., and a vessel has been chartered to Constantinople at the high rate of 19s. per ton. Coasting is strong for ready boats on the basis of: London 4s. 3d., Nantes 8s. 3d., Antwerp 6s., Calais 6s., Havre 6s. The Bay is also strong, as shown by: Lisbon 9s. 9d., Bayonne 8s. 6d., St. Nazaire 7s. 9d., Oporto 12s. 10½d. The Baltic season is drawing to a close, and rates are on the easy side. Stockholm 7s. 3d., Helsingfors 7s. 9d., Swinemunde 6s. The River Plate is quoting 23s. to 24s. for prompt loading.

Middlesbrough-on-Tees.

COAL.

There is a very full enquiry for fuel, and the position in all departments is stronger than it has been for some time past. Demand for coal for November and December is good, whilst for next year's delivery many purchasers abroad are coming into the market much before the usual time. Quotations on forward account are a little above prompt figures. Deliveries of gas coal are heavy. Best Durham gas coal ranges from 13s. 9d. to 14s. 3d. f.o.b., and seconds are 13s. 6d. to 13s. 9d. Bunker coal is well taken up, and ordinary Durhams are 13s. to 13s. 3d. f.o.b., bests 13s. 6d. to 14s. and special kinds 14s. 6d. to 15s. Coking coal is in excellent demand, and has been so well sold over next year that there is very little available surplus. So scarce is coking coal that unscreened kinds are realising 14s. 3d. to 14s. 6d. for good quality, and up to 14s. is named for coking smalls. The supply of coke is fully absorbed. Local requirements are very heavy, and up to 24s. 6d. is quoted for average blast-furnace kinds delivered at Teesside works. Foundry coke for shipment is now in the neighbourhood of 26s. f.o.b. Gas-house coke is put at 23s.

IRON.

Quietness characterises the iron trade just now. War news is blamed, to a considerable extent, for the present inactivity; but the present lull is also largely due to the usual period of comparative idleness after briskness. Values of Cleveland pig iron are rather unsteady, being influenced by fluctuations in warrants. No. 3 g.m.b. Cleveland is now 66s. 9d. for early f.o.b. delivery, and that rate is also quoted for No. 4 foundry and No. 4 forge iron, both of which are so scarce that makers are anxious to deliver No. 3 in their place. Forge iron is said to be almost unobtainable. Mottled and white iron each stand at 66s. 3d. No. 1 Cleveland pig is reported fairly plentiful, and is rather freely offered at 71s. 3d. Enquiries for east coast hæmatite pig do not appear to lead to sales. There is little iron to be had, and the market quotation for this year's delivery of Nos. 1, 2 and 3 stands at 80s., though some second hands are prepared to sell small odd lots at a little below that figure. Foreign ore, though still inactive, fully maintains its value on the basis of 23s. ex-ship Tees for rubio of 50 per cent. quality. Complaints are frequent that ore boats are difficult to fix. Freights as high as 7s. 9d. have this week been paid for Bilbao-Middlesbrough. The various branches of the manufactured iron and steel industries present no new features of moment. Producers are so full of work that they are not seeking new contracts. Quotations all round are stationary.

◆

South-West Lancashire.

COAL.

The inland household trade is at the moment not above an average October delivery, many customers utilising the fuel bought during the August and September rush. Prices are without change at about 16s. 3d. for the best qualities, 14s. 6d. to 14s. 9d. for good second grades and 12s. 3d. or thereabouts for kitchen coals—all into wagons at the pit. The heavy consumption continues for screened coal for forge and manufacturing purposes. Bunkering requirements this week are, on the whole, up to the average of recent weeks, though, owing to the large amount of outward cargo offering, bunker fuel taken here is in many cases cut down to the lowest possible quantity. Supplies generally are more readily available, and prices of screened Lancashire steam coals remain at from 12s. 6d. to 13s. 6d. f.o.b., according to quality. House coals for the coastwise and cross-Channel trade are lagging a little at the moment, not for want of orders but by reason of irregularities of running on the part of the coastwise vessels. Best coals for prompt shipment rule at about 16s. 6d., with good medium grades 15s. or thereabouts—both f.o.b. There is nothing new to report with regard to slacks at the moment. Requirements are being promptly met with prices from 9s. 9d. to 10s. for the best rough qualities, with second grades 9s. to 9s. 3d., and the commoner and finer sorts at about 8s. 6d.—all into wagons at the pit.

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South Lancashire and Cheshire.

COAL.

There is nothing of special interest to report in regard to the coal trade; house coal is moving away in moderate quantities and prices are steady at late rates, 16s. 6d. to 17s. for the best house grades, with good medium qualities 15s. 3d. to 16s., and the commoner sorts from 12s. 6d. to 13s.—all into wagons at the pit. Furnace coal is in steady demand, and the price is firm at about 12s. 6d. per ton at the pit. Business in shipping coal continues brisk, the price being unchanged at about 14s. f.o.b. Partington. Slack is in moderate call with prices at 9s. to 9s. 9d. for the best qualities, with the commoner grades at from 8s. to 8s. 6d.—all into wagons at the pit.

IRON.

Pig iron, and the finished commodities, remain without change at prices previously quoted. There is a very big volume of work going through, and everybody in the district—whether cotton mills, collieries, or iron and steel works—are all fully employed.

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Yorkshire and Derbyshire.

Leeds.

COAL.

The main topic of interest on the Yorkshire Coal Exchange on Tuesday was the agreement come to by the masters and men with reference to the Conciliation Board and wages. Although the form of agreement was confidently anticipated, there is no doubt that considerable forward business has been held back until these matters were finally settled. It is expected that colliery owners will now be more ready to enter into business over next year. There are many enquiries. Business on 'Change was fairly brisk, but the orders given out were mainly for small parcels of house coal and works fuel. The pits have worked fairly regularly, considering the scarcity of empty trucks. Quite five days have been averaged. The output has been cleared, with the possible exception of house coal, part of which has been put into stock. London merchants have taken full contract tonnage, but very little beyond. Pit prices are very firm, as under:—Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. to 14s.; Silkstone best, 13s. to 14s. (special qualities up 14s. 6d.); Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. 6d. to 12s. The coastwise trade is moderate. Secondary qualities of house coal are appreciably dearer. Current f.o.b. Hull figures:—House coal, 16s. 6d. to 17s.; Silkstone best, 15s. 6d. to 16s. 6d.; Silkstone house, 14s. 9d. to 15s. 3d.; house nuts, 13s. 6d. to 14s. In Leeds, Bradford, Halifax, and some other West Riding centres merchants report a sluggish retail trade, but more enquiries for best qualities. Pit prices are unchanged, but firm, as follow:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s.; secondary qualities, 13s. to 14s. 6d. There is a strong call for manufacturing fuel, and supplies are none too plentiful. Buyers inclined to contract find pit prices about 3s. per ton higher than 12 months ago. Coking smalls are still very scarce. Pit prices:—Large double-screened engine nuts, 10s. to 11s.; small nuts, 9s. 6d. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. 6d. to 10s.; best rough slacks, 8s. 6d. to 9s.; small slacks, 7s. 6d. to 8s. 3d.; coking smalls, 7s. 6d. to 8s. Prices of washed furnace coke remain at 18s. per ton at the ovens, with the demand far ahead of the supply. The gas coal pits are being urgently pressed for supplies ex contracts, and there is very little coal free for the open market. Pit prices are exceptionally firm. It is said that one large local gas authority is to-day cheerfully paying, in order to replenish its stocks, quite 6d. per ton more than the prices declined a month ago. Current pit prices:—Screened gas coal, 11s. to 12s.; gas nuts, 10s. to 11s.; unscreened gas coal, 9s. 6d. to 10s. There is a good demand for export, and f.o.b. Hull prices average as under:—Screened gas coal, 12s. 9d. to 13s. 6d.; gas nuts, 12s. 6d. to 13s.; unscreened gas coal, 12s. to 12s. 6d.

Barnsley.

COAL.

There has been very little change in any section of the trade during the week, though perhaps there was an easier tendency prevailing at some collieries in regard to steam coal. A much less quantity of large steams is being sent to Hull at the present, and though there is still difficulty in obtaining tonnage at what is regarded as a reasonable freightage, it is apparent that, at all events so far as the Baltic ports are concerned, the bulk of the requirements for the season has been supplied. The quieter demand is largely in regard to the Mediterranean ports, and prices are therefore again slightly weaker. Coalowners, however, are not disposed to grant any material concessions, and their position is strengthened by the granting of the recent 5 per cent. advance in wages; but the fact remains that with a full output there is more than an average surplus of coal to be dealt with. Prices are now about 10s. 9d per ton for the best hards, and secondary descriptions vary from 9s. 9d to 10s. 3d. per ton. The disturbance of trade consequent upon war is expected to have an early effect on some of the home trade districts which will cause a reduced demand for the smaller kinds of fuel, which of late have been in such good request. Buyers are therefore looking forward to easier quotations. For the present sellers are demanding late prices. The best quality washed nuts are still making from 10s. to 10s. 3d. per ton, and secondary descriptions 9s. 3d. to 9s. 6d. per ton. Slacks continue to be in strong demand, the better qualities yet being rather scarce, and late quotations—8s. to 8s. 3d. per ton—still prevail. The rougher kinds of slacks, the bulk of which are retained at the collieries for their cokemaking plants, however, are rather more plentiful, and prices are from 7s. to 7s. 6d. per ton. On gas coal account a good enquiry is reported from abroad, but with few exceptions the local collieries, though working full time, have difficulty in keeping up deliveries on contract account. The demand for house coal has not shown much vigour during the week, but collieries having such small stocks on hand are still able to deal with the position and to enforce the quotations which have prevailed of late. The best quality coal still presents the least difficulty, and quotations are as follow:—Best Silkstone, 14s. 6d. to 15s. per ton; Barnsley softs, 14s. to 14s. 3d. per ton; secondary descriptions, 12s. 6d. to 13s. per ton; and best washed nuts are making about 11s. 6d. per ton. The remarkable demand for coke continues, and the demand is well in excess of the output, despite the fact that the output is being augmented as far as possible. Buyers with small contracts are having to supplement deliveries, and they have to pay high prices. As high as 18s. per ton is again being made, but the greater portion of the production is being dealt with under contract.

Hull.

COAL.

The tone of the market generally is firm, and a brisk inland and export demand keeps prices up to the recent level. The weak spot is South Yorkshire steam hards, which have been in very slow demand and sagged considerably earlier in the week. To-day, however, there is a somewhat better enquiry, and prices show a hardening tendency. The continued scarcity of shipping tonnage, and especially small boats, has had an adverse influence on the export trade, which, however, is fairly strong. Derbyshire steam hards at Hull are fully 6d. dearer than Yorkshire steams, while washed doubles command high prices. Secondary sorts and small coals generally continue in good request, as also do gas coals, which are very firm. House coal is an improving market. Forward business is fairly good, and is being done on the basis of 14s. 3d. f.o.b. at Hull for best South Yorkshire steams. A normal quantity is being shipped at the docks, both foreign and coastwise, though no great stocks are in the sidings. The latest advices from St. Petersburg concerning the Baltic, to hand to-day, states: "Seven degrees frost; very cold weather all over North Russia; fear early close of navigation." The freight market is quiet, and only a few fixtures are reported. The Baltic demand is poor, and small or medium vessels have been engaged Hull to Cronstadt at 7s. 3d. and 7s. 6d. Riga is quoted at 6s. 4½d. and Reval 6s. 6d. Coastwise the rates are on the basis of London 4s. to 4s. 3d. Rotterdam has been fixed from Immingham at 4s. 3d. and Boulogne from Goole at 7s. The following are the approximate prices for prompt shipment f.o.b. Hull:—South Yorkshire: Best steam hards, 13s. 9d. to 14s.; washed double-screened nuts, 13s. 6d. to 14s.; unwashed double-screened nuts, 12s. 6d. to 13s.; washed single-screened nuts, 13s. 3d. to 13s. 6d.; unwashed single-screened nuts, 12s. 3d. to 12s. 6d.; washed smalls, 11s. 6d. to 11s. 9d.; unwashed smalls, 10s. 6d. West Yorkshire: Hartleys, 13s. to 13s. 6d.; rough slack, 10s. 3d. to 10s. 6d.; pea slack, 8s. 9d. to 9s.; best Silkstone screened gas coal, 13s. 3d. to 13s. 6d.; best Silkstone unscreened gas coal, 12s. 6d. to 12s. 9d. Derbyshire and Notts: Best steam hards at Hull, 14s. 3d. to 14s. 6d.; best steam hards at Grimsby, 14s. to 14s. 3d.; Derbyshire nuts (doubles) at Hull, 13s. to 13s. 3d.; Derbyshire nuts (doubles) at Grimsby, 12s. 9d. to 13s.; Derbyshire large nuts at Hull, 13s.; Derbyshire large nuts at Grimsby, 12s. 6d. to 12s. 9d.; Nottinghamshire hards at Hull, 13s. 9d. to 14s. 3d.; Nottinghamshire hards at Grimsby, 13s. 6d. to 14s.

Chesterfield.

COAL.

Business in the house coal branch of the trade has improved during the last few days, and merchants are placing orders more freely than they have done lately. Prices remain firm with a tendency to advance. Scarcity of wagons is interfering seriously with the regular working of the pits, while the prevalence of fog is adding to the difficulty. The demand for fuel for manufacturing use is stronger than ever, and consumers still find considerable difficulty in obtaining full supplies. Contracts for cobbles and nuts for gas producers are being renewed at substantial advances, while in almost every instance buyers are anxious to purchase a larger quantity than was covered by the expiring contracts. There are no stocks at the collieries, and as a rule the whole output of a colliery is disposed of every day with not a single loaded wagon left in the sidings at the close of the day's operations. Slack for steam raising is in strong demand and prices are very firm. It is impossible to meet the full requirements of the market. There is a distinct shortage of small fuel, and in many cases collieries themselves experience much difficulty in obtaining sufficient for their own use. The price of slack of the best kind is now up to 8s. per ton at the pit. Steam coal for locomotive use continues in great demand, and heavy deliveries are going forward daily. Railway companies are, as a rule, quite unable to obtain a larger quantity of coal than is sufficient to meet their current requirements. To add to their stocks is at present quite out of the question. The export trade is active, and heavy shipments of steam coal continue to be made on account of existing contracts. No sales of this class of fuel have yet been made for next year's shipment. Enquiries are now coming forward, but the ideas of buyers and sellers with regard to prices are so widely apart that it is impossible at the moment to come to terms. There is an active enquiry for slack for export both for current delivery and for shipment over next year. Prices are strong. There is also a very brisk enquiry for washed nuts and washed slack for shipment over 1913; indeed, the demand for small fuel has never been so great as it is at present, while the available supply tends to become more and more restricted as the collieries' own requirements for the rapidly-increasing number of by-products grow at their present rate. The coke trade maintains the considerably strong position which it has occupied during the present year, and there are no signs of any change. The demand is active for blastfurnace qualities, as well as for foundry and steel-melting kinds, and prices, which are already on a high level, are firmer than ever. Consumers have much difficulty in procuring all they require even at the current dear prices. Coking fuel is scarce, and much trouble and inconvenience is caused at the ovens in consequence. Quotations are as follow:—Best 14s., seconds 12s. 6d., cobbles 12s., nuts 11s., slack 8s.

IRON.

The iron trade of the district is in a buoyant condition. There is an active demand for pig iron both for forge and foundry purposes, but supplies are scarce. Finished iron is also in brisk request with prices unchanged at the recently advanced figures. Engineers and ironfounders are very busy, while wagon builders are inundated with orders.

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Nottingham.

COAL.

The general tone of the coal trade in this county continues to be of a moderate character, yet in the past week the collieries have nearly all been fully employed. In the house coal section local merchants are purchasing sparingly in the hope of a fall in prices, but a good business is being done at the landsale depots. The tonnage to London and the southern and eastern counties has not been quite so weighty and orders are not so numerous. Still, the outlook is by no means discouraging, and with a sharp spell of weather a revival is sure to set in. In the present state of affairs prices are being well maintained, and there is practically no change in quotations from a week ago. There is a less active tone in the steam coal branch, the demand on export account beginning to display a falling off, and collieries are able to cope with orders comfortably. Owners have obtained higher contract rates for supplies to railway companies than a year ago, the companies paying from 10s. 3d. to 10s. 9d. per ton. For best steams the ruling prices at the pits are 11s. to 11s. 6d. per ton, seconds 10s. to 10s. 6d. Slacks are in steady request. Coke is going out of hand satisfactorily.

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Leicestershire.

COAL.

Business continues very brisk in this district. The collieries have a very full supply of orders and the output is heavy. It would be heavier if all the coal could be sent away, but restricted means of transportation check working time. There is a good demand for household coal generally, except for the best qualities, which are rather slow. These may be expected to recover shortly. Small household coal is in very good request, and there is also a good demand for the medium qualities. Steam coals of all sorts are in quite brisk demand, and deliveries are pressed for. Local merchants are not quite so busy as they have been, but the quietness is not very seriously regarded. The market continues very firm, and there appears but little probability of there being any decline from the present rates. The prices which have ruled for some weeks, and which are high, are fully held, and form the basis on which business is transacted. There is a very cheerful prospect for some time yet, and a busy season is anticipated.

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South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL

Throughout the Cannock Chase district a good business is being done in connection with the coal trade. Orders are coming freely to hand, and the collieries are working regularly. The local "wakes" have given some of the miners an excuse for a day's play. Prices on the whole are satisfactory, with an upward tendency. There was a slight easing off in the demand for house coal, but it is becoming brisk again. For fuel for manufacturing purposes the enquiry continues satisfactory. Railway sales are brisk, and there is an improvement in business at the landsale depots.

Birmingham.

COAL.

Best coal is in less active demand, and stocks are beginning to accumulate at several collieries. For all other sorts there is the usual brisk enquiry, and prices on all contracts rise automatically by reason of the advance in miners' wages, which took effect from the 16th inst. Merchants were notified on Thursday to this effect, and in turn communicated with their customers. The market generally is quite firm, and the outlook is hopeful.

IRON.

The weekly meeting of the iron trade revealed little change. So far as can be gathered, the war in the Balkans has not materially affected export business. It is noticeable that merchants are buying up all the galvanised sheets available, defective or otherwise, and these will presumably find their way to the seat of war to be utilised for military cantonments. Pig iron quotations are firm and unchanged, and attempts to secure concessions in the present state of the fuel market are not likely to be successful. Makers of small rounds and bar iron generally are trying to obtain lower prices for puddled bars; but here, again, the cost of fuel, coupled with the advance of 5 per cent. in miners' wages and the high price of pigs, are advanced as reasons for maintaining the high figures of £6, and in some cases £6 2s. 6d.—fully £1 a ton more than was asked for puddled bars a couple of years ago. In the bar iron trade the extreme pressure may be said to be over. Merchants have made up their stocks and are not disposed to speculate with prices at the present high level, which for merchant qualities is firmly quoted at £8 5s. to £8 10s. per ton. Still the principal houses have got easily two months' work on their books, and the outlook is hopeful. There is also a good demand for nut and bolt iron from Darlaston users. Galvanised sheets continue to strengthen, and for forward delivery nothing under £13 5s. is taken, with a few makers quoting £13 10s. Black sheet makers are also doing well, both in respect of the amount of business and values obtained. Strips, gas and steel are unchanged. The conditions in the bedstead industry are a shade less active, the increasing cost of production having checked output, and consequently less steel strip is going into consumption there. Conditions in the steel trade continue brisk, and for certain classes of plate makers cannot promise delivery until the second half of next year, so heavily are they sold. All the heavy trades of the district are in full activity, and in the case of carriage and wagon industries there is an increasing proportion of high-class railway carriage work in prospect. Copper sheets have fallen £2 a ton, and the basis now stands at £91. A fair amount of business is passing.

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Forest of Dean.

Lydney.

COAL.

The house coal trade in this neighbourhood has undergone practically no change since last writing. Whilst showing no further signs of expansion, the business passing continues of a fairly satisfactory character; but it cannot be said that there is anything in the way of pressure in the demand. The pits for the most part are still averaging five and six days in the week; stocks are comparatively low. The shipping trade keeps fairly brisk, whilst the demand for railborne consignments is about maintained. Prices continue at—block 16s. 6d., rubbles 15s. 9d., nuts 14s., and rough slack 6s. 6d. at pit. The enquiry for all steam coal is excellent, and all the pits are busy.

Partnerships Dissolved.—The *London Gazette* announces the dissolution of the following partnerships:—H. Haggas, J. Ward, C. W. Smith, F. T. Haggas, W. Haggas, and J. Ward, carrying on business as machine tool makers, at Keighley, under the style of Ward, Haggas and Smith; W. Hay and J. J. Mavins, carrying on business as boiler-scalers, at Westman-street, South Shields, under the style of Hay and Mavins.

Home Office Prosecution at Stirling.—At Stirling Sheriff Court on Tuesday the trial, which was adjourned a fortnight ago, was resumed of Mr. Wallace Thorneycroft, managing director of the Plean Colliery Company Limited, and Mr. Peter Inglis, manager, on a charge, at the instance of the Home Office, of having connived at seven men being underground more than eight hours in 24 consecutive hours on May 5 and 6. It was pleaded in defence that the action of the officials was justified on the ground that they apprehended danger in the pit. The Sheriff found the charge proven, and imposed a penalty of 10s., or five days' imprisonment, in the case of Mr. Thorneycroft, and 5s., or three days, in the case of Mr. Inglis. The agent for the defence asked his lordship to state a case.

H COAL AND IRON TRADES.

HURSDAY, OCTOBER 24.

North Wales.

COAL.

of this locality continues to be in a
on so far as orders are concerned, and
ihood of the present state of affairs con-
little time to come. Salesmen have no
g orders at the current rates, the trouble
executed as desired. Buyers are also
rders, though the colliery proprietors
er averse to settling many merchants'
o the great likelihood of prices still
ly in the near future. The collieries are
ime when they can get empty wagons,
se still continues to hamper some of the
hough every effort is being made to get
ed with as little delay as possible.
ifferent grades of fuel respectively, the
mains good, and prices are firm for best
ities. Steam coal for manufacturing
k demand. The railway companies are
ries on account of their contracts, and
can to make up the stocks which were
time of the late coal strike. Gas coal,
demand, but of course all this is sold
none being bought in the open market
The school contracts have now mostly
e coming winter period, and the prices
re been as follow:—Best crank coal
st main 17s., seconds 16s., and gas coke
n, delivered to the schools; and landsale
re generally busy. There is also a good
of fairly rough sorts, for which good
le. The average ruling prices are about
ed last week, but now it has been settled
are to have the advance of 5 per cent.,
come into operation forthwith, it is
advance in prices of fuel will take place

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thshire, South Wales, &c.

COAL.

-day in the steam coal trade is much the
namely, a steady tone for shipment within
with a strong inclination for prices to
orward bookings, which tends to make
hold aloof. Tonnage continues scarce,
ough to cope with the heavy stocks on
inued high rates of freights offering must
pply. Sellers attach some importance to
dmiralty enquiry just put on the market
ext year, the probable quantity may run
s. There has been, too, some enquiry
rchants, but so far, very little actual
oals remain steady in value at last week's
les a shade easier. The house coal trade
fluctuation. Latest approximate ruling
taken as follow, coal prices f.o.b. cash in
r cent.:—Coal: Very best Newport Black
l. to 15s. 6d.; western-valleys, ordinaries,
eastern-valleys, best, 14s. 3d. to 14s. 6d.;
9d. to 14s.; colliery smalls, best, 9s. to
. 6d. to 8s. 9d.; inferiors, 8s. to 8s. 3d.;
to 9s. 6d.; through coals, 11s. to 11s. 6d.;
11s. 6d. to 12s.; house coals, best, 18s. to
17s. to 17s. 6d.; patent fuel, 22s. 6d. to
nace, 22s. to 23s.; foundry, 25s. to 32s.,
l. Pitwood: Best French fir, 22s. 6d. to

IRON.

tle change to report in the condition of
steel trades. A fair amount of business
values in all departments are practically
same time, there is no inclination shown
roducers to ease their quotations in any
ot that Continental prices are again
heir position somewhat stronger. Work
tinues in every way satisfactory, heavy
eported all round. Prices remain at
er and £6 Siemens for Welsh bars. Rail
wards; production here is better, and
based upon £6 10s. to £6 15s. for heavy
n continues steady with values strong,
being priced 86s. to 87s. delivered in the
rnaces now in blast are being kept busily
re quotations are unaltered, best rubio
. 6d. c.i.f. Newport. The tin-plate trade
and here, too, the tendency of values is
quotations, however, are not materially
es being 15s. 9d. to 15s. 10½d. Bessemer,
16s. Siemens for I C's 20 × 14 × 112
te £11 12s. 6d. to £11 15s. per ton.

COAL.

od deal of excitement on 'Change at the
week owing to the action taken by the
t in sequestrating vessels flying the
which were either already docked and
were reported to be on their way to the
It afterwards transpired that eight
hich were owned by local firms, had been
rs. Cleeves and Co. at a freight rate of
yance of some 25,000 tons of Monmouth-
rms, and when the Greek consul, M.
stops to commandeer some of them, it
no little uneasiness amongst the ship-
d that the arrangements they had made
gs would be seriously dislocated. On the
ng approached on the subject of com-
ply told the shipowners to send the
n and he would discuss with them
The notice served upon the captains
they entered the dock was to the effect
ith the respective crews, consider them-
being under military law. All last week
y shipment of coal to foreign ports, the
corded for Cardiff alone being nearly
422,000 tons, which, with two exceptions, was the largest shipment reported since the middle of May. Notwithstanding this fact, there is still an enormous quantity of coal standing in wagons, which in great measure is attributed to the inability of the dock companies to provide adequate tipping accommodation. Instances are reported of collieries being obliged to hire a large number of foreign wagons in order to keep their pits going, despite the fact that they had a considerable amount of tonnage in dock ready but unable to be loaded, there is not the slightest doubt that the lack of facilities for shipping is acting very detrimentally on prices. Demurrage is alleged to have been incurred solely through vessels being kept waiting for tips, and unfortunately this state of things is likely to continue, and even to become intensified. About 2,000 men employed at the Merthyr Vale Colliery have been rendered temporarily idle through the failure of the supply of trucks. In this case it was admitted that the congestion on the railway sidings was partly due to the scarcity of tonnage, many vessels having been blocked at ports in the Black Sea. Chartering is by no means active, the transactions last week only representing a total of 270,000 tons, being a decrease of nearly 45,000 tons as compared with the previous six days. In consequence of the large stocks of coal standing about, buyers are still able to purchase at a considerable reduction from the quoted prices, though in the case of collieries which are well stemmed, concessions are more difficult to obtain than a few weeks ago. For best steam coals, prices for prompt loading are nominally 16s. 9d. to 17s., whilst for shipment over the next couple of months from 3d. to 6d. per ton more is demanded. Another great contract has been fixed up for South America—this time by the Buenos Ayres Great Southern Railway Company. Usually their requirements extend to 350,000 tons, and although up to the time of writing no details were accessible, it is believed that the company have arranged for the supply of the bulk of their requirements for next year. The coal bought is best Monmouthshire Black Veins, and the price is said to be about 16s. 3d. to 16s. 6d., less 2½ per cent., or an increase of 1s. to 1s. 3d. per ton compared with the contract price for the current year. Owing to an unfortunate misprint the figure given for the coal purchased by the Central Argentine Railways was stated in last week's report to be a little under 12s. instead of 17s. Actually the price obtained by the Lewis-Merthyr and Standard colliery companies was 16s. 10½d., that by Hood's Glamorgan Coal Company a few pence less. Formerly there used to be a rebate allowed of at least 1½d. per ton, but it is understood that on the present occasion the price is net. According to reports on 'Change the North of Spain railways have placed their order for 45,000 tons of second-class steam coals with Cory's Trading Company Limited. The coal is to be delivered at Barcelona, Alicante, and Valencia, but the prices have not transpired. There is an enquiry in the market from the Austrian Marine for about 30,000 tons of best steam coals, tenders for which have to go in next month. The French State Railways are also enquiring for six to 12 months' supplies of large and small coal. According to the specification, tenderers have the option of quoting for the delivery of 85,000 tons of large over six months or 145,000 tons over 12 months; and for 225,000 tons of small over six months and 380,000 tons over 12 months. The fast rate at which new steamers are being turned out of the building yards is inspiring sellers with increased confidence, and most of them express the opinion that next year is going to be a bumper, provided of course that tonnage and dock questions become easier. Freights at present are still very high, as much as 15s. 6d. having been paid to Venice, 13s. 3d. to Genoa, 13s. to Naples, 11s. 6d. to Madeira, 22s. to Monte Video, and 23s. 6d. to Rio de Janeiro. As far as small coal is concerned the position is somewhat anomalous, as this year there has not been a dull season, although there has, of course, been the usual dearth of wagons in Italy during the vine harvest. Prices all through have kept very firm, and at present best cargo sorts for prompt shipment realise from 9s. 3d. to 9s. 6d. As to next year, one of the first Admiralty collieries is refusing to book any further orders at 9s. 6d. Best bunkerings for prompt delivery are 10s. 6d. to 11s., and best ordinaries 10s. 6d., with cheaper kinds at 10s. per ton. Although for shipment next year as much as 11s. has been obtained by one of the leading collieries, the top price generally named is 10s. 6d., whilst a fair amount of business has been done at 10s. Washed nuts are 15s., and washed peas 12s. 6d. to 13s. per ton. For Monmouthshire coals the tone is decidedly better. Demand for early shipment is good, and the arrivals of tonnage over the week end have been more satisfactory. Best Black Veins are 15s. 6d., western-valleys 14s. 9d. to 15s., best eastern-valleys 14s. 6d., and seconds 14s. to 14s. 3d., in each case f.o.b. Cardiff. The total shipments from the Channel to foreign countries during September amounted to 2,387,536 tons, as against 2,172,636 tons in the corresponding month of last year, being an increase of 214,900 tons. From Cardiff alone the shipments were 1,596,602 tons, an increase of 193,318 tons; from Port Talbot 154,588 tons, an increase of 9,679 tons; and from Swansea 268,115 tons, an increase of 8,851 tons. From Newport the shipments were 352,982 tons, or a decrease of 467 tons. There is no material change in bituminous coals, No. 3 Rhondda large is 17s., through-and-through 14s. 3d. to 14s. 6d., and small 11s. 6d. to 12s. No. 2 large is 12s. 6d., through-and-through 10s. 9d., and small 9s. 6d. to 9s. 9d. per ton. Shipments of patent fuel for the week amounted to over 21,000 tons, the Crown Fuel Company despatching 8,416, and Swansea makers 12,800 tons. Prices still rule from 18s. to 19s. It is reported that L. Gueret Limited have secured the order for 45,000 tons of patent fuel for the North of Spain Railways. The coke market is very strong, ordinary foundry reaching 25s. to 27s. 6d., special 30s. to 32s., and furnace 22s. to 23s. per ton. Pitwood is 22s. 6d. to 23s. per ton.

IRON.

The war in the Balkans is seriously affecting the tin-plate industry. Three of the mills of Mr. W. H. Edwards, of the Duffryn Works, Morriston, have been closed owing to the difficulty of shipping plates, and stocks are accumulating. The total shipments last week were 100,271 boxes, or 3,030 boxes more than were received from works. Stocks stand now at nearly 203,000 boxes. It is reported that the sailings of the Johnson line of steamers from Swansea to the Danube have been cancelled. These vessels carried practically the whole of the Swansea tinplates for the Roumanian market. Cargoes for Turkey, Greece, Austria, and Italy are also affected by this cancellation, so far as tin and black plates are concerned. The exports of galvanised sheets and sulphate of copper, which amount to some thousands of tons per annum, are also suspended. The non-unionist question has caused a strike among the girls employed at the Welsh Tin-plate and Metal Stamping Works at Llanelly. The trouble arose through the refusal of five of the girls to join the workers' union, and it affects about 300 girls. Already the work in the enamelling department is quite disorganised. There is very little change in the prices of tin-plates. Notwithstanding the temporary slump in tin, works generally have such well filled order books that they refuse to make any concession to buyers, and are anticipating higher prices for the first half of next year. Their idea of option contracts from January to June is 15s. 9d. for 14 by 20 cokes. A couple of steel smelting furnaces have been put out at Morriston, and tin bars therefore are not in over supply. Prices keep very firm at £5 17s. 6d. for forward delivery with a premium of 2s. 6d. for 5s. per ton for prompt service. There is rather less enquiry for galvanised sheets, but the market still keeps fairly steady on the basis of about £13 for 24 gauge corrugateds. With the price of spelter still advancing makers are not inclined to make any concessions to buyers. Welsh pig iron continues firm at 85s. f.o.t. Best rubio iron ore is also steady at 22s. 6d., whilst seconds are 21s. Scrap metals have a rising tendency, old steel rails (mixed sections) being quoted at 60s., and double-headed at 65s. to 70s. per ton. Cast scrap is 58s. 6d., and heavy wrought 55s. per ton.

Swansea.

COAL.

The returns of the trade of the port were again satisfactory last week, the coal trade was active, but patent fuel exports were only moderate. The shipments together amounted to 95,278 tons. There was a very good attendance on 'Change this morning, and there was no material alteration to report in the general condition of the anthracite coal market, which, with a few exceptions, continued firm. Swansea valley large was in good demand, and prices were slightly advanced. Red Vein large was also very firm. The best quality machine-made French nuts were strong, but Germans were still rather slow. Beans and peas were weaker. Rubbly culm was in slightly better request, but prices were not materially affected. Duff continued to move off strongly. In the steam coal market there was no outstanding feature, large was still weak. Smalls were firm. The closing quotations were approximately as follows:—Anthracite: Best malting large (hand-picked), 23s. to 25s. net; second quality ditto, 20s. to 22s. 6d. net; Big Vein large, 18s. 6d. to 19s. 3d., less 2½ per cent.; Red Vein large, 15s. to 15s. 9d., less 2½ per cent.; machine-made cobbles, 21s. to 23s. 6d.; Paris nuts, 23s. to 26s.; French nuts, 23s. to 26s. 6d.; German nuts, 23s. to 26s.; beans, 21s. to 23s. 3d.; machine-made large peas, 12s. 6d. to 14s.; ditto fine peas, 11s. to 12s. 6d., all net; rubbly culm, 6s. 3d. to 6s. 9d., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 17s. to 18s.; seconds, 13s. 6d. to 14s. 6d.; bunkers, 10s. 6d. to 11s. 6d.; small, 9s. 6d. to 10s. 9d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. to 18s.; through-and-through, 14s. 6d. to 15s. 6d.; small, 11s. 6d. to 13s.; No. 2 Rhondda large, 14s. to 15s. 6d.; through-and-through, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 6d., all less 2½ per cent. Patent fuel, 17s. to 18s., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

Normal activity was observed in the iron and steel trades during the past week. There were good yields of pig iron and steel bars, but tinbars were not in over supply. Excellent outputs were recorded at the local sheet mills, but owing to the Balkan trouble a few tin-plate mills were closed down. Work at the engineering establishments generally continued good, but some of the local iron foundries suffered from lack of orders. The shipments of tin-plates last week were 100,270 boxes, receipts from works 97,240 boxes, and stocks in the dock warehouses and vans 202,979 boxes.

Llanelly.

COAL.

The coal trade of this district continues to be very firm, and there is every indication of the market keeping brisk for several months to come. Already for some kinds the demand exceeds the make, and there is every probability that as the winter advances there will be quite a scarcity for several sorts. Tonnage is getting more plentiful, and if this continues it is bound to improve the position. Anthracite still goes very well, and prices are more favourable than they have been for some time. Horticultural sorts are in great demand, and some of the better class coals are really difficult to get. Stove coals are also going well. Machine-made kinds for suction gas plants show no fluctuation in price or demand. Steam and bituminous quality smalls have a very good enquiry. Prices this week are:—Best malting large, 23s. to 25s.; second malting large, 21s. to 23s.; Big Vein large, 17s. to 19s. 6d.; Red Vein large, 14s. to 15s.; machine-made large cobbles, 22s. to 23s. 6d.; German nuts, 24s. to 25s. 9d.; French nuts, 24s. to 25s. 9d.; Paris nuts, 25s. to 25s. 6d.; machine-made large beans, 23s. to 24s.; ditto second quality, 20s. 6d. to 22s. 6d.; machine-made peas, 14s. to 15s.; rubbly culm, 6s. 6d. to 7s.; duff, 5s. to 5s. 6d.; large steam, 16s. to 16s. 6d.; through-and-through, 10s. 9d. to 11s. 3d.; small steam, 9s. 6d. to 10s. 6d.; bituminous small, 10s. 6d. to 11s. 6d.—all f.o.b.

At Huddersfield County Court last week, before his Honour Judge Longstaffe, Messrs. George Moxon and Sons, coal merchants, of Huddersfield, claimed £12 3s. from Messrs. Robert Brearley and Son Limited, woollen manufacturers, Batley, as the price of goods delivered. It appeared that defendants bought from claimants a wagon load of "washed cannel nuts," an inferior coal, during the shortage occasioned by the coal strike. The coal was delivered, but defendants refused to pay for it. It was urged for the defence that what was supplied was not coal at all, and that it put the fires out. The defendants only used seven or eight tons of it. It was largely clayey matter and shale and would not generate heat. His Honour gave judgment for the plaintiffs on the ground that the term "washed cannel nuts" was a term invented for the invoicing of coal which everybody knew had not been freshly hewn.

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SUBSCRIPTIONS.

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(A Classified List appears on page 862.)

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Forthcoming Annual Meetings.

Institution of Mining and Metallurgy	March 13, 1913
International Geological Congress—	August 21, 1913 (Toronto)
Geological Society ...	Feb. 21, 1913
North of England Institute of Mining and Mechanical Engineers ...	August 2, 1913
South Wales Institute of Engineers— Annual Dinner ...	Jan. 23, 1913
Annual Meeting ...	March 18, 1913
Institution of Mechanical Engineers	Feb. 14, 1913
Annual Dinner ...	April 17, 1913
Mining Institute of Scotland— Annual Dinner ...	Dec. 7, 1912

The Colliery Guardian.

LONDON, FRIDAY, OCTOBER 25, 1912.

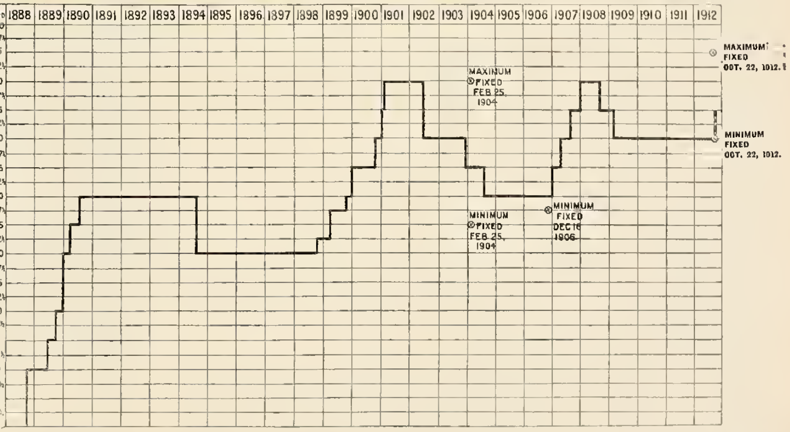
Of the total exports of coal during September, the mean value of the large coal exported was 14s. 1·5d.; through-and-through (unscreened) coal, 10s. 9·7d.; and small coal, 10s. 3·4d. The average value of all kinds of coal exported was 12s. 6·6d., an increase of 0·8d. as compared with the preceding month. Otherwise divided, it fetched the following values:—Steam coal, 12s. 9·9d.; gas coal, 10s. 11·4d.; anthracite, isehold coal, 11s. 11·5d.; and al, 10s. 10·03d. The value of the was 17s. 6·8d. per ton, and of d fuel 16s. 6·01d. per ton.

d that the Rhenish-Westphalian having decided upon a further basis prices for 1913-14, despite raised by the State Mining the Minister of Commerce has e sales agreement which was the Syndicate for the current

ciliation Board, meeting at the ace Hotel, London, on Tuesday, reed to an immediate advance of ges to the miners employed in rea in England and North Wales, v agreement for a period of three gulation of wages, with a fixed per cent. and a maximum of 65 standard wage of 1888.

be made with the sinking at ncaster.

FEDERATED DISTRICTS OF ENGLAND & N. WALES: CHANGES IN RATE OF WAGES 1888 1912.



station has been erected by the re and Leicestershire owners at ach.

th annual meeting of the South and Warwickshire Institute of rs was held at the Birmingham Monday. Prof. Cadman was t for the ensuing year. Important Effects of Deficiency of Oxygen of a Safety Lamp," by Dr. J. S. Dr. T. L. Llewellyn, and by on "Illumination at the Coal ecial Reference to the Incidence agmus" were read.

g of the South Wales Coal Con- in Cardiff, on the 21st inst., the esentatives sought the employers' enquiry with a view to giving olution of the conference of the tion of Great Britain concerning e owners refused the application, he demands were a breach of the reement.

ood that besides discussing the gulations under the new Coal he executive of the Miners' their meetings in London on the nst. and the previous day, considered a resolution in favour of a five days week, and decided to take a ballot of the whole country on the question, to be completed by the last week in January. They also considered the position of surfacemen, and decided that every district should hold an enquiry, and furnish the general secretary of the Federation with full information respecting the wages and working conditions of the various grades of surfacemen, and, further, that in each area an interview should be sought with the employers, in order, if possible, to effect a satisfactory arrangement wih the latter.

Greece has declared all fuel contraband.

The King has been pleased, on the recommendation of the Secretary for Scotland, to approve the appointment of a Royal Commission to enquire into the housing of the industrial population of Scotland, rural and urban—with special reference in the rural districts to the housing of miners and agricultural labourers—and to report what legislative administrative action is in their opinion desirable to remedy existing defects. The Commission is to consist of the following persons:—Sir Henry Ballantyne (chairman), Lord Lovat, K.C.V.O., C.B., D.S.O., Sir William Younger, Bart., Mr. W. F. Anderson, Mr. G. F. Barbour, Mr. Charles Carlow, Mr. J. F. Duncan, Mr. David Gilmour, Mr. J. Milne Henderson, Mr. W. Leslie Mackenzie, M.D., Mr. J. Middleton, and Mrs. George Kerr. Mr. Charles Carlow is chairman of the Fite Coal Company Limited, whilst Mr. David Gilmour is general secretary of the Lanarkshire Miners' Union.

The Home Secretary has agreed to receive a deputation of twelve on the 31st inst., representing the owners and workmen at Northumberland and Durham collieries, regarding the new Explosives Order, and to hear reasons why it should not apply to mines where naked lights are in use.

Dissatisfaction exists in the South Yorkshire coalfield, owing to the decision of Sir Edward Clarke fixing minimum rates of 6s. 9d. for colliers and 5s. 9d. for trammers. It is alleged that colliers, as a result, are penalised by having to suffer a reduction of 1s. a day to make up the trammers' minimum. The colliers have appointed a deputation to the Board of Trade.

The death has occurred of Mr. James Nimmo, the well-known Scottish coalowner.

Wages in the Federated Area.

THE decision arrived at by the Conciliation Board for the Federated Districts of England and North Wales at the meeting held in London on Monday is, on the whole, satisfactory. No good employer grudges the payment of additional wages, providing that they are justified, and it is a reasonable hypothesis, although not always admitted, that an advance in wages, when made in timely sympathy with improving market conditions, does no harm to trade. Without going so far, however, it may be taken that this advance is actually an earnest of improving trade.

The full terms of settlement indicate, we think, a genuine desire to maintain the conciliatory principles that have animated this Board from its inception after the great strike of 1893. A glance at the diagram given on this page will show how greatly the miners have benefited by it, and it goes without saying that the owners have reaped great advantages also from its existence.

The present Board may be said to have come into being in 1904, when the minimum of 35 per cent. and the maximum of 60 per cent. above the standard of 1888 were fixed. In 1906 a new agreement was entered into for three years, the minimum being raised to 37½. Until the autumn of the present year the proceedings of the Board have been but little in the public eye since September 1909, when the following resolution was adopted:—

> In consideration of the present application for a reduction of 5 per cent. not being pressed, the Board agree as follow:—(1) No application shall be made for any advance in wages until the selling price exceeds 7s. 10·21d. by such an amount as shall have recouped the owners for the disadvantage they shall have incurred by payment of the present rate of wages during the period the selling price was less than 7s. 10·21d.; (2) that notice to terminate the Conciliation Board shall not be given until the selling price has recovered to and continued at the amount which the Board, or, in case of difference, an outside chairman, shall decide to be sufficient to recoup the owners as mentioned in clause 1.

It is a matter for congratulation that the terms of this resolution have been such as to leave untouched the incidents that have intervened since it was carried. The interpretation to be placed upon it plainly is that the losses sustained by the employers by reason of the payment of

5 per cent. on standard rates during the period—up to the close of last year—that prices were below the figure at which a reduction was justified, according to the methods of the Board, should be recouped by the margin of sales above the price of 7s. 10·21d., and that no advance should be made until this amount had been restored. With the acceptance of this view, the whole question resolves itself into a simple multiplication of the output by the prices prevailing during the present year. There was no necessity to introduce the troublous and uncertain factors of volume of trade, profits and economies in production that might be cited for purposes of argument on the one hand, or of increased cost of production, capital outlay, &c., upon which the other side might rely—that is, during the period in which prices fell below the standard fixed in 1909. It is a positive advantage that acrimonious discussion on these subjects should have been barred, and additional support is given to the belief that arrangements that tend to equilibrate wages over a long period are wholly to the advantage of trade; they reassure customers, and enable collieries to proceed with greater certainty as to the future.

On the other hand, although it is an advantage that the Conciliation Board should not have been too deeply engrossed by the intricate details of finance and management that have lately undergone so radical a transformation, the general conclusion must be that the men have not fared badly in the present instance. The accumulated burdens of the Eight Hours, Coal Mines, National Insurance and Minimum Wage Acts, the increase in rates and taxes, &c., greatly outweigh the economies that may have sprung from these or other causes; and at the best, the burden is merely handed on to the consumer, to whose powers of endurance there is surely a limit.

It will be noticed that in conceding the advance to contractors, the owners have been careful to guard themselves by the insertion of a clause asserting that the method now adopted is really outside the province of the Board. It was one of the inevitable consequences of the Minimum Wage Act, if not of the Eight Hours Act, that difficulties would arise in regard to the earnings of contractors. The necessity for the reservation made by the employers only shows how radically the entire system of wages has been affected by recent legislation. It has been affirmed that the minimum wage rate is independent of all existing systems of varying wages on the standard rates; but, nevertheless, in several instances the awards under the Minimum Wage Act do refer, in some way or another, to the percentages, the consequence being that it is difficult to obtain any uniformity in method. It may not be opportune at this juncture to reopen so thorny a question, but strength is given to the conclusion that whilst the continued retention of the obsolete standards of 1888 and 1879 has in itself little to commend it, the setting up of a fresh standard without abolishing the old is anomalous and confusing.

Before leaving the subject, it is worthy of note that the Board finds itself with a new set of chairmen. Death has taken Lord James of Hereford and Mr. Enoch Edwards, and their places as independent chairman and vice-president have been filled by Lord Coleridge and Mr. W. E. Harvey, M.P., respectively, whilst as president the place of Mr. Alfred Hewlett, who is now taking a well-earned rest from the activities that have so long engaged him, is filled by Mr. F. J. Jones, the well-known Yorkshire coalowner, who has already once before acted as president of the Mining Association of Great Britain. We believe that the high traditions of the Board are in safe hands. It is a curious coincidence that each office has had three occupants in the history of the Board.

Trade Summary.

The London coal trade for the past week has been exceedingly slow. The wholesale trade has been very restricted, and orders are very meagre. Manufacturing qualities are firm, and the demand good. Coke is unusually high. All household qualities are neglected, and stocks at the various depots are accumulating. Prices remain stationary, with here and there a lower quotation. Bakers' nuts are firm. Slacks and small nuts have somewhat recovered, but the higher prices are with difficulty maintained. Shipping freights continue abnormally high, but cargoes are becoming more plentiful. Seaborne quotations continue unaltered, and Yorkshire qualities are once more on offer. Prices are, however, firm.

There has been a sharp rise in quotations for prompt shipment at Newcastle, and the forward demand is strong. House coals and coke are steady.

The position in Durham is one of great strength, there being a pressing demand for gas and coking coals. Loading turns are lengthening.

The Lancashire house coal trade is steady. Other classes are heavily consumed. Slacks are in moderate request.

Business in West Yorkshire has been fairly brisk, but orders are on the small side. The coastwise trade is moderate. There is still a strong call for manufacturing fuel, which is scarce.

In South Yorkshire there is a somewhat easier tone in steam coals, and slacks are rather more plentiful. House coal is slow. Coke continues in strong demand.

More business is passing in Derbyshire house coal, but wagons are scarce. The demand for manufacturing sorts is stronger than ever.

Shipments at Cardiff have been heavy, but stocks are considerable, owing to the inadequate shipping facilities. Under the circumstances, prices are shaded. Monmouthshire coals are in better request. Coke is very strong.

Shipments of Scottish coal have been on the up-grade, and house and manufacturing coals are in excellent request.

THE IRISH COAL TRADE.

Thursday, October 24.

Dublin.

The demand, upon the whole, continues to be fairly active, and it is not probable that there will be any advance in prices before the first week in November, unless any severe weather sets in in the meantime. City prices stand as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; steam coals, from about 20s. per ton upwards; best coke, 23s. per ton, or 18s. per chaldron; "bell" coal, 1s. 5d. per sack. Pit-mouth prices at Wolfhill, Queen's County, are:—Best large malting coal, 20s. per ton; best hand-picked breakage, 20s. per ton, and 17s. 6d. per ton; cobbles screened and beans screened, 17s. 6d. per ton; culm, 5s. During the past week 65 coaling vessels arrived in this port, compared with 64 the week previously, chiefly from Glasgow, Newport, Liverpool, Point of Aire, Garston, Preston, Workington, Neath Abbey, Ayr, Ardrossan, Maryport, Newcastle-on-Tyne, Ellesmere Port and West Bank Dock. The total quantity of coal discharged upon the quays was 28,379 tons.

Belfast.

There is no change in prices of any class of coal and apparently nothing to warrant an advance in house coal, business continuing to be normal. Trade with Scottish ports is improving and the supply is plentiful. Quotations in the city are as follow:—Giant's Hall Arley coal, 26s. 6d. per ton; Hartley, 25s. 6d.; Wigan, 24s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 22s. 6d.; Orrell slack, 22s. 6d. Current prices ex-quay:—Arley house coal, 22s. 8d. per ton; Scotch house coal, 19s. 6d. per ton; Scotch steam coal, 16s. 6d. to 17s. 6d.; navigation steam, 16s. 6d. to 17s. 6d.; Welsh steam, 17s. to 18s. per ton. From September 29 to October 12 the coaling vessels arriving in the port totalled 119. Coal cargoes during the past week were chiefly from Ayr, Troon, Swansea, Lydney, Newport, Preston, Garston, Workington, Ellesmere Port, Partington, Glasgow, Girvan, Sharpness, Maryport, Cardiff, Irvine and Burryport.

At Southampton on the 7th inst. Heinrich Kalbe was summoned by the Board of Trade, under the Merchant Shipping Act, for loading a German ship over the Plimsoll mark. The defendant was the acting master of the "Kommerzienrat Boeckel" when the vessel was lying at Fowey on April 6. The facts were communicated to the German Consul-General in London, who forwarded them to the German authorities. In July the defendant was summoned before the Mercantile Marine Court at Rostock and was fined 50 marks. In the course of a long legal argument it was stated that the new load-line regulations had been put into force between Germany and England. It was contended for the Board of Trade that offences could be dealt with in both countries. The defence was that the master of a merchant ship could not be legally prosecuted under international shipping law by two countries for the same offence. The magistrates unanimously decided to dismiss the information, but agreed to state a case for appeal should the Board of Trade wish to leave the matter to a higher court.

THE SCOTCH COAL AND IRON TRADES.

Thursday, October 24.

Glasgow and Lanarkshire.

COAL.

There has been a considerable increase in the coal shipments at Scotch ports, due in some measure to the despatch of cargoes formerly delayed on account of various causes. The aggregate shipments at Scotch ports reached 370,152 tons, being 39,641 tons more than in the preceding week, and 11,207 tons above the quantity despatched in the corresponding week of last year. From Glasgow 43,053 tons were sent abroad, and 44,378 coastwise, the total of 87,431 tons comparing with 73,845 in the preceding week, and 90,195 in the corresponding week of 1911. A fair demand exists for steam coal about former prices. Ell coal and other first-class qualities of household coal have been in good demand for shipment at steady prices. Splint coal occupies an exceptionally favourable position, being much wanted both for home consumption and export, and is accordingly firmer in price than other qualities. A fair business is being done in nuts. The f.o.b. prices at Glasgow are for steam coal 11s. 6d. to 12s., ell 12s. 3d. to 12s. 9d., splint 13s. 6d. to 14s., treble nuts 13s. to 13s. 6d., doubles 12s. 6d. to 13s., and singles 12s. to 12s. 6d. per ton. There has been a considerable increase this week in the demand for house coal for home use. First-class house coal is delivered in Glasgow from 17s. to 19s. per ton, and at 11½d. to 1s. per cwt. delivered in bags. The business under monthly contract with manufacturing consumers is very large, and good prices are obtained for all kinds of suitable small hard coal and dross for furnace use.

IRON.

The Glasgow pig iron market has been irregular owing to the war and other causes, but a large business has been done, and while considerable fluctuations have occurred in prices, confidence in the business is at the same time well supported by the large home and export demand and the favourable reports as to the condition of trade in America and on the Continent. Business has been done in Cleveland warrants since last report between 66s. 11½d. and 66s. 6d. cash, and 67s. 4d. and 66s. 10d. one month, and 67s. 7½d. and 67s. 11d. three months, and transactions have also been noted at 67s. 3d. 22 days, 67s. 3½d. 28 days and 66s. 9d. 11 days. A large consumption of Cleveland iron is proceeding in Scotland, and the arrivals at Grangemouth of pig iron from Middlesbrough and district were 14,956 tons, an increase of 872 tons on the quantity received in the corresponding week of last year. About 1,500 tons of Cumberland hæmatite warrants have been done at 81s. 11d. cash, which shows an advance of 1s. per ton on previous business. Scotch hæmatite is quoted 84s. for West of Scotland delivery. There are 88 furnaces in blast in Scotland against 84 at this time last year. Shipments of Scotch pig iron are small, but there is a good and steady home consumption, and prices are well maintained. Govan and Monkland, Nos. 1, are quoted f.a.s. at Glasgow, 75s., Nos. 3, 73s. 6d.; Carnbroe, No. 1, 76s., No. 3, 75s.; Clyde, Summerlee, and Calder, No. 1, 81s., No. 3, 76s; Gartsherrie and Langloan, Nos. 1, 82s. 6d., Nos. 3, 77s. 6d.; Coltness, No. 1, 97s. 6d., No. 3, 79s. 6d.; Egliaton, at Ardrossan or Troon, No. 1, 75s., No. 3, 74s.; Glengarnock, at Ardrossan, No. 1, 82s. 6d., No. 3, 77s. 6d.; Dalmellington, at Ayr, No. 1, 76s., No. 3, 74s.; Shotts, at Leith, and Carron, at Grangemouth, Nos. 1, 81s., Nos. 3, 76s. per ton. There is very full employment in the finished iron and steel trades, basis prices being £8 2s. 6d. for Scotch crown iron bars, and the same figure for steel ship plates.

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Renfrew, Ayr and Dumbarton.

COAL.

There has only been a moderate business in the shipment department of the coal trade in this district. Labour troubles have interfered with business to a considerable extent, but this drawback is likely to be overcome. No foreign shipments took place in the past week. The coastwise clearances were at Bowling 102 tons, Greenock 728, Ardrossan 1,156, Irvine 1,218, Troon 5,415, and Ayr 17,273—total 25,897 tons, against 30,198 in the preceding week, and 29,700 tons in the corresponding week of last year. Inland business in coal is increasing, both as regards household qualities and coal for manufacturing purposes, the call for the latter being extensive.

◆

Stirling, the Lothians and Fife.

COAL.

There has been a considerable increase in coal shipments at Firth of Forth ports. Foreign exports reached 113,614 tons, and coastwise 28,259 tons. At Granton 11,900 tons were despatched, Bo'ness 14,235, Leith 54,373, Grangemouth 61,365 — total 141,873 tons, compared with 105,250 in the preceding week, and 103,673 in the corresponding week of 1911. The collieries have in most cases been fully employed. Best screened steam coal is quoted at Leith 12s. 6d. to 13s., secondary qualities 11s. 6d. to 12s., treble nuts 13s. 3d. to 13s. 6d., doubles 12s. 9d. to 13s., and singles 12s. 3d. to 12s. 6d. per ton. There appears to have been a good supply of vessels for loading at Fife ports, but coals could not be got forward freely, and for this reason and also because of the dock labourers stopping work on Saturdays, the quantity despatched has been curtailed. From Methil 59,524 tons were despatched, Burntisland 50,340, Dysart 1,638, Wemyss 1,372, Alloa 809, Tayport 729, Charleston 539—total 114,951 tons, compared with 121,216 in the preceding week and 130,377 in the corresponding week of last year. First-class screened navigation coal is quoted at Methil and Burntisland 16s. to 16s. 6d., unscreened 14s. to 14s. 6d. First-class steam 13s. 6d., secondary qualities 11s. 6d. to 12s., treble nuts 14s. to 14s. 6d., doubles 13s. 6d. to 14s., and singles 12s. to 12s. 6d. per ton. An increasing inland business is being done in house coal.

ONDON COAL TRADE.

URSDAY, OCTOBER 24.

rade for the past week has not shown
ity, and delivery orders are distinctly
s report a very meagre supply of orders
blic, and as a result the trade generally
icted. Contract orders, and especially
qualities, continue very firm, and the
ng the riverside are all working strong,
are proportionately in better demand
lities. Bakers' nuts and kitchener coals
steady demand, but all qualities of
inctly weak. Colliery representatives,
air number of orders still unexecuted,
is reported in the pit prices, and the
nt continues strong, whilst freights are
as coals have been coming forward into
easing regularity, and the supply has
d. Coke has experienced a very strong
ices rule exceedingly high. The one
he market has been the household
accumulation of loaded trucks at
halling stations as well as at the
a has begun to have an effect on the
The over-abundance of supply has cut-
d, and stocks are steadily increasing.
notice was pinned on the door of the
ciety acquainting the general body of
al Porters' Union have agreed to the
working, viz., that all depots should
at 1 o'clock from April 1 to September 30,
rough the winter months. The atten-
as not been so good as formerly, and
st was particularly thin. The colder
present stimulated any extra trade, and
expansion at this season of the year,
et appears to contract. The seaborne
in for a fair amount of attention, par-
ong period has elapsed since any cargoes
So many of the vessels arriving in the
sold, and the restrictive character of
ated the offering of Tyne qualities. A
coal was on offer during the week and
l further cargoes of Sharlston Wallsend
this figure. On Monday last 36 cargoes
ses, and 17 on Wednesday, but very few
ng for sale. Inland qualities are main-
as the stocks are still light at the
e other hand, orders are very sparingly
l tone of the market is optimistic, and
nt demand is so small, yet the firm
es points conclusively to the fact that
, and this is more than probable at this
the expansion in the domestic demand
unced, and higher prices will follow.
e north country coal is offering in the
are more or less nominal. The latest
e at 21s. 6d. for best Wallsend, and
Sharlston Wallsend are also quoting
ficulty in the transport of inland coals
the wagon question is still acute, so
been withdrawn from the coal traffic for
m produce that a considerable shortage
ed, and in many cases collieries have
time simply for want of empties; very
vagons have been made recently in the
ke this shortage.

Olzham, Fawous and Co.'s Repors.

8.—The seaborne house coal market con-
with no sales reported. Best (Durham)
tto 20s. 6d. Cargoes 22.

21.—There was a fair enquiry for
l to-day, but no Durham procurable—a
kshire best was sold at 21s. 6d. Best
econds ditto 20s. 6d., Sharlston (W.E.
goes 36.

r 23.—There was no alteration in the
al market to-day; no sales reported.
. 6d., seconds ditto 20s. 6d., Sharlston
. Cargoes 17.

TIN-PLATE TRADE

as not been a great deal of business
week, many buyers preferring to hold
e of the market is firm, and prices of all
l maintained. Works are all very busy.
of new orders is now almost impossible
al makers report that they are comfort-
r the first quarter of 1913. Current
called:—Coke tinplates: I C 14 × 20
s. 6d. to 15s. 9d. per box; I C 28 × 20
s. 3d. to 31s. 9d. per box; I C 28 × 20
10½d. to 16s. 3d. per box; I C 14 × 18¾
s. 10½d. to 16s. per box; I C 14 × 19½
5s. 10½d. to 16s. per box; I C 20 × 10
s. to 23s. 3d. per box; I C squares and
6s. 3d. basis. Terneplates are quietly
26s 6d. for I C 28 × 20. Charcoal tins
at 18s. basis and upwards, according to
rs are firm at the following rates:—
to 14s. 9d. per box; C W 28 × 20, 28s. 9d.
C W 14 × 18¾, 14s. 4½d. to 14s. 6d. per
14s. 6d. to 14s. 9d. per box; C W 20 × 10,
ox—all f.o.b. Wales, less 4 per cent.

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safety lamp has been invented by
fore overman at Messrs. Joicey's East
The gauzes are protected by means of a
principle of ventilation is such as to
lation of flame in the gauze, and when
trength of 8 per cent. the flame dies
flame never accumulates in the upper
s remains as a cap on the light. The
in Messrs. Joicey's "tester" at Tanfield
highly satisfactory results. The lamp
detachable pump for the purpose of
e smallest quantities of gas are thus

CONTINENTAL MINING NOTES.

France.

There has been a fresh advance of ½ fr. in manufacturing coals in the Nancy district. All classes of fuel are scarce, and the shortage of rolling stocks adds a further complication.

The price of blast-furnace coke has, according to the formula agreed upon by the cokemakers in the Pas-de-Calais and the ironmasters of the East, been fixed at 24 fr. 34 c. per ton for the fourth quarter of 1912. Since January the advance has been 2 fr. 90 c., and the new price is 1 fr. 46·5 c higher than that immediately prevailing.

The following shows the exports and imports of fuel during the first eight months of this year:—

	Exports.		Imports.	
	1911. Tons.	1912. Tons.	1911. Tons.	1912. Tons.
Coal	863,620	1,333,035	10,692,900	10,102,900
Coke	99,388	120,352	1,577,300	1,780,300
Briquettes	79,396	142,787	783,400	734,400

Imports of coal from Great Britain amounted to 5,547,000 tons (as against 6,020,100 tons); from Germany, 2,166,200 tons (1,961,400 tons); and Belgium, 2,223,700 tons (2,533,700 tons). In August imports from Great Britain amounted to 780,800 tons (against 663,700 tons), whilst those from Germany fell from 292,700 tons to 291,600 tons, and those from Belgium from 328,100 tons to 293,800 tons. Stocks of coal at the principal depots on August 31 were as under:—Marseilles, 85,260 tons; Havre, 99,580 tons; Nantes, 2,465 tons; Bordeaux, 21,068 tons; Rouen, 22,010 tons; Dieppe, 5.403 tons; Dunkirk, 510 tons; Boulogne, 2,683 tons; St. Nazaire, 13,902 tons; other ports, 122,891 tons. Total (1912), 375,773 tons, (1911) 334,692 tons.

Germany.

Prussian Fiscus and Coal Syndicate.—It is generally reported in the German Press that the Prussian Fiscus has decided to withdraw from its agreement with the Coal Syndicate at the end of the 12 months, as it considers the projected increases in the price of coals contrary to the terms of that agreement.

Coal Syndicate Report for September.—The total coal raised during September amounted to 7,958,448 tons (7,824,988 tons in September 1911), or 318,338 tons (280,192 tons) per working day. The calculated distribution was 6,543,808 tons (5,776,853 tons), being 261,752 tons (222,187 tons) per working day, or 99·68 per cent. (84·74 per cent.) of the participation. Total distribution of coal by Syndicated pits: 8,081,601 tons (7,194,914 tons), or 323,264 tons (276,727 tons) per working day. Total deliveries including local sales, miners' house coal and supplies to pits' own ironworks: Coal, 5,106,646 tons (4,791,172 tons), or 204,266 tons (184,276 tons) per working day; coke, 1,722,772 tons (1,368,669 tons), or 57,426 tons (45,622 tons) per working day; briquettes, 367,376 tons (325,141 tons), or 14.695 tons (12,505 tons) per working day.

Turkey.

The British Consul at Beirut states that German competition in foundry coke is facilitated by the direct communication of a line of steamers with Essen. German patent fuel is sought after for silk factories and smiths' forges on account of its quick firing, but is not so durable as British. In 1911 21,000 tons of patent fuel were imported from Swansea and Cardiff and 1,500 tons from Germany; 9,000 tons of gas coal came from the Heraclea mines.

During the Privy Council enquiry into the petition of the inhabitant ratepayers of the South Bank and urban districts for the incorporation of those districts as a seperate municipal borough, some interesting statements were made by Mr. W. W. Storr, general superintendent for Messrs. Bolckow, Vaughan and Co. He said the business was founded in Middlesbrough in 1841. At that time the ironstone in Eston Hills had not been discovered. The firm started blastfurnaces at Witton Park. The first blastfurnace in Middlesbrough was erected in 1851. In 1853 six furnaces were erected at Eston, and in 1854 six more were built at Normanby and Eston. The first Bessemer steel plant in the north of England was laid down at Eston. The normal production of coal from the mines of the company for the year was about 2½ million tons, of which over ½ million was made into coke for smelting purposes, and their production of iron was over 2 million tons. Between 18,000 and 19,000 men were employed by the company, whose wage bill was over £1,500 000. The annual wage bill for the works in the Eston and Normanby district was £462,000. They had concluded an agreement for the reclamation of land further to the east, which would develop their works still further. His firm established works at Eston because it was necessary they should not have a large ratable cost, and because it was cheaper to bring the coke to the iron than take the iron to the coke. They had often considered the advisability of moving their offices from Middlesbrough to Eston. Messrs. Bolckow, Vaughan and Co. paid about 64 per cent. of the rates of Eston. One of the grounds of his firm's opposition to Middlesbrough's expansion over the districts was certainly the fear that the rates would go up. Mr. B. Talbot, managing director of the Cargo Fleet Iron Company, employing 2,000 men, said the firm paid about a third of the rates of Normanby. Their opposition to Middlesbrough was a business action.

LABOUR AND WAGES.

North of England.

Mr. H. S. Mundahl, the umpire, has presented his award on six cases under the Minimum Wage Act submitted before him at Seaton Burn Colliery. One case was that of a workman who had lost a shift on a Sunday night. The men contended that Rule 5 did not apply, and that the workman was not disentitled from receiving wages at the minimum rate for that pay, inasmuch as he had worked an extra shift—working in all twelve shifts for that pay. The umpire held that this was not a reasonable excuse within the rule, no notice having been given or leave obtained. Another case was that of two hewers working as marrows, one of which lost one shift in No. 9 pay and two shifts in No. 10 pay, and one worked full time in No. 9 pay, but lost two shifts in No. 10 pay, viz., the Monday and Tuesday The excuse given was the badness of the air owing to a fall of stone having interfered with the ventilation. No complaint was, however, made to the management till No. 11 pay, and the umpire found that there was not a reasonable excuse for absence, and that, therefore, neither of the two men were entitled to the minimum for No. 10 pay. With regard to No. 9 pay, inasmuch as one of the workmen's absence on April 18 was at a time which the owners did not include for the payment of minimum rates, he considered that absence during that time ought not to be included for the purpose of disqualifying a workman, and accordingly he did not find that one of the workmen was disqualified from receiving the minimum in No. 10 pay.

The miners of Dawdon Colliery, near Seaham Harbour, who have been on strike for a month, owing to a dispute about housing, decided, on the 21st inst., to resume work. The matter will be placed before the urgency committee of the Coalowners' Association and the Durham Miners' Association.

The introduction of weekly pays at the Northumberland collieries is having an unexpected effect. It has been the custom to have money kept off at the various pay offices in respect of the men's contributions to the permanent relief fund, the medical charities, the doctors' fund, for the nursing and ambulance associations, the aged people's treats, mechanics' institutes, &c. The management at some of the collieries have now intimated that the custom will be discontinued, and it is stated they have refused to meet the men to discuss the question.

A further extension of the principle of conciliation is proposed in Cumberland. The smooth working of the machinery for the adjustment of coalminers' and cokeworkers' wages has induced the colliery owners to suggest the setting up of another Conciliation Board for the settlement of wage questions affecting colliery enginemen and boiler firemen. The proposal has been favourably received by the men. At a joint meeting of representatives of the colliery owners and the Winding Enginemen and Boiler Firemen's Association at the offices of the Coalowners' Association, Workington, last week, Mr. W. Graham, of the Moresby Company, in the chair, rules were adopted provisionally. They will be submitted to the men's association for approval, which gained, another joint meeting will be called for the appointment of chairman and secretaries, and the settlement of other details.

Coalminers' wages in Cumberland automatically rose on Monday 2½ per cent. in consequence of an advance in the area of the Midland Federation Board. An existing agreement provides that the Cumberland miners' wages shall be 5 per cent. below the Midland wage in summer, and 2½ below in winter.

Mr. Thomas Cape, financial secretary of the Cumberland Miners' Association, states that all the money acquired as loans to the association, in response to the appeal issued by the executive committee in March of this year, have all been repaid.

Federated Area.

The meeting of the Coal Conciliation Board for the Federated mining districts in England and North Wales has resulted in the concession of an immediate advance of 5 per cent. in wages to the miners, and the signing of a new agreement until March 31, 1915, for the regulation of wages, with a fixed minimum of 50 per cent. and a maximum of 65 per cent. on the standard wages of 1888. Both parties held private meetings previous to the Conciliation Board meeting. The miners decided to accept the amended offer made by the coalowners on October 10, and with the parties in agreement on the main proposal it was expected that the meeting would be of only short duration. This forecast was upset, for when the parties came together quite a number of points were raised by the coalowners, principally with reference to the Minimum Wage Act and it was nearly 6 o'clock before the terms of the agreement were satisfactorily adjusted and the new agreement signed. Sir Thos. Ratcliffe-Ellis presented the following official report to the Press:—

At a meeting of the Board of Conciliation for the Coal Trade Federated districts, held at the Westminster Palace Hotel on Monday, Mr. F. J. Jones in the chair, and Mr. W. E. Harvey, M.P., in the vice-chair, the following resolution was unanimously adopted:—

It is agreed between the undersigned members of the Board, as representatives of the coalowners and workmen in the Federated areas, as follows:—

1. That the Conciliation Board be continued until March 31, 1915, determinable thereafter by a three months' notice on either side, with a minimum of 50 per cent. above the 1888 rates and a maximum of 65 per cent. The procedure regulations of the present Board to apply.

2. That an advance of 5 per cent. in wages be paid to all underground workmen and those on the pit banks and screens manipulating the coal by putting on the reduction of 5 per cent. made as from the first making-up day after March 20, 1909, such advance to commence as from the third making-up day in October instant.

3. That the above advance be applied as regards piece and day wage men either upon the basis rate of 1888 or on the list rate, as has been the case hitherto, and where workmen are paid by contract, and are not earning the minimum rate fixed by the Joint District Board for the district, there shall be paid to the workmen and those employed by them, in addition to the minimum, 5 per cent. on the 1888 rate, so long as wages remain at 55 per cent. on the standard rate of 1888. In the event of a reduction of wages the above addition is to be subject to such reduction.

The terms of the above agreement for the continuation of the Conciliation Board and the method of applying the 5 per cent. advance to contractors are outside the powers of the Board; but on the recommendation of the Board the coalowners in the Federated area have agreed that the advance shall be applied in the manner provided for in clause 3.

The agreement was signed by Messrs. F. J. Jones, H. Westlake, H. Dyke Dennis, A. Leslie Wright, C. R. Pilkington, W. E. Harrison, J. F. Waddington, W. H. Hewlett, A. H. Heap, O. B. Crawshaw, J. J. Addy, W. B. M. Jackson, A. G. Barnes, C. Pilkington and T. Ratcliffe-Ellis for the coalowners; and Messrs. W. E. Harvey, M.P., J. Haslam, M.P., J. Wadsworth, M.P., W. Johnson, M.P., S. Walsh, M.P., A. Stanley, M.P., W. Carter, C. Bunfield, L. Lovett, E. Hughes, J. Hocking, H. Smith J. Parkinson and T. Ashton for the miners.

The men's section of the Coal Conciliation Board held a private meeting previous to the joint meeting to consider the position and to receive the decision of the men in the various districts. Mr. W. E. Harvey, M.P., presided. The returns from districts showed a large majority in favour of accepting the amended proposals and signing the new agreement. Practically the whole of the districts within the Federated area were in favour, with the exception of Yorkshire. For the first time in the history of these Conciliation Board agreements the Lancashire miners voted in favour of it. The opinion was expressed that the proposed maximum of 65 per cent. ought to be increased to 70 per cent. It was contended that the 15 per cent. between the minimum and maximum was too small in the event of a coal boom. It was also decided to ask for an alteration of Clause 2 of the agreement so as to make its meaning clearer and to secure to all the men employed the full 5 per cent. advance.

The coalowners also held a private meeting under the presidency of Mr. F. J. Jones, of Yorkshire.

Sir Edward Clarke, independent chairman of the South Yorkshire District Board under the Coal Mines (Minimum Wage) Act, 1912, has issued the following supplementary award:—

"Whereas by Rule 7 of the rules and rates for the South Yorkshire District and for the special District of Ganister Mines, it was provided that any question as to the interpretation of rules should be referred to me, the chairman of the Joint District Board, and that my decision should be final, now I, as chairman of the said Board, at the request of both parties thereon, held a meeting of the Board at Sheffield on the 20th inst., in order to consider certain questions upon which differences existed between the Board of the workmen and the employers respectively.

"The two questions submitted to me at such meeting were:—

"(1) As to Rule 4, whether, in the case of a collier employed at piecework, paying the trammer whom he engages a day wage exceeding the trammers' minimum rate, he is entitled to deduct the amount so paid to the trammer when claiming to have his own earnings made up to his minimum wage, and whether, if it has been the custom for the collier and the trammer to join in sharing the sum earned by piecework, each of them is entitled to claim the 6s. 9d. minimum wage fixed by the rates for colliers.

"(2) Whether an employer, when called upon to pay the minimum wage, can make any deduction on account of explosives or the sharpening of tools or other similar expenses.

"(1) The first question is really not a question of interpretation of the rule, as that is quite clear. Rule 4 says: 'In ascertaining the earnings of coal-getters or their workmen paid by the piece, there shall not be deducted from their gross earnings for their trammers, fillers, or others working under them a wage more than one shilling in excess of the minimum rate of wages fixed for those classes of workmen respectively.'

"It was suggested to me that the rule and rate, according to its plain meaning, would be *ultra vires*; and, although I should have no power to alter the rule on that ground, I thought it desirable to have the question fully discussed.

"I am of opinion, after careful consideration, that the rule, as it stands, is not *ultra vires*, and is a reasonable and proper rule.

"There is no doubt much difficulty in adjusting a law establishing a minimum daily wage to a system of piecework payment. It was agreed that there is no general practice or custom as to the proportion of the amount paid to the collier which the trammer is to receive. It was further agreed that, since the passing of the Minimum Wage Act and the fixing of the rates, no collier is entitled to employ a trammer at a daily wage of less than the minimum wage of 5s. 9d. a day. But it was stated that colliers having experienced trammers with whom they had been in the habit of working often paid them more than that sum—sometimes as much as 7s. or 8s. a day—and were assisted by them in getting the coal, and in kinds of work which the ordinary trammer would not be expected or be competent to do. That arrangement, no doubt, is to some extent an advantage to the coalowner, and I, therefore, in settling the rates, rejected the proposal of the employers that the collier, in making a claim for the minimum wage, should only be allowed to deduct for the trammer the 5s. 9d. per day fixed as the minimum for his class. But it seemed to me clearly inequitable that the collier should be able, without the approval or knowledge of the employer, to give his trammer a high rate of pay, and to claim to deduct from his own earnings the whole sum so paid when he himself was claiming the benefit of the minimum wage.

"I thought, and still think, that justice is done by the rule as it stands.

"If the collier pays his trammer not a daily wage, but a a share of the sum earned by piece-work, and employs the trammer to help him in work which an ordinary trammer would not do, that does not remove the trammer from the class to which he belongs, or entitle him to more than the 5s. 9d. fixed for that class.

"(2) As to this second question, I am of opinion that the minimum wage must be paid in full, without any deduction for explosives or tool-sharpening, or any other expense which is incidental to the doing of the work. The clear intention of the Act is that a man who has worked underground is to be assured that he will receive in respect of each day's work not less than the sum which is by the rules and rates prescribed for men employed at this class of work. To permit the deductions referred to would tend to defeat the main purpose of the Act.

"September 30, 1912. (Signed) Edward Clarke"

There is trouble threatened at several collieries in the Mexborough district, where the men allege that the above award of Sir Edward Clarke has led to a reduction in wages. It is pointed out that the award gives a minimum of 6s. 9d. for the collier and 5s. 9d. for the trammer. On the old basis the payment worked out, for a collier and trammer with an earning capacity of 12s. 6d. per day, at 7s. 9d. for the collier and 4s. 9d. for the trammer. And now the collier, having to make up the trammer's minimum, is himself suffering a reduction of 1s. per day. A deputation has been appointed to solicit the Board of Trade's intervention, and to ask the ruling of the President as to whether Sir Edward Clarke has carried out the Act in the spirit it was intended to operate. Questions may also be asked in Parliament.

The dispute at the Astley and Tyldesley Collieries over the employment of non-unionist miners has been settled by an arrangement between the Tyldesley Miners' Federation and the management, under which only union men will be employed.

The men employed at Pilsley Colliery were on Saturday empowered by the council of the Derbyshire Miners' Association to take a ballot among themselves to decide whether they should come out on strike as a protest against the attitude of the management regarding a wages question. It was further decided that, the manager of the pit not having replied to the secretary of the Minimum Wages Board respecting certain matters, an action should be entered in the county court. Pilsley, it may be explained, is one of the non-associated pits.

A conference was held at Sutton-in-Ashfield on Saturday to consider the question of hours and wages of the surface workers (other than bank workers) of the collieries connected with the Erewash Valley. It was decided to request the council to take immediate steps to arrange a meeting between the owners of the Erewash Valley and representatives of the association. A circular letter is to be sent to each colliery affected requesting the local official to obtain, as far as possible, all information as to hours, wages and conditions of all the workers concerned.

The surfacemen employed at Bentley Colliery, Doncaster, last week tendered their notices to the management in consequence of the latter declining an application for a general advance of wages. The notices expire on Monday next, and unless terms are agreed upon, the closing down of the colliery must result. The men allege that the management have failed to carry out the agreement signed on August 29 last between representatives of the South Yorkshire Coal Trades Association, and representatives of the National Federation of Colliery Surface Workers, under which it was agreed the basis wages of all able-bodied surfacemen over 22 should be not less than 3s. 7d. per day, plus 17½ per cent., the new basis being retrospective to June 17 last. It is hoped that peace will prevail and a general stoppage be avoided, but at the moment of writing the outlook does not appear to be very favourable.

Advances of wages are to be made to the bank workers at the Crown Farm Colliery, Mansfield. Men over 22 years of age will have a basis rate of 3s. 4d,, which, with the current percentage, will make their wages 5s. a day.

Somerset.

The chairman, vice-chairman and the two secretaries of the Radstock District Coal Trade Conciliation Board, acting upon the instruction of the Board of the 12th inst., met at Radstock on Tuesday afternoon, and decided that an advance of 5 per cent. in wages be made as from the third making-up day in October, in accordance with the advance granted by the English Conciliation Board, the first payment of the amended wages to be made on Saturday next. October 26. At the Board meeting on the 12th inst., it was decided that the Radstock District Conciliation Board should be continued, provided the English Conciliation Board decided that the National Board should be continued. The National Board having since decided to continue that Board until March 31, 1915, subject to three months' notice on either side, the Radstock and District Board will be continued on the same lines.

Scotland.

Following the rise in wages recently granted to shale-miners, negotiations have been proceeding between the Scottish oil companies and Mr. Robert Small, miners' agent, with regard to the wages paid to underground oncostmen employed in shalemines. An arrangement has now been effected whereby the oncostmen will receive increases varying from 1d. to 3d. per day. The increase is to date from the 17th inst.

Delegates from every district of Mid and East Lothian met in the miners' board room at Dalkeith on the 17th inst. Mr. Brown, the secretary, reporting that a claim by the Scottish coalmasters for a reduction of 12½ per cent. had been withdrawn on the occasion of the meeting of the Scottish Coal Trade Conciliation Board held in Edinburgh on Thursday of last week, said this was the first time in the history of the coal trade when any such reduction had been claimed that had been withdrawn in this way. This, he considered, indicated that the favourable prospects of the coal trade were likely to continue.

THE BY-PRODUCTS TRADE.

Tar products:—The market generally is fairly steady, but in the case of crude carbolic the feeling is decidedly weak. Crystals keep the same. Pitch is quiet, but benzols and naphthas are firm, and the former in satisfactory demand. Creosote also favours the seller. Nearest values are:—

Benzols, 90's, 1s.; ditto 50's, 11d.; toluol, 11½d.; carbolic acid, crude (60 per cent.), 1s. 11d. to 2s.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 1s. 1d, as in quality and package; crude ditto, 5¼d in bulk; creosote, 3¼d. for ordinary qualities; pitch, 46s. 6d. to 47s. f.o.b. east coast; ditto, 46s. to 47s. f.a.s. west coast.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—Quietude is the characteristic of the week. It is true that there is scarcely enough business passing to test prices either way, but makers are very firm in their ideas as to future deliveries, and buyers assume indifference as to prompt. Between the two, things are quiet naturally. American advices are satisfactory, with a rather slow market, and nitrate of soda easing off there. Closing prompt prices are:—

London (ordinary makes), £13 8s. 9d.; Beckton £14; Liverpool, £14 3s. 9d.; Hull, £14 2s. 6d.; Scotch ports, £14 5s.; nitrate of soda (ordinary), per cwt., 11s. 7½d.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

INATION QUESTIONS.

a copy of the printed questions set to
nagers' and under-managers' certifi-
ination held in the Manchester and
1911.

R AND IRELAND DISTRICT.

First-class Certificates.

1.—*Arithmetic*

travelling at the rate of 1¾ miles per
the pit bottom. The tubs are placed
rvals of 15 yards, and are 3 ft. 3 in. by
in in inside dimensions. If the coal is
e top of the tub, and 1 cwt. of coal
t of space, what is the total weight of
ht hours, after allowing 7½ per cent. for

0 yards deep and, before the alteration,
ter, has been strengthened by putting
brickwork. The bricks are shaped to
and measure 9 in. on the front or short
y 3 in. thick. Mortar occupies a space
joints and ½ in. between the new and
ricks cost £1 5s. per 1,000, and mortar
ely 20 per cent. and 40 per cent. of the
what is the total cost? If, instead of
he lining had been formed of concrete,
of 15s. per cubic yard of concrete, what
difference in cost? (9)

seam of coal, 32 in. thick, in which the
efuse incidental to its working occupy
cavation, will require to be taken out
e material from two tunnels, each 127
ectively 8 ft. by 5 ft. and 6 ft. by 5 ft. in
ssume that the loose material from the
2½ times the space which it occupied in
(9) (Total 27.)

al Mines Regulation Acts

provisions under section 111. of the
Rules in regard to—(*a*) concentric
d bare wires? (*c*) cables in shafts?
ulage roads? (8)

argeman's duties in a sinking shaft as
l Rules? (8)

General Rule 4 as to inspections, and
withdrawal of workmen. (8)

wn words, the duties of the certificated
y the Special Rules (8)

w regarding systematic timbering?
itable for the timbering of any seam

account of the alterations in the law
und work in coalmines since the
tal 48.)

–Practical Mechanics

description, with sketches, of any two
a) A controller to a winding engine;
r a winding engine; (*c*) an injector for
an economiser; (*e*) a self-acting

electricity is generated at a power
d along bare wires on the surface to a
top of a winding shaft, where it is
um pressure. It is then conducted
to a haulage motor underground·
ments you would make for safeguarding
n the generator to the motor (10)

wind 1,000 tons of coal in eight hours
a depth of 500 yards, the dip being
you propose as to—(*a*) diameter of
es? (*c*) capacity and number of tubs
f winding and decking? (*e*) diameter
(12)

eaking strain of a larch, pitchpine or
ween the supports, 10 in. deep and 5 in.
enly distributed and both ends firmly
ronger is the bar than one of the same
supports 9 in. deep and 6 in. wide,
way, but with the weight in the

nditions under which you would use
pumps at a mine:—(*a*) pulsometer;
three-throw; (*d*) quadruple action;
t size of three-throw ram pump would
0,000 gallons per hour against a head
brake horse-power must be provided
)

–Practical Working.

rds deep, which is required to produce
urs, what system of haulage and what motive power would you adopt—(1) in a main downbrow, 1,200 yards long, dipping 1 in 6? (2) in the main levels on each side of the pit? (3) in the rise brows and levels branching off them? These roads being in a dry and dusty state, what steps would you take—(*a*) to minimise the deposition of coaldust? and (*b*) to reduce the danger from the unavoidable deposit thereof? (18)

2. Draw a section of any 6 miles of country with which you are acquainted, showing the coalseams faults, &c., and mention any features of geological interest. (12)

3. If you were the certificated manager of a colliery employing 700 men and boys in one driving out and three widework districts, what officials would you appoint above and below ground, what duties would you assign to them, and what information would you expect from each daily to enable you to control the work efficiently? (16)

4. How would you conduct the survey of a widework district of six places, making the best use of both fast and loose needle? Show how you would sketch the details, and enter the readings in your book, and state the method you would adopt to maintain the roads in the desired alignment. Plot, by means of scale and protractor, the survey you have made. (14)

5. A 4 ft. seam of coal is overlain by and separated by 6 ft. of shale from a 5 ft. seam of coal The roof of the top seam of coal consists of strong shale. Show, by sketches, any simultaneous or other method of working the two seams, and give your reasons therefor. (16)

6 Show by plan and section the mouthings you would make at the bottom of a shaft, 400 yards deep, and 16 ft. diameter, suitable for hooking on with safety and economy 1,500 tons per shift. (14) (Total 90.)

5.—*Mine Gases, Lighting, and Ventilation.*

1. What are the proportions, in relation to fresh air, of firedamp, carbon dioxide, and carbon monoxide, respectively, which render them fatal to life; and what at those proportions is the effect on the flame of a safety lamp in each case? Give the chemical composition, density and properties of each of the three gases. (8)

2. Describe the following instruments:—Barometer, thermometer, hygrometer, anemometer, water-gauge, gas detector (other than by a flame). How are the readings of the first three instruments and the underground conditions affected by atmospheric variations? (8)

3. In what emergency might it be advisable to reverse the ventilation (*a*) by an arrangement at the surface? (*b*) by an arrangement underground? Sketch and describe the arrangements in both cases, and state what regulations you would make for this purpose. (8)

4. What five conditions affect the movement of air in mines? What unit value has been assigned to one of them? Express each one in terms of the rest. If a pressure equal to 1 in. water-gauge will cause 20,000 cubic feet of air per minute to pass through an airway 6 ft. wide by 6 ft. high, what W.G. would be required to pass 40,000 cubic feet per minute through the same length of airway enlarged to 9 ft. wide by 8 ft. high? If 40,000 cubic feet had been passed through the original airway by a fan working at an efficiency of 60 per cent., what W.G. would have been set up, and what brake horse-power would have been required? (12)

5. Show how you would ventilate the workings on the accompanying plan*, having due regard to haulage, coal being wound at the downcast shaft only; show by arrows the direction of the air currents, putting in the necessary stoppings, doors, brattices, and lamp stations. (21) (Total 57.)

For Second-class Certificates.

1.—*Arithmetic.*

1. Four colliers working together send out 93 tons of coal in a week of six days. The rate per ton is 1s. 6¾d. plus 47 per cent. There are two drawers employed whose united wages are in the proportion of 3s. 6d. for every 5s. which each collier receives. What rate per day will each collier have for himself? (6)

2. Simplify $\frac{3}{4}$ of 0·69512 + $\frac{\frac{1}{5}}{\frac{12}{20}-\frac{1}{4}}$ (6)

3. A superficial area of coal of 70 statute acres 3 roods 30 poles 20 square yards has been worked from an estate. After deducting 5 per cent. for faults, what is the value of the coal if the thickness is 3 ft. 5 in., and the price £25 per foot per statute acre? (6) (Total 18.)

2.—*Coal Mines Regulation Acts.*

1 Quote General Rule 25 and Special Rule 95 in regard to signalling in shafts. (8)

2. What does the Act direct as to—(*a*) measuring and recording of the air? (*b*) persons in charge of ventilating apparatus? (*c*) persons in charge of machinery underground? (8)

3. State in your own words the duties of the under-manager as defined by the Special Rules. (8)

4. Quote the various rules in which the lengths or dimensions of roadways are referred to. (8)

5. Give the words of the Special Rules as to missed shots. (8) (Total 40.)

3.—*Practical Working.*

1. Describe some method of working a seam of coal with which you are familiar. Give reasons as to its suitability or otherwise. Explain the conditions, and make a complete sketch of one working place. (11)

2. A night fireman has charge in a district where men are employed in roofing down, packing on the face, repairing haulage roads, and pumping. Having regard to safety, what is the nature of the examination you would expect him to make at the place where each class of workman is engaged? (10)

3. Sketch and describe some safety device for withdrawing timber, and carefully explain the taking out by its means of a row of timber behind a working face. (10)

4. How would you line the sides of a sinking shaft in ordinary strata—(*a*) temporarily, (*b*) permanently? Give a description of the scaffold you would adopt in sinking a shaft of moderate depth. (11)

5. Under what circumstances would you employ for haulage purposes (*a*) endless rope, (*b*) main-and-tail rope, (*c*) single rope? Give what you consider a suitable working speed of rope, and the method you would adopt for working a branch road under each system. (11) (Total 53.)

4.—*Mine Gases, Lighting, and Ventilation*

1 What are the respective advantages and disadvantages of an ordinary safety lamp and a portable electric safety lamp for use in underground workings? (8)

2. What gases are evolved when coaldust is exploded? What are their properties, and how would you deal with coaldust upon the haulage roads of a mine which is naturally dry? (8)

3. Describe and sketch a stopping, an air door and frame, and an air crossing, such as would be least likely to suffer damage by an explosion. (8)

4. Explain fully, with sketches, how you would ventilate in strata yielding firedamp the following:—(*a*) A shaft in course of sinking, (*b*) a tunnel, (*c*) a level, an upbrow and a downbrow in coal. (9)

5. Show how you would ventilate the workings on the accompanying plan*, having due regard to haulage, coal being wound at the downcast shaft only. Show by arrows the direction of the air currents, putting in the necessary stoppings, doors, air crossings, brattices, and lamp stations (21) (Total 54.)

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arentheses show the number of marks
tion and the total for each paper. In
tion the maximum marks obtainable
; candidates were required to obtain
ral examination, for which 30 marks
hird for a pass, making 200 out of 300
. In the second-class examination,
obtainable were 165 on the papers;
red to obtain 110 to come up for oral
h 30 marks were awarded, less a third,
aximum total of 195 for a pass.

* Not shown.

* Not shown.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.—October 18.

Firemen's Certificates.

Mr. COOPER asked the Home Secretary if the regulations of the Home Office required a manager, under-manager or other underground official of a coalmine to hold a fireman's certificate, in addition to a first or second class certificate of competency under the Coal Mines Act, 1911, before inspecting a working place and giving permission to a miner to enter it to begin his shift, in the temporary absence of the certified fireman?

Mr. MCKENNA replied as follows: The matter is regulated by the Coal Mines Act. Section 64 of the Act requires that the examination before the commencement of a shift must be made by a person who has been appointed to be a fireman, examiner, or deputy, and section 15 provides that after January 1 next no person can be appointed to be a fireman, examiner, or deputy unless he holds a fireman's certificate under sub-section (1) (*b*) of that section. Unless the person making the examination is required to hold such a certificate there would be no guarantee that his eyesight, for instance, was such as to enable him to make accurate tests for firedamp I may add that in future, under the rules which have been made with my approval by the Board for Mining Examinations, all applicants for managers' or under-managers' certificates will be required to have obtained a fireman's certificate.

Grimsby Coal Exports.—The following is the official return of the quantity of coal exported from Grimsby during the week ended October 18.—Foreign: Christiania, 1,924; Antwerp, 657; Hamburg, 737; Rotterdam, 726; Stockholm, 1,916; Dieppe, 634; Reykjavik, 975; Abus, 1,466; Cimbrisham, 409; Kolding, 648; Aarhus, 1,988; Drammen, 614; Malmo, 1,329; Gothenburg, 968; Landscrona, 1,278; Visby, 437; Gefle, 5,734; Cronstadt, 1,924; Assens, 1,215; and Svaneke, 320; total, 25,912 tons. Coastwise: London, 114; Lowestoft, 504; and Yarmouth, 630; total, 1,248 tons.

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, October 15, 1912, is as follows:—Amsterdam, 771 tons; Abo, 102; Alexandria, 3,214; Antwerp, 939; Bombay, 1,470; Buenos Ayres, 11,997; Bremen, 983; Christiania, 1,441; Copenhagen, 399; Cronstadt, 5,689; Dahlsbruk, 1,367; Drontheim, 248; Esbjerg, 643; Fiume, 20; Genoa, 650; Gothenburg, 895; Ghent, 2,566; Genoa, 2,622; Hamburg, 4,660; Harlingen, 1,200; Harburg, 4,220; Libau, 390; Landscrona, 2,338; Malmo, 1,401; Marseilles, 688; Nezr, 597; Oporto, 1,041; Pernau, 2,400; Port Said, 4,202; Reval, 5,041; Ronneby, 634; Rotterdam, 15,603; Riga, 7,424; Rouen, 3,115; Stettin, 95; St. Petersburg, 14,039; Stockholm, 577; Sandefjord, 486; Santos, 2,280; Trieste, 150; Venice, 892; Varburg, 146; total, 109,845 tons; corresponding period last year, 68,625 tons.

MINING AND OTHER NOTES.

It is stated that the Stobie Steel Company, of Sheffield, have decided to erect on Tyneside the first big steelworks in Great Britain solely engaged in the electrical manufacture of tool steels, alloy steels, and similar material. The installations will at first consist of a 15-ton three-phase steel melting furnace, a 5-ton two-phase one for special steels, and a 2-cwt. alloy melting furnace. A 2-ton electric steel melting furnace is shortly being built for another Sheffield steelworks, and a 15-ton furnace is also projected for a steelworks in the North.

Upwards of 200 members and friends were present at the Royal Victoria Hotel, Sheffield, on the 17th inst., at a "smoker" organised in aid of the funds of the Coal Trade Benevolent Association. The gathering was under the auspices of the Sheffield and District branch, and Mr. T. K. Fox, who is president, who was in the chair. He was supported by Mr. Albert Usher, of London, chairman of the board of directors of the association; Mr. W. J. Collins, general secretary; Mr. E. T. Wilks, Mr J. P. Houfton, Mr. George Blake Walker, Mr. J. W. Laverick, Mr. J. V. Newton, Mr. Gibson, and many other prominent members of the coal trade, as well as railway representatives.

Mr. Archibald Livingstone has tendered his resignation to the directors of the Kinneil Cannel and Coking Coal Company, Glasgow, as manager of their collieries at Bo'ness. Mr. Livingstone was born in Armadale in 1854, and when a youth entered the office of Messrs. Dixon and Marshall, civil and mining engineers, Glasgow. After obtaining his certificate as mine manager, he served as general manager to the Antrim Iron Ore Company, Antrim. For five years he was in charge of the Shieldhill Collieries, belonging to the Carron Company, and in 1900 he was appointed to Kinneil Collieries, which position he is relinquishing on account of failing health.

At an informal meeting between the chairmen of the Caledonian Railway Company, the North British Railway Company, and the Glasgow and South Western Railway Company, the question of revising the rates for the carriage of passengers and goods has been discussed. It has been suggested that in view of the increasing working costs there should be a slight increase in most of the classes of goods carried, and also in third class passenger fares, but the matter has not been discussed officially by the directors of any of the companies, and even if it should be raised officially no definite step can be taken without consulting the other lines in Scotland and England.

Messrs. T. B. Sanderson and Son, auctioneers, Newcastle, offered by auction, on the 18th inst., at the Station Hotel, Newcastle, Thirlwall Colliery, near Gilsland. The mining royalties in connection with the colliery cover an area of 3,484 acres, and one seam, which has been proved by borings to be under 2,262 acres, is of an average thickness of 3 ft. 4 in., and gives 8 000,000 tons after making ample allowance. There was only one offer, £2,000, and the property was withdrawn.

Mr. Walter Dixon, in his presidential address at the meeting of the West of Scotland Iron and Steel Institute, said to those concerned in the iron and steel industries he ventured to suggest that a year ago to contemplate a month's total stoppage of their industries would have spelt industrial and national ruin to them. They had withstood not one but nearly two months' stoppage, and they were neither individually nor nationally ruined, but, on the other hand, either through or by or in spite of such stoppage the industries concerned were now in a flourishing condition. There were some of the impressions which appeared to him to warrant the feeling that the coal strike was not all evil, but that the country at large now knew itself better, having passed through a trial in matters which went to the making of a great nation, and had no cause to be downhearted at the result. He believed the result would be as beneficial as it would be long-lasting and widespread, and that it would be a serious mistake to look back upon it as a national calamity.

The annual business meeting of the Sheffield Society of Applied Metallurgy was held on the 18th inst., at the applied science department, St. George's Square. The chairman (Mr. E. H. Hill) congratulated the members on having a new room in which to meet, and said there was every prospect of the society continuing its successful work. Certain alterations in rules were agreed to, including the eligibility of manufacturers of cutlery and edge-tools for membership. Dr. R. S. Hutton was elected president.

A new coal hoist, which has been erected on the new West Dock at Goole by the Aire and Calder Navigation, was on Tuesday put into operation for the first time. The hoist, which has a capacity of 200 to 250 tons per hour, will deal with the compartment boats of the Aire and Calder Navigation, and will increase the coal shipments of the port.

While coaling at Portland last week, the "Neptune" battleship established a "world's record" by taking in 650 ton in 1 hour and 25 minutes, an average of 458·8 tons per hour. All the coal was taken from lighters.

Mr. Percy Greenhalgh, of Atherton, has taken up the position of chief mechanical engineer at Lord Ellesmere's Brackley and Wharton Hall collieries, Little Hulton, in place of Mr. Cornelius Whillance, who has retired after occupying the position for about 30 years.

Four "Underfeed" stokers of the "A" class have been supplied to the Grand Hornu Mines, Belgium.

Mr. Edward Sparkes, employed as under-manager to the Ffaldau Collieries, Pontycymmer, has been appointed manager at the Hanham Collieries, owned by the Kingswood and Parkfield Colliery Company, Bristol. Mr. Sparkes commenced working underground at the age of 12, and has filled the post of fireman at various collieries, also being under-manager at Caerau and Bristol. He emigrated to Canada in 1907 to fulfil an appointment as manager at the Crow's Nest Pass Mines, and resided in British Columbia. He took part in the rescue work at the great mining disaster at the Fernie Collieries in 1908, when 1,000 people were made homeless.

A creditable performance of quick shipment of coal was carried out at Immingham on the 12th inst. The "Gretchen Muller" arrived at 1 p.m. and finished loading at 9.15 p.m., and after deducting stoppages and bunkering time she actually loaded 1,639 tons in five hours, or at the rate of 327 tons per hour. For this smart piece of work the Great Central Railway Company are to be complimented.

The following changes have taken place on the council of the Iron and Steel Institute, consequent on the death of Mr. W. H. Bleckly, hon. treasurer.—Mr. W. Beardmore, vice-president, has been appointed hon. treasurer, and Mr. J. M. While, member of council, has been elected a vice-president to fill the vacancy thus created. Lord Airedale of Gledhow has been elected a member of council in lieu of Mr. While.

The announcement that Messrs. Pease and Partners have decided to freeze the shafts at their colliery at Thorne Moorends may be taken as quite authentic, our correspondent having had an assurance to this effect from Mr. H. Greener, the local manager of the firm. Mr. Greener estimates that the work may take 18 months or two years. The contract has been placed with the same firm which carried out the work of freezing the shafts of the Bullcroft Colliery, and whose works are at Selby. It will be remembered the sinking at Thorne was suspended for something like 12 months, Messrs. Pease and Partners contending that, in view of the exceptional water difficulties with which they were confronted, and having already spent a great sum upon the pit, the royalty owners should meet them with more favourable terms. It is understood better terms have now been conceded. The decision to proceed with the work has given the greatest satisfaction in Thorne, especially among tradespeople, builders and others who have invested capital in the district as a result of the colliery enterprise.

In view of the exodus of miners which has taken place of late from the southern portion of Notts to the newer coalfields in the north of the county and the Doncaster district, it is interesting to record that considerable developments are being undertaken at two of the Leen Valley collieries, viz., Kirkby, which is owned by the Butterley Company, and Bentinck, which belongs to the New Hucknall Company. At Kirkby, which provides employment for 2,000 men, the Top Hard coalseam is being worked, but the company have decided to prove the four lower seams, and operations for carrying out this work have just been put in hand. The seam hitherto principally worked at Bentinck has been the Deep Soft, and the Low Main seam is now gradually being opened out. This development, it is anticipated, will find employment for about a thousand more hands at Bentinck. It may be added that at the New Hucknall Company's latest venture in the north of the county, the work of sinking the Welbeck Colliery is progressing rapidly, two shafts 20 ft. in diameter having been completed to a depth of close on 100 ft.

Under the auspices of the Society of Chemical Industry and Armstrong College, a course of five lectures on the "Manufacture of Coal Gas and the Carbonisation of Coal," delivered by Dr. Harold Colman, D.Sc., Ph.D., commenced on October 16, and will continue on subsequent Wednesdays at 8 p.m., at Armstrong College, Newcastle-upon-Tyne. This course will be followed by one on "Metallography" by Dr. C. H Desch in January.

The coalowners in Northumberland and Durham are making representations to the North-Eastern Railway Company, through their coal trade associations, on the subject of the increased rates to be charged for carrying coals to the docks for shipment.

A Cumberland correspondent says:—During last week an important seam of coal was found in Watergate Colliery, situated about a mile and a-half from Maryport, the property of the Flimby Colliery Company. For some weeks the company have been boring in various parts of the colliery with the object of finding new seams, and on Monday one was struck quite unexpectedly. The first shift of miners who went into the pit on Monday morning observed that a very heavy fall had occurred over the week-end in the Yard Band seam, and after the great quantity of metal had been cleared away, the new Three-quarter seam was visible at the roof. It was at once decided to drive a drift from the Yard Band. This has now been successfully accomplished, and the coal has been reached. The new seam is about 3 ft. in height, and is said to be excellent in quality. It has a layer of cill on the top. This will be used by the by-product works, which are in close proximity to the pit. It also has a layer of clay on the bottom, and this will be utilised at the Broughton Moor Brickworks, both of which belong to the same company. The new Three-quarter seam, which lies in the Tarn district, has never been touched before; it will be worked in a northerly direction, and will practically open up an immense area of new ground. The nearest colliery in this direction is Bertha Colliery, about 3 miles away, which is owned by the same company, and where the same seam was worked very successfully some years ago.

A circular has been issued by the Local Government Board, Edinburgh, drawing the attention of local authorities to the fact that the duty of enforcing the statutory requirements regarding the fencing of shafts of disused mines, which formerly devolved partly on the inspector of mines and partly on the local authority, was now, through the alteration of the law, entrusted wholly to the local authorities, so far as regards mines to which the Coal Mines Act applied. In future every shaft or outlet which failed to comply with the requirements of Section 26 was to be deemed a nuisance within the meaning of the Public Health Act, 1897.

Mr. E. O. Forster Brown, of the firm of Morison and Forster Brown, consulting mining engineers, Mexico, informs us that he has opened an office for general consulting work at 706-7, Salisbury House, Finsbury-circus, London, E.C.

Mr. Henry O'Connor, A.M.I.C.E., F.R.S.E., the honorary president of the Scottish Industrial Arts Association, gave the opening lecture for the session in the National Portrait Gallery, Queen-street, Edinburgh, on the 9th inst. The subject of the lecture was "Coal."

The Chief Inspector of the Sheffield Weights and Measures Department in his report for the year ended March 25 states that the committee have had under consideration a revision of the by-laws relating to the retail sale of coal, and it is hoped the new by-laws will be approved by the Board of Trade at an early date.

Important developments are shortly expected in the local mining industry. The Bickerstaffe Colliery Company have recently had their lease of the colliery, which is situated on the borders of the Skelmersdale coalfield, extended, in order to commence boring operations for further supplies of coal. Below the present workings, where nearly 700 men are employed, an extensive seam known as the Mountain mine, which ranges over a wide area, has long been known to exist, and the lease has been extended in order that the company may develop their resources in this direction.

In view of his appointment as district manager in Lanarkshire to the firm of Messrs. W. Baird and Co., Mr. Richard M'Phie has been presented by the workmen at Bothwell Park Colliery, where he was formerly manager, with a handsome case of cutlery, a roll-top desk, a drawing room clock, a bedrooom clock and a hall barometer.

On Saturday evening, October 12, at the Conservative Club, Westhoughton, near Bolton, Mr. J. P. Winstanley, who has been manager for the past four years of the Westhoughton Coal and Cannel Company's pits, was presented with a Waltham lever watch, and Mr. R. H. Jones, who for 26 years has been surface manager at the company's Westhoughton pits, was presented with a purse of gold. The presents were subscribed to by officials and workmen. Mr. Winstanley and Mr. Jones are going to similar positions at the Bowser Colliery, Hollinwood.

The directors of the Vulcan Boiler and General Insurance Company Limited have received, with regret, the resignation, as chief engineer, of Mr. J. F. L. Crosland, who, owing to advancing years, has felt bound to retire from active participation in the life of the company he has served with so much devotion. Mr. Crosland, who joined the engineering staff of the Vulcan in 1863, will retain a connection with the company as consulting engineer. The directors have appointed Mr. C. Bullock, Wh.Sch., A.M.Inst.C.E., to be chief engineer. Mr. Bullock joined the engineering staff of the Vulcan in 1876, and was appointed chief assistant engineer in 1888. He is the patentee of various specialities connected with the maintenance and safer working of steam boilers, all of which have been acquired by the Vulcan Company. The directors have also appointed Mr. J. C. H. Crosland, A.M.I.C.E., and Mr. F. H. Bullock, A.M I C.E., to be assistant engineers.

Prof. Henry Louis, of the Armstrong College, Newcastle, has again been appointed examiner in mining subjects to the universities of Cambridge and London. He has also been appointed by the Board of Education a member of the commission to investigate the work of the University College, Nottingham, and to be chief examiner and chairman of the examination board in mining and metallurgy. On behalf of the Civil Service Commission Prof. Louis has conducted examinations in local mining and mining law for the assistant inspectorships in coalmines, and in mining law for the inspectorships of mines and quarries. He has been re-elected a member of the board of studies in mining and metallurgy in the University of London, and has been appointed the representative of the Institution of Mining Engineers upon the Royal School of Mines advisory board.

Mr. J. P. Houfton, J.P., who has accepted an invitation to become Mayor of Mansfield, Notts, during the next municipal year, is widely known in mining circles. A native of Chesterfield, he has held important positions of honour in connection with mining, having been president of the

ion of Colliery Managers, president of
nob of the same organisation, and vice-
Federated Institute of Engineers. He is
of the Bolsover Colliery Company, which
in Notts and Derbyshire, and the output
it year was two and three-quarter million
of the best years of Mr. Houfton's life
over in Derbyshire, but some four or five
e opening of the company's new colliery
moved to Mansfield. He is a prominent
Vesleyan Methodist Church, a justice of
ts and Derbyshire, and president of the
sfield Woodhouse District Hospital.

AND COLONIAL NOTES.

India.

rice now obtaining for Bengal coal has
effect on imports of coal into India, as
es demonstrate:—

August.		Five months, April 1 to August 31.		
1911. Tons.	1912. Tons.	1910. Tons.	1911. Tons.	1912. Tons.
11,464	11,480	99,522	89,953	73,064
Nil	17,156	6.	*Nil*	56,448
900	7,376	541	5,068	38,624
Nil	8,265	15,288	4,500	47,627
Nil	13,424	1,461	1,716	40,283
12,364	57,701	116,818	101,237	256,046

represent values (in rupees) of 2,79,975,
9,57,427, 17,04,751, and 43,64,066 respec-

e is likely to be added to in the near
he price of coal, and the inadequacy of
lities. Sea freight from Calcutta to
Rs8, and from Japan to Bombay 11s, a
4 annas. Japan, therefore, becomes a
r the Western India coal market. The
countries, on the other hand, are as

	Five months. April 1 to August 31.		
1912. Tons.	1910. Tons.	1911. Tons.	1912. Tons.
82,970	440,776	329,382	420,903

represent values (in rupees) of 5,72,679,
5,72,724, 28,00,711, and 42,28,882 respec-
a healthy expansion.

the Coal Trade.—Further details have
gard to the meeting called by the Indian
to discuss the railway situation held at
mber 24, and briefly recorded in the
September 27. There were 12 speeches,
haracter. Mr. Topping, who proposed
tually carried, said they owed it to the
the country that they should impress
at the necessity for active and immediate
en to put the whole railway system of
ent state not only as regards wagon
regards track and terminal facilities.
ad sanctioned an additional crore and
ailways, and had accepted the offer from
lders to take payment in 3½ per cent.
hey had no assurance that the money
in the right direction, or that the con-
to payment of wagons would be taken
full extent. The resolution, which was
. A. Ironside, and carried, was in the

f the menace to the industries of India
ailure of the railways to keep pace with
irements of the country, the Govern-
l, by a memorial to the Secretary of
give a guarantee that all capital or
iture which is neither directly repro-
sent essential for the safety and efficient
the country, shall cease until the needs
ent have been satisfied, and that the
ements of railways shall be forthwith
ablished."

led the suggestion that the collieries
ok a quarter of their output for nine
Mr. W. A. Lee thought it was time
red the scheme of administration of
March the Railway Board had agreed
s, because that represented the sum of
at had now been increased to 4,500,
extend it by another 6,000. Other
g various branches of industry, were
, Mr. Bedell, Sir Cecil Graham, Mr.
. Shorrock, Mr. J. Mackenzie, and

he Bengal Chamber of Commerce sent
e Railway Department, in which they
nsidered that a conference, as proposed
vould serve no useful purpose, but that
ot, into the delays at the collieries and
traffic between the collieries and
productive of great advantage. The
Board is dated September 20 and outlines the proposals referred at the meeting held four days later and referred to above. The additional 1¼ crores of rupees have been allotted for immediate expenditure on works to improve the carrying capacity of lines. Of the new wagons, 400 are for the East Indian Railway, which have now 1,400 wagons in course of construction. On this railway the chief difficulty has been experienced in the lack of terminal facilities; estimates have now been submitted for a large increase in the accommodation at Howrah, and important alterations are proposed at the docks. As regards the request of the Bengal Chamber for an enquiry, the Railway Board still pin their faith to a conference; they ask, however, for information on specific points, to be combined with memoranda from the railway managers and the Port Trust, and discussed at a meeting in Calcutta, after the completion of the railway conference at Simla, at the beginning of the present month, and that, following this meeting, the conditions on the spot should be investigated.

At the time the foregoing details reached us, there had been little abatement of the anxiety prevailing. A very serious wagon famine is anticipated during the coming cold weather, due either to the ineptitude or the callousness of the Government of India. Although strong representations have been on various occasions, yet there is no apparent improvement. It is felt to be essential for the well-being of the country that some measures of a drastic nature be taken in hand, and at once, if this chronic state of want of railway facilities is to be avoided.

OBITUARY.

The death has occurred of Mr. William James, at his residence, 45, Dalzell-street, Moor Row, Cumberland. Mr. James was a native of Crowlas, near Penzance, and went to live at Bigrigg about 50 years ago. For many years he worked at Messrs. S. and J. Lindow's mines, Cleator, and took a prominent part in sinking several of that firm's iron ore pits. Mr. James next entered the employ of Messrs. Burnyeat, Dalzell and Co., at Moor Row Mines, and afterwards became engaged by the then Maryport Iron and Steel Company at their pit at Moor Row. Later he entered the employ of the Wyndham Mining Company at Egremont, and remained with them for some years. About 23 years ago he was appointed manager at the Postlethwaite Mines, Moor Row. In 1909, Mr. James retired from the management of these mines. He was 74 years of age, and leaves a wife and family of four sons and three daughters.

The death is announced of Mr. D. F. Schloss, the first director of the Census of Production, and a well-known industrial investigator He published *Methods of Industrial Remuneration*, a short treatise on unemployment, a book on insurance in Germany, and other writings on statistical and economic subjects.

The death took place at his residence, Westquarter, near Falkirk, on the 18th inst, of Mr. James Nimmo, of the firm of James Nimmo and Co. Limited, coalmasters, Glasgow. He had been in failing health for about a year. Mr. Nimmo was the son of Mr. Thomas Nimmo, mining contractor, Airdrie, where he was born 73 years ago. He completed his education at Dollar Institution, after which he obtained a situation as a clerk at his uncle's pit at Slamannan. After some time he acquired the pit for his uncle, who afterwards had several pits in Fifeshire, which his family still possess. Mr. Nimmo then became associated in business with the late Mr. M'Killop, and pits in the surrounding district were acquired by them. Later, when the firm of James Nimmo and Co. was formed, new coal pits at Longriggend, Westfield, and elsewhere were opened, and since then the interests of the company have extended until now it controls a large number of collieries in various parts of Scotland, and employs about 3,000 workers. About ten years ago the firm became a limited liability company, with its registered offices in Glasgow, and with Mr. Nimmo as chairman of the board of directors. Mr. Nimmo spent the first 20 years of his business life in Slamannan. On leaving Slamannan, Mr. Nimmo and his family took up residence in Edinburgh, where they remained about a quarter of a century. He then removed to Innellan, on the Clyde coast, in order to be in touch with the offices of his firm in Glasgow, and then he went to reside in Glasgow. About fourteen years ago he removed to Stirling, where he remained until about two years ago, when he purchased the estate and mansion at Westquarter, near Falkirk. His son, Mr. Adam Nimmo, is chairman of the employers' representatives on the Scottish Joint Board under the Minimum Wage Act.

The death occurred on Monday, at his residence, The Gaer, Newport (Mon.), of Mr. Charles David Phillips, J.P., one of the best known and most popular public men in South Wales He had been ill for some time. Born in December, 1845, Mr. Phillips was educated at Long Ashton and Normal College, and became proprietor of the Emlyn Engineering Works at Newport and Gloucester. Mr. Phillips was a member of many societies and public bodies, including the Newport Harbour Commission, the Newport Chamber of Commerce, and the Newport Ratepayers' Association; he also served on the Town Council.

The death took place at Fairview, Kirkintilloch, last week, of Mr. John Roberton, J.P., retired ironfounder, in his 75th year. Mr. Roberton was a Glasgow man, who in 1868, along with the late Mr. John Cameron, purchased the Southbank Ironworks.

The death has taken place at his residence, Union-terrace, York, of Mr. Robert Dutton, who for about thirty years carried on business as a coal merchant at Castle Mills Bridge, York.

The death has taken place at his residence, Brookfield House, Carlton, near Barnsley, of Mr. Evan Parry, who for 23 years was manager of the Wharncliffe Woodmoor Colliery, Carlton. The deceased gentleman was 66 years of age, and had resided at Carlton for some 28 years, and was well known for his very active interest in local affairs. Death was due to the effects following upon a slight stroke which he had a fortnight ago.

Mr. Jonathan Williams, colliery agent, Newport, died on Sunday at the early age of 35. His firm are part proprietors of the Welsh Patent Fuel Works.

COAL, IRON AND ENGINEERING COMPANIES.

Barnard Bros. Limited.—This private company has been registered, with a capital of £45,000 in £1 shares (£31,000 preferred), to take over the business of coal, &c., merchants carried on by J. H. Barnard, S. C. Barnard and E. A. Barnard at Newport, Saffron Walden, Elsenham, Audley End, and Littlebury, Essex, as Barnard Bros.

Beresford (James) and Son Limited.—This private company has been registered, with a capital of £50,000 in £1 shares, to take over the business of metallic fittings manufacturers, engineers and general brassfounders carried on by H. J. Beresford and F. W. Beresford at Cato-street Works, Cato-street, Birmingham, as James Beresford and Son. First directors, H. J. Beresford and F. W Beresford (permanent joint managing directors, with £1,500 each per annum as remuneration). Registered office, Cato-street Works, Cato-street, Birmingham.

Blakeley (E. F.) and Co. (Liverpool), Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of constructional engineers, manufacturers of steel and iron roofs, principals, stanchions and girders, iron and steel tanks, &c., and to adopt an agreement with E. F. Blakeley. First director: E. F. Blakeley.

Brabbins Fuelless Engine Syndicate Limited.—This private company has been registered, with a capital of £500 in £1 shares, to carry on the business of engineers, electricians, &c. First directors: A. G Jeffs, B. Brabbins, W. Sammons and A. E. Edwards.

Burgoyne (A. J.) and Sons Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to take over the business of a coal, &c., merchant carried on by H. Morton at Catford Bridge, S.E., as A J. Burgoyne and Sons. First directors: J. P. Harper and H. Morton.

Buswell (F. B.) Limited.—This private company has been registered, with a capital of £1,000 (750 preference shares of £1 each and 5,000 ordinary shares of 1s. each), to carry on the business of dealers in coal, iron, ironstone, metals, minerals, colliery proprietors, &c. First directors: F. B. Buswell (permanent) and A P Buswell. Qualification, one share. Registered offices: 17, Newhall-street, Birmingham.

Joint Standard Union Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to acquire inventions relating to joints for pipes, tubes, cables, tubular fittings and the like, and to adopt an agreement with A G. France. First directors to be appointed.

Karpeles (Jules) and Co. Limited.—This private company has been registered, with a capital of £40,000 in £1 shares (18,000 6 per cent. preference), to carry on the business of dealers in coal, &c., carried on by Jules Karpeles at 21, Mincing-lane, E C., and at Calcutta and elsewhere. First directors: J. Karpeles (permanent chairman), F. W. Marshall and R. Mareau.

Sheepbridge Coal and Iron Company Limited.—The directors have issued a prospectus regarding the authorised issue of £250,000 5 per cent first mortgage debentures. The present issue is for £100,000 only, the debentures being a floating charge on the general assets of the company. The prospectus sets forth the principal items of the firm's properties, including shares and debentures of the total nominal value of £756,983 (£514,054 paid up) in the Newstead, Dinnington Main, Maltby Main, and Rossington Main colliery companies, the Loddington Ironstone Company, and the Langwith By-Product Company. The value of the company's properties and plant is £853,339, in addition to stocks, &c, £127,052, making a total of £980,391 odd. It has been arranged to allot debentures of this issue to the holders of existing debentures in repayment of those debentures. The prospectus points out that the company's profits for the last decade, after deducting depreciation and interest, rose from £76,142 10s. 1d. in 1903, to £169,479 1s. 1d. in 1908. In 1909 the profits fell to £97,502 4s. 8d., and in the following year to £76,663 8s. 8d. In 1911, however, they rose to £96,716 18s., and this year were £90,679 9s. 4d. The new issue is made in order to provide temporarily for improvements and extensions in connection with the ironworks and collieries of the company, and of other companies in which the Sheepbridge Company holds the predominant interest, and also partly to meet the calls payable on the 255,000 £1 shares taken in the Rossington Main Colliery Company.

Mortgages and Charges.—The following have been registered in pursuance of the Companies Acts, 1907:—Garnet Colliery Company Limited (particulars of £25,000 debentures created August 15, 1912, present issue £13,000); North Central Wagon Company Limited (issue on September 18, 1912, of £4,900 debentures, part of a series); Standard Steel Company Limited (particulars of £2,500 debentures created September 25, 1912, present issue £300); Tredegar Iron and Coal Company Limited (issue on September 23, 1912, of £1,850 debentures, part of a series); Unstone Colliery Company Limited (issue on September 17, 1912, of £500 debentures, part of a series; Wharncliffe Woodmoor Colliery Company Limited (issue on September 20, 1912, of £200 debentures, part of a series); Yorkshire Samet-Solvay Company Limited (issue on September 12, 1912, of £12,000 debentures, part of a series); Bristol Mineral and Land Company Limited (mortgage dated September 23, 1912, to secure £1,200); Gwaun-cae-Ourwen Colliery Company Limited (issue on September 25, 1912, of £2,500 debentures, part of a series); Lincoln Wagon and Engine Company Limited (issue on September 25, 1912, of £6,015 8s. 2d. debentures, part of a series not exceeding £1,000,000); Margam Forge Limited (debenture dated September 11, 1912, to secure all moneys due or to become due from the company to H. J. Randall, of Bridgend, not exceeding £1,000); Pontelec Welding Patents Limited (issue on September 27, 1912, of £300 debentures, part of a series); Rockwood Colliery Company Limited (issue on September 16, 1912, of £2,200 debentures, part of a series); Wigan Wagon Company Limited (charge dated September 27, 1912, to secure all moneys due or to become due from the company to the Manchester and Liverpool District Banking Company Limited, Spring-gardens, Manchester); B. Whitaker and Sons Limited (satisfaction in full on October 2, 1912, of debentures dated March 5, 1908, securing £12,000, notified—particulars of £12,000 debentures created by resolutions of March 5, 1908, and October 2, 1912, whole amount now issued); Bristol Mineral and Land Company Limited (mortgage dated October 3, 1912, to secure £1,900—satisfaction to the extent of £3,100 of charge dated March 26, 1912, securing sums due or to become due, also notified); British Wagon Company Limited (issue on June 26 of £9,090 and on June 28, 1912, of £29,121 debentures, parts of a series); Brush Electrical Engineering Company Limited (issue on September 29, 1912, of £20,000 debentures, part of a series); Hepworth Iron Company Limited (satisfaction in full on Aug. 2, 1912, of mortgage dated December 5, 1911, securing £300); South-Eastern Coalfield Extension Limited, jointly with Extended Extension Limited (equitable mortgage dated September 21, 1912, to secure £12,000, and as a further security for an amount of £10,000); Sunderland Forge and Engineering Company Limited (issue on October 1, 1912, of £400 debentures, part of a series).

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader and Last White pages.

Abstracts of Contracts Open.

Beckenham, October 28.—For Midland small coal, for the Urban District Council.

Downpatrick, November 6.—For best household coals (about 40 tons) and steam coal, for the County Council.

Dublin, October 30.—For coal, for the South Dublin Guardians. The coal to be best Wigan.

Dunchurch, October 28.—For 80 tons, more or less, good household coal, for the Trustees of the Dunchurch Poor's Plot Charity.

Huddersfield, October 31.—For slack, for the Corporation.

Lagos (Southern Nigeria), November 22.—For the supply to the Government of Southern Nigeria of not less than 20,000 tons of best quality double-screened South Wales steam coal (Admiralty standard). Particulars can be obtained by British firms on application to the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E C.

Leigh, October 30.—For steam slack (approximate quantity 4,000 tons), for the Corporation.

Limerick, October 29.—For 200 tons either of best 4 ft. Wigan, Whitehaven, Garston, Orrell coal, for the Guardians.

Neath, October 31.—For through-and-through or small steam coal, for the Rural District Council.

Skirbeck, November 5.—For about 40 tons of Bonds' Main best Silkstones, for the Skirbeck Quarter Charity Trustees.

Trichinopoly (India), November 18.—The South Indian Railway Company Limited invite tenders for the supply of 800 tons of Indian smithy coke and 800 tons of foundry coke. Further particulars obtainable from the locomotive and carriage superintendent, South Indian Railway, Negapatam. Tenders must be sent to the agent, South Indian Railway, Trichinopoly.

Uxbridge, October 31. — For slack coal, for the Guardians.

Wakefield, November 9.—For coal (slack and smudge), for the Corporation.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Adelaide (Australia), December 11.—*Telegraph, &c., Material.*—Tenders will be received at the office of the Deputy Postmaster-General, Adelaide, for the supply of—(1) 4 nautical miles of submarine telegraph cable and cable tank (Schedule No. 249); (2) 12,000 copper binders, 3,100 jointing sleeves, 12,000 copper tapes, and 37 tons of hard drawn copper wire (Schedule No. 250); (3) 87½ tons of galvanised iron wire (Schedule No. 251); and (4) 22,600 porcelain insulators (Schedule No. 252). For forms application must be made to the High Commissioner in London for the Commonwealth of Australia, 72, Victoria-street, S.W.

Aldershot, November 5.—*Balancer.*—For a balancer for the Urban District Council.

Barking, October 28.—*Steam Roller.*—For a 10-ton steam roller, with scarifier, for the Urban District Council.

Barrow-in-Furness, November 5.—*Electrical Plant.*—For electricity works extensions, for the Corporation (Contract No. 17).

Dublin, November 5.—*Generating Set.*—For a complete generating set of approximately 3,000 kw. capacity, for the Corporation.

Egremont (Cumberland), November 18.—*C.I. Pipes.*—For about 1,080 tons of cast iron pipes and 70 tons of steel pipes, principally 11 in., 9 in. and 7 in. diameter, with all necessary sluice, air, pressure-reducing and other valves, hatch boxes, castings, screenings, &c., for the Urban District Council.

London, October 29.—*Steel Tires.*—For steel tires, for the directors of the Bombay, Baroda, and Central India Railway Company. Forms can be obtained at the offices. Mr. S. G. S. Young, acting secretary, Gloucester House, 110, Bishopsgate, London, E.C.

London, October 30.—*Helical Springs.*—For helical springs, for the directors of the East India Railway Company, as per specification to be seen at the company's offices. Mr. C. W. Young, secretary, Nicholas-lane, London, E.C.

London, October 30.—*Steel Rails, &c.*—For (1) steel rails (41¼ lb. per yard, 30 ft. long) and fishplates, about 270 tons, for the directors of the South Indian Railway Company Limited. Forms can be obtained at 91, York-street, Westminster, S.W.

London, October 31.—*Rails, &c.*—For (1) rails, (2) fishplates, (3) bearing plates, (4) coachscrews and dogspikes, for H.M. Government. Conditions of contract can be obtained on application to the Director-General of Stores, Mr. H. J. W. Fry, India Office, Whitehall, S.W.

Manchester, November 1.—*Motor Fire Pumps.*—For two four-cylinder petrol-driven motor fire pumps, capable of delivering 350 gallons per minute at a pressure of 120 lb., also one four-cylinder petrol-driven motor hose carriage, for the Corporation.

Nenagh (Ireland), November 16.—*Traction Engine, &c.*—For (1) traction engine, 6-horse power; (1) 5 ton motor tractor; (1) 16 by 9 stone crusher; (2) three-bunk sleeping vans; (2) 6 ton end-tipping wagons; (3) water carts, for the Tipperary N R. County Council.

Southery (Norfolk), October 31.—*Centrifugal Pump.*—For a centrifugal pump driven by a crude oil engine, for the Methwold and Feltwell Drainage Board.

Swansea, October 31.—*Coalseam Driving.*—For driving through seam of coal 2 ft. 3 in. thick, 300 yards in length. Dimensions: Road, 6 ft. high, 9 ft. wide; coal, 10 yards wide with waste 3 ft. 6 in. on deep side. Further particulars obtainable from Mr. D. J. Walters, manager, Rock Colliery, Glyn Neath.

Wellington (New Zealand), December 16.—*Water Supply, &c.*—Tenders are invited for the supply and erection of power station equipment, comprising two 150-b.h.p. Diesel engines and accessories, two direct-coupled dynamos of 100 kw. output each, balancer, 60 b.h.p. motor generator, switchboard, and engine-room traveller, two 400-gallon oil tanks, &c. A copy of the specification, &c., can be seen by British manufacturers and contractors at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Whiston (Prescot), November 6.—*Steam Fire Engine.*—For fixed steam fire engine, fire mains, and hydrant works at the Prescot Union Workhouse, Whiston, for the Prescot Guardians.

THE FREIGHT MARKET.

Outward chartering on the north-east coast has been of small dimensions this week. Rates from the Tyne have been based on the following typical figures:—London, 4s. 3d.; Hamburg, 5s.; Havre, 6s.; Bordeaux, 7s. 9d.; Aalborg, 6s. 8¼d.; and Genoa, 13s. 3d. to 13s. 6d. The tendency of these rates is to advance, owing to the Balkan troubles. At South Wales chartering has been very active. Rates in all directions rule strong, tonnage being scarce and orders plentiful. At the Clyde, business is quiet at unaltered figures. The Humber is on the dull side, but rates are firmly maintained. Homewards, there has been a fair volume of business. New York advices report that tonnage is offering more freely and, as shippers are not pressing so much on the market, grain and cotton rates have eased off. The timber tonnage demand is quiet, at fully late rates. Time-charter tonnage is in good demand at firm figures. Black Sea, Azof and Danube rates are firm and rising, owing to the war in the Near East. Mediterranean and ore trade figures are steady. The Baltic is unaltered. Eastern markets are quiet, but firm. There is a fair enquiry at late prices from the River Plate.

Tyne to Aalborg, 1,700, 6s. 8¼d.; Algiers, 2,800, 11s. 3d.; Bas Indre, 1,700, 8s.; Carthagena, 2,100, 13s.; Constantinople, 3,200, 19s.; Calais, 2,400, 6s.; Genoa, 3,700, 13s. 6d.; 5,200, 13s. 3d.; 4 200, 13s. 6d., river loading; Gibraltar, 2,100, 10s., 700; Havre, 1,800, 5s.; Lisbon, 2,800, 9s. 9d.; London, 1,800, 4s. 3d.; Monaco, 1,750, 15s., 250; Oporto, 1,300, 12s. 10½d.; Pozzuoli, 3,000, 14s. 6d. coal, 15s. 6d. goods, 400, Dunston and Elswick loading; Rouen, 2,800, 6s.; Savona, 5,000, 13s. 5d; 5,200, 13s. 3d.; 4,200, 13s. 6d., river loading; 5,000, 13s. 3d., from Dunston; St. Nazaire, 50,000 tons, voyages over next year, 6s., option Dunston loading, 6s. 1½d.: 2,300, 7s. 9d.; Venice, 5,000, 15s.

Cardiff to Antwerp, 3,000, 5s. 3d., end October; Algiers, 2,300, 13·37½ fr.; Brest, 300, 6s. 6d.; Brindisi, 3,300, 15s., October 28; Charlestown, 460, 5s. 6d.; Civita Vecchia, 2,800, 13s. 6d.; Campana, 5,000, 23s. 6d., October; Colombo, 5,000, 16s., November 27; 5,000, 16s., ppt.; Djibouti, 6,500, 15s.; Frey Bentos, sail, 21s.; Genoa, 4,000, 13s. 3d., ppt.; 5,400, ditto; 4,400, 13s., ppt.; 3,150, 13s., ppt.; Havre, 1,500, 6s. 6d.; Islands, 4,700, 11s. 6d., ppt.; Invergordon, 950, 6s. 6d., Admiralty; Las Palmas, 4,000, 11s. 4½d.; 4,750, 11s. 6d.; Leghorn, 4,200, 13s.; 700, ppt.; Lisbon, 2,100, 9s. 6d.; 2,300, 9s. 4½d., 500; Malaga, 2,000, 13s.; Monte Video, 22s. 6d., November; 22s., November 15-30; 5,400, 22s. 6d., October 28; 22s., end November; Madeira, 3,800, 11s. 6d., ppt.; Messina, 5,600, 11s. 6d., 700, net terms, free of all commission, October 28; Marseilles, 2,400, 14½ fr., ppt.; Malta, 4,000, 11s., end October; 5,900, 10s. 6d.; Naples, 4,200, 13s., 700, ppt.; 6,400, 13s., 800, end October; 5,000, 12s. 9d.; Perim, 5,000, 14s. 10½d.; Port Said, 5,500, 13s., ppt.; 7,000, 12s. 10½d., next week; 5,500, 13s., November 25; Piræus, several vessels, 18s. to 19s.; Pembroke, 240, 4s., Admiralty; Portland, 1,900, 4s. 3d., Admiralty; 2,800, 4s. 3d., Admiralty; Portsmouth, 400, 6s. 4½d., plates; Rio de Janeiro, 6,000, 23s. 6d., early November; 4,200, 23s. 6d.; 23s., 300, early November; Rosario, 3,900, 24s., October 28; 23s. 9d.; 5,000, 24s.; River Plate, 23s., mid-November; Seville, 2,500, 11s.; Sheerness, 750, 6s. 6d.; Teneriffe, 4,000, 11s. 4½d.; Torre Annunziata, 3,900, 13s. 3d.; Tunis, 2,000, 16½ fr., spot; Venice, 4,000-4,400, 14s. 9d., November; 4,000, 14s. 9d., 500, November 1; 4,200, 15s. 6d., ppt.; Villa Constitucion, 5,000, 23s. 6d., October.

Barry to Santos, 5,000-5,500, 27s., October 28.

Swansea to Ancona, 15s. 6d.; Rouen, 1,300, 7s. 10½d.; 1,080, 8s.; 1,500, 7s. 9d.; Genoa, 14s., 500, 6½d.; Savona, 14s., 500, 6½d.; Leghorn, 14s., 500, 6½d.; Tunis, 1,800, 15¾ fr.; 16¾ fr.; Alexandria, 3,750, d.w., 13s. 3d., ppt.; Barletta, 15s. coal, 15s. 9d. fuel; 2,500, 15s., ppt.; Venice, 3,100, 16s., end October; Hamburg, 1,100, 6s. 6d.

Glasgow to Alexandria, 3,500, 13s., coal basis; Buenos Ayres, 24s., early November.

Port Talbot to Bona, 1,800, 15¾ fr.

Hamburg to Rosario, 26s. 3d., sugar, October; 27s.

Wales to Bahia, Rio de Janeiro, Monte Video or Buenos Ayres, sail, 20s., November; Mexillones and home to United Kingdom-Continent, sail, 46s. 6d., less 1s insurance; West Coast South America and home to United Kingdom-Continent, sail, 46s. 6d., stiffened; nitrate port and home to United Kingdom-Continent, sail, 45s. 6d. in and out, 46s. stiffened, May-June loading on the Coast.

Wear to Bayonne, 1,900, 8s. 6d.; Helsingfors, 1,700, 7s. 9d.

Blyth to Swinemunde, 2,100, 6s.; Catania, 2,600, 13s. 3d., 600; Skutskar, 1,800, 7s. 4½d.; Sundswall, 7s. 10½d., November; Helsingfors, 1,250, 8s.

Hull to Buenos Ayres, 4,000, 22s. 3d. with 250, 22s. 6d. with 200, November 15; 3,000, 20s., January 10; Nykjobing, 2,600, 6s. 6d; Riga, 2,700, 6s. 6d.; Genoa, 4,400, 12s. 11d., October 28; Naples, 2,300, 12s. 9d.; Rouen, 1,400, 6s. 6d., ppt.; Cronstadt, 2,000, 7s. 3d., October 27; London, 1,450, 5s.

Newport to Naples, 4,300, 13s.; Torre Annunziata, 4,300, 13s.; Vigo, 2,400, 9s. 3d.; Cadiz, 1,150, 12s.; Seville, 2,000, 11s., ppt.; Gibraltar, 1,700-1,900, 10s.

Grangemouth to Kiel, 2,000, 6s. 10½d.

Ayr to Alexandria, 3,500, 13s., coal.

Alloa to Konigsberg, 1,600, 8s.

Bo'ness to Horsens, 1,300, 8s.; Gibraltar, 10s.

Leith to Bruges, 1,450, 6s. 6d.

Birkenhead to Marseilles, 11s. 9d., early November.

Goole to London, 1,450, 5s. 6d.; Boulogne, 650, 7s., ppt.

Seaham Harbour to Naples, 2 300, 14s.

Forth to Sonderberg, 1,500, 7s. 9d.

Immingham to Rotterdam, 1,600, 4s. 3d., spot.

Grantham to Oporto, 900, 13s. 3d.

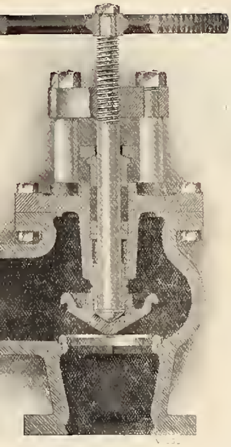
Rotterdam to Bordeaux, 3,500, 7s. 6d. coal, 8s. 3d. fuel, ppt.; Chantenay, 2,300, 7s. 4½d. coal, 9s. 4½d. coke, ppt.; St. Nazaire, 3,300, 7s. 3d. coal, 8s. fuel, October 25; Barcelona, 6,000, 13s., ppt; Livorno, 4,600, 12s. 9d. coal, 13s. 6d. fuel, 14s. 9d. coke, ppt.; Porto Vecchio di Piombino, 4,400, 13s. 3d., ppt.; Algiers, 1,600, 13½ fr., fuel, ppt.; Genoa, 4,400, 12s. 11d.

Fife port to Stockholm, 1,800, 7s. 6d.

Homeward bound:—Azof, 6,500, West Italy, basis 28 fr., one port, cancelling November 5; 2,500, Tunis, 28 fr., ppt.; 3,500, 10 per cent., 22s., n.c. or any, 22s. 6d. Hamburg, option Novorossisk 1s. less ppt; 3,000, 25s., n.c. or any, 25s. 6d. Hamburg, ppt.; 5,000, Marseilles, 26½ fr., option West Italy, basis 27 fr. one port, ppt.; 3,900, Antwerp or Rotterdam, 26s., ppt.; 5,000, Marseilles, 27 fr., ppt; Vladivostock, 2,482 net, United Kingdom-Continent, 40s., December; 6,000, ditto; 2,275 net, 40s., December; Kurrachee, 2,169 net, p.p. U.K.-Continent, 23s. 3d. one port, 24s. two ports, January; 5,800, 23s. 3d., December-January; 3 042 net, 23s. 3d., January; 2,317 net, 24s., December; 3,018 net, Antwerp, 23s. 3d., less 3 per cent., November-December; Calcutta, 2,450 net, Bombay or Kurrachee, Rs. 7·8, October-November; Pensacola, 1,000 stds., 10 per cent., Holland and Tyne, 141s. 3d., November; 1,450 stds., 10 per cent., Hamburg and Liverpool or London, 150s., November; San Lorenzo, 6,200, 10 per cent., United Kingdom-Continent, 27s. o.c., less 6d., option full cargo below bar 1s. 6d. less, November 1-15; 4,000, 10 per cent., 27s. o.o., less 6d., November 5-25; 5,100, 10 per cent., 26s. 9d. o.o., less 6d., option full cargo below bar 2s. less, October-November; 5,000, 10 per cent., 27s. 9d. o.o., less 6d., cancelling November 2; Buenos Ayres or La Plata, 6,800, 10 per cent., United Kingdom-Continent, 25s. o.c., less 6d., October-November; 6,300, 10 per cent., United Kingdom-Continent, 23s. 6d. o.c., less 6d., with Mediterranean options, December 15 January 15; Santa Fé, 4,000, 10 per cent., United Kingdom-Continent, 32s. 6d., less 6d., quebracho, December-January; Bilbao, 3,600, Middlesbrough, 7s. 9d., October; 3,000, Newport, 6s. 1½d., ppt.; 2,900, Rotterdam, 7s. 3d., October; 3,600, ditto; 2,200, ditto; Torrevieja, 5,000, Calcutta, 12s., salt, November 20-December 20; New York, 1,745 net, Avonmouth, Hull or Rotterdam, 4s., heavy grain ppt; 28 009 qrs., 10 per cent., 4s.; heavy grain, October; Gulf, 2,327 net, United Kingdom-Continent, 23s., net form, cotton, early November; 1,988 net, 23s., net form, mid-November; Iquique, sail, 30s., U.K.-Continent, less 9d., spot; Gulf timber port, 187s. 6d., River Plate, November-December; Novorossisk, 6,000, Antwerp or Rotterdam, 22s., ppt.; Sulina, 5 300, Rotterdam, 22s. 7½d., Antwerp 22s. 9d., ppt; 3,850, West Italy, 27 fr., October-November; 5,300, Antwerp, Rotterdam, or Leith, 23s., ppt.; Baltimore, 30,000 qrs., 10 per cent., Rotterdam, Avonmouth, Cardiff, or Barry, 3s. oats, 3s. 9d. heavy grain, October-November; 40,000 qrs., 10 per cent., London, Avonmouth, or Rotterdam, 3s., Antwerp 3s. 1½d., oats, November-December; Algiers, 4,300, Rotterdam, 9s. 3d. ppt.; Alexandria, 2,000, 10 per cent., Dunkirk, o.s., about 27s., ppt.; Tragana, 5,000, Rotterdam, 8s., October; Hornillo Bay, 4,000, Rotterdam, 7s. 6d., October; time charter, Transatlantic trade, 13s., one trip, delivery Gulf, re-delivery United Kingdom-Continent; Gulf, 23s., United Kingdom-Continent, one port to one, cotton, mid-November; San Francisco, 8,500, 51s., United Kingdom-Continent, ex. France; Kherson, Nicolaieff, or Odessa, 5,500, London or Rotterdam 21s. 6d., Hamburg 22s. 3d., ppt.; 4,200, London or Rotterdam, 22s. 6d., October-November 5; 4,700, Rotterdam 23s., Hamburg 23s. 6d., Weser 23s. 9d., ppt.; 3,800, Rotterdam 22s. 9d., London, Hull, or Antwerp, 23s., ppt.; Nicolaieff, 5,500, London, Hull, or Rotterdam, 23s., Hamburg 23s. 6d., ppt.; Kertch, 3,400, 24s. 6d. n.c. or any, 25s. Hamburg, ppt.; Kustendje, 5,500, Antwerp or Rotterdam, 22s. 9d., ppt.; Mauritius, 2,308 net, Australia, 12s. 6d., November; Almeria, 4,200, Rotterdam, 7s. 9d., November; Hornillo Bay, 3,500, Cardiff, 7s., November; Villaricos, 3,100, Emden, 8s. 3d., October; West Australia, sail, 36s., United Kingdom-Continent, January-February; North Pacific, sail, 85s. one port, 87s. 6d. two ports South Africa, March-May; time charter, 4,800, £4,840, one trip, Gulf to United Kingdom-Continent; time charter, European trade, 3,000, £610, 12 months, delivery Wales, February; time charter, Brazil and River Plate trade, 7s. one round trip, delivery Dunkirk, re-delivery United Kingdom-Continent; Norfolk, 2,000 net, Liverpool or Manchester 53s. 9d., Bremen 55s., cotton, November; Taganrog, 5,400, Genoa or Marseilles, 26½ fr., ppt.; Bombay, 2,291 net, Antwerp or Rotterdam, 27s. 6d., ore, November; 2,140 net, Manchester, 28s., ore, October-November; Carthagena, 3,300, Oslebshausen, 9s. 3d., end November; Newcastle, N.S.W., sail, 49s., West Coast South America and home to United Kingdom-Continent; Rosario, sail, 20s., United Kingdom-Continent; Buenos Ayres, sail, 22s. 6d., United Kingdom-Continent; time charter, general trade, 5s., two years; 11s. 6d., one trip, States to Black Sea; Baltimore, 3s. 10½d., Cardiff, Antwerp or Rotterdam.

The question of hospital accommodation for the collieries in the coalfield around Doncaster is a somewhat burning one, as the Doncaster Infirmary is at present taxed to its fullest capacity. Frickley Colliery has solved the difficulty by the provision of a hospital of its own, and there is a probability of something being done in this direction at Maltby. According to Lord Scarbrough's agent, it is his lordship's opinion that a cottage hospital should be established for Maltby before very long, and later on, it is said, Lord Scarbrough may have some proposals to make in this respect. The large and continual increase in the population of this district makes it necessary to relieve the institutions at Doncaster and Rotherham.

"SENTINEL"
PATENT STOP VALVES



THE careful designing of these valves at once enhances the appearance and makes them considerably stronger than ordinary valves. The metal flows in easy curves throughout, avoiding the risk of crystallisation and fracture which is inseparable from the usual sharp bends.

The internal valve cannot chatter or rock on its seat, as it receives the pressure of the spindle ***below*** its working face; while the seating ring is screwed and not merely forced into position, and therefore cannot work loose.

The spindle is of large dimensions and is made of nickel steel, having three times the strength of bronze. The threads are cleanly cut by automatic machinery, and the hand-wheel is attached by a key of special design which cannot work out of the key-way.

The stuffing-box is deep and seldom requires re-packing, which can be carried out, when necessary, under steam. It is provided with a fool-proof gland, which cannot bind under any circumstances, however carelessly screwed up.

These are only a few of the features (many of them exclusive) of the "Sentinel" Patent Stop Valves.

They and our other specialities for steam and water users are more completely described and illustrated in our Catalogue 25 S, which will be sent to engineers and others on application.

Those who are visiting the Machinery Exhibition at Olympia are invited to inspect our Valves at STANDS Nos. 82 & 97, Row G.

Always use and specify "SENTINEL" PATENT VALVES

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ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

6986 (1912). *Improvements in Hoisting, Hauling and Winding Apparatus.* W. H. Lindsay and H. R. Couper, both of the Coil Clutch Company Limited, Phœnix Works, Johnstone, Renfrewshire. — This invention relates to hoisting, winding, or hauling apparatus wherein the winding drum is thrown into and out of operative connection with the driving means by a clutch, the drum being of the "free-barrel" type and provided with a ratchet ring capable of being held by a brake, pawls on the drum engaging the teeth of the ratchet ring. Under the invention screw mechanism is provided for operating the brake and screw mechanism for operating the clutch, said screw mechanisms being arranged in line and each operated by a spindle, the spindles being arranged the one within the other. Mechanism is also provided arranged in connection with the drum and adapted to positively reverse the same for the purpose of overhauling. Fig. 1 is a side view, partly in section, showing the apparatus complete. Fig. 2 is a view of the same partly in plan and partly in section on the line X. X, fig. 1. The invention is specially suitable for use on ship board for dealing with cargo, but it may be used for many other purposes where hoisting, winding, or hauling is necessary. (Five claims.)

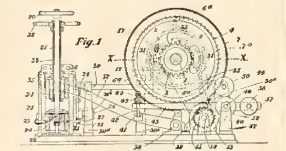


Fig.1

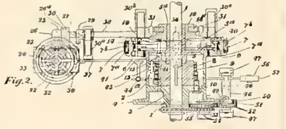
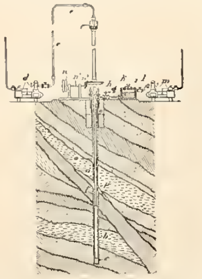


Fig.2.

10926 (1912). *Improvements in Methods of Remedying Faults in Boreholes.*—G. Pauli, of 56, Haupt Strasse, Altenheim, Baden, Germany.—When in deep boring water-bearing strata are met with, the usual practice is to force concrete under pressure into the strata through pipes provided for the purpose. The present invention consists in the application of the counter-pressure system to the art, the concrete, cement, or other suitable material, fed under pressure down the space between the hollow boring rods and the borehole walls being forced into the strata where the faults are, by the counter-pressure of water, or the like, supplied through the hollow rods. Thus, whereas in the prior method the concrete is forced into the rifts merely by pressure acting upon it from above, there are, according to this invention, two distinct forces acting to press filling-material into the fissures—viz., the pressure of the concrete itself from above and the water pressure from below. In the accompanying drawing the figure is a sectional view showing a deep-boring plant. Let it be assumed that, in the course of boring, water-bearing strata, or fissures, or the like have been met with at *o* and *p*. To render the sides of the borehole firm at the places *o* and *p*, according to the invention, the ready prepared concrete, cement, or similar material *k* is first supplied to the collecting chamber *i* and the latter then hermetically closed. Hereupon the pump *m* is started, whereby the material *k* is forced through the pipe *g* into the borehole *f*, the material descending the space between the boring-rod and the wall of the bore as far as, or somewhat lower than, the defective place in the latter. The pump *d* is next set to work, and owing to the pressure exerted by the water in the boring-rod and by the material *k* upon each other and upon the well of the borehole, the material *k* will be forced into the water-bearing stratum, fissure, or the like, and at the more constricted places thereof will choke up the passage, and finally binds and effectively stops up the entire part. The superfluous material *k* remaining in the borehole can be expelled from the latter by opening the valve *h* and allowing the pump *d* to work alone, whereby the pressure-water rising between the boring-rod *a* and the wall of the borehole will drive out the material at the open valve. The plant can also be used for working without counter-pressure in cases where this is necessary or desirable. (One claim.)



13453 (1912). *Improvements in and relating to Protectors for the Points of Miners' Picks and the like.* S. Griffiths, 24, John-street, Treharris, Glamorganshire, and E. Thomas, 1, Pen-street, Treharris, Glamorganshire. — This invention consists in the manner in which the protector is held to the blade and in the application of a split wedge-piece of frictional substance, as rubber or leather, lining the protector with solid ends projecting beyond the metal case and forming little buffers which bear the impact if the point of the tool drops on the foot or elsewhere. Fig. 1 represents an elevation of a miner's pick with the points of the blade shielded according to the invention, the protector to the left being shown in medial longitudinal section. Fig. 2 represents a plan of the protector. (One claim.)

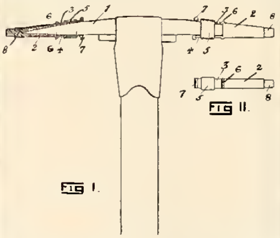


FIG II.

FIG I.

14624 (1911). *Improvements in and relating to Fuel Briquetting Plants and the like.* T. Rigby, Station Hotel, Dumfries, Scotland, and N. Testrup, 6, Broad-street-place, London.—This invention relates to improvements in the handling of fuel in plants for briquetting the same or in similar installations and has for its object to prevent ignition or explosion in conveying the same when in a relatively dry condition, from driers to a more or less distant press or other locality, a further object being to effect heat economy in a process of the character indicated. The invention consists in conveying the material after it leaves the driers to the briquetting press or other locality when in the condition referred to in an atmosphere consisting of a mixture of water vapour and air or of flue gases. Figs. 1 and 2 show respectively in part-sectional elevation and in part-sectional plan an installation in which the material is conveyed from Schulze driers to the hopper above a briquetting press by a very humid air current. The material which passes through the heated driers *a* is dried therein, and by allowing little or no air to pass through the drier the atmosphere in contact with the material can be caused to become so humid therein that no possibility of ignition can arise. The material still in such an atmosphere is by the conveyor *l* brought to the intake of the fan *m*, where the light dusty particles are drawn by the velocity of the gas current through the duct *o* into the cyclone, the heavier stony matters remaining behind and passing out to the pit *q*. In the cyclone *w* the solid matters are precipitated and fall into the bunker *v*, while the mixed air and water vapour after passing through the separator *s* are sucked out by the fan 1 and passed out to any suitable spot and preferably to the grate of the ammonia recovery producer where such is used in the plant to utilise the larger amount of water vapour therein contained. The material which has fallen into the bunker is in the usual way superheated and supplied to the briquetting press 2. When working with lignite or brown coal it is in some cases necessary to reduce the temperature of the dust to the neighbourhood of between 30 degs. and 40 degs. Cent., before briquetting. When working with peat, a saturation temperature for the mixture in the neighbourhood of 95 degs. Cent. would give one mixture which was suitable for the present purpose. (Five claims.)

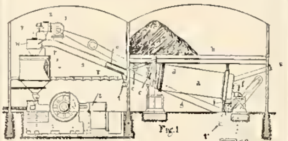


Fig.1

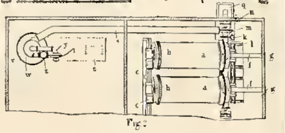


Fig.2

17662 (1911). *An Arrangement in Connection with Drilling and Boring Machines for Mining, Quarrying and like Operations, of a Nut, Crossbar or Clamp on the Feed or Driving Screw, to Effect the Withdrawal of the Drill from a Hole.* G. W. Teekel, 16, Ton-Coch-terrace, Cefnpennar, Mountain Ash, South Wales.—This invention has reference to means for withdrawing drills and boring tools which frequently become jammed in holes owing to the refractory or variable nature of the material being bored, or to the drill becoming bent, or to some other cause. Fig. 1 is a side elevation, fig. 2 a back elevation, and fig. 3 a plan of part of an ordinary type of drilling and boring machine, in which the driving nut 10 engages in notches in the main frame 7, enabling the drill to be driven by turning the driving screw 2 in the forward direction. The invention consists in the arrangement on the driving screw 2, behind the main frame, of the nut 6 of rectangular or other suitable shape, having projecting parts or trunnions 6, 9. When drilling, the nut 6 is kept back clear of the frame. To withdraw the drill the nut 6 is screwed up to the back of the frame 7, and then held in position while the driving screw is given a few turns in the direction reverse from that for boring, thus causing the nut to enter between the side bars of the frame which will prevent the nut from turning. The projections 8, 9 will then bear against the back of the frame, and any further turning of the driving screw in the reverse direction will cause the drill to be drawn out from the hole. The trunnions of the driving or feed nut 10 need not be entirely disengaged from the notches when doing this. (Two claims.)

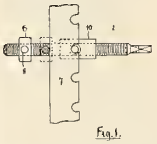


Fig.1.

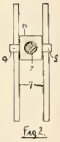


Fig.2.

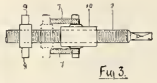


Fig.3.

21344 (1911). *Process for the Detonation of Explosive Bodies.* W. Fairweather, of 65-66, Chancery-lane, London, W.C., and 62, St. Vincent-street, Glasgow (a communication from Dr. Conrad Claessen, of 45, Dorotheenstrasse, Berlin, Germany).—Explosive charges can be detonated by means of detonating tubes which are either inserted in, wound around, or led through the charges, and fired at one end by means of a detonator. The ignition power of detonating tubes applied in this manner is considerably increased when, in accordance with this invention, the tube is detonated at both ends, so that the two series of detonating waves meet on the surface or in the interior of the explosive charge. This is the case when, for instance, 100 cm. of detonating tube are wound round the explosive in such a way that the middle portion of the tube, *i.e.*, from about the 45th to the 55th centimetre, is in direct contact with the explosive. The increased ignition power of the tube obtained in this manner is proved by the following experiments, in which compressed trinitrotoluol of a density of 1·6 was used as the explosive charge. Experiments were carried out in series with three different detonating tubes, the core of which consisted in the first instance of trinitrotoluol, in the second of chlorotrinitrobenzol, and in the third of tetranitromethylaniline. In one series ignition was effected with No. 8 fulminate of mercury detonators fired at both ends of the tube simultaneously; in the other, for the purpose of comparison, at one end only. It was found that double ignition of the tube caused detonation in cases where single ignition failed to bring about the explosion of the charge, or did so only partially. (Two claims.)

27672 (1911). *Improvements in and relating to Apparatus for Burning Finely-divided Fuel.* Babcock and Wilcox Limited, Oriel House, 30, Farringdon-street, London, E.C. (communicated by the Babcock and Wilcox Company, of New York, U.S.A.).—This invention, which is an improvement on, or modification of, that described in the Specification of Letters Patent No. 18712 of 1911, relates to what has been termed an impeller plate for use in connection with a burner for finely-divided fuel for giving the air for combustion a whirling or rotating motion. According to the invention the plate is given a substantially conical form, as will be understood by reference to the accompanying

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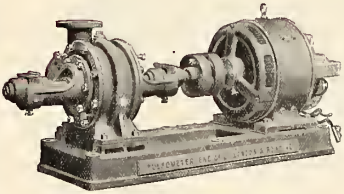

HIGH LIFT CENTRIFUGAL PUMPS.
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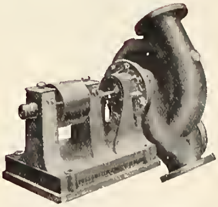

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Volute Type. Belt Driven.
For Lifts up to 80 ft.
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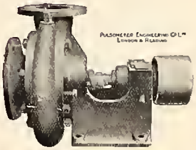

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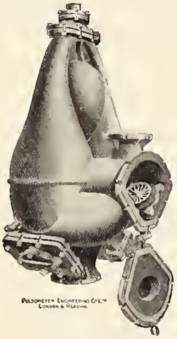

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STEAM PUMP.
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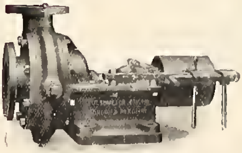

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with Fast and Loose Pulleys.
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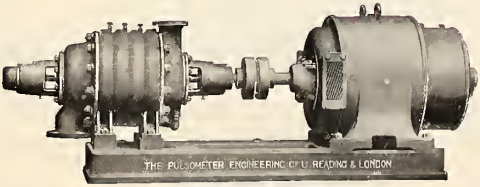
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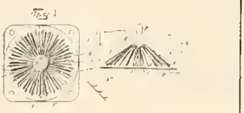
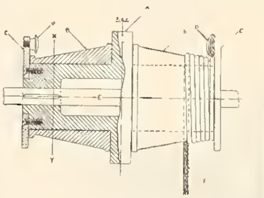
drawings, which show a front elevation of one form of impeller plate according to the invention, a top view thereof, and a detail view of the blades. The burner 7 may terminate relatively to the impeller plate, as shown, or it may be placed within the opening of the ring 2. Also the relative disposition of the impeller plate to an opening 6^a leading from an air conduit 8 into the furnace may be reversed—that is, the apex of the cone may be fixed at the



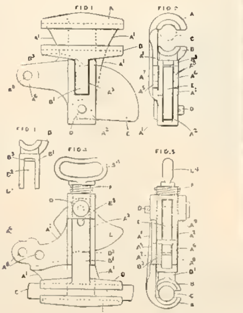
opening leading to the furnace instead of the base of the cone being fixed at said opening. Under special circumstances of pressure or character of fuel or furnace, the inclination of the blades to the surface of the cone may be varied and also the angle of the cone may be varied, or the impeller plate may be of conoidal rather than truly conical form, or the sides of the cone may be stepped, or the base of the cone may be of a form departing from a true circle. (One claim.)

26357 (1911). *Improvement in Winding Drums for Hoists or Cranes.* T. Petersen, "Shipleke", Parkside-gardens, Wimbledon, Surrey.—The object of this invention is to prevent unevenness of spacing and winding of coils of wire-rope or cord where wound up on a winding drum, and also to prevent waste of space on the drum itself. To accomplish this a tapered loose sleeve "B" is taken which may be slipped into position over winding drum "A". After



tapered sleeve "B" is in position, end plate "C" to which is attached a terminal stud "D" is secured to the drum. The winding rope or cord "F" is made fast to the stud "D", and when the drum is revolved by means of shaft "E" to which drum "A" is keyed, the rope is wound round the loose tapered sleeve "B", the arrangement being such that the tension of the rope is transmitted to its point of attachment, thus ensuring evenness of spacing and winding. The arrangement described above is shown on the accompanying drawing, which is a combined section and front elevation of the drum and loose sleeve. (Two claims.)

27631 (1911). *Improvements in or relating to Haulage Clips.* G. Wood, Holmesdale, Dronfield, Derbyshire.—This invention relates to that type of haulage clip for use in the haulage of corves, wagons, tubs or the like, having a fixed jaw, two plates carried by said jaw, a movable jaw guided in said plates, a cam located between said plates and



pivoted thereto, and projections carried by said plates to which the article to be hauled is attached. Fig. 1 is a front elevation and fig. 2 is an end elevation of a clip adapted for overhead haulage. Fig. 3 is an end elevation of the movable jaw shown in figs. 1 and 2. Fig. 4 is a front elevation, and fig. 5 is an end elevation of a clip adapted for under haulage. When it is desired to tighten the clip upon a rope or cable C, the cam E is rotated on its pin or bolt D, thus raising the movable jaw B into contact with the rope or cable. A blow is given in one direction to the cam E to cause the jaw B to grip the rope firmly and in the other direction to loosen it. (Two claims.)

GOVERNMENT PUBLICATIONS.

⁂ Any of the following publications may be obtained on application to this office at the price named post free.

Trade of New Zealand, 1911, 3d.

Anti-Trust Legislation Report, 4d.

"Options" and "Futures" Reports from the Canadian Government, 2d.

Taxes and Imports Return, 1911-12, 4d.

Labour Gazette, October, 2d.

Mortality of Government Life Annuitants: Report, 8d.

Board of Education: Science Syllabuses, Subjects 1 to 6, 9 to 14, and 16, 17, 1½d. each or 7d. per dozen.

National Insurance: Model Rules C (3rd Ed.), 1d.; Regulations *re* Married Women's Special Benefits, 1d.; *re* Medical Benefits, 2½d.; Tables Showing Transfer Value under Section 44, 1d., or 2s. 9d. per 100.

Consular Report: Valparaiso, 7½d.

PUBLICATIONS RECEIVED.

Index of Mining Engineering Literature. Vol. 2. Edited by Walter R. Crane, Ph.D. New York: John Wiley and Sons. London: Chapman and Hall Limited.

Electricity Made Plain. By George R. Peers. Manchester. John Heywood Limited. Price, 1s. net.

"Le Mois Scientifique et Industriel" (157), Septembre, price 2 fr.; "The British Chamber of Commerce of Turkey, Quarterly Trade Journal," September, price 2s. 6d.; "Cassier's Magazine" (Vol. 42, No. 4), October, price 1s.; "Annales des Mines" (tome 2, Nos. 8 and 9); "Bergrechtliche Blatter" (7 Gahngang, 1912, 3 and 4 Heft); "Colorado School of Mines Magazine" (Vol. 2, Nos. 12 and 13) September and October; "The Engineering Magazine" (Vol. 43, No. 6, Vol. 44, No. 1), September and October, price 1s.; "Bulletin of the American Institute of Mining Engineers" (No. 69), September; "The Mining Magazine" (Vol. 7, No. 4), October, price 1s.; "The Journal of the Chemical, Metallurgical and Mining Society of South Africa" (Vol. 13, No. 2), August, price 3s.; "The Journal of the South African Institution of Engineers" Vol. 11, No. 2), September, price 2s.; "Bulletin et Comptes Rendus Mensuels de la Société de l'Industrie Minérale" (tome 2, No. 9), Septembre; "Revue Universelle des Mines de la Métallurgie" (tome 39, No. 3), September; "The Journal of the Franklin Institute" (Vol. 174, No. 4), October, price 50 c.; West of Scotland Iron and Steel Institute; Presidential Address by Walter Dixon, M.I.M.E., M.I.E.E.; "The Incorporated Chamber of Commerce of Liverpool Monthly Magazine" (Vol. 11, No. 11), October; "The Journal of the American Peat Society" (Vol. 5, No. 2), July, price 1½ dols.; "Bulletin of the British Chamber of Commerce for Italy" (Vol. 3, No. 5), September; "Annales des Travaux Publics de Belgique" (tome 17), Octobre; "Transactions of the Institution of Mining Engineers" (Vol. 43, Part 6); "Department of the Interior, U.S. Geological Survey" (Prof. Paper 74, "Geology and Ore Deposits of the Butte District, Montana," by Walter Harvey Weed); ditto (Bulletin 507, "The Mining Districts of the Western United States," by James M. Hill); "New South Wales, Department of Mines, Geological Survey" (Mineral Resources, No. 16, "The Antimony-Mining Industry and the Distribution of Antimony Ores in New South Wales," by J. E. Carne).

NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

23396. Method of and means for lining bearings with white metal or the like. A. W. Madell and J. W. Madell.
23419. Means for ventilating mines. E. Hock and E. Strauch.
24436. Pneumatic hammers or like percussion tools. H. S. B. Brindley and Boiler Scalers Limited.
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23524. Process and apparatus for the production of tin-plate and tin-plate substitutes. S. G. Cowper-Coles.
23525. Production of tin-plates and tin-plate substitutes. S. G. Cowper-Coles.
23526. Process for scouring, burnishing, or polishing metallic surfaces. S. G. Cowper-Coles.
23533. Ratchet drills. F. R. Suburu.
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23536. Heating by gaseous combustion and in furnaces therefor. C. D. McCourt and Bonecourt Surface Combustion Limited.
23539. Safety apparatus for the cage mechanism of coal-mines and the like. E. Fletcher.
33561. Hydraulic drilling apparatus. B. von Vnngel.
23641. Water-tube steam generators. C. D. McCourt and Bonecourt Surface Combustion Limited.
23642. Steam generators. P. St. G. Kirke and Bonecourt Surface Combustion Limited.
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23670. Grabs. D. J. Barnard.
23679. Manufacture of steel sheets for use in making tin-plates. R. P. Bevan.
23692. Steam boiler furnaces. M. E. Batting and O. H. Baldwin.
23698. Rocking firebars for furnaces. J. G. Jackson.
23719. Treating peat and the like, and manufacturing briquettes therefrom. C. Sureties and M. Wolff.
23725. Process of manufacture of bricks and other refractory products having spinel as a binding material. K. A. Mankau.
23738. Coal shoot and screen. D. Treharne.
23739. Manufacture of steel. H. Eccles and R. P. Bevan.
23763. Ore roasting or drying furnaces. H. M. Ridge.
23772. Volatilising roasting of refractory ores. J. Sackett and S. A. Cobbett.
23773. Extraction of precious metals from antimonial clinker. J. Sackett and S. A. Cobbett.
23801. Manufacture of cartridges. E. Jones and Kynoch Limited.
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23862. Breaking down clinker in furnaces of gas producers and the like and means for use therein. G. M. Gill.
23863. Ovens, kilns and the like. C. Dressler.
23876. Apparatus for deep boring. A. C. Potter.
23884. Steam boilers. A. McCallum.
23892. Apparatus for coupling and uncoupling railway wagons and the like. J. Darling.
23914. Air compressors. H. E. M. Hobbs and P. F. Tysoe.
23918. Automatic electrically-operated elevators. R. Liljeblad and Aktiebolaget Elevator.
23937. Device for breaking or splitting coal, ice, and the like. C. L. Mathews.

Complete Specifications Accepted.

To be published on November 7.

1911.

16041. Reversible regenerative gas furnaces. Reynolds.
20087. Furnaces. Fletcher.
22425. Steam boilers and water heaters. Howes and Bannerman.
22498. Drills or the like and sockets therefor. Barnes.
22501. Treatment of peat. Rigby and Testrup.
22576. Haulage clips for rope-haulage railways. Arnold and Atkin.
22790. Fans. Barry.
22813. Method of and means for washing coal, coke, and other granular materials. Benson and Head, Wrightson and Co.
23014. Centrifugal fans or pumps. Whitfield and Whitfield Fan Company.
24943. Compressors for air and gas. Hurst.

1912.

608. Means for supplying air or oxygen or other gas or a mixture thereof to divers and persons working in compressed air. Davis and Siebe, Gorman and Co.
3331. Divers' helmets. Davis and Siebe, Gorman and Co.
3602. Steam-turbine pumps, blowers, air-compressors, and the like. G. and J. Weir Limited and Petermöller.
6207. Method of and apparatus for recovering fibre from peat. Granville.
11489. Carriages for ropeways and the like. A. Bleichert and Co.
12456. Apparatus for washing smoke and fumes. De Mont.
15480. Furnaces. Blair.

Complete Specifications open to Public Inspection before Acceptance.

1911.

25793. Steam-generators. Soc. Anon. des Etablissements Delaunay-Belleville.

1912.

23057. Furnaces of steam-generators, and other furnaces. Schleyder.
23283. Hydraulic compressors. Snida.

Corrections.—Owing to a typographical error, Dr. John Harger, in his lecture on "Gob-fires and their Prevention," before the members of the Manchester Geological and Mining Society, reported in the last issue of the *Colliery Guardian*, p. 788, was stated to have said that "Hamstead was described as a non-gassy mine, but a test was given showing 28 per cent. marsh gas in a main return"; the percentage should have been given as 0.28. Prof. O'Shea also wishes to point out that at the recent meeting of the Midland Institute of Mining, Civil, and Mechanical Engineers, held at Doncaster, he is erroneously reported in our issue of the 11th inst. (p. 738) as having said that Prof. Dixon had been able to bring about ignition of *coaldust* with only 13 to 14 per cent. of oxygen present; this should read *marsh gas*.

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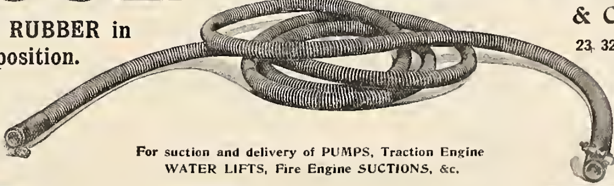

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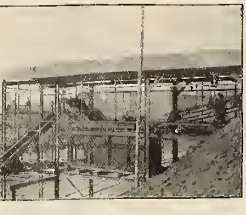

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Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Accumulators
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent

Acid Plant
Daglish, Robert, and Co. Ld., St. Helens, Lancs.

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Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

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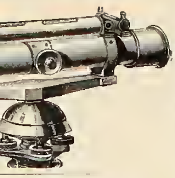

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Heenan and Froude Ld., Worcester

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Ferro-Concrete Constructions
Yorkshire Hennebique Contracting Co. Ld., Leeds

Files
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'gham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

Fire Appliances
Pell, C. A., Dronfield, near Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'gham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Purchasers' Guide to Advertisers' Specialities.—(continued).

Firelighter Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Fishplates
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

Fittings (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

Forced Draught
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

Forges
Hardy Patent Pick Co. Ld., Sheffield

Forgings
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld. Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Fuel Economisers
Fell, C. A., Dronfield, near Sheffield
Pillatt and Co., Stapleford, Nottingham
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld., Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Pillatt and Co. Ld., Stapleford, Nottingham
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall

Fuses (Safety)
Bickford, Smith & Co. Ld., Tuckingmill, Cornwall
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Bricks

Gas Engines
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Glover, M., and Co., Holbeck-lane, Leeds
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Gas Exhausters
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Gas Plant
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Tipton

Gas Valves
Haslam and Schontheil Ld., Bristol

Gauge Glasses
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gear (Special for Motor Lorries Cars &c.)
Brown, David, & Sons (Hudd.) Ld., Huddersfield

Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroën, Andre, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Nuneaton Engineering Co. Ld., Nuneaton.
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Rods Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, H., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hoists
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Hooks or Links (Safety)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Leampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Hydraulic Jacks
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Ryland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hydrometers
Davis, John, and Son (Derby) Ld., Derby

Incline Rollers
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Reddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld.; Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

Jointing Cement
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

Jointing (Sheet)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Joists (Rolled Steel)
Heenan and Froude Ld., Worcester
Benton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Keps (for Winding Cages)
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Lamp Cleaning Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Gauze Brushes
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Glasses
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Oil Filling Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Re-lighting Apparatus (Underground)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Arc)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Lamps (Electric)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

Lamps (Electric Safety)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent
Photos Miner's Electric Lamp Ld., Queen's-road, Battersea
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Miners' Safety)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Outdoor)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

Lathes
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

Leather Appliances

Lessons by Post
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

Lifting and Hoisting Tackle
Benton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

Lightning Conductors
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Shaw, John, Ld., Sheffield
Theedam, E. C., Ld., Dudley

Locknut Washers
Benton, B. M., and Co., Sheffield

Loose Collars
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster S.W.

Lubricators
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Machinery (Second-hand)
Bute Works Supply Co. Ld., Cardiff
Foot, B. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Benton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

Machine Tools
Foot, B. G., & Co., 11, Queen Victoria-street, E.C.
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

Mathematical Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mechanical Stokers
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

Metal Perforators
Barne, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 33, Victoria-street, S.W.

Metallic Packing
United States Metallic Packing Co. Ld., Soho Works, Bradford

Meteorological Instruments
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mills (Grinding)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

Mining Dials
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mining Machinery
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Hurd Coal-Cutter and Engineering Co. Ld., 188 St. Vincent-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Mining Tools
Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

Motors
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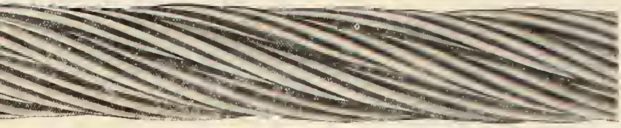

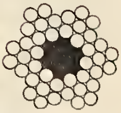

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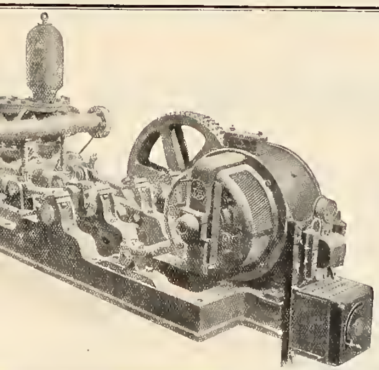

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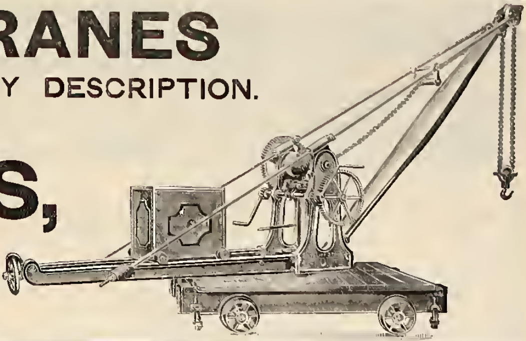

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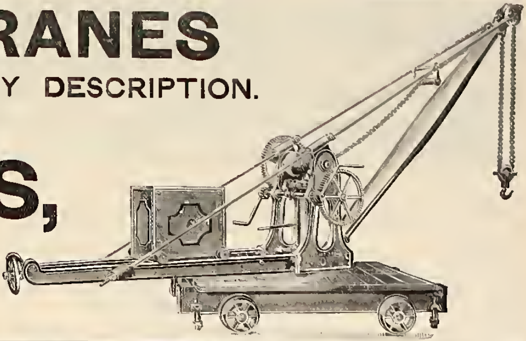

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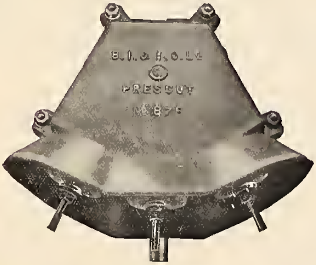

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(Patent No. 12,359, May 30th, 1903).

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Sizes. Nos.	1	2	3	4	5	6
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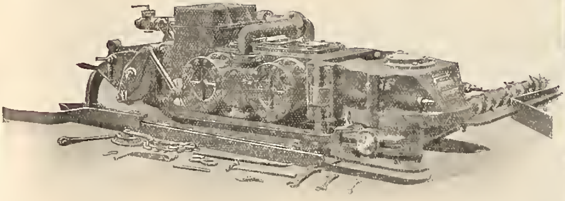

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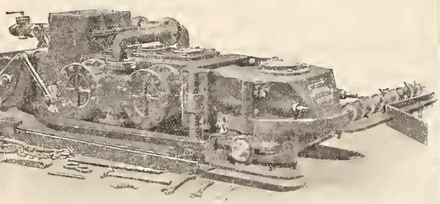

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Yorkshire Hennebique Contracting Co. Ld.	Ferro, Leeds	873
Youngs	Oldens, Birmingham	—

Where the Numeral is absent the Advertisement does not appear in the present issue.

Classified List on Page 914.

Diploma of Honour, Brussels, 1887.

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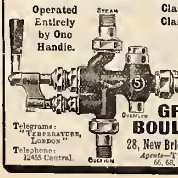

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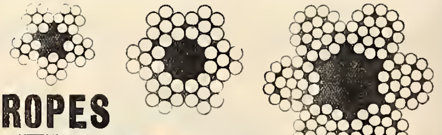

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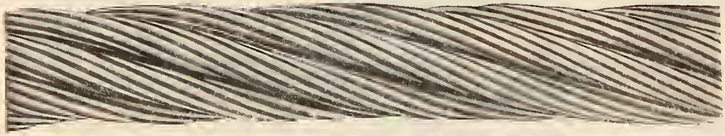

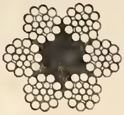

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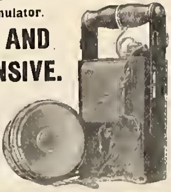

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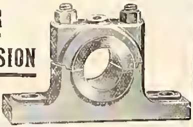

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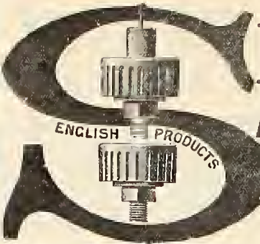

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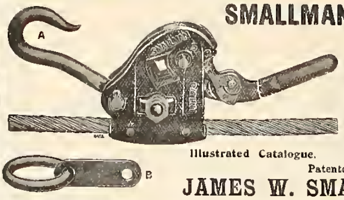

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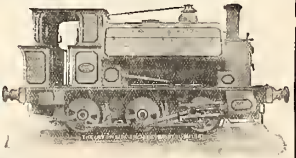

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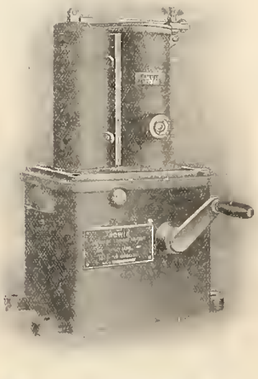

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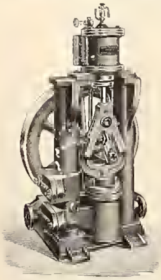

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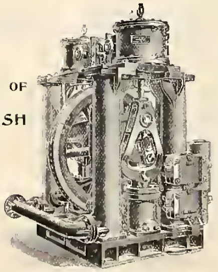

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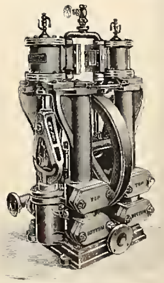

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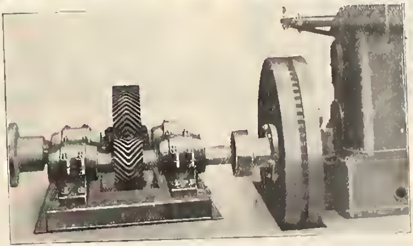

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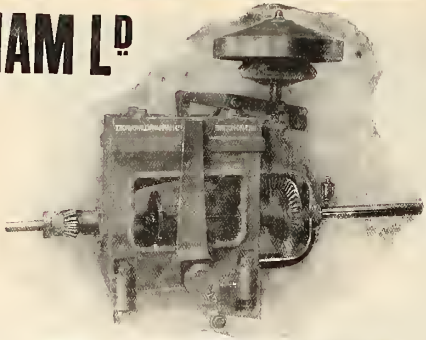

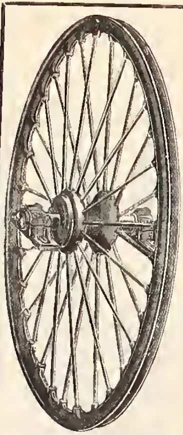

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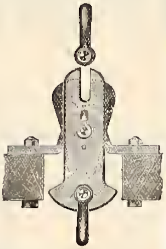

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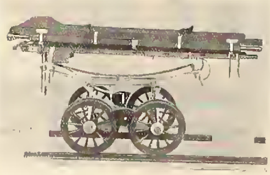

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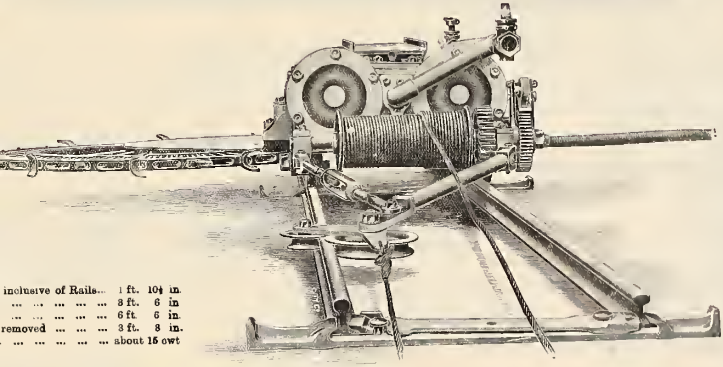

inclusive of Rails...	1 ft. 10½ in.
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HARDY SIMPLEX -	**74** in. in **6** min. **55** sec. -	**193** cub. ft.	,, ,,

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		AIR CONSUMED.	AIR PRESSURE.
German Machine - -	54 in. in 26 min. 15 sec.	Not taken.	65-70 lb. sq. in.
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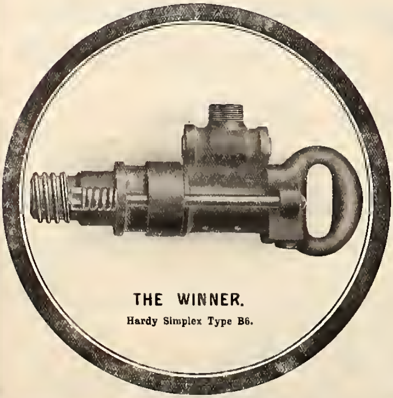

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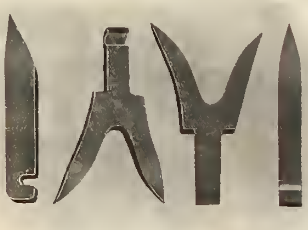

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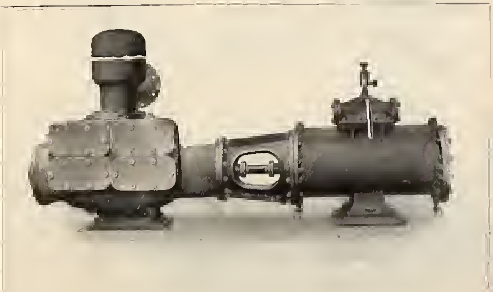

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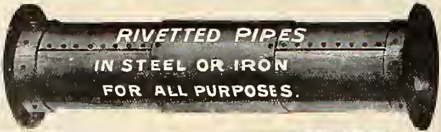

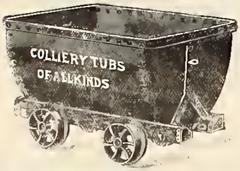

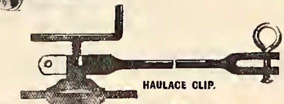

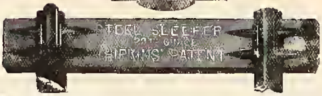

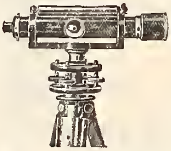

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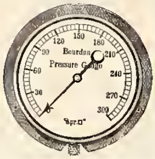

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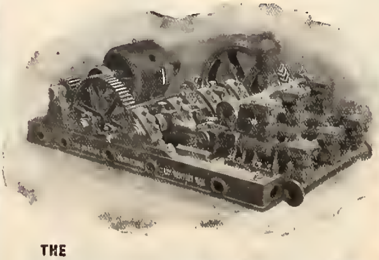

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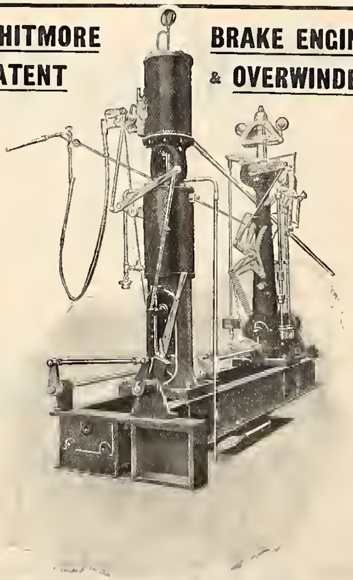

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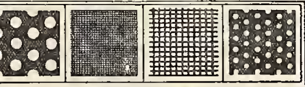

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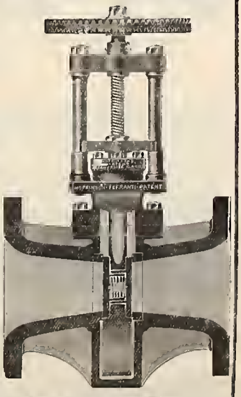

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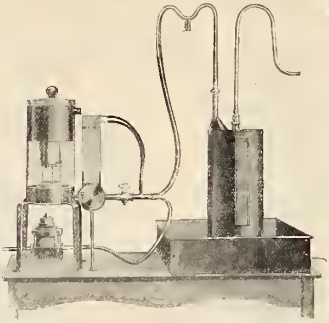

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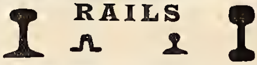

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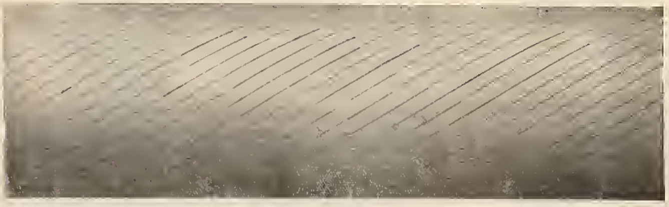

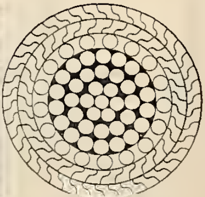

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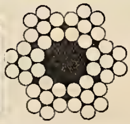

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No. 2705.

STEM OF SHAFT-SINKING AROT COLLIERY.*

f shaft-sinking is a combina-
ter-flush boring, the bit being
, whilst the flushing liquid is
ep out of the shaft any quick-
ble to cave in. Hence, no
er lining is required until the
y, when the tubbings are in
en them and the walls of the

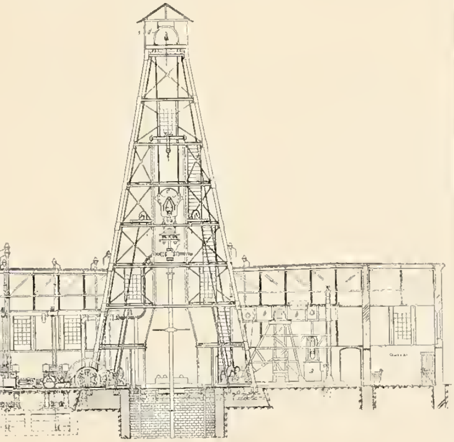
cement milk and other materials
of concrete.
, for carrying out the system is
inary drilling ring, and consists of
the rods and engine, flushing
tanks, boilers and air-compressing

the derrick depend on the diameter
aft to be sunk. At the Diergardt
depth of the shaft was about
100 yards and the diameter of the finished shaft about 10 ft., the height of the derrick, up to the rope-pulley bearings, was 72 ft., and the superficial area covered by the base about 1,100 square feet. In other respects the dimensions are so chosen that the derrick can be used for continuing the sinking after the loose rock has been got through.

The boring tools are operated by a vertical cylinder *a* (fig. 1) 27 in. in diameter, and having a stroke adjustable up to 24 in. This cylinder is fitted with automatic reversing gear, and acts on a walking beam *b* through a connecting rod attached to the piston. To enable the string of tools to be lifted and dropped vertically, the connection between them and the walking beam is not direct, but through a rope which passes over a number of pulleys. The 2¼ in. rope from the walking beam passes first round a pulley *c*, mounted on a foundation, thence over a pulley *d* in the head of the derrick, and from this to the sheathed loose pulley *e* carrying the tools, the loose end being carried over another pulley (not shown) to the winch drum in the engine shed. The sheathing of the pulley *e* is provided with two rollers, which run in fixed guide rails to prevent lateral swaying of the rope while in work, and also to prevent the rope from twisting when the rods are unscrewed for changing the bit. The upper end of the rods is elaborated into a flushing head *f*. The spring connection between the tools and the driving mechanism increases the actual stroke of the driving cylinder by about 2 in., so that the maximum stroke of the tools is $(24 \div 2) + 2 = 14$ in.

The rods consist of bored tubes of best open-hearth steel, 10½ in. outside diameter and 8¾ in. inside, in lengths of 32 ft. They are connected together by flanges, secured by 12 nickel steel bolts and locking nuts. The connecting piece between the rods and bit has a very strong flange pierced for 20 bolts.

Fig 1.—Section of Sinking Installation.



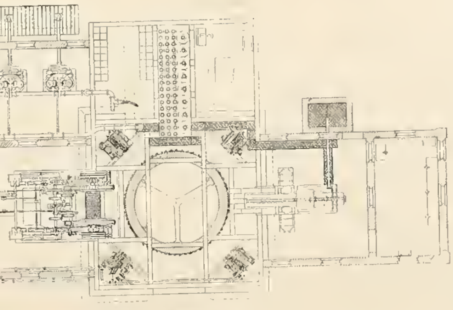


Fig. 2.—Plan of Sinking Installation.

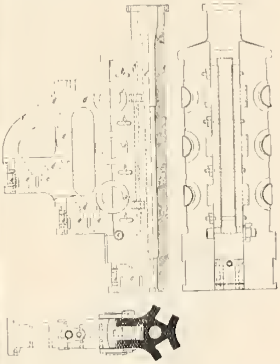


Fig. 3

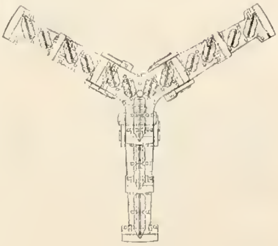


Fig. 4.

The construction of the bit is illustrated in figs. 3 and 4, and is based on the following considerations. The triple arm shape was adopted to prevent the bit from jamming sideways in the event of the rods breaking. To facilitate manufacture and transport, the bit, which is about 12 ft. high, 10 ft. in diameter, and weighs 24 tons, is made in four parts—centre piece and three arms. The centre piece can be used as a preliminary borer if desired; and the arms are secured to it (fig. 3) by a tongue and groove joint, assisted by rings *a*, wedges *b*, and locking bolts *c*.

The flush entering the bit through the hollow rods is distributed through a system of channels *d* (fig. 3), which lead it to the flushing nozzles *e*, by which it is discharged uniformly all over the shaft sole. There is no discharge through the actual cutters, owing to the liability to clog when drilling through clay or similar material. The

---

essor Krecke. *Glückauf*

cutters are arranged in three steps (fig. 3), and set in relative positions (fig. 4), which ensure a uniform cutting action over the whole of the shaft bottom. The wear on the cutting edges is equalised by reversing the direction of rotation of the bit, which is rendered possible by the substitution of flanges for screw connections on the string of tools. The uniform action of the bit on the shaft bottom is shown by the diagram, fig. 5.

The tools are raised and lowered by a 30-ton steam winch, which also serves to work the fishing tools and lower the iron tubbings. The lowering of the tools as sinking progresses is effected continuously by passing the boring rope round the winch drum for a sufficient number of turns to allow for an advance equal to the length of a rod. Four auxiliary winches are mounted in the corners of the derrick, for raising and lowering the supplementary flushing pipes, erecting the segments of tubbing, and other small jobs. The pumps for the flushing liquid at the Diergardt Colliery were three in number (fig. 2), with an individual capacity of 330 gallons per minute.

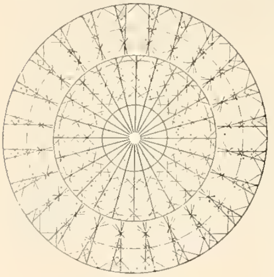


Fig. 5.

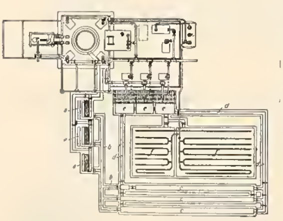


Fig. 6.

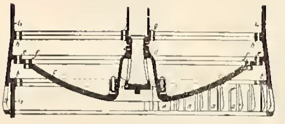


Fig. 7.

The clarifying plant (fig. 6) covers an area of about 80,000 square feet, and consists of three tanks *a* fitted with sieves, and the settling channels *c*, with which they are connected by pipes *b*. The coarse impurities (lumps, &c.) are separated in the tanks, the sandy detritus being deposited in the channels *c*. Each tank and channel can be shut off from the rest by slide gates, for being cleaned out. The clarified flushing liquid drains away through the pipes *d* to the pump tanks *e*. There are also two tanks *f* for mixing the material for the concrete backing, and for making the cement milk, by means of compressed air blown in through perforated pipes.

The tubbings are built up of six segments, and terminate at the bottom in a carrying ring (fig. 7), also of cast iron, pierced by six openings *a* for the passage of the concreting material. To enable sinking to be extended, if desired, by the aid of suspended tubbings, this ring tapers outward at the bottom, and is provided with a flange *b*, leaving a free internal space equal to the diameter of the tubbings. The bottom cap *c* is secured to the ring at *e* by means of a loose ring *f*, built up of three segments, so that the cap can be taken out after the concreting is finished. The flushing pipe *g* terminates in a regulating valve *d*.

In carrying out the sinking at the Diergardt Colliery, a bricked sinking shaft was put down for a depth of 18½ yards through the upper gravel, to shut off the surface water. At first the rate of progress was slow, the flushing liquid being of insufficient density to keep back the gravel and sand; but on adding more clay to the flushing water to bring up the density to 1·4-1·5 matters improved. The daily progress varied considerably with the nature of the rock, the maximum being 7½ yards. At 85 yards a bed of pyrites was encountered, which was so hard that a smaller bit (5 ft. diameter) was substituted to drive down to the coal measures, which were struck at 96 yards. No difficulties were experienced in putting in the tubbings, which were lowered into the shaft against the upward pressure of the thick flushing liquid, with which the latter was filled by means of four auxiliary flushing pipes, so arranged that they could be withdrawn when the tubbing neared the shaft bottom.

The concreting mixture consisted of levigated chalk, introduced through auxiliary flushing pipes, and cement milk forced in through the central pipe, the density being sufficient to displace the original flushing mixture (clay and water) in an upward direction. The new mixture, weighing 80 tons in all, set hard in a few weeks, at the end of which time further sinking was continued by forcing down a sinking shoe of triangular section, followed by rings of 4 in. iron.

COAL DISCOVERIES IN BRITISH COLUMBIA

The Groundhog Mountain Coalfield.

The annual report of the Minister of Mines for the province of British Columbia contains an interesting account by Mr. W. Fleet Robertson, Provincial Mineralogist, of the developments in the new coalfield at the headquarters of the Skeena River, north of Groundhog Mountain, in the Omineca Mining Division, an area that has attracted much attention of late. Mr. Robertson observes that, from present indications and developments, it would seem as though this coalfield would prove to be one of the most important developments that the province has seen for many years. The field is, as yet, only slightly developed, and if but a fraction of its present promise is fulfilled it is bound to have a wonderfully stimulative effect upon the future of the province.

As yet, no official examination has been made of the field, as, until the past season, no important development work has been done, nor did such development seem to be justified until the approaching completion of construction on the Grand Trunk Pacific Railway from the coast to Hazelton brought the field within reasonable reach of transportation and afforded a market for its coal.

The probability of the existence of the coalfield in this district has been realised for some years, but its actual discovery was made in 1893 by James McEvoy, B.A.Sc., who had formerly been of the Geological Survey of Canada, and was then the geologist and mining engineer of the Crow's Nest Pass Coal Company in East Kootenay. Mr. McEvoy was accompanied by W. W. Leach as an assistant, who was also formerly of the Geological Survey; they were there in the interest of a Toronto syndicate known as the Western Development Company, of which G. G. S. Lindsey is the head. In the year 1903 Mr. McEvoy staked and duly acquired for his company some 12 square miles of the coal lands, and the following year Mr. Leach staked four additional square miles for the company, whose holdings are at present 16 square miles. Credit for the discovery of the field belongs as mentioned above, and the discovery cannot be now called "new," although it is only within the past two years that the existence has been proved of a field far greater than was at first even suspected.

The first stakings—those of the Western Development Company—are situated near the headwaters of the west fork of the Skeena River in latitude 57 degs. north and longitude 128 degs. west, and at an elevation above sea-level ranging from 3,000 to 4,000 feet. Subsequent stakings and discoveries have shown the field to extend in a north-westerly direction for a distance of about 75 miles, and to have a width, in places, of about 30 miles. This extension of the field will include portions of the headwaters of the Nass River, and also of a stream flowing northerly into the Stikine River. The location of the field may therefore be given, briefly, as on the watershed forming the headwaters of the Skeena, Nass and Stikine rivers. The field has been referred to as the Groundhog Mountain basin, but is, in reality, not on Groundhog Mountain, although immediately to the north of it.

The shortest and most available route into the field is at present *via* Hazelton. The Grand Trunk Pacific Railway is at present building its line from Prince Rupert, and this passes near to Hazelton. Rails were laid and the line was operated in 1911 as far as Newtown, on the Skeena River, a distance of 100 miles from Prince Rupert and within 6 miles of Kitsalas Canyon. From Hazelton into the coalfield is, by trail, a distance of about 140 miles.

There seems to be no great difficulty in reaching the field by a railway, save the question of distance, and, with coal in the quantity and of the quality as here indicated, distance is not of importance. No actual survey has as yet been made for a railway location, but engineers competent to decide, who have been over the ground, are agreed that there are at least three practical routes by which railways could be run to the seaboard, at Prince Rupert, Naas Harbour and the Portland Canal respectively.

According to a report of James McEvoy to his company, who spent the summer of 1911 in this field, the rocks in which the coal occurs have been classed as of cretaceous age, but their age has not yet been absolutely proved. At the top of the series there is about 100 ft. of hard conglomerate, similar to the conglomerate overlying the coal in the Fernie district of the Crow's Nest. Below this there is a thickness of 2,000 to 3,000 feet of dark-grey and black shales with thin bedded sandstones, containing here and there small lenses of conglomerate. The greater part of the coal occurs in the top 800 ft. of this series. No section could be uncovered on the property (that of the Western Development Company) owing to the flat-lying attitude of the rocks and the almost universal surface covering of clay and gravel. On the mountains, almost a mile west of the northern part of these claims, Mr. Malloch, of the Dominion Geological Survey, measured a section of 2,700 ft., in 800 ft. of which, near the top, were seven coalseams aggregating 23 ft. of coal. A supplementary section measured to the south of the property, and believed to be a downward continuation of the first, gave three seams totalling 11 ft. of coal in a thickness of 200 ft. of rocks. Mr. Malloch's total section showed 11 seams, amounting to 35·9 ft. of coal in 2,800 ft. of measure.

Speaking in general terms, the report continues, this property may be said to comprise the middle portion of the enlarged southern end of a coalfield which occupies the valley of the west fork of the Skeena River. Going westward, the ground rises gradually and fairly uniformly from the river to the western limits of the property, where the elevation is about 1,200 ft. above the river. The dip of the rocks, in a general way, is parallel to the surface of the ground. The writer has previously stated that the development of this cretaceous coal to an anthracite was caused by a source of heat in the rocks beneath the coal measures, and further observations on the ground this past season only confirm this theory. In the south-eastern corner of the field, near the eastern edge of the field, on Lot 131, there is abundant proof of this heating action, as evidenced by the quartz veins or veinlets which permeate the coalseams. Elsewhere in the main part of the field small veinlets of quartz, although rare, are still occasionally to be seen.

On the map of the property accompanying Mr. McEvoy's report he shows the seams to be, in many places, horizontal, and in others the dip runs from 5 to 15 degrees, with, in one place towards the southern end of the property, a maximum of 35 degs.

Mr. McEvoy's report only deals with the southern end of the field, where his company's properties are situated, but he states that he is satisfied that coal outcrops are found for a distance of at least 70 miles in a north-west direction and over a width of some 30 miles. G. S. Malloch, of the Geological Survey, spent the summer of 1911 investigating the southern end of the field; his report has not yet been published, but the Director of the Survey has issued a Press bulletin which contains the following notes:—"The coal measures, so far as known, have a north-westward extent of at least 70 miles, and a width at the southern end of 30 miles. The sediments have a thickness of upwards of 3,000 ft., but contain coal in commercial quantities near the top and bottom only, though there are a few thin seams in the intermediate beds. The upper horizon contains seven seams, with thicknesses varying from 2 to 6 feet, and, so far as is known, is limited to an area of 20 square miles. The lower horizon contains at least three seams from 4 to 6 feet thick, and extends over most of the area occupied by the coal measures. The coal is anthracitic in character. Some of the seams are high in ash, but from one of them some excellent analyses have been obtained. The basin is faulted considerably, and there are numerous local flexures associated with the faults. The development of a coalfield of this character near the Pacific coast would be of great importance to British Columbia.

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caused, or at least facilitated, the formation of tiny quartz veinlets, which are more numerous here than in any other part of the field." It is expected that this condition, with the resulting high ash, will prove to be purely local. Several of the seams contain a shale, or clay, parting, and it is quite possible that a crushing, sizing, and washing of the coal may be found desirable, as is done in the anthracite regions of Pennsylvania.

The analyses given in the appended schedule show what the coal is at the outcrops, or very near the outcrops, and it should be noted in samples Nos. 1 to 6—taken by Mr. McEvoy—that "the samples were taken in each case all across the face of the coalseam, but not to include the shale parting; these may therefore be regarded as average samples All of these coals are almost smokeless and have a pale-blue flame with a slight tinge of red. They are non-smoking."

The physical character of the coal is not, as yet, shown at its best in the samples obtained, the coal still being affected by proximity to the surface, and, consequently, is much broken in most of the samples. The greatest depths have been obtained on the Western Development Company's property, and, speaking of the exposures on Lots 126 and 133, Mr. McEvoy says: "According to Kent's and also to Fraser's classification, the coal is just within the anthracite class. In physical characteristics, it deserves, in a greater degree, to be placed in the anthracite class. The upper half of the seam does not show any bedding planes; it is bright and clean, with the typical conchoidal fracture of anthracite. It is very hard, solid, and homogeneous throughout. The lower half of the seam is also a bright, very hard, clean coal. It shows signs of bedding planes and has a rectangular jointage as well as a conchoidal fracture on a smaller scale." Speaking of the coal on Lot 136, a seam 6 ft. 8 in. thick, he says: "This is a bright, hard coal with a crystalline fracture, breaking into large lumps of firm, tough coal."

The classification of the coal, as classed by the system adopted by the bureau, is indicated in the schedule of analyses attached. For purposes of classification, the "expanded analysis" is used—viz., the analysis of the clear coal, free from ash; the analyses have been made on air-dried samples by fast-coking method. As the majority of the samples are from near the outcrops and in a wet basin, these samples probably contain an undue amount of included water, which, in the system of classification adopted, would lower the classification of the coal, and therefore a higher classification would be obtained from coal more under cover. In Dowling's classification by the split volatile ratio, coal having a split volatile ratio of between 10 and 13 are classified as anthracitic; those with a ratio between 13 and 15 as semi-anthracite; and those having a ratio of 15 and over as anthracites. To summarise the attempt made to classify the coals of the field, it would seem that the coal may be placed as on the dividing line between a semi-anthracite and anthracite, some of the samples being in each class.

As indicating independent classification of the samples here given, it might be said that a part of sample No. 13 in the schedule was sent to the United States Geological Survey at Washington, through Dr. A. H. Brooks, of that Survey, who reports: "Doctor Martin has examined it (the sample of coal) and regards it as very good, firm anthracite. The blocky appearance of the specimen is particularly favourable."

Mr. McEvoy classifies, using both Kent's and Fraser's classification, samples Nos. 1, 2 and 3 as anthracites; sample No. 4 as a semi-anthracite, but this was only an outcrop sample; sample No. 5 he also places as semi-anthracite; and sample No. 6 as "just outside of the anthracite class and at the top of the semi-anthracite."

In the accompanying schedule of analyses, the source of the analysis is designated by a reference letter, and these references are as follow:—

A. Samples taken by James McEvoy "all across the face of the coal, but not to include the shale partings." The assays were made by Thomas Heys and Son, of Toronto.

B. Samples taken by R. C. Campbell-Johnson, of Vancouver, and assayed in Vancouver.

C. Samples received from respective owners and assayed in the British Columbia Government Laboratory.

Designation Number.	Locality.	Seam.	Authority or reference.	Proximate analysis by fast coking.				Sulphur.	British thermal units.	Expanded analyses calculated on clear coal.		
				Moist.	V.C.M.	F.C.	Ash.			Moist.	V.C.M.	F.C.
1	Lot 126, West Devel. Co. ..	6 ft. thick.	A	1·17	6·54	83·37	8·92	0·74	—	1·29	7·18	91·53
2	,, 133, ,, ,,	6 ,,	,,	2·62	6·96	84·49	5·93	0·57	—	2·78	7·40	89·82
3	,, 135, ,, ,,	6 ,,	,,	1·17	6·05	76·20	16·58	0·72		1·40	7·25	91·35
4	,, 128, ,, ,,	6 ,,	,,	4·72	10·65	72·02	12·61	0·65	—	5·41	12·18	82·41
5	,, 136, ,, ,,	6 ft. 8 in. thick	,,	1·39	5·75	63·02	29·84	1·08	—	1·98	8·20	89·82
6	,, 131, ,, ,,	4 ft. thick	,,	1·40	6·06	70·68	21·86	1·60		1·79	7·76	90·45
7	Benoit seam	—	B	4·55	4·55	84·84	6·06	1·00	12,852	4·84	4·84	90·32
8	,, ,, ..	—	,,	4·04	5·14	83·26	7·56	0·80	—	4·38	5·55	90·07
19	Scott ,,	10 ft. thick	,,	3·53	4·64	81·75	10·08	0·80		3·92	5·16	90·92
10	,, ,,	10 ,,	,,	4·55	6·57	78·78	10·10	1·00	12,324	5·06	7·31	87·63
11	Garneau ,,	3 ft. thick.	,,	4·04	4·04	83·33	8·59	1·00		4·42	4·42	91·16
12	Pelletier ,,	6 ,,	,,	4·04	4·04	71·72	20·20	1·00	11,340	5·07	5·06	89·87
13	McEvoy No. 1	—	C	2·80	3·70	85·6	7·90	—	—	3·04	4·01	92·95
14	Scott seam, R. C. C. Johnston	—	,,	3·40	3·10	75·9	17·6	—	—	4·12	3·76	92·12
15	Garneau ,, ,,	—	,,	4·3	2·9	82·3	10·5	—	—	4·80	3·24	91·95
16	Benoit ,, ,,	—	,,	3·9	2·9	80·3	12·9			4·48	3·32	92·20
17	Pelletier ,, ,,	—	,,	3·1	3·5	77·7	15·7		—	3·67	4·15	92·18
18	B.C. Anthracite Coal Co. ..	—	,,	4·0	3·1	85·2	7·7			4·34	3·35	92·31

In deciding as to the necessity of a railway to connect the Grand Trunk Pacific Railway at Hazelton with the coalfield near Groundhog Mountain, the question as to existence of sufficient and suitable coal near at hand is of great importance. That there are on the Skeena River, near Hazelton, and extending eastward along the valley of the Bulkley and its tributaries, a number of areas of coal-bearing formation is beyond question Some of these areas are of considerable extent, and several have been proved to contain coal of good quality and in beds of workable thickness, although, of these, a number have been shown to be so flexed and faulted that their exploitation for coal on a commercial basis cannot be considered as feasible.

The question has been investigated by the Geological Survey, and the reports of W. W. Leach record a number of areas of coal formation which are more than suspected of containing such coal. The Provincial Mineralogist, in 1905, examined the coal area of the Telkwa from its junction with the Bulkley River up to Goat Creek. The greater, and seemingly the most promising, part of this area later became controlled by the Grand Trunk Pacific Railway Company, which company has for the past two years been making serious attempts to prove up beds of coal of such character as would justify serious development.

Subsequent reports of Mr. Leach indicate other areas that have come under investigation. One of these areas, noted in Mr. Leach's 1909 report, is in the Skeena Valley above Hazelton, and a couple of miles above the mouth of the Shegunia (Salmon) River; but, until further prospecting proves otherwise, this area cannot be seriously considered as a point of coal supply.

In his 1908 report Mr. Leach describes another coal basin on the Morice, near the mouth of Gabriel Creek, and 1 mile from the river. Here several openings have been made in the outcrop of what is evidently a ten-foot seam, being quite regular and dipping at an angle of 30 degs. west. Below this seam is another, 3 ft. thick The analyses given of these seams average about 31 per cent. V.C.M., 49 per cent. fixed carbon, and 9 per cent. ash. This field has been very little developed and has possibilities; it lies at an altitude of about 4,000 ft., and it is reported that there is a feasible and cheaply-constructed route for a railway down the Morice River to the line of the Grand Trunk Pacific Railway, which would be about 50 miles long. This property consists of some six claims, and is held at present by the Telkwa Mining, Milling and Development Company.

On Goldstream, a tributary of the Morice River, F. M. Dockerill has staked a number of coal areas, lying to the north-west of the Howson properties, which Mr. Leach describes as an important, but small, basin 2 by 2½ miles in area. The property is an extension of the Howson properties, and the two may be classed together.

Mr. Leach mentions a coal basin on Babine Lake waterhed, 17 miles up the Tuchee River, a stream which flows into the south side of the Babine Lake, 50 miles from its outlet. The only coalseam he was able to find was 2 ft. thick, and his sample showed 28 per cent. ash.

It is later reported that a bigger and better seam has since been uncovered. The lack of evidence of good coal at this point, and the fact that the Babine range of mountains intervenes between it and the line of the Grand Trunk Pacific Railway, with no suitable pass, renders this field of no value for the purpose under consideration.

Mr. Leach mentions in his 1908 report the existence of a coal area on the headwaters of the Zymoetz, or Copper, River. Since Mr Leach visited this field there has been a considerable amount of development work done—probably more than on any other in the district—and the field is looked upon as the most promising. The property has passed into the hands of the Copper River Coal Syndicate, of which the National Finance Company, of Vancouver, are the fiscal agents. It appears that the property was examined for parties in September 1910 by Edward Dinnan, a mining engineer, of Seattle, who estimated an exceedingly large tonnage of coal as underlying the company's property. The property was again examined in September 1911 by an English coalmining engineer, who is credited with having made a favourable report. It seems, from a hurried examination of the ground, quite feasible to run a railway from this property to the source of Zymoetz River, where it heads with Pine Creek, a tributary of the Telkwa, in a flat, marshy summit, having an elevation of about 3,000 ft. above the sea-level.

As far as is known to the Bureau, there is no other coal on or near the line of the Grand Trunk Pacific Railway eastward until the Rocky Mountains are reached.

PRESENTATION TO A WELL-KNOWN DURHAM MINING ENGINEER.

As recorded in a recent issue of the *Colliery Guardian* Mr. W. O. Wood, chief agent of the South Hetton Coal Company Limited, has been presented with valuable gifts as mementoes of his completion of 25 years' connection with the company.

Mr. Wood is one of the best-known men in the North of England coal trade. In addition to his office as chief agent of the South Hetton Company (and during the last four years as its joint managing director with Mr. Thomas Jones), Mr. Wood has been intimately identified with many other important undertakings. During his professional career as a mining engineer, extending now over 50 years, he has held responsible positions at Oakenshaw Colliery, Brancepeth, the East Hetton group of collieries, Shincliffe, Cornsay and Garforth. He is at present chairman of the Wingate Limestone and Hawthorn Limestone companies, a River Wear Commissioner, and a director of the Seaham Harbour Dock Company. As a member of the Durham Coalowners' and the allied associations, he takes an active and influential share in the work of controlling the fortunes of the trade in this district, and he is a past-president of the North of England Institute of Mining and Mechanical Engineers. Mr. Wood, who was educated at the Kepier School, Houghton le-Spring, has also contributed to the literature of coalmining, and several of his papers, notably those dealing with special enterprises of his company at Murton Colliery, have been printed in the *Proceedings* of the institution.

Photo by] Mr. W. O. Wood. [*Barclay Bros.*

The presentation made to Mr. Wood consisted of a chest of antique silver (including a handsome salver), a writing desk and study chair, three large and valuable water colours, and a beautifully-illuminated commemorative album. The last is of white vellum, with loose silk cover, and contains, on the front page, views of South Hetton and Murton Collieries, South Hetton Hall (for many years Mr. Wood's residence), and "Holmlea," Sunderland (his present residence), followed by a brief inscription. It also contains the name of each subscriber, headed by the chairman, managing director, and directors of the South Hetton Company.

INTERNATIONAL CONFERENCE ON MINE SAFETY AND TESTING STATION METHODS.

An international conference on mine safety and testing station methods was recently held at the arsenal station of the Bureau of Mines, Pittsburg, with Prof. George E. Monroe, of Washington, D.C., as chairman, and Mr. George S. Rice secretary.

At the opening session an address on "Methods Employed by the Bureau of Mines in Investigating Coaldust and Gas Explosions" was delivered by Mr. George S. Rice. He declared that not only were mine explosions more frequent in America than any other country, but the number of accidents in the last 10 years had been greater than ever before in history, and assigned 10 reasons for the increase. They were:—

"The increase in the use of explosives in many Western mines, the method of shooting off the solid or where no undercutting has been done.

"Where undercutting has been done by machinery, the failure to load up the fine dust made in cutting.

"The increased volume and velocity of the ventilating currents required by the larger number of miners employed in the average mine, and the larger amount of methane encountered as the depth of mines increased. One result of the increased velocity of the air current is that the fine coaldust is blown from the loaded cars hauled through the entries, and the increased quantity of air dries the coaldust more readily.

"The increased amount of inflammable gas present in the air due to the increased depth of the mines, and in special cases due to leakages of gas from wells.

"The employment of a large number of unskilled men as miners, due to the tremendous expansion of the coal-mine industry, the output having been nearly doubled in 10 years, and now amounting to over 450,000,000 metric tons annually.

"The inability of the majority of the miners to speak English, hence the misunderstanding of orders given by the English-speaking foremen.

"Lack of discipline.

"Lack of sufficient knowledge of gases and dust on the part of the foremen and fire bosses.

"The insufficient number of foremen for the supervision of the work at the face.

"The great increase in the use of electricity in 1910—42 per cent. of the total output of the bituminous and lignite coal was mined by machinery, and two-thirds of the machine-mined coal was mined by electrically-driven machinery. A large proportion of the hauling underground is by electric trolley locomotives. The amount of coal so hauled is not known, but it would appear from inspection that about one-half of the whole output is so hauled. Many explosions have been attributed to electricity. Previous to 1902 electricity was very little used."

He sketched the results of the Government work, and said the objects of the coming series of tests were:—To study the origination of dust explosions—that is, the conditions under which they may be started, and the effect of the different natural conditions, such as location, size of passage or chamber, temperature, humidity, position of dust, &c.; to study the propagation of an explosion, and to determine the influence that the natural conditions and coaldust loading may have upon the velocity at which the explosion travels: the development of pressure, and the relation of the pressure to the velocity and the temperature of the flame; to determine, if possible, whether an explosion with uniform dust loading, in a uniform passageway, constantly increases in velocity and intensity to the outlet; or, having reached a certain velocity and intensity, do these become constant, or do they fall and subsequently rise to another culmination; studying the means of preventing explosions from originating; studying the means of checking or stopping dust explosions, when in spite of other precautions, or failure at all times to observe such precautions, an explosion has started; determining the influence of ventilating currents as to direction and volume, upon the propagation of an explosion; influence of temperature and humidity of the atmosphere on the origination and propagation of an explosion.

Afterwards the delegates were taken to the experimental mine at Bruceton, where tests were made. A shot was fired from igniting coaldust, set off 550 ft. from the mouth of the mine.

In one case an explosion was started in the right-hand stub entry of the mine to see if the explosion would pass toward the face of the mine entry as well as the mouth. The cannon was placed 775 ft. from the mouth of the mine at the end of a 100-ft. stub; 2 lb. of coaldust per lineal foot were scattered in the stub on the sides and 1 lb. per lineal foot in the main entrance of the mine toward the mouth, and for a distance of 175 ft. toward the face. The flames came within 100 ft. of the mouth of the mine and went back 300 ft. toward the face. A loaded mine car, containing about 2 tons of coal, with the wheels locked, was blown over 100 ft. from the mouth of the mine by the force of the explosion.

In another case 1,200 lb. of dry coaldust was placed on shelves along the sides of the main entrance of the experiment mine. Two attempts were made to ignite the dust. The first shot was fired from a cannon, and the second from the face of the mine. In both instances but a few feet of coaldust burned, and the flames died out. The failure of the dust to ignite was explained as due to the great humidity, which almost reached the saturation point. The fan forcing the air into the mine carried with it the atmospheric moisture which was absorbed by the coaldust. For some time Dr. J. A. Holmes, director of the United States Bureau of Mines at Washington, D.C., has been asserting that a mine properly dampened was immune from coaldust explosions. Dr. Holmes, in speaking of the value of the demonstration, said:—

"In the coaldust test at the Government experimental mine near Pittsburg to-day, witnessed by representatives of the Government mine experiment stations of Germany, Great Britain, Belgium, Austria and other countries, the results were of special interest as indicating the influence of atmospheric moisture in checkmating the progress of the explosion."

At the morning session of September 19, an exhibition and discussion of safety lamps took place. The delegates spent the whole forenoon in testing different models of lamps. At the afternoon session a demonstration and discussion of electrical appliances for use in gaseous mines was led by Mr. Clark, and one on methods of testing hoisting ropes, safety catches, by Mr. C. P. Hood. At a dinner held in the evening a tentative proposition was made to form an International Mine Conference Association to meet once each year in one of the countries represented.

On September 20 Mr. Clarence Hall demonstrated explosives at the arsenal station during the forenoon, and in the afternoon the final explosion at the Bruceton mine was had. Fifteen hundred pounds of dry coaldust had been placed in the bore, and 5½ lb. of black powder had been planted at the face of the mine, or the inner end, and at a crosscut halfway in the entry. From the mouth of the mine a sheet of flame estimated at 150 ft. in length shot out over the ravine. Trees were withered near the entrance, three coal cars blown hundreds of feet, and ties wrenched out. It was found that an 18 in. stopping had been blown out, but the Taffanel barriers had stopped the explosion in the return air passage. The force of the explosion had lifted the dust and carried it in along the air passage, causing the flames to die out. So great was the force generated that two wooden poles, each ½ ft. in diameter, 50 ft. from the mouth of the mine were broken off at the ground, and a car loaded with 1½ tons of slate hurled 450 ft. across a ravine. The concrete work inside the mine was lifted 8 in. and cracked and seamed for over 100 ft., while a pool of water was lifted in its entirety, carried around a corner and deposited in a depression 25 ft. from its original position. It will require about six months for the mine to be repaired.

Another result achieved at the demonstration was the effective protection afforded the fan by the explosion barrier. An opening was made some feet from the fan and sheet iron placed over the passage. When the force of the explosion reached the weaker spot it lifted the iron and escaped, leaving the fan uninjured and in perfect working order.

The conference closed September 21 with a short business session in the morning and a visit to the mine in the afternoon to investigate the damage done by the explosion of the previous day.

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, October 22, 1912, is as follows:—Antwerp, 373 tons; Abo, 999; Amsterdam, 1,877; Barcelona, 1,608; Brunsbuttel, 1,611; Bremen, 3,200; Christiania, 1,268; Constantinople, 1,001: Cronstadt, 5,160; Danzig, 405; Drontheim, 291; Guernsey, 641; Ghent, 1,809; Harlingen, 1,261; Hamburg, 10,724; Halmstad, 287; Harburg, 2,329; Konigsberg, 2,012; Libau, 398; Marseilles, 509; Ostend, 1,149; Oxelosund, 3,454; Pernau, 2,877; Rotterdam, 4,868; Riga, 3,665; Reval, 6,100; Rio de Janeiro, 37; Rouen, 450; Stockholm, 861; Santos, 5,108; Cimbrishamn, 436; Stettin, 156; St. Petersburg, 9,853; Venice, 202; total, 76,979 tons; corresponding period last year, 78,629 tons.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Increase of Wages Question: Threatened Repudiation of the Maximum Wage Rate—Centralisation in Miners' Organisation—Anthracite Men's Strongly Adverse Vote: Secessions Indicated — Duffryn Scheme Abandoned by Messrs. Davis and Sons—Extensive Developments in Avon Valley Area—Seam Won at Nantgarw—Strike Disorder Cost in Monmouthshire Rates—Interesting Revelations in Federation Finance — 7,000 Men Stopped for Wagons in One Undertaking: The Delays in Shipments—Panels of Umpires under Minimum Wage Act.

The question has been raised as to a further increase of wages, and it derives particular importance from the argument of one or two of the miners' leaders that they should disregard the maximum. This, in the agreement, stands at 60 per cent. above the standard, and already the men are being paid 57½ per cent. The contention of those who wish to exceed the maximum is that the Conciliation Board agreement is extinct, and they base this partly upon the coalowners' action in giving only 24 hours' notice instead of the one month's notice which the agreement provides.

The outlook in respect of the coal trade is such that there is reasonable hope of the present high prices continuing, and even being increased. Yet the peculiar conditions of trade impose additionally heavy costs of production upon colliery proprietors. For instance, they cannot get freedom in shipments, tonnage being so scarce, and the return of empties from the docks extremely dilatory. The hindrance of output adds to the cost of production, which cost is concealed by the high prices the men quote in support of their demands. Indeed, these high prices are in part themselves the product of the very hindrances that add to costs in the collieries.

It is to be hoped that this indication of breach of agreement will not go further, for it will open out a grave question, leading to most disastrous disagreement, just at the time when capital and labour should join to reap the benefit of an exceptional boom period.

The Wages Committee of the Miners' Federation, which sat on Saturday last, considered whether an application should be made to the Conciliation Board. It is evident that at the present moment the question of exceeding the maximum is hardly likely to arise in effective form, because wages are based upon the average price of steam coal f.o.b., and the Custom House returns do not carry that average beyond the figure which is equivalent to 60 per cent. But it is disquieting to observe the indication of readiness to ignore the obligations of the agreement.

The Wages Committee meets again to-day (Friday), when probably a decision will be arrived at as to applying for an increase.

The ballot of the anthracite miners upon the intended change in the constitution of the South Wales Miners' Federation has resulted in a decided negative. Voting was:—

For district administration	8,872
Against „ „	2,753
Majority against centralisation	6,119

Although several collieries did not vote, the attendance of delegates at Swansea on Saturday, when the figures were announced, was exceptionally large, and they manifested strong feeling against the new scheme.

This decision of the anthracite men is doubly important, for it not only indicates their own strong feeling against the centralisation proposal, their voting having been three to one, but it is certain to have very powerful influence upon the resolution which next Monday's conference will arrive at. In order correctly to appreciate the feeling throughout the coalfield as a whole, it is necessary to recall the figures of the ballot recently taken over the whole coalfield, and here it will be remembered that little more than 80,000 went to the poll, the majority being only 10,000 in favour of the proposed changes.

There is consequently a large mass of Federation influence as well as the whole of the non-unionist, which is either indifferent or hostile, and consequently is almost certain to take a lead from the anthracite voting. Then again, certain districts, such as Ebbw Vale, have pronounced strongly against the centralisation scheme, and these will be encouraged in their opposition.

One more point, very important, calls for emphasis, and that is that in the poll of about 80,000 previously referred to, lodges which had not paid up their subscriptions were allowed to vote; and the question is now raised as to their right to do so. The ballot should have been a ballot of "the financial members of the Federation;" and it has to be noted that another ballot of the "financial members" will probably be taken before the scheme becomes operative, so that this question of lodges and members being "in compliance" is likely to affect materially the final and decisive voting.

The executive council have prepared and issued a statement of those alterations in the rules of the Federation which become necessary in order to carry out the new scheme; and these were circulated throughout the coalfield. They show what has been previously brought out—and has occasioned so much antagonism—that the agents would be subject to the central executive and would have to work in any part of the coalfield, although appointments would be made by a local vote in each district. Only in cases of emergency would local disputes be dealt with by the local agent. Otherwise, the executive council and the general secretary would be called in; and the strong feeling in the districts is that such a plan would lead to much hindrance in settlement of disputes.

The immense amount of work which at present is dealt with in each district by the agent would then be delayed until action by the central authority became practicable. Once a quarter there would be general conferences, but the council would probably meet as often as necessary. Indeed, if it were to deal with all the matters which hitherto have been dealt with locally, it would have to remain practically in continuous session.

The more this new proposal of centralisation is considered, the stronger appears to be the feeling of antagonism against it among the members themselves; and the decision of the anthracite men in favour of maintaining the present system of local control, foreshadows their inevitable secession from the Federation, if the new scheme be pushed into operation.

Whilst the project of Messrs. D. Davis and Sons for acquiring 6,000 acres of mineral land on the Talbot estate has been abandoned because of the conditions sought to be imposed, the development of the Port Talbot area is remarkable. It was expected locally that the negotiations with Messrs. Davis, which have been in hand for years, would prove successful, ultimately giving employment to several thousands of men. But, apart from this, even should the abandonment be final, the general development proceeds apace. We announced a short time ago the enlargement of the Port Talbot Steelworks Company's undertaking by the addition of the new smelting furnaces, new steel sheet and plate mills, as well as section mills; and now the definite announcement is made of a large new undertaking with pits at Bryndu, and works at Margam. This undertaking will, it is understood, have a capital of about half a million sterling; and the promoters will erect, on the site of the old copper works of Messrs. Vivian, Taibach, at the corner of the Float and just above the patent fuel works, their coke ovens and by-product plant with the blast furnaces; and there will be two pits at Bryndu, the land having been already acquired.

A false statement was put into circulation at the end of last week, to the effect that Locket's Merthyr Company had acquired the Glyncorrwg properties, where, as reported in last issue, the No. 2 Rhondda seam was struck a few days ago. Prompt denial of the statement was forthcoming, the Locket's Merthyr proprietary having made no such acquisition. Nor is it true, as reported, that Messrs. Baldwin are negotiating for mineral territory on the Talbot estate in the Duffryn Valley.

North's Navigation Company are about to commence sinking operations in the Avon Valley, land having been purchased at Croeserw Farm. The intention of the company is to win the steam coal. In a neighbouring area, Messrs. Jacob and Co., who won the No. 2 Rhondda seam a week or two ago, have built a bridge across the river, and are laying a siding to the Rhondda and Swansea Bay Railway. At the upper end of the Avon Valley, a Bridgend firm has opened out a drift at Cwmcaes, and are working a good seam of house coal.

The colliers in Maesteg district have given a month's notice of their intention to cease work, alleging certain grievances. The point raised involves the suggestion that the new minimum is being made a maximum. It was said by Mr. Hartshorn, the miners' agent, at a mass meeting, that the management had declined to pay allowances such as had been paid in the past, but waited until the end of the week in order to make up wages to the minimum of 7s. 7d., "and in that way they were making the minimum to be the maximum for any man who had any difficulties." In the past, it was stated, the men had received allowances which enabled them to earn substantially more than the minimum, and what was wanted was that they should be able to retain this. The further point was that in regard to certain disputes, there was difficulty in getting either the Conciliation Board or the local management to deal with them.

The meeting decided that 28 days' notice should be given, and that all matters in dispute should be referred to the joint committee, to be dealt with during the running of the notices.

Addressing a meeting of miners at Maesteg, Mr. Frank Hodges, the newly-appointed miners' agent for Garw Valley, said he represented the newer school of thought in the coalfield, and though they were thought to be unpractical, yet he defied the older school to find out where their impracticability came in. Their theory was not vain, for it was that wages must be increased by the abolition of profits, and the practical way to apply that theory was to press constantly for increase of wages and reduction of hours. The principle of the national strike must be extended from one industry until it embraced all industries.

At Nantgarw, Mr. T. Taylor has struck the Little Rock seam at a depth of 500 yards, after operations extending over two years, the seam being very much lower than was originally anticipated. The Big Rock seam is expected to be reached at about 50 yards further. This new colliery, which hereafter is expected to produce from 800 to 1,000 tons a day, is the nearest colliery to Cardiff city, and is directly on the line of the Cardiff Railway Company, near Rhydyfelin. The seam now struck is about 3 ft. thick.

The executive council of the South Wales Federation has resolved not to expedite the hearing of the appeal upon the question of the 24 hours' notice, but their solicitor will be invited to attend the next meeting of the council, when the matter will be further discussed.

On account of the strike disorders in Monmouthshire the finance committee of the County Council recommend an increase of 1½d. in the pound on the rates. The irony of the fact is that, in very large measure, this added burden falls on colliery proprietors who, in the western half of the county, are the chief ratepayers.

More warehouse accommodation to the extent of 17,000 ft. is to be provided for the tin-plate and galvanised sheet trades in Swansea dock warehouses. The harbour trustees have decided to advertise for tenders to construct the new warehouse.

Quick despatch in unloading pitwood, changing dock, and loading coal as outward cargo is reported from Barry and Port Talbot. The s.s. "Vind" entered Barry Dock on Wednesday with 1,650 tons of pitwood; commenced discharge at 9 a.m. on Thursday; left at 4 p.m. Friday for Port Talbot, that dock being entered on the night tide; and by 7 p.m. on Saturday she had loaded 1,850 tons of coal, and started on her voyage to Bayonne.

One satisfactory feature in existing circumstances is that the Joint Committee—appointed by the Coalowners' Association and the South Wales Federation to deal with the new position under the Minimum Wage Act—has so far progressed in its work that a memorandum has been agreed upon for issue by the joint secretaries to the managers and workmen. Some of the points at issue were settled by discussion, others had to be referred to Lord St Aldwyn, and on Friday last the Joint Committee met to draft the memorandum for guidance of both employers and workmen. The work of the Committee was not finished last Friday, and therefore another meeting will be held to-day.

Another gratifying fact is that the workmen's side of the joint sub-committee for dealing with local disputes has been re-appointed. A short time ago it was disbanded because of unsatisfactory progress with the matters in question, but the miners' council has now set it in operation again.

Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

THE STATUS OF COLLIERY SURVEYORS.

Sir,—I quite agree with "Certificated Colliery Surveyor's" remarks *re* the qualification for membership of the proposed institute, and would suggest that two or three years' training in a mining engineer's office or the surveying department at a colliery, supplemented by five years' experience as surveyor or assistant-surveyor, should be the minimum qualification.

Mr. Lockerbie would do the surveying profession a great service if he could arrange a meeting.

Wishing the proposed institute scheme every success,

October 26, 1912. Mining.

SWITCHGEAR: DRAWING-OFFICE EXPENSES.

Sir,—I am directed by my council to invite, through the medium of your valued paper, the attention of municipal and consulting engineers and other principals interested in the purchase of switchboards, switchgear, and apparatus, to the burden at present imposed upon manufacturers by demands for drawings, the cost of preparing which is, in many instances, largely disproportionate to the value of the orders for which they are prepared.

It appears to be customary—the custom originating, no doubt, in competition, and now sanctioned by use—in every instance at the *enquiry* stage of a switchgear order, for purchasers to ask each tenderer for special drawings irrespective of the size or value of the apparatus enquired for; and it is thus not unusual for a maker, when acting as sub-contractor, to be requested by a dozen different firms to supply, for tendering purposes, of each section of the order, a dozen sets of drawings in duplicate, together with blue prints and diagrams of connections and dimensions, the order itself being of the value of, perhaps, not more than £10. In the case of intermediate sub-contractors making the demand on behalf of some main contractor the work is doubled, and may even be quadrupled.

It is submitted by members that while, in the case of large special switchboards, detailed lay-out drawings may reasonably be required, in the majority of cases an immense wastage of time and labour takes place in the manufacturers' drawing offices, most of the drawings demanded being unnecessary for the immediate purpose; and that simple illustrations of the apparatus offered would, in the first instance, be amply sufficient to enable purchasers or their engineers to decide as to the tenderer or tenderers to whom they will, in the first instance, give the preference, who could then be required to submit the necessary drawings.

The grievance is, moreover, as it appears, not confined to the tender stage. In the contract stage, also, the drawings required are, members submit, frequently excessive in number and variety and unnecessarily detailed. In the case of motor panels, for example, of which a large number are sometimes ordered at one time, it is not unusual for three or more dimensional prints of each panel to be asked for.

My council conceive that in many instances excessive demands for drawings may arise from thoughtlessness or lack of knowledge, on the part of purchasers' assistants, who habitually and, perhaps, excusably, make them as a matter of routine with every enquiry or order passing through their hands, specifications usually embodying "covering" provisions as to the drawings which shall be supplied, if required.

From whatever cause arising, however, my council feel assured that a remedy will be found for the grievance; and that, so far as it lies within the power of purchasers to apply it, the remedy will be applied. The interests of both parties are obviously served in the end by keeping down charges for unproductive labour; and the total amount of drawing-office charges incurred yearly by manufacturers as a body is, under the present system, very large indeed, having regard to the fact that only one or two out of the 20 or more tendering firms can possibly get any order.

D. N. Dunlop, Secretary.

The British Electrical and
Allied Manufacturers' Association,
King's House, Kingsway, London, W.C.,
October 25, 1912.

THE CASE OF THE FIREMEN.—I.

Sir,—My apology for inflicting this letter upon your readers must be found in the importance of its subject. The "case of the firemen" includes the case also of those who, in the north of England, are called "deputies," and it also includes, as I shall show, a very real case of the colliery managers. To all of these my feelings are naturally of the warmest kind.

The present situation constitutes (1) a case of great hardship (and unnecessary hardship) for a very fine class of miners; and (2) a sure means of defeating the very object it was designed to attain.

It must be admitted at the outset that the existing firemen have some just cause of quarrel with the Home Office. When the possession of certificates of competency to manage a mine was made compulsory by the Mines Act of 1872, the case of all existing managers was equitably met by granting to each a certificate of service. This enabled him to retain his position, and held good for the remainder of his life. Similarly humane statesmanship has not been displayed in the framing of the new Mines Act (1911). On the contrary, the existing fireman is peremptorily required to obtain a certificate by examination, or otherwise relinquish his position at the end of the present year. As each of these men already holds from his manager a written authority to act as a fireman, this authority is held, and rightly so, to constitute, to all practical intents and purposes, a valid certificate of ability to perform the duties of a fireman.

The written authority referred to has not, in the generality of instances, been granted at random. My own experience is that any prospective fireman is taken round the mine, either by his manager or under-manager, and *there* tested as to his ability to find gas, and *there* required to state the various heights of the different gas-caps found. Such a method has formed, and will continue to form, the only efficient test of this kind, and no colliery manager will allow the new "tests" to supersede it. It has proved efficient in the past, and, on the strength of it, the fireman has been entrusted with the care of that whose price cannot be named in pounds sterling.

The practised fireman of to-day is, therefore, quite naturally demanding to know why he is denied the preferential treatment received by the practised colliery manager of 1872. Why the precedent established for the one has not been followed in the case of the other is an awkward question that can only be answered by the "most democratic Government of modern times." Of course, one cannot help remembering that the big miners' unions are also the big voting machines, and if the firemen and deputies had generally stood within, instead of generally standing outside these great organisations, the Government might possibly have given their case more kindly consideration.

Perhaps, however, it may not even yet be too late for the Home Office to reconsider the case of our existing firemen? It is simply and solely a question of British fair play.

That, Sir, is one point in the case of the firemen. With your permission, I will next week state a second point in their case. H. W. Halbaum.

7, Mafeking-road,
Roath Park, Cardiff.
October 26, 1912.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.—October 29.

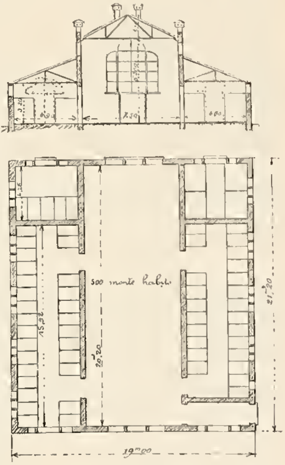
The Minimum Wage in Yorkshire.

Mr. Wansworth asked the President of the Board of Trade if he was aware that the Coal Mines (Minimum Wage) Act, 1912, provided that nothing in that Act should prejudice the operation of any agreement entered into or custom existing before its passing for the payment of wages at a rate higher than the minimum rate settled under the Act, and that some of the district rules in some of the districts stated that, in ascertaining the earnings of coal-getters or their workmen paid by the piece, there should not be deducted from their gross earnings for their trammers, fillers, or others working under them, a wage more than 1s. in excess of the minimum rate of wages fixed for those classes of workmen respectively; and whether he proposed to take any action in the matter, seeing that numbers of men had been reduced in their wages by the operation of these rules.

Mr. Sydney Buxton said: The Board of Trade have no power to give an authoritative opinion upon the legal question whether or not such a rule as that referred to is *ultra vires*, but I understand that in South Yorkshire the matter has been referred to Sir Edward Clarke, the chairman of the Joint District Board, who has stated that, after careful consideration, he is of opinion that the rule, as it stands, is not *ultra vires*, and is a reasonable and proper rule.

BATH HOUSE AT A BELGIAN COLLIERY.

The report of one of the Belgian inspectors of mines contains a description of the wash-house installed at the No. 2 pit of the Bois de la Haye Colliery, Anderlues. The building, which was specially constructed for the purpose, measures 70 ft. by 62 ft., and contains a changing hall (66 by 24 feet), fitted with 500 clothes-hooks, the washing appliances (shower baths) being housed in two annexes. The hall is whitewashed, and is provided with 16 ventilating cowls. The washing appliances include 52 shower baths for the miners, five for the deputies, and four baths for the engineers. The cabins are lined with enamelled bricks, and the baths of enamelled cast iron. The rooms are heated by steam radiators supplied by steam from the boiler-house, reduced to a pressure of about 44 lb. per square inch. A pressure gauge enables the pressure to be kept under observation, and any excess blows off through a safety valve.—*Annales des Mines de Belgique.*



CONTINENTAL MINING NOTES.

France.

The shortage of rolling stock and canal boats has not as yet seriously effected the collieries in the North of France, but complications are feared in view of the situation in Germany and Belgium. There is an exceptionally strong demand both for domestic and manufacturing coals. Briquettes are very rare.

The Coaldust Question.—A conference has just been held in Paris, on the initiative of M. Taffanel, to discuss the coaldust question, at which representatives from the various French coalfields were present. In a note, M. Taffanel referred to the recent La Clarence explosion, and recalled certain conclusions from his reports having a bearing upon it. He said it was impossible as yet to draw any definite deductions from the explosion, but an examination of the workings showed that several of the barriers (*arrêts-barrages*) employed to isolate the districts had been undamaged, whilst several had been traversed by the flame, or at least bore definite traces of calorific action. Thus it had been concluded that the barriers had failed to arrest the propagation of the explosion. He then observed that it was necessary to establish at the inquest whether this failure was to be attributed to certain particular and abnormal causes, such as the insufficiency of the quantity of ashes, the excessive height of the supporting planks, the wrong disposition of the barriers, or the presence of firedamp; or, on the other hand, whether the barriers were employed under conditions comparable with those in which they were used in the experimental gallery. He next pointed out that the important reservation had always been made that it was yet not assured that the methods of arrest that had proved successful in a limited gallery would prove equally efficacious where the conditions were more complex and extended. In the report on the fourth series of experiments at Liévin, it was pointed out that in the event of a slow explosion or at a great distance from the point of origin, such arrangements might prove of less value than in the case of the experiments. The tests

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WING-OFFICE EXPENSES.

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SIR,—My apology for inflicting this letter upon your readers must be found in the importance of its subject. The "case of the firemen" includes the case also of those who, in the north of England, are called "deputies," and it also includes, as I shall show, a very real case of the colliery managers. To all of these my feelings are naturally of the warmest kind.

The present situation constitutes (1) a case of great hardship (and unnecessary hardship) for a very fine class of miners; and (2) a sure means of defeating the very object it was designed to attain.

It must be admitted at the outset that the existing firemen have some just cause of quarrel with the Home Office. When the possession of certificates of competency to manage a mine was made compulsory by the Mines Act of 1872, the case of all existing managers was equitably met by granting to each a certificate of service. This enabled him to retain his position, and held good for the remainder of his life. Similarly humane statesmanship has not been displayed in the framing of the new Mines Act (1911). On the contrary, the existing fireman is peremptorily required to obtain a certificate by examination, or otherwise relinquish his position at the end of the present year. As each of these men already holds from his manager a written authority to act as a fireman, this authority is held, and rightly so, to constitute, to all practical intents and purposes, a valid certificate of ability to perform the duties of a fireman.

The written authority referred to has not, in the generality of instances, been granted at random. My own experience is that any prospective fireman is taken round the mine, either by his manager or under-manager, and *there* tested as to his ability to find gas, and *there* required to state the various heights of the different gas-caps found. Such a method has formed, and will continue to form, the only efficient test of this kind, and no colliery manager will allow the new "tests" to supersede it. It has proved efficient in the past, and, on the strength of it, the fireman has been entrusted with the care of that whose price cannot be named in pounds sterling.

The practised fireman of to-day is, therefore, quite naturally demanding to know why he is denied the preferential treatment received by the practised colliery manager of 1872. Why the precedent established for the one has not been followed in the case of the other is an awkward question that can only be answered by the "most democratic Government of modern times." Of course, one cannot help remembering that the big miners' unions are also the big voting machines, and if the firemen and deputies had generally stood within, instead of generally standing outside these great organisations, the Government might possibly have given their case more kindly consideration.

Perhaps, however, it may not even yet be too late for the Home Office to reconsider the case of our existing firemen? It is simply and solely a question of British fair play.

That, Sir, is one point in the case of the firemen. With your permission, I will next week state a second point in their case. H W. HALBAUM.

7, Mafeking-road,
Roath Park, Cardiff.
October 26, 1912.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.—October 29.

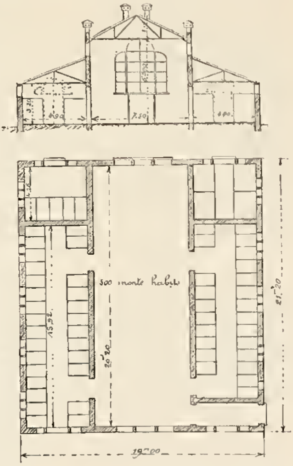
The Minimum Wage in Yorkshire.

Mr. WANSWORTH asked the President of the Board of Trade if he was aware that the Coal Mines (Minimum Wage) Act, 1912, provided that nothing in that Act should prejudice the operation of any agreement entered into or custom existing before its passing for the payment of wages at a rate higher than the minimum rate settled under the Act, and that some of the district rules in some of the districts stated that, in ascertaining the earnings of coal-getters or their workmen paid by the piece, there should not be deducted from their gross earnings for their trammers, fillers, or others working under them, a wage more than 1s. in excess of the minimum rate of wages fixed for those classes of workmen respectively; and whether he proposed to take any action in the matter, seeing that numbers of men had been reduced in their wages by the operation of these rules.

Mr. SYDNEY BUXTON said: The Board of Trade have no power to give an authoritative opinion upon the legal question whether or not such a rule as that referred to is *ultra vires*, but I understand that in South Yorkshire the matter has been referred to Sir Edward Clarke, the chairman of the Joint District Board, who has stated that, after careful consideration, he is of opinion that the rule, as it stands, is not *ultra vires*, and is a reasonable and proper rule.

BATH HOUSE AT A BELGIAN COLLIERY.

The report of one of the Belgian inspectors of mines contains a description of the wash-house installed at the No. 2 pit of the Bois de la Haye Colliery, Anderlues. The building, which was specially constructed for the purpose, measures 70 ft. by 62 ft., and contains a changing hall (66 by 24 feet), fitted with 500 clothes-hooks, the washing appliances (shower baths) being housed in two annexes. The hall is whitewashed, and is provided with 16 ventilating cowls. The washing appliances include 52 shower baths for the miners, five for the deputies, and four baths for the engineers. The cabins are lined with enamelled bricks, and the baths of enamelled cast iron. The rooms are heated by steam radiators supplied by steam from the boiler-house,



reduced to a pressure of about 44 lb. per square inch. A pressure gauge enables the pressure to be kept under observation, and any excess blows off through a safety valve.—*Annales des Mines de Belgique.*

CONTINENTAL MINING NOTES.

France.

The shortage of rolling stock and canal boats has not as yet seriously affected the collieries in the North of France, but complications are feared in view of the situation in Germany and Belgium. There is an exceptionally strong demand both for domestic and manufacturing coals. Briquettes are very rare.

The Coaldust Question.—A conference has just been held in Paris, on the initiative of M Taffanel, to discuss the coaldust question, at which representatives from the various French coalfields were present. In a note, M. Taffanel referred to the recent La Clarence explosion, and recalled certain conclusions from his reports having a bearing upon it. He said it was impossible as yet to draw any definite deductions from the explosion, but an examination of the workings showed that several of the barriers (*arrêts-barrages*) employed to isolate the districts had been undamaged, whilst several had been traversed by the flame, or at least bore definite traces of calorific action. Thus it had been concluded that the barriers had failed to arrest the propagation of the explosion. He then observed that it was necessary to establish at the inquest whether this failure was to be attributed to certain particular and abnormal causes, such as the insufficiency of the quantity of ashes, the excessive height of the supporting planks, the wrong disposition of the barriers, or the presence of firedamp; or, on the other hand, whether the barriers were employed under conditions comparable with those in which they were used in the experimental gallery. He next pointed out that the important reservation had always been made that it was yet not assured that the methods of arrest that had proved successful in a limited gallery would prove equally efficacious where the conditions were more complex and extended. In the report on the fourth series of experiments at Liévin, it was pointed out that in the event of a slow explosion or at a great distance from the point of origin, such arrangements might prove of less value than in the case of the experiments. The tests

THE COAL AND IRON TRADES.

Thursday, October 31.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

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Later.—The Swedish State Railways invite offers of 125,000 tons of best steam coal for delivery from November to March. This enquiry has come as a surprise to the market, and is attributed to the Department not having purchased its full supplies earlier. Tenders are due in on November 7.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 107,500 tons of coal and 1,625 tons of coke, as compared with 103,135 tons of coal and 1,455 tons of coke for the corresponding period of 1911, being an increase of 4,365 tons of coal and 170 tons of coke. The coal market continues to boom, and the upward trend of values of all descriptions is unchecked, but in view of the difficulty in securing early supplies, very little prompt business has been concluded. The demand for coking qualities is still difficult to satisfy, both for unscreened and smalls, with the result that higher prices are obtainable. Steam and gas qualities are equally in keen request. Coke is also very scarce, and prices for all kinds are firm. Bunker coals are in heavy demand, and for prompt shipment prices are 3d. to 6d. per ton dearer. Collieries are heavily booked well into next month, and more attention is now being given to December shipment. It is reported that the London Gas Company have bought best gas at 14s. per ton, and large quantities have been sold to the Paris Gasworks; it is also said that 50,000 tons of first-class Durham coking coals have been sold for shipment over next year at 11s. per ton, and that the Berlin Electric Lighting Works have contracted for 20,000 tons of good unscreened gas coals at a delivered price to leave about 15s. for the coals. Quotations are as follow:—Special Wear gas, 15s.; seconds, 14s. to 14s. 3d.; coking unscreened and smalls, 14s. to 14s. 6d.; smithies, 14s.; peas and nuts, 14s. to 15s.; household ordinaries, 14s. 6d.; bests, 15s. 6d.; foundry coke, 25s. 6d.; furnace, 25s.; gashouse coke, 23s. 6d. Bunker quotations are:—Ordinaries, 14s.; best, 15s.; with superior kinds 15s. 6d. to 16s.—all free on board South Dock. In the freight market the high rates continue to be paid. Coasting has been specially active, and as much as 5s. 6d. has been paid for London boats having been detained by the foggy weather; other fixtures have been Havre 6s. 3d. and Hamburg 5s. To the Bay the demand is good, as shown by: Bordeaux 8s., Rochefort 8s., Bayonne 8s. 9d., Cadiz 12s. 6d. The Baltic orders are scarcer, Cronstadt being now done for the season. Stockholm has paid 7s., Riga 6s. 3d., and Aalborg 6s. 6d. The Mediterranean market is strong, with a very limited supply of tonnage, Genoa 13s. 6d., Port Said 13s., Alexandria 13s. 6d., and Las Palmas 13s. 3d. being recent fixtures.

Middlesbrough-on-Tees.

COAL.

All descriptions of fuel are in good demand and firm in price. Deliveries of gas coal are heavy, and best Durhams are realising 15s., whilst seconds bring 14s. to 14s. 3d. Bunker coal is in heavy request, and up to 14s. f.o.b. is paid for ordinary Durhams, and special kinds realise up to 15s. Household coal is steady and firm. Supply of coking coal is inadequate. The market quotation is in the neighbourhood of 14s. 6d. Coke is very strong, and so scarce that much difficulty is experienced in satisfying needs. Demand is very full both for prompt and forward delivery, and quotations show a marked upward tendency. There are large contracts running at considerably below current rates, but customers necessitated to buy in the open market have to pay up to 26s. for average blastfurnace coke delivered at Teesside works, and some sellers now ask 25s. Foundry coke for shipment is quoted at 26s. to 27s. f.o.b. Gashouse coke is put at 23s.

IRON.

Middlesbrough Chamber of Commerce returns just issued showed that at the end of September there were within the port of Middlesbrough 60 furnaces in operation out of 78 built. The production of pig by Middlesbrough furnaces last quarter reached 590,000 tons, as compared with 520,000 tons for the previous quarter and 565,000 tons for the third quarter of 1911. Imports of foreign ore to Middlesbrough last quarter reached 627,851 tons, as against 338,378 tons for the previous three months and 434,238 tons for the third quarter of last year. The total value of goods other than coal and coke exported to foreign and colonial destinations from Middlesbrough during July, August and September, reached £5,193,548, which is £1,251,801 more than during the corresponding period a year ago. There is rather more business passing in pig iron, but buyers are still rather backward. Values of Cleveland pig are slowly but steadily advancing. The American reports, and the falling stocks, and good shipments here assist to strengthen the market, but the war in the East has checked buying. No. 3 g.m.b. Cleveland pig is 67s. for early f.o.b. delivery, No. 4 foundry is scarce, and is the same price as No. 3, whilst No. 4 forge is almost unobtainable, and for the first time for several years is realising a higher price than No. 3. From 67s. 3d. to 67s. 6d. is quoted for forge iron. Mottled and white iron each stand at 66s. 6d. There is a plentiful supply of No. 1, and it is offered somewhat freely at 71s. 3d. East coast hæmatite pig is enquired for, but there is practically none available. For this year's delivery of mixed numbers the price is 80s., and for spring business 82s. 6d. is generally named. Foreign ore, though inactive, is firm on the basis of 23s. ex-ship Tees for best rubio, and the freight Bilbao-Middlesbrough is 7s. 7½d. to 7s. 9d. Producers of all kinds of manufactured iron and steel are very full of work, but few new contracts are being made, largely because manufacturers do not care to book further orders at current rates. Quotations for several descriptions show a further upward tendency.

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South-West Lancashire.

COAL.

The briskness allied to winter months is not yet perceptible in the household trade, and undoubtedly the quietness of the past few weeks is attributable to the extraordinary demand which arose in the latter end of August and September. Notwithstanding this, however, prices continue firm, as it is recognised that it is only what would naturally ensue after the earlier abnormal buying. Shipping generally remains as it was. Contract bunkering requirements do not show any falling off. On the other hand, outside business is moderate, and mainly of a hand-to-mouth character, partly due to the tonnage difficulty, and probably also, to some extent, to the higher prices asked for forward shipment. Supplies of steam coal are in excess of present demand, but probably not to a very great extent, and a spell of cold weather, which would take off some of the coals that also go for house purposes, would make a difference in this respect. Meanwhile, however, the market is slightly easier, though quotations for screened Lancashire steam coals are still 12s. 6d. to 13s. 6d. f.o.b. according to quality. With the exception that the fog retarded the regular running of the coastwise vessels, the household trade in this branch is quite satisfactory. Best coals for prompt shipment rule at about 16s. 6d., with good medium grades about 1s. 6d. below, both f.o.b. and net. There is not much change with regard to slacks, and the very firm tone continues to prevail with respect to contracts for the coming year, and for present open sale prices rule from 9s. 9d. to 10s. for best qualities, with seconds grades 9s. to 9s. 3d., and the commoner qualities at about 8s. 6d.—all into wagons at the pit.

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South Lancashire and Cheshire.

COAL.

There was a full attendance on the Manchester Coal Exchange on Tuesday. The demand for house coal is fair. Prices remain firm and as last reported, 16s. 6d. to 17s. for the best house grades, with good medium qualities 15s. 3d. to 16s., and the commoner sorts from 12s. 6d. to 13s.—all into wagons at the pit. Furnace coal continues in good demand, and the price is steady at about 12s. 6d. per ton at the pit. Business in shipping coal is fairly brisk, and prices are at about 14s. f.o.b. Partington. At present the demand for slack is good; but the war in the Near East is likely to have some effect on the working of the cotton mills, and this in turn will naturally affect the consumption of slack. Prices are steady at 9s. to 9s. 6d. for the best qualities, with the commoner grades at from 8s. to 8s. 6d.—all into wagons at the pit.

IRON.

Trade is still very good, with makers absolutely full of work and deliveries very hard to get hold of. Sales of pig iron have been made very far forward, and foundry iron continues in the neighbourhood of 72s. 6d. delivered this district, and forge iron about 71s. to 72s. 6d. In the forges, bars are to be bought at £8 10s., second quality £8, hoops £8 12s. 6d., sheets £9 5s.; steelworks bars at £8 to £8 5s., hoops £8 10s., boiler plates £9 5s., and billets £6 10s. The foundries and heavy engineers are not so busy as one could expect; but the textile machinery makers are full of business. Wagon works are also well employed.

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Yorkshire and Derbyshire.

Leeds.

COAL.

There were many traders at the Coal Exchange on Tuesday, but business was not brisk, the mild weather and the turn of the month having checked the buying of house coal. In other branches of the trade there was a pretty good demand and prices were maintained, except that spot parcels of steam coal were more freely offered at special prices. The pits have worked about five days this week, but wagons have again been very scarce owing to the fog of last week-end and the consequent dislocation of traffic. There is a decided lull in the house coal trade, and stocks in colliery sidings have begun to accumulate. These cause no uneasiness, however, as a week's real cold weather would clear them. London merchants have taken little outside contracts, while factors have bought scarcely anything this week. Pit prices are unchanged. Current quotations:—Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. to 14s.; Silkstone best, 13s. to 14s. (special samples up 14s. 6d.); Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. 6d. to 12s. The coastwise demand is mostly for the cheapest qualities, best sorts being neglected. Small boats are scarce, and freights are still very high. Quotations given in Hull this week range round the following f.o.b. figures:—Haigh Moor house coal, 16s. 6d. to 17s.; Silkstone best, 15s. 6d. to 16s. 3d.; Silkstone house, 14s. 6d. to 15s. 3d.; house nuts, 13s. 6d. to 14s. In the local markets the retail trade is very quiet, and merchants are having to stock to avoid siding rent. Pit prices are maintained, and average as under.—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s.; secondary qualities, 13s. to 14s. 6d. There is a full demand for all the manufacturing fuel raised, and pit prices are firm. The call for small nuts and peas for electric power purposes is increasing, while coking smalls are quite 3s. per ton dearer than a year ago. The industrial position is strong, and in the manufacturing districts many of the mills are working overtime. Pit prices:—Large double-screened engine nuts, 10s. to 11s.; small nuts, 9s. 6d. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. 6d. to 10s.; best rough slacks, 8s. 6d. to 9s.; small slacks, 7s. 6d. to 8s. 3d.; coking smalls, 7s. 6d. to 8s. Washed furnace coke remains very firm at 18s. to 18s. 6d. per ton at the ovens. Buyers refuse to contract at these figures except for short periods. There has been a very big consumption of gas coal locally this week, and the pits are hard pressed to cope with the demand for contract supplies. Any spot lots offered in the open market find ready buyers

THE COAL AND IRON TRADES.

Thursday, October 31.

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Sunderland.

COAL.

The exports from Sunderland last week amounted to 107,500 tons of coal and 1,625 tons of coke, as compared with 103,135 tons of coal and 1,455 tons of coke for the corresponding period of 1911, being an increase of 4,365 tons of coal and 170 tons of coke. The coal market continues to boom, and the upward trend of values of all descriptions is unchecked, but in view of the difficulty in securing early supplies, very little prompt business has been concluded. The demand for coking qualities is still difficult to satisfy, both for unscreened and smalls, with the result that higher prices are obtainable. Steam and gas qualities are equally in keen request. Coke is also very scarce, and prices for all kinds are firm. Bunker coals are in heavy demand, and for prompt shipment prices are 3d. to 6d. per ton dearer. Collieries are heavily booked well into next month, and more attention is now being given to December shipment. It is reported that the London Gas Company have bought best gas at 14s. per ton, and large quantities have been sold to the Paris Gasworks; it is also said that 50,000 tons of first-class Durham coking coals have been sold for shipment over next year at 14s. per ton, and that the Berlin Electric Lighting Works have contracted for 20,000 tons of good unscreened gas coals at a delivered price to leave about 15s. for the coals. Quotations are as follow:—Special Wear gas, 15s.; seconds, 14s. to 14s. 3d.; coking unscreened and smalls, 14s. to 14s. 6d.; smithies, 14s.; peas and nuts, 14s. to 15s.; household ordinaries, 14s. 6d.; bests, 15s. 6d.; foundry coke, 25s. 6d.; furnace, 25s.; gashouse coke, 23s. 6d. Bunker quotations are:—Ordinaries, 14s.; best, 15s.; with superior kinds 15s. 6d. to 16s.—all free on board South Dock. In the freight market the high rates continue to be paid. Coasting has been specially active, and as much as 5s. 6d. has been paid for London boats having been detained by the foggy weather; other fixtures have been Havre 6s. 3d. and Hamburg 5s. To the Bay the demand is good, as shown by: Bordeaux 8s., Rochefort 8s., Bayonne 8s. 9d., Cadiz 12s. 6d. The Baltic orders are scarcer, Cronstadt being now done for the season. Stockholm has paid 7s., Riga 6s. 3d., and Aalborg 6s. 6d. The Mediterranean market is strong, with a very limited supply of tonnage, Genoa 13s. 6d., Port Said 13s., Alexandria 13s. 6d., and Las Palmas 13s. 3d. being recent fixtures.

Middlesbrough-on-Tees.

COAL.

All descriptions of fuel are in good demand and firm in price. Deliveries of gas coal are heavy, and best Durhams are realising 15s., whilst seconds bring 14s. to 14s. 3d. Bunker coal is in heavy request, and up to 14s. f.o.b. is paid for ordinary Durhams, and special kinds realise up to 15s. Household coal is steady and firm. Supply of coking coal is inadequate. The market quotation is in the neighbourhood of 14s. 6d. Coke is very strong, and so scarce that much difficulty is experienced in satisfying needs. Demand is very full both for prompt and forward delivery, and quotations show a marked upward tendency. There are large contracts running at considerably below current rates, but customers necessitated to buy in the open market have to pay up to 26s. for average blastfurnace coke delivered at Teesside works, and some sellers now ask 25s. Foundry coke for shipment is quoted at 26s. to 27s. f.o.b. Gashouse coke is put at 23s.

IRON.

Middlesbrough Chamber of Commerce returns just issued showed that at the end of September there were within the port of Middlesbrough 60 furnaces in operation out of 78 built. The production of pig by Middlesbrough furnaces last quarter reached 590,000 tons, as compared with 520,000 tons for the previous quarter and 565,000 tons for the third quarter of 1911. Imports of foreign ore to Middlesbrough last quarter reached 627,851 tons, as against 338,378 tons for the previous three months and 434,238 tons for the third quarter of last year. The total value of goods other than coal and coke exported to foreign and colonial destinations from Middlesbrough during July, August and September, reached £5,193,548, which is £1,251,801 more than during the corresponding period a year ago. There is rather more business passing in pig iron, but buyers are still rather backward. Values of Cleveland pig are slowly but steadily advancing. The American reports, and the falling stocks, and good shipments here assist to strengthen the market, but the war in the East has checked buying. No. 3 g.m.b. Cleveland pig is 67s. for early f.o.b. delivery, No. 4 foundry is scarce, and is the same price as No. 3, whilst No. 4 forge is almost unobtainable, and for the first time for several years is realising a higher price than No. 3. From 67s. 3d. to 67s. 6d. is quoted for forge iron. Mottled and white iron each stand at 66s. 6d. There is a plentiful supply of No. 1, and it is offered somewhat freely at 71s. 3d. East coast hæmatite pig is enquired for, but there is practically none available. For this year's delivery of mixed numbers the price is 80s., and for spring business 82s. 6d. is generally named. Foreign ore, though inactive, is firm on the basis of 23s. ex-ship Tees for best rubio, and the freight Bilbao-Middlesbrough is 7s. 7½d. to 7s. 9d. Producers of all kinds of manufactured iron and steel are very full of work, but few new contracts are being made, largely because manufacturers do not care to book further orders at current rates. Quotations for several descriptions show a further upward tendency.

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South-West Lancashire.

COAL.

The briskness allied to winter months is not yet perceptible in the household trade, and undoubtedly the quietness of the past few weeks is attributable to the extraordinary demand which arose in the latter end of August and September. Notwithstanding this, however, prices continue firm, as it is recognised that it is only what would naturally ensue after the earlier abnormal buying. Shipping generally remains as it was. Contract bunkering requirements do not show any falling off. On the other hand, outside business is moderate, and mainly of a hand-to-mouth character, partly due to the tonnage difficulty, and probably also, to some extent, to the higher prices asked for forward shipment. Supplies of steam coal are in excess of present demand, but probably not to a very great extent, and a spell of cold weather, which would take off some of the coals that also go for house purposes, would make a difference in this respect. Meanwhile, however, the market is slightly easier, though quotations for screened Lancashire steam coals are still 13s. 6d. to 13s. 6d. f.o.b. according to quality. With the exception that the fog retarded the regular running of the coastwise vessels, the household trade in this branch is quite satisfactory. Best coals for prompt shipment rule at about 16s. 6d., with good medium grades about 1s. 6d. below, both f.o.b. and net. There is not much change with regard to slacks, and the very firm tone continues to prevail with respect to contracts for the coming year, and for present open sale prices rule from 9s. 9d. to 10s. for best qualities, with seconds grades 9s. to 9s. 3d., and the commoner qualities at about 6s. 6d.—all into wagons at the pit.

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South Lancashire and Cheshire.

COAL.

There was a full attendance on the Manchester Coal Exchange on Tuesday. The demand for house coal is fair. Prices remain firm and as last reported, 16s. 6d. to 17s. for the best house grades, with good medium qualities 15s. 3d. to 16s., and the commoner sorts from 12s. 6d. to 13s.—all into wagons at the pit. Furnace coal continues in good demand, and the price is steady at about 12s. 6d. per ton at the pit. Business in shipping coal is fairly brisk, and prices are at about 14s. f.o.b. Partington. At present the demand for slack is good; but the war in the Near East is likely to have some effect on the working of the cotton mills, and this in turn will naturally affect the consumption of slack. Prices are steady at 9s. to 9s. 9d. for the best qualities, with the commoner grades at from 8s. to 8s. 6d.—all into wagons at the pit.

IRON.

Trade is still very good, with makers absolutely full of work and deliveries very hard to get hold of. Sales of pig iron have been made very far forward, and foundry iron continues in the neighbourhood of 72s. 6d. delivered this district, and forge iron about 71s. to 72s. 6d. In the forges, bars are to be bought at £6 10s., second quality £8, hoops £8 12s. 6d., sheets £9 5s.; steelworks bars at £8 to £8 5s., hoops £8 10s., boiler plates £9 5s., and billets £6 10s. The foundries and heavy engineers are not so busy as one could expect; but the textile machinery makers are full of business. Wagon works are also well employed.

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Yorkshire and Derbyshire.

Leeds.

COAL.

There were many traders at the Coal Exchange on Tuesday, but business was not brisk, the mild weather and the turn of the month having checked the buying of house coal. In other branches of the trade there was a pretty good demand and prices were maintained, except that spot parcels of steam coal were more freely offered at special prices. The pits have worked about five days this week, but wagons have again been very scarce owing to the fog of last week-end and the consequent dislocation of traffic. There is a decided lull in the house coal trade, and stocks in colliery sidings have begun to accumulate. These cause no uneasiness, however, as a week's real cold weather would clear them. London merchants have taken little outside contracts, while factors have bought scarcely anything this week. Pit prices are unchanged. Current quotations:—Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. to 14s.; Silkstone best, 13s. to 14s. (special samples up 14s. 6d.); Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. 6d. to 12s. The coastwise demand is mostly for the cheapest qualities, best sorts being neglected. Small boats are scarce, and freights are still very high. Quotations given in Hull this week range round the following f.o.b. figures:—Haigh Moor house coal, 16s. 6d. to 17s.; Silkstone best, 15s. 6d. to 16s. 3d.; Silkstone house, 14s. 9d. to 15s. 3d.; house nuts, 13s. 6d. to 14s. In the local markets the retail trade is very quiet, and merchants are having to stock to avoid siding rent. Pit prices are maintained, and average as under:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s.; secondary qualities, 13s. to 14s. 6d. There is a full demand for all the manufacturing fuel raised, and pit prices are firm. The call for small nuts and peas for electric power purposes is increasing, while coking smalls are quite 3s. per ton dearer than a year ago. The industrial position is strong, and in the manufacturing districts many of the mills are working overtime. Pit prices:—Large double-screened engine nuts, 10s. to 11s.; small nuts, 9s. 6d. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. 6d. to 10s.; best rough slacks, 8s. 6d. to 9s.; small slacks, 7s. 6d. to 8s. 3d.; coking smalls, 7s. 6d. to 8s. Washed furnace coke remains very firm at 18s. to 18s. 6d. per ton at the ovens. Buyers refuse to contract at those figures except for short periods. There has been a very big consumption of gas coal locally this week, and the pits are hard pressed to cope with the demand for contract supplies. Any spot lots offered in the open market find ready buyers managing full time. The output is disposed of without any going to stock, but there is a complete absence of pressure in the demand. Orders from the inland merchants have not been so numerous of late, and sales put on rail are not so substantial. Shipments continue good, and stocks at the Basin are still very low. Prices continue on the basis of block 16s. 6d. at pit and 18s. 3d. f.o.b. Lydney or Sharpness. The steam coal pits are all doing good business, and the pits are kept going at full pressure.

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Gloucestershire, Somersetshire and Wilts.

Plymouth.

COAL.

Messrs. W. Wade and Son report that there is a limited wholesale demand for house and steam coal at the south-coast ports. Most of the larger importers are drawing freely on their coal and freight contracts. Steam freights on the west coast appear a little easier, 6s. having been done to-day from Preston to Devonport for a small boat.

THE USE OF RELIGHTING APPARATUS.

New Order.

An Order of the Secretary of State, dated October 24. 1912, has been issued under section 35 (1) of the Coal Mines Act, 1911 (1 and 2 Geo. V., c. 50), authorising the use underground of apparatus for the relighting electrically of safety lamps. It is in the following terms:—

In pursuance of the power conferred on me by Section 35 (1) of the Coal Mines Act, 1911, I hereby authorise the use underground of apparatus for the relighting electrically of safety lamps; provided

(1) the apparatus complies in all respects with the requirements of any rules or regulations in force for the time being with respect to the use of electricity underground, and is used in accordance with the provisions of such rules or regulations and of the said Act;*

(2) the station where the apparatus is used shall not be within a distance of 200 yards of any part of the working face;

(3) when not in use the apparatus shall be kept securely locked and no person shall be given or have in his possession any key or contrivance for unlocking the apparatus, other than a person appointed in pursuance of Section 34 (1) (iii) of the said Act.

R. McKenna,
One of His Majesty's Principal
Secretaries of State.

Whitehall,
24th October, 1912.

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* The other provisions at present in force are as follows:—

(1) A safety lamp (other than an electric hand lamp) must not be relighted except
  (a) at an appointed station, which must not be in a return airway
  (b) by a competent person appointed in writing by the manager for the purpose
  (c) after examination by the person appointed
  } Section 34 (3).

The lamp must also be examined by the appointed person after being relighted, and before being issued [Electricity Rules No. 18 (c)].

(2) The apparatus must not be used in any part of a mine where inflammable gas, although not normally present, is likely to occur in quantity sufficient to be indicative of danger [Electricity Rules Nos 18 (b) and 15].

(3) The apparatus (a) must be so constructed, installed, protected, worked and maintained as to prevent danger so far as is reasonably practicable and in particular (b) must be so constructed, worked and maintained as to preclude the accumulation of explosive gas within it [Electricity Rules Nos. 7 (a) and 18 (a)].

THE TIN PLATE TRADE

Liverpool

Business has been slow during the past week, buyers not being inclined to commit themselves ahead to any extent. Most works are fully booked up for several weeks to come, and are on the whole standing to their quotations for forward delivery, but the tone may be called a hesitating one at the moment; and here and there "bears" are reported to be on the "prowl." Makers' quotations run:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 15s. 6d. per box; I C 28 × 20 (112 sh. 216 lb.) 31s. 3d. to 31s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 10½d. to 16s. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. 9d. per box; I C 14 × 19½ (120 sh. 110 lb.), 15s. 9d. per box; I C 20 × 10 (225 sh. 156 lb.) 23s. per box; I C squares and odd sizes, 15s. 10½d. to 16s. basis. Ternes are easy at 26s. 3d. to 26s. 6d. for 1 C 28 × 20, but charcoal tins rule firm at 18s. basis and upwards, according to finish. Coke wasters are quiet at the following rates:—C W 14 × 20, 14s. 6d. per box; C W 28 × 20, 28s. 9d. per box; C W 14 × 18¾, 14s. 6d. per box; C W 14 × 19½, 14s. 6d. per box; C W 20 × 10, 21s. per box—all f.o.b. Wales, less 4 per cent.

COLLIERY ACCIDENTS.

Dinnington.

An inquest was held on the 10th ult. by the district coroner, Mr. Kenyon, at Dinnington, upon Charles Caprile, who was killed whilst following his employment for a Dewsbury firm at the Dinnington Main Colliery.

Alfred Firth, who was employed by the same firm, said deceased and himself were erecting gas purifiers at the Dinnington Main by-product works. Deceased was trying to unfasten the guide rope connected with the derrick they were using, when the guide rope came in contact with a live wire. This wire would be 20 ft. from the ground. Deceased knew it was a live wire, as he had had a slight shock from it the previous week.

Frederick John Shaw, of Laughton, bricklayer, said he was near deceased. He (deceased) stood on a box 2 ft. high when he took hold of the guide rope with his left hand. Immediately witness saw a flash from near deceased's hand, and also two others on the guide rope. Deceased fell to the ground and never spoke nor moved again.

Frederick Patrick McDonald, electrician, said the guide rope was in a bad position. There were 500 volts on that service.

The jury returned the following verdict:—"That deceased came by his death by being accidentally electrocuted."

Dean Moor.

An inquest with reference to the death of Peter Hutchinson (30), miner, who was drowned by an inrush of water in Dean Moor Colliery on June 8, was held recently.

Wilkinson Serginson, drifter, stated that on June 8 he was working with Hutchinson and commenced work at six o'clock in the morning. The blacksmith and manager's son were also down the pit and the blacksmith helped to put a pump in, while the manager's son brought a key down for the pump. They were drifting, and there were two men on each shift. When they first went down they cleared out some metal left from a shot on a previous shift. They afterwards hewed a bit of coal out of a hole so that they could get a machine set for boring. It was used either for shots or for boring for water. They had previously bored into the coal. It was nearly one o'clock, the time for stopping the shift, when an outburst of water occurred and seemed to come from under Hutchinson's feet. Witness got hold of the bell wire, and also shouted, after which someone lowered a rope and pulled him up. It would be about 16 fathoms to the top of the shaft. There was not the least indication that they were in any danger while they were working in the drift. They had bored shot-holes down into the solid coal on the previous Wednesday, and there were no signs of water then. Before the accident he was shown a plan of the colliery by Mr. Thomas, the manager. He knew there were some old workings near the place where they were drifting. Their intention was to bore a ring of holes in the place referred to for fear of any danger. When he started the shaft was put down really for the drift. The first borehole was put down 11 ft. 6 in. in hard shale and did not get the coal. It was put down to prove the dip of the coal. The next borehole was put down about 40 ft. further away—about 11 ft. down and into 3 ft. of coal. The third hole was put down 20 ft. further on, 5 ft. 6 in. into the coal. The holes were put down also with a view to guard against any danger from the old workings. He had worked in the old working drift, and had seen the level of water, but he did not anticipate the head of water there proved to be. He thought it might have been 10 or 12 feet, but it proved to be over 30 ft. From the plan he thought they would pass over the old workings. They thought where the hole was sunk in the seam they were right in a pillar of 20 or 30 feet of coal. Asked why they had not, according to the rule of the Act, put flank holes, witness said he did not think the rule applied to a stone drift, and that the plan they adopted was the best and safest. It was an old working that did not appear on the plan, or they should not have done what they did.

After further evidence, Mr. Wm. Thomas, manager of the pit, stated that the water must have come from an old working. It came right from the face, on the left-hand side, and scooped out a hole about 2 ft. square. The coal between the face and where the water came through was between 16 in. and 2 ft. This was practically a new drift, but there were a lot of old workings about. These had been worked from other shafts. They were worked by the Moorside Colliery Company, which was managed by the late Mr. Johnson. Witness made a tracing of the old workings from a plan in the possession of Mr. Johnson, and that was all he had to guide him as to the position of the old workings. He had found the plan accurate in every way practically since he commenced to use it. When the men got into the hole in question witness calculated that they were about 35 ft. from the old working, according to the plan. It was their intention to bore in this place, and then commence working the coal. He had instructed the men that as soon as they got sufficient coal out they were to put boreholes in to find water. The proprietors of the colliery had promised to supply the necessary apparatus for boring as soon as he sent for it. They had practically finished the work previous to boring when the accident occurred, and he was going to send for the boring appliance probably at the week end. He knew where the tail of the water was at several points. The deputy used to go and measure it. It indicated a head of water of between 30 and 40 feet, he calculated. The old workings were stopped in 1900. Witness set off the pit himself, and it was correctly shown on the plan. They drove a drift so as to get into a solid pillar of coal. Witness said he did not think it would have been practicable to have bored from the drift so as to have proved there were no old workings near, because if he had put the hole in the centre of the drift he would have gone much further beyond the distance, and then he would have proved nothing. Nor did he think flank holes would have answered in this case. He put the holes in the bottom of the drift to ascertain the extent of the coal and also to prove the water. If that was not in the strict letter of law he considered he was doing the thing in a much safer way. He put them in the direction of where he thought the water was. Considering the dry condition of the coal he thought there was no danger in sinking down from the last borehole. His experience and also that of the workmen, was that water passed very freely along the sole of the seam, and all his boreholes went down through the seam to the sole. If they had put in a 15 ft. borehole in the centre of the face it would have gone through solid coal and they would not have touched water.

The jury found that Hutchinson was accidentally drowned through an inrush of water.

Giltbrook.

An inquest has been held on the body of John Leshetter, who met his death in the New London Colliery.

Deceased's son said that his father was 60 years of age, and he was a ripper at the New London pit. He had frequently remarked that his work was dangerous. On one occasion he told witness that a prop came out and caused the wheel and rope to swing. It was a similar mishap that caused his death. There was no other pit in the district using a conveyor.

Frank Harris, a collier, said the coal was carried by conveyors along the place. It was about 2 ft. 6 in. in height, and was lighted by lamps. Witness had worked there for two years, and there had been no serious mishap. The conveyor, explained witness, ran along the floor, drawn by a rope worked by an electric motor. He saw deceased at work inside the rope. He was hacking a prop from the roof for ripping purposes, and was about 2 yards from both the packing and the face. When between the rope and the packing, an anchor prop, retaining the wheel and the rope, came out and swayed across. It caught Leshetter, and dashed him against the packing. He was so badly injured that he died within a quarter of an hour. The rope also pulled two props down, but did not injure anyone else. It was made of steel. The deputy had frequently told them to keep on the face side of the rope, and the deceased was well aware of this injunction. Witness believed that the prop holding the wheel, a piece of round timber, broke near the bottom. It was fixed into the ground as well as the roof.

William Stirland, under-manager of the colliery, said he believed the cause of the accident was the trays becoming fast through weight in the roof. Witness was of the opinion that a steel prop would be of no advantage.

Mr. John White, the manager, said he had previously made an examination, and gave the signal to start himself. He thought the trays were capable of being moved, or he would not have given the signal. On account of the distance he could not see if every man was clear, though he had told them to keep clear. He considered wooden props preferable to steel. The timber that broke had been in use some time. In future, witness added, they were going to strengthen the props. He was going to put up written instructions to the men to keep out of danger. Witness had had experience of similar working in Lanarkshire, and did not consider it more dangerous than any other method.

The jury returned a verdict to the effect that deceased was accidentally killed by being crushed between the rope and the pack. They added that they were strongly of opinion that the work in which the deceased was engaged should only be done when the conveyor was not in motion.

THE BY-PRODUCTS TRADE.

Tar products:—Generally the tone is quiet, but prices as a whole are fairly well maintained. Pitch is quiet, and inclined to be easier. Benzols also are not quite so firm. Carbolics are steady at the recent reduction, and napthas are very firm. Creosote firm, and well held. Nearest values are:—

Benzols, 90's, 11d.; ditto 50's, 10d.; toluol, 11½d.; carbolic acid, crude (60 per cent.), 1s. 11d. to 2s.; ditto crystals (40 per cent.), 7¼d.; solvent naphtha, 1s. 0½d., as to quality and package; crude ditto, 5½d. in bulk; creosote, 3½d. for ordinary qualities; pitch, 45s. to 46s. f.o.b. east coast; ditto, 44s. 6d. to 46s. f.a.s. west coast.

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

Sulphate of ammonia:—Quiet but steady, is about all that can be said concerning this market. There is really very little actual first-hand business passing; so buyers, having small needs at the moment, are trying to make the most of their indifference, and the slackness of the American market. The marked increase in Javan and Japanese requirements more than counteracts the effect of such effete tactics. Closing prompt quotations are:—

London (ordinary makes), £13 7s. 6d.; Beckton, £13 17s. 6d; Liverpool, £14 2s. 6d.; Hull, £14; Scotch ports, £14 2s. 6d. to £14 5s.; nitrate of soda (ordinary), 11s. 7½d. per cwt.

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

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COLLIERY ACCIDENTS.

Dinnington.

An inquest was held on the 10th ult. by the district coroner, Mr. Kenyon, at Dinnington, upon Charles Caprile, who was killed whilst following his employment for a Dewsbury firm at the Dinnington Main Colliery.

Alfred Firth, who was employed by the same firm, said deceased and himself were erecting gas purifiers at the Dinnington Main by-product works. Deceased was trying to unfasten the guide rope connected with the derrick they were using, when the guide rope came in contact with a live wire. This wire would be 20 ft. from the ground. Deceased knew it was a live wire, as he had had a slight shock from it the previous week.

Frederick John Shaw, of Laughton, bricklayer, said he was near deceased. He (deceased) stood on a box 2 ft. high when he took hold of the guide rope with his left hand. Immediately witness saw a flash from near deceased's hand, and also two others on the guide rope. Deceased fell to the ground and never spoke nor moved again.

Frederick Patrick McDonald, electrician, said the guide rope was in a bad position. There were 500 volts on that service.

The jury returned the following verdict:—"That deceased came by his death by being accidentally electrocuted."

Dean Moor.

An inquest with reference to the death of Peter Hutchinson (30), miner, who was drowned by an inrush of water in Dean Moor Colliery on June 8, was held recently.

Wilkinson Serginson, drifter, stated that on June 8 he was working with Hutchinson and commenced work at six o'clock in the morning. The blacksmith and manager's son were also down the pit and the blacksmith helped to put a pump in, while the manager's son brought a key down for the pump. They were drifting, and there were two men on each shift. When they first went down they cleared out some metal left from a shot on a previous shift. They afterwards hewed a bit of coal out of a hole so that they could get a machine set for boring. It was used either for shots or for boring for water. They had previously bored into the coal. It was nearly one o'clock, the time for stopping the shift, when an outburst of water occurred and seemed to come from under Hutchinson's feet. Witness got hold of the bell wire, and also shouted, after which someone lowered a rope and pulled him up. It would be about 16 fathoms to the top of the shaft. There was not the least indication that they were in any danger while they were working in the drift. They had bored shot-holes down into the solid coal on the previous Wednesday, and there were no signs of water then. Before the accident he was shown a plan of the colliery by Mr. Thomas, the manager. He knew there were some old workings near the place where they were drifting. Their intention was to bore a ring of holes in the place referred to for fear of any danger. When he started the shaft was put down really for the drift. The first borehole was put down 11 ft. 6 in. in hard shale and did not get the coal. It was put down to prove the dip of the coal. The next borehole was put down about 40 ft. further away—about 11 ft. down and into 3 ft. of coal. The third hole was put down 20 ft. further on, 5 ft. 6 in. into the coal. The holes were put down also with a view to guard against any danger from the old workings. He had worked in the old working drift, and had seen the level of water, but he did not anticipate the head of water there proved to be. He thought it might have been 10 or 12 feet, but it proved to be over 30 ft. From the plan he thought they would pass over the old workings. They thought where the hole was sunk in the seam they were right in a pillar of 20 or 30 feet of coal. Asked why they had not, according to the rule of the Act, put flank holes, witness said he did not think the rule applied to a stone drift, and that the plan they adopted was the best and safest. It was an old working that did not appear on the plan, or they should not have done what they did.

After further evidence, Mr. Wm. Thomas, manager of the pit, stated that the water must have come from an old working. It came right from the face, on the left-hand side, and scooped out a hole about 2 ft. square. The coal between the face and where the water came through was between 18 in. and 2 ft. This was practically a new drift, but there were a lot of old workings about. These had been worked from other shafts. They were worked by the Moorside Colliery Company, which was managed by the late Mr. Johnson. Witness made a tracing of the old workings from a plan in the possession of Mr. Johnson, and that was all he had to guide him as to the position of the old workings. He had found the plan accurate in every way practically since he commenced to use it. When the men got into the hole in question witness calculated that they were about 35 ft. from the old working, according to the plan. It was their intention to bore in this place, and then commence working the coal. He had instructed the men that as soon as they got sufficient coal out they were to put boreholes in to find water. The proprietors of the colliery had promised to supply the necessary apparatus for boring as soon as he sent for it. They had practically finished the work previous to boring when the accident occurred, and he was going to send for the boring appliance probably at the week end. He knew where the tail of the water was at several points. The deputy used to go and measure it. It indicated a head of water of between 30 and 40 feet, he calculated. The old workings were stopped in 1900. Witness set off the pit himself, and it was correctly shown on the plan. They drove a drift so as to get into a solid pillar of coal. Witness said he did not think it would have been practicable to have bored from the drift so as to have proved there were no old workings near, because if he had put the hole in the centre of the drift he would have gone much further beyond the distance, and then he would have proved nothing. Nor did he think flank holes would have answered in this case. He put the holes in the bottom of the drift to ascertain the extent of the coal and also to prove the water. If that was not in the strict letter of law he considered he was doing the thing in a much safer way. He put them in the direction of where he thought the water was. Considering the dry condition of the coal he thought there was no danger in sinking down from the last borehole. His experience and also that of the workmen, was that water passed very freely along the sole of the seam, and all his boreholes went down through the seam to the sole. If they had put in a 15 ft. borehole in the centre of the face it would have gone through solid coal and they would not have touched water.

The jury found that Hutchinson was accidentally drowned through an inrush of water.

Giltbrook.

An inquest has been held on the body of John Leebetter, who met his death in the New London Colliery.

Deceased's son said that his father was 60 years of age, and he was a ripper at the New London pit. He had frequently remarked that his work was dangerous. On one occasion he told witness that a prop came out and caused the wheel and rope to swing. It was a similar mishap that caused his death. There was no other pit in the district using a conveyor.

Frank Harris, a collier, said the coal was carried by conveyors along the place. It was about 2 ft 6 in. in height, and was lighted by lamps. Witness had worked there for two years, and there had been no serious mishap. The conveyor, explained witness, ran along the floor, drawn by a rope worked by an electric motor. He saw deceased at work inside the rope. He was hacking a prop from the roof for ripping purposes, and was about 2 yards from both the packing and the face. When between the rope and the packing, an anchor prop, retaining the wheel and the rope, came out and swayed across. It caught Leebetter, and dashed him against the packing. He was so badly injured that he died within a quarter of an hour. The rope also pulled two props down, but did not injure anyone else. It was made of steel. The deputy had frequently told them to keep on the face side of the rope, and the deceased was well aware of this injunction. Witness believed that the prop holding the wheel, a piece of round timber, broke near the bottom. It was fixed into the ground as well as the roof.

William Stirland, under-manager of the colliery, said he believed the cause of the accident was the trays becoming fast through weight in the roof. Witness was of the opinion that a steel prop would be of no advantage.

Mr. John White, the manager, said he had previously made an examination, and gave the signal to start himself. He thought the trays were capable of being moved, or he would not have given the signal. On account of the distance he could not see if every man was clear, though he had told them to keep clear. He considered wooden props preferable to steel. The timber that broke had been in use some time. In future, witness added, they were going to strengthen the props. He was going to put up written instructions to the men to keep out of danger. Witness had had experience of similar working in Lanarkshire, and did not consider it more dangerous than any other method.

The jury returned a verdict to the effect that deceased was accidentally killed by being crushed between the rope and the pack. They added that they were strongly of opinion that the work in which the deceased was engaged should only be done when the conveyor was not in motion.

THE BY-PRODUCTS TRADE.

Tar products.—Generally the tone is quiet, but prices as a whole are fairly well maintained. Pitch is quiet, and inclined to be easier. Benzols also are not quite so firm. Carbolics are steady at the recent reduction, and napthas are very firm. Creosote firm, and well held. Nearest values are:—

Benzols, 90's, 11d.; ditto 50's, 10d.; toluol, 11½d.; carbolic acid, crude (60 per cent.), 1s. 11d. to 2s.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 1s. 0½d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 3½d. for ordinary qualities; pitch, 45s. to 46s. f.o.b. east coast; ditto, 44s. 6d. to 46s. f.a.s. west coast.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—Quiet but steady, is about all that can be said concerning this market. There is really very little actual first-hand business passing; so buyers, having small needs at the moment, are trying to make the most of their indifference, and the slackness of the American market. The marked increase in Javan and Japanese requirements more than counteracts the effect of such effete tactics. Closing prompt quotations are:—

London (ordinary makes), £13 7s. 6d.; Beckton, £13 17s. 6d: Liverpool, £14 2s. 6d.; Hull, £14; Scotch ports, £14 2s. 6d. to £14 5s.; nitrate of soda (ordinary), 11s. 7½d. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

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At the time of writing, however, this difficulty had to a very great extent been got over, and some of the Greek boats had commenced loading. It has been a matter of surprise to merchants generally to find so many Greek vessels frequenting the port. Owing to the embargo temporarily placed on Greek steamers, and the stormy weather, no less than 4,000 men employed at the Cambrian collieries, Clydach Vale, had for a time to cease work. These stoppages very seriously affect the day wage men, inasmuch as, since the Minimum Wage Act came into force, they are only paid for the time actually worked. The chief event of the week has been the receipt of circulars from the British Admiralty asking colliery owners to submit tenders for supplies of coal for delivery over next year. What quantity of coal is required is not known, as the colliery companies are simply asked to state what supplies they are prepared to deliver, but the quantity usually contracted for is from 1,250,000 to 1,500,000 tons. The tenders went in towards the end of last week, but the result is not likely to be known for some days yet. There is, of course, a good deal of interest taken in the competition, and speculation is rife as to what prices have been sent in. Last year's contracts were arranged on the basis of slightly over 16s. net for best coals, but on the present occasion it is expected that the Admiralty will have to pay at least 1s. per ton more. It is very generally anticipated that coalowners will be more stiff in their attitude, from the fact that most of them are already well sold for delivery over next year. Current values of best steam coals are nominally 16s. 9d. to 17s. for early or prompt shipment, but for delivery next year from 17s. 6d. to 18s. is firmly quoted. The Russian Marine are in the market for, it is said, some 30,000 tons of best steam coals. Owing to the prohibitive tax of 7s. 10½d. which Russia imposes on coal imports in order to stimulate the sale of Donetz coal, cargoes for Russian ports in the Black Sea have been practically unknown for the last three or four years. Enquiries for Welsh coals, therefore, came as a surprise. One vessel has already been chartered for Odessa at 16s. 3d. for 550 delivery or 16s. 9d. for 350 delivery. Russia is not the only country taking exceptional quantities of Welsh coal. German shipments have recently been heavier than usual, while within the past month the agents of the Italian Government have chartered from 20 to 25 vessels. The scarcity of tonnage continues very seriously to affect the market, and buyers who are fortunate enough to have a boat ready to load are able to fulfil their requirements at a considerable reduction from the quoted figures. In some cases best coals have been sold at as low as 16s., superior seconds 15s. 9d., and ordinary seconds 15s. 6d. per ton. There is no question that the outputs at the collieries are much larger than anyone anticipated, and until the stocks of coal standing in wagons have been very considerably reduced, the prospect of any improvement in prices is somewhat remote. There is no active enquiry for coals for 1913 from any quarter at present, and the only contract business reported since last week is that of the Orient Steamship Company. Their requirements run to from 60,000 to 80,000 tons, and it is stated that Messrs. W. Cory and Sons Limited have again secured the contract, but at what price has not been disclosed. The small coal market keeps very firm, best bunkerings commanding from 10s. 9d. to 11s., best ordinaries 10s. to 10s. 6d., cargo qualities 9s. 3d. to 9s. 6d., with inferior kinds down to 8s. 6d. per ton. Washed nuts are round about 15s. and washed peas 13s. In house and other bituminous qualities there is very little change. Best households are 18s to 18s. 3d., seconds 17s. 3d. No. 3 Rhondda large is 16s. 6d to 17s., through-and-through 14s. 3d., and small 12s. No. 2 large is 12s. 3d. to 12s. 6d., through-and-through 10s. 6d. to 10s. 9d., and small 9s. 3d to 9s. 6d. per ton. The following table shows the principal exports for the month, as compared with the shipments in September of last year:—

	September. 1911. Tons.	September. 1912. Tons.
Russia	89 628	88,007
Sweden	9,888	27,128
Norway	10.126	12,411
Germany	17,999	21,945
Netherlands	12,994	13,682
Belgium	35,023	27,857
France	470,145	563 850
Algeria	39,865	39 381
Bourbon (Reunion)	5 721	4 308
Portugal	32 875	46,794
Madeira	8 032	21,506
Spain	70,847	75.201
Canary Islands	50,071	43 620
Italy	388.792	435,359
Austria-Hungary	14,049	29 548
Greece	12 519	21,729
Bulgaria	18 228	—
Roumania	27 642	44,740
Turkey (European)	20,128	15,540
„ (Asiatic)	9.419	16.761
Egypt	167,550	159.507
Tunis	8 250	10.260
Peru	248	6,456
Chili	37,065	30,684
Brazil	124,114	115,210
Uruguay	71,559	87,626
Argentine Republic	247,395	251,053
Channel Islands	4,440	6,885
Gibralter	20 905	19,124
Malta	31,069	29,824
Aden	15,743	10,907
British India	5,004	10,693
Straits Settlements	5,671	854
Ceylon	23,756	30 869
Wei-hai-Wei	—	6 080
Hong Kong	6,295	2 505
West Africa (French)	10,378	10 785
„ (Portuguese)	16 116	20,757
„ (British)	8,284	3,567

France showed an increase of 93.705 and Italy of 46,569 tons, whilst the following countries showed increases of between 10,000 and 20.000 tons, Sweden 17,210. Portugal 13,919, Madeira 13,474, Austria-Hungary 15,499, Roumania 17,098, and Urugany 16,007 tons. To Bulgaria, whither in September of last year there were shipped 18,228 tons, the return for last September was nil. In no other country was there a decrease of over 10,000 tons The *Cardiff Journal of Commerce* publishes a table giving the average declared price per ton of coal exported from the different ports of the country during the month of September. The following figures relate to the chief South Wales ports:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	16	1	14	9	15	4	14	9
Through-and-through	12	10	11	8	10	9	10	3
Small	9	1	10	2	7	6	8	6
Large anthracite	25	9	—		14	10	17	7
Household	16	10	—		15	6	—	

In September of last year the prices were:—

	Cardiff.		Newport.		Port Talbot.		Swansea	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	15	7	14	8	15	3	13	11
Through-and-through	10	6	11	1	9	11	10	0
Small	8	0	10	0	7	2	7	11
Large anthracite	—		—		12	11	16	8
Household	16	3	—		—		15	9

The quantity of coal shipped coastwise in September from the South Wales ports amounted to 329 281 tons, as against 393,959 tons in the corresponding month of last year, being a decrease of 64,678 tons. From Cardiff the shipments were 169,310 tons, of which Southampton took 41,610, London 34,810, Liverpool 30,302, and Bristol 16,765 tons. From Newport the shipments were 51,058, Swansea 36,457, Port Talbot 14,937, Briton Ferry 5,387, and Llanelly 7,071 tons. Shipments of patent fuel for the week were light, the Crown and other local companies despatching 10,385, and Swansea 5,680 tons. Prices continue steady on the basis of 18s. 6d. for best brands. The coke market keeps strong. Special foundry is 32s. to 33s., ordinary foundry 28s. to 30s., and furnace 21s. to 22s. per ton. Pitwood is 23s. per ton.

IRON

A fair amount of business continues to be done in the tin-plate market. Shipments for the week exceeded 119,000 boxes, and the receipts from works amounted to 125,528 boxes, leaving 6,520 boxes to be added to stocks, which now stand at 209 500 boxes. Prices are without much change, makers not being disposed to make any concessions so long as the cost of production continues to advance; 14 × 20 cokes are 15s. 6d. to 15s. 9d., oil sizes 3d. more. Fears are entertained in some quarters that the demand may be checked owing to the high prices at present ruling for the materials used in the manufacture of tin-plates; but with steel bars quoted at from £5 17s. 6d. to £6, or fully £1 more than was formerly paid, and block tin selling at £230 per ton, as against £161 in 1905, and £56 in 1895, manufacturers say it is impossible to produce plates at less prices than those now quoted. When the war is over in the Balkans, it is stated to be the intention of the St. Davids Tin-plate Company to put down six new mills. The strike of the girls employed at the Welsh Tin-plate and Metal Stamping Works, Llanelly, has been settled, the girls who were in arrear with their contributions to the Workers' Union having paid up The galvanised sheet market is rather quiet, but makers adhere very firmly to their prices, which for 24-gauge corrugateds are £13 to £13 5s. Great extensions are in contemplation at Port Talbot. A company has been formed, with a capital of about £500,000, for the erection of blastfurnaces, coke ovens, and by-product works on the site of the old Margam Copper Works, at the extreme corner of the Margam Float. In order to provide coal for the manufacture of the coke, two new pits are to be sunk at Bryndu, near Pyle. The Port Talbot Steelworks Company are also erecting three new smelting furnaces, new steel sheet and plate mills, and section mills. Industrial developments at Llanelly are proceeding apace, Messrs. Richard Thomas and Co. being about to erect additional steel furnaces at their South Wales works. Amicable arrangements have been made with the helpers at the sheet mills in the Swansea Valley, those who were working 12 hours being placed on eight-hour shifts, and those who were paid by the day on tonnage rates. There is no change in pig iron or iron ore.

Swansea.

COAL

Last week the returns of the port were fairly satisfactory, the coal trade was brisk, but the export of patent fuel was very limited. The shipments of coal and patent fuel amounted to 94,186 tons. There was a capital attendance on 'Change this morning, and the undertone of the anthracite coal market was from steady to firm. Swansea Valley large continued in excellent demand for immediate delivery, and for forward business sellers were quoting advanced prices. Red Vein large also continued a very strong market. Of the machine-made sizes, both French and German nuts were very scarce, with values harder. Beans and peas were very slow, whilst there was a slightly better demand for rubbly culm, but prices were not materially affected. Duff was very firm at last figures. In the steam coal department there was no material alteration, and this market closed weaker. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. 6d. to 25s. 6d. net; second quality ditto, 20s. 6d. to 22s. 6d. net; Big Vein large, 18s. to 19s. 3d., less 2½ per cent.; Red Vein large, 15s. 3d to 15s. 9d., less 2½ per cent.; machine-made cobbles, 21s. 6d. to 23s. 6d.; Paris nuts, 23s. 6d. to 26s. 9d.; French nuts, 23s. 6d. to 27s.; German nuts, 23s. 6d. to 26s. 6d.; beans, 21s. to 23s. 3d.; machine-made large peas, 12s. 6d. to 14s.; ditto fine peas, 11s. to 12s. 5d., all net; rubbly culm, 6s. 6d. to 6s. 9d., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 17s. 6d. to 18s. 3d.; seconds, 13s. 6d. to 14s. 6d.; bunkers, 10s. 6d. to 11s. 6d.; small, 9s. 6d. to 10s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. to 18s.; through-and-through, 14s 6d. to 15s. 6d.; small, 11s. 6d. to 13s.; No. 2 Rhondda large, 13s. 6d. to 14s. 6d.; through-and-through, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 6d., all less 2½ per cent Patent fuel, 17s. to 17s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

During last week there was a good demand for pig iron, and the yield compared favourably with similar periods of the month. The demand for steel bars was also very good, and the mills were fully operating. Briskness characterised the large sheet and galvanising industry, the whole of the mills in the district being at work. There was continued activity in the tin-plate trade, the demand being well maintained. Prices were hardening, owing to the increased cost of raw materials, and makers were refusing new business except at higher rates. The shipments of tin-plates last week were 119,007 boxes, receipts from works 125 528 boxes, and stocks in the dock warehouses and vans 209,500 boxes.

Llanelly.

COAL.

The position is not quite so satisfactory in the local market this week, and the demand for several kinds is not so strong. This is due to the boisterous weather of the past few days more than to any slackening off in demand, and it is expected that as soon as boats come along the position will again be firm. It is quite a new experience for the smaller machine kinds to be slow in moving, as for the past 12 months they have been bought up almost as soon as made. From present appearances there is no likelihood of the market becoming weak for many months to come; in fact, the prospects are that for the next 12 months there will be a very good demand for most kinds, and prices possibly be higher than they are to-day. For manufacturing fuels there is a very good enquiry, and many of the works would willingly book up their requirements over the next 12 months at higher figures if the collieries would only close. Prices are easier at the moment for spot lots to have wagons released. This week's quotations are:—Best malting large, 23s. to 25s.; second malting large, 21s. to 23s.; Big Vein large, 17s. to 19s.; Red Vein large, 14s. to 15s.; machine-made large cobbles, 22s. to 23s. 6d.; German nuts, Paris nuts, French nuts, 24s. 6d. to 25s. 6d.; machine-made beans, 23s to 23s. 6d.; machine-made peas, 13s. 6d. to 14s. 6d.; rubbly culm, 6s. to 7s.; duff, 4s. 6d. to 5s. 6d.; large steam, 16s. to 16s. 6d; through-and-through, 10s. 9d. to 11s; bituminous small, 10s. 9d. to 11s. 6d.; small steam, 9s. 6d. to 10s. 6d.—all f.o.b.

THE LONDON COAL TRADE.

THURSDAY, OCTOBER 31.

The London coal trade for the past week has been exceedingly quiet, the delivery trade is slow, and orders for house coal very feeble. The few days immediately preceding the turn of the month are invariably slack, as merchants do not care to purchase more than they are absolutely obliged to buy, because by waiting until the 1st of the month they have the extra month's credit But this does not altogether account for the steady decrease in the orders—the weather has been one of the principal features, and whilst it has remained so mild and open the actual consumption has been proportionately small. Manufacturing qualities continue in good demand, and all the better qualities of hard steam coal are selling freely; the common qualities are not in such good demand and stocks are somewhat increasing. The heaviest accumulations, however, are to be found amongst the household qualities. Slacks have to a certain extent recovered, and more attention has been devoted to them lately than was the case a few weeks ago. This may, however, arise from the diminished quantity available for the market, as the collieries have not been able to work such regular and full time as a month ago. Small nuts and peas have also been changing hands in very large quantities lately, and the demand continues good. One of the best known merchants on the London Exchange died during the week—Mr. Hylton W. Dale, of the firm of Messrs. Charrington, Sells, Dale and Co., aged 56. A large representative number from the Coal Exchange and also from the collieries attended at the funeral on Wednesday last at Kensal Green Cemetery. The return of the milder weather has led to some very quiet markets during the last few days, and the conditions of trade have been exceedingly small—in fact, during some of the later market days the factors and merchants have been the principal sellers, for in their anxiety to avoid siding rent and demurrage charges they have frequently undersold the collieries in their current prices. In the seaborne market there has been very little demand for house coal, but no cargoes are pressing for sale, and whilst the boom in all classes of house coal and smalls continues so firm in the north of England, the quoted prices are firmly maintained; 21s. 6d. is still the market price for best Durham Wallsend and 20s. 6d. for seconds. Sharlston Wallsend (Yorkshire) is also quoted at 21s. 6d. On Monday's market 30 cargoes were reported to have arrived in the River Thames, and on Wednesday 15, all of which were sold. In one respect the present diminution in the demand owing to dull trade is not without its compensating item, for few collieries are at present able to work full time, on account of the shortage in the wagon supply—the stoppages at many of the collieries are so important as to draw particular attention to the matter. The iron trade continues to be unusually busy, and in many cases orders are booked as far forward as October of next year. In the coke market prices continue very firm, and there is a good demand for both qualities, gas and foundry coke. Prices of all qualities, both household and manufacturing fuel, are steadily maintained, but the accumulations are making themselves felt on all sides. The public orders are all within a very narrow compass and stocks at the various wharves and depots are rapidly accumulating. November, however, usually presents a very firm front for all kinds of household fuel, and it is anticipated that the present depression will in all probability pass away with the turn of the month.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, October 25.—The seaborne house coal market was rather quiet to-day, with no cargoes of either Durham or Yorkshire on offer. Best (Durham) 21s. 6d., seconds ditto 20s. 6d, Sharlston (W E Yorks) 21s. 6d. Cargoes 15.

Monday, October 28—The seaborne house coal market was again quiet to-day, no cargoes pressing for sale. Best (Durham) 21s. 6d., seconds ditto 20s. 6d., Sharlston (W.E. Yorks) 21s 6d. Cargoes 40.

Wednesday, October 30—The mildness of the weather and small attendance caused a quiet market, and no business done Best (Durham) 21s. 6d., seconds ditto 20s. 6d., Sharlston (W.E. York) 21s. 6d. Cargoes 15.

the collieries have experienced great difficulty in providing full work for their workpeople. In numerous instances stoppages have taken place, whilst the commandeering of steamers by the Greek consul has also been an adverse factor, as a large number of boats in dock were prevented from being loaded. At the time of writing, however, this difficulty had to a very great extent been got over, and some of the Greek boats had commenced loading. It has been a matter of surprise to merchants generally to find so many Greek vessels frequenting the port. Owing to the embargo temporarily placed on Greek steamers, and the stormy weather, no less than 4,000 men employed at the Cambrian collieries, Clydach Vale, had for a time to cease work. These stoppages very seriously affect the day wage men, inasmuch as, since the Minimum Wage Act came into force, they are only paid for the time actually worked. The chief event of the week has been the receipt of circulars from the British Admiralty asking colliery owners to submit tenders for supplies of coal for delivery over next year. What quantity of coal is required is not known, as the colliery companies are simply asked to state what supplies they are prepared to deliver, but the quantity usually contracted for is from 1,250,000 to 1,500,000 tons. The tenders went in towards the end of last week, but the result is not likely to be known for some days yet. There is, of course, a good deal of interest taken in the competition, and speculation is rife as to what prices have been sent in. Last year's contracts were arranged on the basis of slightly over 16s. net for best coals, but on the present occasion it is expected that the Admiralty will have to pay at least 1s. per ton more. It is very generally anticipated that coalowners will be more stiff in their attitude, from the fact that most of them are already well sold for delivery over next year. Current values of best steam coals are nominally 16s. 9d. to 17s. for early or prompt shipment, but for delivery next year from 17s. 6d. to 18s. is firmly quoted. The Russian Marine are in the market for, it is said, some 30,000 tons of best steam coals. Owing to the prohibitive tax of 7s. 10½d. which Russia imposes on coal imports in order to stimulate the sale of Donetz coal, cargoes for Russian ports in the Black Sea have been practically unknown for the last three or four years. Enquiries for Welsh coals, therefore, came as a surprise. One vessel has already been chartered for Odessa at 16s. 3d. for 550 delivery or 16s. 9d. for 350 delivery. Russia is not the only country taking exceptional quantities of Welsh coal. German shipments have recently been heavier than usual, while within the past month the agents of the Italian Government have chartered from 20 to 25 vessels. The scarcity of tonnage continues very seriously to affect the market, and buyers who are fortunate enough to have a boat ready to load are able to fulfil their requirements at a considerable reduction from the quoted figures. In some cases best coals have been sold at as low as 16s., superior seconds 15s. 9d., and ordinary seconds 15s. 6d. per ton. There is no question that the outputs at the collieries are much larger than anyone anticipated, and until the stocks of coal standing in wagons have been very considerably reduced, the prospect of any improvement in prices is somewhat remote. There is no active enquiry for coals for 1913 from any quarter at present, and the only contract business reported since last week is that of the Orient Steamship Company. Their requirements run to from 60,000 to 80,000 tons, and it is stated that Messrs. W. Cory and Sons Limited have again secured the contract, but at what price has not been disclosed. The small coal market keeps very firm, best bunkerings commanding from 10s. 9d. to 11s., best ordinaries 10s. to 10s. 6d., cargo qualities 9s. 3d. to 9s. 6d., with inferior kinds down to 8s. 6d. per ton. Washed nuts are round about 15s. and washed peas 13s. In house and other bituminous qualities there is very little change. Best households are 18s. to 18s. 3d., seconds 17s. 3d. No. 3 Rhondda large is 16s. 6d. to 17s., through-and-through 14s. 3d., and small 12s. No. 2 large is 12s. 3d. to 12s. 6d., through-and-through 10s. 6d. to 10s. 9d., and small 9s. 3d. to 9s. 6d. per ton. The following table shows the principal exports for the month, as compared with the shipments in September of last year:—

	September. 1911. Tons.		September. 1912. Tons.
Russia	69 628	...	88,007
Sweden	9,886	...	27,126
Norway	10.126	...	12.411
Germany	17,999	...	21,945
Netherlands	12,994	...	13,682
Belgium	35,023	...	27,857
France	470,145	...	563 850
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Bourbon (Reunion)	5 721	...	4 308
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Canary Islands	50,071	...	43 620
Italy	388.792	...	435,359
Austria-Hungary	14.049	...	29 548
Greece	12 519	...	21,729
Bulgaria	18 228	...	—
Roumania	27 642	...	44,740
Turkey (European)	20,128	...	15,540
„ (Asiatic)	9.419	...	16.761
Egypt	167.650	...	159.507
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	Cardiff. s.	d.		Newport. s.	d.		Port Talbot. s.	d.		Swansea. s.	d.
Large steam	16	1	...	14	9	...	15	4	...	14	9
Through-and-through	12	10	...	11	8	...	10	9	...	10	3
Small	9	1	...	10	2	...	7	6	...	8	6
Large anthracite	25	9	...	—		...	14	10	...	17	7
Household	16	10	...	—		...	15	6	...	—	

In September of last year the prices were:—

	Cardiff. s.	d.		Newport. s.	d.		Port Talbot. s.	d.		Swansea s.	d.
Large steam	15	7	...	14	8	...	15	3	...	13	11
Through-and-through	10	6	...	11	1	...	9	11	...	10	0
Small	8	0	...	10	0	...	7	2	...	7	11
Large anthracite	—		...	—		...	12	11	...	16	8
Household	10	3	...	—		...	—		...	15	9

The quantity of coal shipped coastwise in September from the South Wales ports amounted to 329 281 tons, as against 393.959 tons in the corresponding month of last year, being a decrease of 64,978 tons. From Cardiff the shipments were 169,310 tons, of which Southampton took 41,610, London 34,810, Liverpool 30,302, and Bristol 16,765 tons. From Newport the shipments were 91,068, Swansea 36,457, Port Talbot 14,937, Briton Ferry 5,387, and Llanelly 7.071 tons. Shipments of patent fuel for the week were light, the Crown and other local companies despatching 10,385, and Swansea 5,680 tons. Prices continue steady on the basis of 16s. 6d. for best brands. The coke market keeps strong. Special foundry is 32s. to 33s., ordinary foundry 28s. to 30s., and furnace 21s. to 22s. per ton. Pitwood is 23s. per ton.

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Last week the returns of the port were fairly satisfactory, the coal trade was brisk, but the export of patent fuel was very limited. The shipments of coal and patent fuel amounted to 94,186 tons. There was a capital attendance on 'Change this morning, and the undertone of the anthracite coal market was from steady to firm. Swansea Valley large continued in excellent demand for immediate delivery, and for forward business sellers were quoting advanced prices. Red Vein large also continued a very strong market. Of the machine-made sizes, both French and German nuts were very scarce, with values harder. Beans and peas were very slow, whilst there was a slightly better demand for rubbly culm, but prices were not materially affected. Duff was very firm at last figures. In the steam coal department there was no material alteration, and this market closed weaker. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. 6d. to 25s. 6d. net; second quality ditto, 20s. 6d. to 22s. 6d. net; Big Vein large, 18s. to 19s. 3d., less 2½ per cent.; Red Vein large, 15s. 3d. to 15s. 9d., less 2½ per cent.; machine-made cobbles, 21s. 6d. to 23s. 6d.; Paris nuts, 23s. 6d. to 26s. 9d.; French nuts, 23s. 6d. to 27s.; German nuts, 23s. 6d. to 26s. 6d.; beans, 21s. to 23s. 3d.; machine-made large peas, 12s. 6d. to 14s.; ditto fine peas, 11s. to 12s. 6d., all net; rubbly culm, 6s. 6d. to 6s. 9d., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 17s. 6d. to 18s. 3d.; seconds, 13s. 6d. to 14s. 6d.; bunkers, 10s. 6d. to 11s. 6d.; small, 9s. 6d. to 10s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. to 18s.; through-and-through, 14s. 6d. to 15s. 6d.; small, 11s. 6d. to 13s.; No. 2 Rhondda large, 13s. 6d. to 14s. 6d.; through-and-through, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 6d., all less 2½ per cent Patent fuel, 17s. to 17s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

During last week there was a good demand for pig iron, and the yield compared favourably with similar periods of the month. The demand for steel bars was also very good, and the mills were fully operating. Briskness characterised the large sheet and galvanising industry, the whole of the mills in the district being at work. There was continued activity in the tin-plate trade, the demand being well maintained. Prices were hardening, owing to the increased cost of raw materials, and makers were refusing new business except at higher rates. The shipments of tin-plates last week were 119,007 boxes, receipts from works 125 528 boxes, and stocks in the dock warehouses and vans 209,500 boxes.

Llanelly.

COAL.

The position is not quite so satisfactory in the local market this week, and the demand for several kinds is not so strong. This is due to the boisterous weather of the past few days more than to any slackening off in demand, and it is expected that as soon as boats come along the position will again be firm. It is quite a new experience for the smaller machine kinds to be slow in moving, as for the past 12 months they have been bought up almost as soon as made. From present appearances there is no likelihood of the market becoming weak for many months to come; in fact, the prospects are that for the next 12 months there will be a very good demand for most kinds, and prices possibly be higher than they are to-day. For manufacturing fuels there is a very good enquiry, and many of the works would willingly book up their requirements over the next 12 months at higher figures if the collieries would only close. Prices are easier at the moment for spot lots to have wagons released. This week's quotations are:—Best malting large, 23s. to 25s.; second malting large, 21s. to 23s; Big Vein large, 17s. to 19s.; Red Vein large, 14s. to 15s.; machine-made large cobbles, 22s. to 23s. 9d.; German nuts, Paris nuts, French nuts, 24s. 6d. to 25s. 6d.; machine-made beans, 23s to 23s. 6d.; machine-made peas, 13s. 6d. to 14s. 6d.; rubbly culm, 6s. to 7s.; duff, 4s. 6d. to 5s. 9d.; large steam, 16s. to 16s. 6d; through-and-through, 10s. 9d. to 11s; bituminous small, 10s. 9d. to 11s. 9d.; small steam, 9s. 6d. to 10s. 6d.—all f.o.b.

THE LONDON COAL TRADE.

Thursday, October 31.

The London coal trade for the past week has been exceedingly quiet, the delivery trade is slow, and orders for house coal very feeble. The few days immediately preceding the turn of the month are invariably slack, as merchants do not care to purchase more than they are absolutely obliged to buy, because by waiting until the 1st of the month they have the extra month's credit But this does not altogether account for the steady decrease in the orders—the weather has been one of the principal features, and whilst it has remained so mild and open the actual consumption has been proportionately small. Manufacturing qualities continue in good demand, and all the better qualities of hard steam coal are selling freely; the common qualities are not in such good demand and stocks are somewhat increasing. The heaviest accumulations, however, are to be found amongst the household qualities. Slacks have to a certain extent recovered, and more attention has been devoted to them lately than was the case a few weeks ago. This may, however, arise from the diminished quantity available for the market, as the collieries have not been able to work such regular and full time as a month ago. Small nuts and peas have also been changing hands in very large quantities lately, and the demand continues good. One of the best known merchants on the London Exchange died during the week—Mr. Hylton W. Dale, of the firm of Messrs. Charrington, Sells, Dale and Co., aged 56. A large representative number from the Coal Exchange and also from the collieries attended at the funeral on Wednesday last at Kensal Green Cemetery. The return of the milder weather has led to some very quiet markets during the last few days, and the conditions of trade have been exceedingly small—in fact, during some of the later market days the factors and merchants have been the principal sellers, for in their anxiety to avoid siding rent and demurrage charges they have frequently undersold the collieries in their current prices. In the seaborne market there has been very little demand for house coal, but no cargoes are pressing for sale, and whilst the boom in all classes of house coal and smalls continues so firm in the north of England, the quoted prices are firmly maintained; 21s 6d. is still the market price for best Durham Wallsend and 20s. 6d. for seconds. Sharlston Wallsend (Yorkshire) is also quoted at 21s. 9d. On Monday's market 30 cargoes were reported to have arrived in the River Thames, and on Wednesday 15, all of which were sold. In one respect the present diminution in the demand owing to dull trade is not without its compensating item, for few collieries are at present able to work full time, on account of the shortage in the wagon supply—the stoppages at many of the collieries are so important as to draw particular attention to the matter. The iron trade continues to be unusually busy, and in many cases orders are booked as far forward as October of next year. In the coke market prices continue very firm, and there is a good demand for both qualities, gas and foundry coke. Prices of all qualities, both household and manufacturing fuel, are steadily maintained, but the accumulations are making themselves felt on all sides. The public orders are all within a very narrow compass and stocks at the various wharves and depots are rapidly accumulating. November, however, usually presents a very firm front for all kinds of household fuel, and it is anticipated that the present depression will in all probability pass away with the turn of the month.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, October 25.—The seaborne house coal market was rather quiet to-day, with no cargoes of either Durham or Yorkshire on offer. Best (Durham) 21s. 6d., seconds ditto 20s. 6d, Sharlston (W E Yorks) 21s 6d. Cargoes 15.

Monday, October 28 —The seaborne house coal market was again quiet to-day, no cargoes pressing for sale. Best (Durham) 21s 6d., seconds ditto 20s. 6d., Sharlston (W.E. Yorks) 21s 6d. Cargoes 40.

Wednesday, October 30 —The mildness of the weather and small attendance caused a quiet market, and no business done Best (Durham) 21s. 6d., seconds ditto 20s. 6d., Sharlston (W.E. York) 21s, 6d. Cargoes 15.

— PROGRESS. —

Hydraulic Packing in the German State Mines.

The *Zeitschrift fur das Berg- Hutten- und Salinenwesen* (No. 3, 1911) contains an interesting account of the extension of hydraulic packing in the State mines in Saarbrücken. The bulk of the facts are condensed in the table reproduced below. The system was first employed in 1903 in the Sulzbach and Altenwald Collieries, and is now used in 11 pits, the capital involved being calculated at £700,000, and the total length of tubing at 42,000 yards. In 1910, 736,000 tons of coal were extracted with hydraulic stowage, and the quantity of material stowed was 577,900 cubic yards.

The water usually comes from the pit pumps, which is stored in large reservoirs so as to ensure continuity of supply. At the Velsen Colliery, for example, there are two reservoirs. The pressure is an important factor in economising water consumption; thus at the König Colliery the consumption has been considerably reduced by increasing the pressure from 2½ to 10 atmospheres. The proportion of materials and water varies from 1:0·8 to 1:6. The consumption of water increases with the size of the particles, the specific gravity, and the content of clay. It also varies with the distance it has to be transported below ground.

An average figure of cost is about 2 marks per cubic metre of material. At Ensdorf the cost for 624 cubic metres was 1·62 marks per cubic metre; at Dudweiler, 0·71 mark for 33,300 cubic metres; Velsen, 1·90 marks for 74,166 cubic metres; at Louisenthal, 2·52 marks per ton of coal extracted.

Speaking generally, the system has led to economy in the cost of upkeep and a decrease in the cost of timbering; but in pits where, as at Altenwald and Reden, the strata are of a friable nature, the use of water has increased the cost of maintenance. Hydraulic packing tends to increase the output of the workmen and to improve the product from the point of view of size. An advantage which it affords is the ability to get thick seams at one working. Accidents from falls of stone and coal have been generally lessened, and it affords complete security against gob fires. Further, by its means the subsidence of the surface is rendered more gradual.

Name of colliery.	Year of introduction.	Purpose.	Percentage of output raised in 1910 with hydraulic stowage.	Materials used.	Quantity stowed. (Cubic yards.) 1910.	Quantity stowed. (Cubic yards.) Per hour.	Size of particles.	Proportion of water used.	Conduits. Diameter.	Conduits. Material.	Total length.
							In.		In.		Yards.
Ensdorf	1909	Security against fires	0·4	Sand	1,308	26 to 32	2·36	6	7·35 and 5·9	Steel and steel with porcelain lining	1,619
Viktoria Louisenthal	1909	Workings under village of Püttlingen	—	Waste and boiler cinders	1,308	105	2·36	3·5 to 1	7·87 to 6·92	Cast iron	2,570
Louisenthal (internal installation)	1908	Shortage of waste	30	Washery refuse	60,168	54	1·96	1·5 to 3	5·9	Cast and wrought iron	940
Dudweiler No. 1	1907	Protection of the surface	4·2	Ditto	43,556	52	1·18	1·5	Do.	Wrought iron and steel	1,915
Ditto No. 2	1907	Ditto				Do.	Do.	1 to 1·5	Do.	Ditto	872
Mellings pit, Sulzbach	1904	Ditto	33	Ditto	70,950	105 to 130	3·14	1·1 to 1·5	Do.	Cast iron	5,141
Lochweiss pit, ditto	1905	Working of shaft pillar				Do.	2·95	1·05 to 1·36	Do.	Steel	
Moorbach pit, Altenwald	1903	Protection of surface	29	Sand and material from blasting	17,527	143 to 156	Do.	1·4	Do.	Cast iron & steel	4,301
Eisenbahn pit, ditto	1906	Ditto		Washery refuse & broken waste	56,244	Do.	Do.	0·8	Do.	Ditto	5,787
Gegenort pit, ditto	1903	Ditto		Ditto	23,594	Do.	Do.	0·95	Do.	Ditto	1,127
Feuerofen pit, ditto	1910	Ditto		Sand and material from blasting	3,5[illegible]7	Do	Do.	1·5	Do.	Ditto	1,597
Heinitz	1904	Protection of pillar for coke ovens and central gas station	2	Washery refuse	11,772	40	1·57	1·5 to 2	5·51	Cast iron	765
Dechen	1908	Pillars of protection for coke ovens	2	Boiler cinders & screened waste	9,810	40	1·18	2	6·29 in shafts, 5·78 in mine	Cast iron & steel	765
Welerbachtal	1911	Security against fires	—	Old washery refuse	—		1·57	Do.	Do.	Ditto	
König Colliery (Heusuerweiher)	1908	Pillars of protection for Neunkirchen and the Stumm works	24	Sand	129,034	105	1·77	1 to 2	4·92	Drawn iron	5,822
König Colliery (Wilhelm I.)	1905	Ditto		Washery refuse and slag		80 to 130	1·57	1·5 to 2	6·29	Cast iron	
Ditto (Wilhelm II.)	1905	Ditto		Ditto		Do.	Do.	Do.	Do.	Drawn iron and iron with porcelain or wood lining	
Helene Colliery, Friedrichsthal	1909	Working of shaft pillar	7	Sand	9,496	27	2·36	1·5	5·9	Steel & steel with porcelain lining	2,188
Velsen Collery, (Gustave pit)	1905	Shortage of waste: protection against firedamp and danger from coal-dust	55	Ditto	18,312	94	Do.	1·47	7·35	Drawn iron and steel	5,588
Ditto (East pit)	1908	Ditto		Ditto	97,109	70	Do.	1·33	5·9	Ditto	

Subsidence due to Coalmining.

The *Annales des Mines de Belgique* contains an elaborate memoir by M. Léon Thiriart, the manager of the Patience and Beaujonc Collieries, in which he discusses various questions connected with the subsidence of the surface above mining properties. Amongst other conclusions to which he comes, are the following, viz.:—(1) That mine workings make their influence felt about one year after their passage under a building; (2) the duration of the influence is very variable, but in the majority of cases it is confined to three years. The main purpose of the memoir is to complete the theory of the "law of the tangent" by seeking theoretically the trace of the "line of secondary fracture" or "draw" of which M. Hause speaks in his publications. The author gives the following tables showing the angle which the "draw" makes with the horizontal, according to different authorities:—

Angle of dip.	Rule of M. Hause. First hypothesis.	Rule of M. Hause. Second hypothesis.	Rule of the completed tangent.	German rule. First hypothesis.	German rule. Second hypothesis.	Jicinski's rule	English rule.
Draw to Rise.							
0	70	70	70	75	70	90	81¼
10	65	67	67⅓	75	70	85	73¾
20	60¾	64½	65¼	70	70	80	66¾
30	56	62	63	60	60	75	64
40	52¾	60¾	61¼	55	55	70	64
50	50¾	60¾	60¼	55	55	70	64
60	51	61	60½	55	55	75	64
70	54	61	62	55	55	80	64
80	61½	65½	65¾	55	55	85	64
90	70	70	70	55	55	90	64
Draw to Deep.							
0	70	70	70	75	70	90	81¼
10	75	77	72½	75	70	85	83¾
20	79¾	83¾	74¾	75	70	80	88½
30	84	90	77	75	70	75	90
40	87½	95¼	78¾	75	70	70	90
50	89¼	99½	79¾	75	70	70	90
60	89	99	79¼	75	70	75	90
70	86	93	78	75	70	80	90
80	78½	82½	74¾	75	70	85	90
90	70	70	70	75	70	90	90

Rare Gases in Firedamp.

In a note presented to the Académie des Sciences by MM. Moureu and Lepape, the authors observe that they had formerly established the ratio in volume of krypton to argon, of xenon to argon, of xenon to krypton, and of argon to nitrogen in a large number of gases derived spontaneously from hot springs and in volcanic gas. The results obtained showed a constancy in the ratios, and the mean respective values were very similar—slightly higher than those obtained from air. They have now included firedamp in their investigation. For this purpose the argon-nitrogen ratio has been calculated in the samples tested, and, by the application of the authors' spectro-photometric method of ascertaining the proportions of krypton and xenon, they have been able to calculate approximately the krypton-argon, xenon-argon, and xenon-krypton ratios. They have also determined the values of the same ratios in a sample of crude argon. In the following tables are indicated the respective values, in bulk, of the various ratios, the value of the same ratio in atmospheric air being taken as a unit:—

Firedamp taken from	Firedamp. $\frac{Ar}{N}$ / Air. $\frac{Ar}{N}$	Firedamp. $\frac{Kr}{Ar}$ / Air. $\frac{Kr}{Ar}$	Firedamp. $\frac{Xe}{Ar}$ / Air. $\frac{Xe}{Ar}$	Firedamp. $\frac{Xe}{Kr}$ / Air. $\frac{Xe}{Kr}$
Liévin	1·38	1·4	1·2	0·9
Anzin	0·97	1·0	1·1	1·1
Lens	1·72	0·5	0·3	0·7
Mons	0·82	1·3	2·1	1·6
Frankenholz	0·85	1·1	1·2	1·1
Argon samples	—	1·0	1·0	1·0

It will be seen that the numbers are generally close to one another and relatively vary but slightly from the unit. Further, all (with the exception of three ratios obtained from the Lens gas) are comprised within the extreme limits established in the case of the preceding investigation with natural gaseous mixtures. The authors consequently consider that it may be affirmed that the law of constancy in the ratios of inert gases in natural gaseous mixtures extends to firedamp. M. Schlœsing had already observed that the ratio of crude argon to nitrogen in firedamp varies between narrow limits, and is sometimes very near the value which it presents in the air.

The next table shows the percentage composition of the firedamps referred to above:—

	CO_2.	Combustible gases.	Nitrogen.	Rare gases. Total.	Rare gases. Helium and trace of neon.	Rare gases. Argon and traces of Kr. and Xe
Liévin	0·5	97·03	2·41	0·053	0·013	0·04
Anzin	0·16	97·92	1·854	0·065	0·044	0·021
Lens	*Nil*	98·15	1·81	0·037	0·0003	0·0367
Mons	Traces	99·60	0·317	0·053	0·050	0·003
Frankenholz	2·80	95·09	2·06	0·048	0·027	0·021

The absence of oxygen is explained as being due to care in sampling.

To explain the fact that the values of the ratios in the case of firedamp have been found to be lower than the average values of the corresponding ratios in gases from hot springs, the authors suggest that, in the formation of firedamp in coal, the crude nitrogen (*i.e.*, nitrogen + the rare gases) may undergo a selective absorption on the part of the coal, which has the effect of lowering, more or less, the value of the relative proportions of the rare heavy gases.

In regard to helium—which, in common with the other rare gases, is always to be found in the crude nitrogen

GRESS. —

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It will be seen that the numbers are generally close to one another and relatively vary but slightly from the unit. Further, all (with the exception of three ratios obtained from the Lens gas) are comprised within the extreme limits established in the case of the preceding investigation with natural gaseous mixtures. The authors consequently consider that it may be affirmed that the law of constancy in the ratios of inert gases in natural gaseous mixtures extends to firedamp. M. Schlœsing had already observed that the ratio of crude argon to nitrogen in firedamp varies between narrow limits, and is sometimes very near the value which it presents in the air.

The next table shows the percentage composition of the firedamps referred to above:—

	CO_2.	Combustible gases.	Nitrogen.	Rare gases. Total.	Rare gases. Helium and trace of neon	Rare gases. Argon and traces of Kr. and Xe
Liévin	0·5	97·03	2·41	0·053	0·013	0·04
Anzin	0·16	97·92	1·854	0·065	0·014	0·021
Lens	*Nil*	98·15	1·81	0·037	0·0003	0·0367
Mons	Traces	99·60	0·317	0·053	0·050	0·003
Frankenholz	2·80	95·09	2·06	0·048	0·027	0·021

The absence of oxygen is explained as being due to care in sampling.

To explain the fact that the values of the ratios in the case of firedamp have been found to be lower than the average values of the corresponding ratios in gases from hot springs, the authors suggest that, in the formation of firedamp in coal, the crude nitrogen (*i.e.*, nitrogen + the rare gases) may undergo a selective absorption on the part of the coal, which has the effect of lowering, more or less, the value of the relative proportions of the rare heavy gases.

In regard to helium—which, in common with the other rare gases, is always to be found in the crude nitrogen satisfactory results, and has been proved to stand the worst that a steel-blasting furnace can do. It is claimed that the manufacture of this peat can be worked on a paying commercial basis, and that many valuable by-products will be yielded in the process of manufacture. It is the bottom or black layers of peat which are used, and there is an unlimited supply in the district. A company has been formed to work the patent.

A national mine rescue and first aid conference was held at Pittsburg on September 23, when some important questions were discussed. Despite the opinion of the American Medical Association, who favour the Schafer system, the doctors present at the conference declared in favour of the Sylvester system of resuscitation. The conference has been made a permanent organisation.

The Fife Coal Company Limited have just placed an order with the Fife Motor Company, of Dunfermline, for an Albion 32-horse power motor rescue wagon. The vehicle, which will be the first of its kind in Scotland, will have accommodation for eleven men, including the driver, and will also carry ten sets of rescue apparatus, four smoke helmets, oxygen cylinders, ambulance boxes, and other first-aid apparatus for use in connection with accidents in the mines.

It is stated that a Wigan firm has just taken over the Freystrop Colliery, Pembrokeshire, which was closed down five or six years ago, and they have also acquired the whole of the mineral rights from Johnston to Nolton Haven, a distance of eight or nine miles. A high-class anthracite is produced at the colliery. At the present time the firm is engaged in acquiring the concessions of the Milford Docks Company. Extensive developments are contemplated, and in four or five years the new venture will find employment for between two and three thousand men.

In connection with the rumour of a scheme for establishing armour plate works in South Durham, it is stated that the promoters of a new industry have obtained options at West Hartlepool in respect of certain sites in the immediate neighbourhood of the town, in respect of a supply of molten metal from the West Hartlepool Steelworks, and in respect also of the supply of electrical energy from the Corporation.

Mr. G. F. Findlay, manager of the Broughton and Plas Power Colliery, and Mr. Edward Hughes, J.P., agent to the North Wales Miners' Federation, have been elected as members of the Advisory Committee in connection with the National Insurance Act.

The Denbighshire Education Authority are offering every facility to the young men of the locality to study mining. In practically every village near a colliery mining classes have been commenced in connection with the evening classes. High qualified teachers have been engaged, who are managers of the different collieries, and who have a thorough theoretical and practical knowledge of the subjects taught. In connection with the recent examination held at Wrexham, at the Science and Art Schools, for firemen, under the Coal Mines Act, which was conducted by Mr. H. Harris, Brynmally Colliery, and Mr. Carrington Jones, Broughton and Plas Power Colliery, there were firemen from practically every colliery in the North Wales area, and the total number of passes was 75. There has been a subsequent examination held, the result of which is not known as yet.

Mr. T. W. Robson, late under-manager at Swalwell and Garesfield Collieries for three years, has been appointed under-manager for the Plenmeller Collieries Limited, Haltwhistle.

Boring operations are being continued in connection with the Douglas coalfield of the Wilsons and Clyde Coal Company. It is anticipated by this prosperous Glasgow concern that before very long a new colliery will be established on that coalfield with an equipment of the most modern plant capable of a large output. This company has just declared substantial dividends for the past year's working.

Mr. Henry Briggs, of the Heriot-Watt College, Edinburgh, has been awarded the Hepburn prize and medal by the Royal Scottish Society of Arts for a communication on his invention of the loop device for detecting gases in mines. We understand that this is the largest award the society has made this year.

At a meeting held at the North Stafford Hotel, Stoke, on Monday evening, under the presidency of Mr. G. H. Winstanley, it was decided to form a branch of the National Association of Colliery Managers for North Staffordshire. Mr. A. M. Henshaw was elected as president of the branch, Messrs. G. P. Hyslop and J. R. L. Allott as vice-presidents, Mr. E. P. Turner as secretary and treasurer, and the following as members of the council:—Messrs. W. Barber, F. E. Buckley, P. Edwards, C. Johnson, N. R. H. MacGowan, R. C. MacGowan, W. G. Peasegood, and W. G. Salt.

We are asked to state that in response to the wish of the late Mr. Charles D. Phillips, J.P., whose death we announced last week, the large business, which he founded and carried on so successfully for over 40 years, will be continued in the same manner after his death. All the necessary arrangements have been made, and the business will continue under the joint management of his eldest son, Mr. C. Godfrey Phillips, and of Mr. T. Morris Prosser (who has been with him for over 30 years).

COAL, IRON AND ENGINEERING COMPANIES.

Advisory Engineers' Corporation Limited.—This private company has been registered, with a capital of £6,000 in £1 shares, to carry on business as consulting, mechanical electrical and general engineers, &c. First directors: W. T. Pressland (chairman) and C. Lakin-Smith (managing director). Qualification, 300 shares. Registered office, 11, Tothill-street, Westminster, S.W.

Collieries Improvements Limited.—This private company has been registered, with a capital of £1,625 in 5s. shares, to carry on the business of manufacturers of and dealers in pit props, mine galleries, rails and clips for narrow-gauge railways, trams, trucks, drills, picks, shovels, hammers and wedges, electrical and general engineers, &c. The subscribers are:—Mr. C. C F. Walton, Whitehaven, and Mr. C. H. Clough, Guiseley, near Leeds.

Dixon, Scott and Co. Limited.—This private company has been registered, with a capital of £5,000 in £1 shares (2,000 cumulative 5 per cent. preference), to take over the business of engineers carried on by H. H. Portway, of Halstead, Essex, and 32, King-street, Sudbury, as Portway and Co. First directors: R. H Dixon and W. Scott (both permanent), and A. Walters, jun. Qualification, £25.

Ensien Syndicate Limited—This private company has been registered, with a capital of £30,000 in £1 shares, to carry on the business of engineers, metal merchants, colliery proprietors, &c., to acquire any mines, mining claims and metalliferous land in any part of the world, and to adopt an agreement with A. E. Roberts. First directors: A. E. Roberts, Hollin House, Tunbridge Wells, A. Methuen, care of Lloyds, E.C, and F. H. Lee. Qualification, 50 shares. Remuneration, £50 each per annum. Registered office, Bush-lane House, Cannon-street, E C.

Henllys Anthracite Collieries (1912) Limited.—This private company has been registered, with a capital of £15,000 in £1 shares, to carry on the business of colliery proprietors, mineowners, coal merchants, &c., to acquire the colliery and lands held therewith known as the Henllys Colliery, Quarter Bach, Carmarthen, and certain easements and rights relating thereto, and to adopt agreements (1) between Henllys Collieries Company Limited, the Metropolitan Bank (of England and Wales) Limited, J. P. Jacob, F. E. Jacob, J. C. Napier and W. H. Thomas, (2) with J. C. Napier, and (3) with J. P. Jacob Qualification of first directors, who are not named, 500 shares.

Horden Collieries Limited.—A further dividend of 6 per cent. is announced, making 8 per cent. for the year ended September 30.

Hurst, Nelson and Co. Limited.—The accounts for the year to July 13 show a gross profit of £32,543, after deducting directors' fees and all other charges. From this amount £11,942 is deducted for depreciation on works, machinery and plant, and £4,269 for interest and income-tax, leaving £16,332. The balance at the debit of profit and loss—namely, £3,611 brought forward—has been wiped out, and also £1,026, the amount paid in dividend on the preference shares in excess of profits available for division at May 15, 1911. A dividend at the rate of 6 per cent. per annum on the preference shares for the half-year to November 11, 1911, is to be paid, absorbing £5,650, and a similar amount is reserved to provide for payment of a half-year's dividend on May 15 next, a credit balance of £395 being carried forward

Kirk and Randall Limited.—This private company has been registered, with a capital of £50,000 in £1 shares, to take over the business of constructional and steelworks engineers, &c., carried on by J. Randall and L. C. Randall at Warren-lane, Woolwich. First directors include L. C. Randall (permanent) and J. Randall.

Lancashire Wagon Company Limited.—The directors' report shows that the balance at the credit of profit and loss account as at March 31 was £5,384 10s., out of which there has been paid a dividend at the rate of 5 per cent. per annum on the preference shares for the half-year to March 31, leaving £4,308 10s. To this must be added the profit shown by the revenue account for the half-year to September 30, £3,350 0s. 1d., making £7,658 10s. 1d. The directors recommend the payment of a dividend at the rate of 5 per cent. per annum on the preference shares for the current half-year, which will absorb £1,076, leaving £6,582 10s. 1d. There has been transferred to the profits reserve fund (making the total of that fund £5,445 10s. 1d.) £1,137, leaving to be carried forward to next account £5,445 10s. 1d.

Metal Plates Limited.—This private company has been registered, with a capital of £6,000 in £1 shares (3,000 A and 3,000 B), to carry on the business of smelters, rollers, assayers, and manufacturers of and dealers in metals, ores, and metallurgical and mineral substances of all kinds, &c., and to adopt an agreement with S. O. Cowper-Coles. First directors: Col. J. R Wright, J. G. Gordon and S. O. Cowper-Coles. Qualification, 100 shares. Registered office, 1 and 2, Old Pye-street, Westminster, S.W.

Mickelwright Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to take over the business of electrical engineers, manufacturers of and dealers in electrical apparatus, carried on at Sicilian House, Southampton-row, W.C., and to adopt an agreement with W. R. Mickelwright. First directors: W. R. Mickelwright and W. W. Peck.

Musgrave and Green Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to carry on the business of a sheet metal worker carried on by T. L. Green at 46, Bromsgrove-street, Birmingham, as Musgrave and Green. First directors: T. L. Green (permanent managing director, subject to holding 500 shares) and others to be appointed. Qualification of ordinary directors, 50 shares. Registered office: 46, Bromsgrove-street, Birmingham.

Napier (J. C) and Co. Limited.—This private company has been registered, with a capital of £10,000 in £1 shares (5,000 preference), to carry on the business of colliery agents and coal exporters formerly carried on by J. C. Napier at 2, Cambrian-place, Swansea, as Napier and Co. First directors, J. C. Napier and E. Haydn Harries (both permanent subject to holding 500 ordinary shares). Qualification of ordinary directors 300 ordinary shares. Remuneration (except managing director) £10 per annum. Registered office, 2, Cambrian-place, Swansea.

Rotherham Electrical Engineering Company Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of electricians, mechanical engineers, manufacturers and workers of and dealers in electricity, motive power and light, &c., and to adopt an agreement with S. Walford-Grout and J. E. Tongue. The first directors are S W Grout (chairman) and J E. Tongue (both permanent governing directors, subject to holding £500 shares).

Scottish Australian Mining Company Limited.—The report for the six months to June 30, 1912, states that the balance of profit amounted to £4,949. The directors propose to pay a dividend at the rate of 2½ per cent per annum, less tax, and to carry forward £1,824. It is proposed to make the dividend payable on November 6 next.

Scott (John O) and Co., Colliery Stores, Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to take over the business of a ship, colliery and general store merchant, oil importer, grease, brick and fireclay manufacturer, and iron, steel and metal merchant, carried on by C. D. Beane at 20, Broad Chare, Newcastle-on-Tyne, as John O. Scott and Co. C. D. Beane is the first director and chairman. Registered office, Milburn House, Newcastle-on-Tyne.

Shotts Iron Company Limited. — Dividend on the ordinary shares for the past year of 25 per cent., subject to tax. The sum of £10 000 has been carried to reserve fund, raising it to £40,000.

Stannington Colliery Company Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to carry on the business of colliery owners, coal merchants, &c. Table A mainly applies. Secretary, F. Christie. Registered office, Exchange Buildings, Newcastle-on-Tyne.

Stockbow Hall Iron Ore Company Limited.—This private company has been registered, with a capital of £4 000 in £1 shares, to acquire certain mines and rights at Lamplugh and elsewhere in Cumberland; to carry on the business indicated by the title, and to adopt an agreement with E. Jackson. First directors, E Jackson (managing director), J. W. Hartley, F. Watson, W. Dixon and J. Burns. Qualification, 100 shares. Remuneration, £25 each per annum.

Thornton (George) and Co. Limited. — This private company has been registered, with a capital of £10,000 in £1 shares, to take over the business of manufacturers of and dealers in edge tools and agricultural implements carried on at Phœnix Works, Wharf-street, Aston, as George Thornton and Co, and to adopt an agreement with A E Godrich. First directors. A. E Godrich, S. L. Aston and F. S. Pearson. Registered office, Phœnix Works, Wharf-street, Aston, Birmingham.

Partnerships Dissolved.—The *London Gazette* announces the dissolution of the following partnerships:—E. Hall and T. Hill, under the style of T. Hill and E. Hall, at the Walsall Engineering Works, Wolverhampton-road, Walsall, in the trade of general engineers, ironfounders, weighing machine and annealing pan makers, so far as regards Thomas Hill.

Doncaster and Town Planning.—The important question of town planning for the rapidly-developing Doncaster district was advanced a stage further last week, when another conference of the representatives of local authorities was held in the Mansion House. The conference was called by the Mayor of Doncaster (Councillor Wm. Clark), and, in addition to the local Corporation, there were represented the Urban District Councils of Bentley, Balby, Bolton-on-Dearne, Thurnscoe, and Doncaster Rural District Council. It will be remembered that the result of the previous conference was that each authority represented was to request its surveyor to get out a sketch plan affecting its own district, but it was soon evident from the discussion last week, that the authorities, with about two exceptions, had been waiting for Doncaster Corporation to give the lead. The Mayor pointed out that Doncaster's difficulty is that it is practically built up to its borders, and that if a person walked for a few minutes in any direction he was out of the borough. Mr. H. M Marshall (the clerk of the Doncaster Rural District Council) was able to demonstrate to the conference that that authority is doing something, if the Doncaster Corporation is not. He said there had been correspondence with the Local Government Board, and the Rural District Council made it clear to that Board that the rural district immediately surrounding Doncaster should be town planned, but that the question affected more than the rural district. The Doncaster Rural Council had recently appointed a town planning committee, he said, whose first step was to recommend the Council to appoint a staff, including a surveyor, to help town plan their area. They were proceeding immediately to deal with the new colliery district around Askern Spa, after which they would deal with Carcroft, Adwick, Owston and Skellow, and afterwards probably with Rossington. But there was no hurry about the latter place, as it was to have a splendid colliery village within an area prescribed by Mr. Streatfeild.—Mr. Hawksworth (Bolton-on-Dearne) stated his Council were in communication with the Local Government Board with a view to plans for their own and adjacent areas.—Mr. F. O. Kirby, borough surveyor of Doncaster, suggested the surveyors should first meet, consider the general lines of development and make a report, the general lines not to be violated by anything that was done in each district. Each authority could then map out its own area in detail.—The Mayor favoured the proposal for a conference of the surveyors, and it was agreed that the meeting should take place within the month of November, it being stated that as yet no authority was committed to anything outside its own area.—The conference concluded with a vote of thanks to the Mayor for the use of the Mansion House and for having presided.

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Stockhow Hall Iron Ore Company Limited.—This private company has been registered, with a capital of £4,000 in £1 shares, to acquire certain mines and rights at Lamplugh and elsewhere in Cumberland; to carry on the business indicated by the title, and to adopt an agreement with E. Jackson. First directors, E. Jackson (managing director), J. W. Hartley, F. Watson, W. Dixon and J. Burns. Qualification, 100 shares. Remuneration, £25 each per annum.

Thornton (George) and Co. Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to take over the business of manufacturers of and dealers in edge tools and agricultural implements carried on at Phœnix Works, Wharf-street, Aston, as George Thornton and Co., and to adopt an agreement with A. E. Godrich. First directors: A. E. Godrich, S. L. Aston and F. S. Pearson. Registered office, Phœnix Works, Wharf-street, Aston, Birmingham.

Partnerships Dissolved.—The *London Gazette* announces the dissolution of the following partnerships:—E. Hall and T. Hill, under the style of T. Hill and E. Hall, at the Walsall Engineering Works, Wolverhampton-road, Walsall, in the trade of general engineers, ironfounders, weighing machine and annealing pan makers, so far as regards Thomas Hill.

Doncaster and Town Planning.—The important question of town planning for the rapidly-developing Doncaster district was advanced a stage further last week, when another conference of the representatives of local authorities was held in the Mansion House. The conference was called by the Mayor of Doncaster (Councillor Wm. Clark), and, in addition to the local Corporation, there were represented the Urban District Councils of Bentley, Balby, Bolton-on-Dearne, Thurnscoe, and Doncaster Rural District Council. It will be remembered that the result of the previous conference was that each authority represented was to request its surveyor to get out a sketch plan affecting its own district, but it was soon evident from the discussion last week, that the authorities, with about two exceptions, had been waiting for Doncaster Corporation to give the lead. The Mayor pointed out that Doncaster's difficulty is that it is practically built up to its borders, and that if a person walked for a few minutes in any direction he was out of the borough. Mr. H. M. Marshall (the clerk of the Doncaster Rural District Council) was able to demonstrate to the conference that that authority is doing something, if the Doncaster Corporation is not. He said there had been correspondence with the Local Government Board, and the Rural District Council made it clear to that Board that the rural district immediately surrounding Doncaster should be town planned, but that the question affected more than the rural district. The Doncaster Rural Council had recently appointed a town planning committee, he said, whose first step was to recommend the Council to appoint a staff, including a surveyor, to help town plan their area. They were proceeding immediately to deal with the new colliery district around Askern Spa, after which they would deal with Carcroft, Adwick, Owston and Skellow, and afterwards probably with Rossington. But there was no hurry about the latter place, as it was to have a splendid colliery village within an area prescribed by Mr. Streatfeild.—Mr. Hawksworth (Bolton-on-Dearne) stated his Council were in communication with the Local Government Board with a view to plans for their own and adjacent areas.—Mr. F. O. Kirby, borough surveyor of Doncaster, suggested the surveyors should first meet, consider the general lines of development and make a report, the general lines not to be violated by anything that was done in each district. Each authority could then map out its own area in detail.—The Mayor favoured the proposal for a conference of the surveyors, and it was agreed that the meeting should take place within the month of November, it being stated that as yet no authority was committed to anything outside its own area.—The conference concluded with a vote of thanks to the Mayor for the use of the Mansion House and for having presided.

No. 19.

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Z. Bayr. Revis. Ver. = Zeitschrift des Bayerischen Revisions-Vereins.
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The Industry of the Ruhr District and Adjoining Districts. (In Schacht und Huette. Die Industrie des Ruhrkohlenbezirkes und benachbarter Gebiete.) Gust. Koepper. 350 ill., 50 pl. Lex 8vo., 647 p. Reutlingen, Ensslin and Laiblin. 1912. 30s.

Report of the Association for Promoting the Interest of the Rhenish Brown Coal Industry in 1912. (Bericht des Vereins fuer die Interessen der Rheinischen Braunkohlen-Industrie ueber das Jahr 1912. "Glückauf," 1912, 30, p. 1205-9. (Output, sales, working conditions, &c., compared with 1911.) 2s. 9d.

The Strike of the Miners in the Ruhr District, March 1912, Statistically explained. (Der Ausstand der Ruhrbergarbeiter vom Maerz 1912, in statistischer Darstellung.) E. Jüngst. "Glückauf," 1912, 26, p. 1044-55. 2s. 9d.

Coalmining in India in 1911. "Colliery Guard.," 2702, p. 742; 2703, p. 787; 2704, p. 839. 1s. 6d.

Discoveries in the Hainault Coalfield. "Colliery Guard.," 2703, p. 799. 6d.

III.—Geology.

Southern Kentucky Coalfield. J. E. Butler. "Mines Minerals," vol. 33, 2, p. 63-6; 5 fig. 2s. 2d.

Contribution to the Knowledge of the South Bohemian Coalfield. (Ein Beitrag zur Kenntnis des suedboehmischen Braunkohlenbeckens.) "Hor. a Hut. List.," vol. 13, 1912, 8, p. 111-3.

The Occurrence of "Diluvial" Coal at Pirmallen, Gwilden and Kl. Tauerlauken, at the Russian Frontier. (Das Vorkommen von "Diluvialkohle" bei Pirmallen, Gwilden und Kl. Tauerlauken an der russischen Grenze.) Hans v. Hess-Wichdorf. With 3 maps. Published by the Geologische Landesanstalt.

Geological Thermometers. (Geologicke teplomery.) F. Slavik. "Chem. List.," vol. 6, 1912, 4, p. 162-5.

IV.—Mine Surveying.

The Effect of Errors in Surveying. Henry Briggs. 8vo., 192 p. C. Griffin, 1912.

Mine Engineer's Room-o-Meter for Survey Draughting. "Coal Age," vol. 2, 10, p. 327; 3 fig. 1s. 3d.

VI.—Working of Minerals.

Sydney District Coalmines of Nova Scotia Steel and Coal Company. "Canad. Min. Jl.," vol. 33, 18, p. 626-32; 4 fig., 1 map. (The systematic coalmining in the Duke of York's grant of the whole of the minerals of Nova Scotia to the company). 1s. 6d.

New Bosnia Coalmining. "Coal Age," vol. 2, 12, p. 389-91; 5 fig. (Seams 16 ft. thick, coal prepared in five sizes, coal stored in slack demand, no women or boys employed.) 1s. 3d.

A Rope-driven Coal-cutter. W. L. Spence. "Trans. Inst. Min. Eng.," vol. 43, 5, p. 516-539; 10 fig. 8s.

VII Boring, Shaft Sinking, and Tunnelling.

Reinforced Concrete as Applied to Mine Shafts. E. R. Jones. "Concrete," vol. 7, 9, p. 693-9; 2 fig. 2s.

Concrete in Mining (Beton im Bergbau.) "Baumaterialienmarkt," vol. 11, 1912, 26, p. 687-8; 3 fig. (Requirements to be fulfilled by the various materials employed.) 2s.

Making Concrete and Ferro-Concrete Shaft Linings Watertight. (Abdichtung von Schachtauskleidungen in Beton und Eisenbeton.) F. Baumstark. "Armierter Beton," vol. 5, 1912, 4, p. 151-4; 4 fig. (Providing drain pipes. Difficulty of shutting off water from a borehole on tapping a water-bearing fissure, overcome by means of the Meissner-Trippe apparatus, which enables the hole to be made watertight by mechanical means.) 2s.

Steel Sets in Inclined Shafts. W. L. Brown. "Min. Scient. Press," vol. 105, 10, p. 296-300; 8 fig. 1s. 4d.

Rock Drill with Rotary Bit and Automatic Feed Both Ways without Change of Direction. (Gesteinbohrmaschine mit drehendem Werkzeug und selbsttaetigem Vor- und Rueckschub der Rohrspindel bei gleicher Drehrichtung derselben D.R.P. Nr. 243223 vom 19 Feber 1910, fuer Alfred Wagner in Gr. Lichterfelde bei Berlin.) "Steinbruch," vol. 7, 1912, 22, p. 359; 6 fig. (Drill spindle provided with right- and left-hand threads with which corresponding split nuts engage alternately.) 1s. 6d.

Boring Machines and Boring Plants. (Bohrmaschinen und Bohranlagen.) "Erzbergbau," 1912, 7, p. 110-27 14 fig. (Description of representative types.) 2s.

Recent Types of Boring Machines. (Ueber neuere Bohrmaschinen.) M. Freyberg. "Erzbergbau," 1912, 7, p. 97-119; 54 fig. 2s.

Electric Air Drills in Japanese Tunnels. C. A. Hirschberg. "Comp. Air Mag.," vol. 17, 9, p. 6539-41; 5 fig. 1s.

VIII.—Explosives, Blasting.

Thaw Houses and Thawing of Explosives. C. Hall. "Min. Eng. World," vol. 37, 10, p. 441-3; 9 fig. 1s. 3d.

Minimising Missfires in Electrical Shotfiring. "Canad. Min. Jl.," vol. 33, 17, p. 577. 1s. 6d.

IX.—Timbering, Packing, &c.

Portable Stone-breaker for Use in Mines. (Fahrbarer Grubensteinbrecher mit Druckluftantrieb.) "Glückauf," 1912, 27, p. 1089. (The broken stone is used for concrete or for hydraulic goaf packing.) 2s. 9d.

Hydraulic Goaf Packing. (Om Spülversatz.) A. Kualheim. "Tekn. Ugeblad.," 1912, 28, p. 363-4. 2s.

Mine Timber Preservation. "Mines Minerals," vol. 33, 2, p. 83-6; 5 fig. (Relative life of treated and untreated timbers, with methods and costs of various treatments.) 2s. 2d.

So-called Air Blasts and Roof Pressure in Mines. T. Johnson. "Jl. Chem. Soc. S. Afric.," vol. 13, 2, p. 37-40. 4s.

The Use of Old Wire Ropes in Timbering Roadways. J. McLuckie. "Colliery Guard.," 2703, p. 784. (Abst. paper read before Min. Inst. Scot.) 6d.

X Surface Arrangements.

Calculating Pithead Gear. (Die Berechnung der Foerdergerueste.) R. Blumenfeld. "Eisenbau," vol. 3, 1912, 1, p. 1-7; 14 fig. (Differences in accordance with the method of mounting the rope pulleys. Loads due to pull of rope, wind, and weight of structure. Determining the slope of the stays.) 2s.

Surface Plant and Workings of Grimethorpe Colliery. "Iron Coal Trades Rev.," vol. 85, 2324, p. 380. 1s.

Bankhead and Picking Belt House at Albion Coalmines, Stellarton, Nova Scotia. "Canad. Min. Jl.," vol. 33, 18, p. 650-4; 10 fig. 1s. 6d.

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Locomotives for Electric Mine Haulage. G. W. Hamilton. "El. Jl.," vol. 9, 8, p. 706-9; 2 tab. 2s.

Comparative Tests with Pit Locomotives. (Vergleichende Untersuchungen an Grubenlokomotiven.) Bustow and Dobbelstein. "Glückauf," 1912, 12, p. 461-8; 13, p. 501-11; 17, p. 661-6; 18, p. 701-10; 40 fig. (Results of tests made with different pneumatic and electric locomotives. With the conditions prevailing in the Ruhr district, single-phase locomotives show the lowest working costs.) 11s.

New Test for Mine Rope. Aerial Ropeway Cables and other Steel Wires. C. Fremont. "Iron Coal Trades Rev.," vol. 85, 2323, p. 345; 3 fig. 1s.

The Safety of Winding Ropes. (Die Sicherheit der Förderseile.) Speer. "Glückauf," 1912, 19, p. 737-47; 20, p. 781-8; 21, p. 824-9; 29, p. 1145-60; 30, p. 1194-8; 31 fig. 13s. 9d.

On Haulage over Small Inclines. (Ueber die Forderung in Strecken mit kleiner Neigung.) C. Hruska. "Hor. a Hut. List," vol. 13, 1912, 2, p. 19-21; 3, p. 34-6 4s.

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Electric Winding Engines. A. E. de Pasquier. "Colliery Guard.," 2700, p. 633; 2702, p. 751; 2703, p. 791; 24 fig. (Abst. paper read before S. Wales Inst. Engin.) 1s. 6d.

Electrically-driven Winding Engines in South Africa. A. W. Brown. "Colliery Guard.," 2704, p. 841. (Abst. paper read before N. Eng. Inst. Min. Mech. Engin.) 6d.

XIII.—Lighting.

The Varta Electric Mine Lamp. J. Hortens. "Coal Age," vol. 2, 11, p. 358-9. 1s. 3d.

Acetylene in Underground Mining. J Deszenyi. "Acetylene," vol. 9, 108, p. 204-5. 9d.

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Acetylene in Underground Mining. J. Deszenyi. "Acetylene," vol. 9, 108, p. 204-5. 9d.

BOOK NOTICES.

The Coal Resources of New South Wales By Edward F. Pittman, Government Geologist and Under-Secretary for Mines. Issued by direction of the Minister of Mines. Sydney: Government Printer. Price 1s.

This little work is really a second edition of the article on coal published in "The Mineral Resources of New South Wales, 1901," and its chief *raison d'être* is stated to be the developments that have since taken place in the Maitland-Cessnock and other areas. No less than 194 representative samples of coal have been carefully taken within recent months by the mines inspectors and analysed by the chemical staff of the Geological Survey Laboratory, and the results are given here. Consequently, those desirous of obtaining information as to the coal resources of New South Wales can turn to Mr. Pittman's book with the assurance that the facts recorded are above suspicion.

Coal was first discovered in New South Wales in 1797, and it is curious that the sites of the discovery—viz., near Wollongong and the mouth of the Hunter River, at Newcastle, still remain the most important seats of the coalmining industry, although many fresh areas have been developed since the beginning of the last century. The coal-bearing rocks of the colony may be geologically classified as follow:—

Geological age.	Maximum thickness. Ft.	Locality.	Character of coal.
1. *Tertiary*, Eocene to Pliocene.	About 100	Kiandra, Gulgong, Chouta Bay, &c.	Brown coal or lignite.
2. *Mesozoic*, Triassic or Trias-Jura.	„ 2 500	Clarence and Richmond rivers.	Coal suitable for local use.
3. *Palæozoic*, Permo-carboniferous.	„ 13,000	Northern, Southern, and Western coalfields.	Good coal, suitable for gas-making, and for household and steam-raising purposes.
4. *Palæozoic*, Carboniferous.	„ 10,000	Stroud, Bullah Delah.	Very inferior coal, with bands; no value.

It will be seen that all the best coal is obtained from the permo-carboniferous measures. These have been classified in descending order as follow:—

	Thickness in ft.
1. *Upper or Newcastle Coal Measures*, containing 12 seams of coal. In the aggregate they contain 35 to 40 feet of workable coal	1,400 to 1,500
2. *Dempsey Series*, freshwater beds, containing no productive coal. This series thins out completely in certain directions	2,200
3. *Middle, or Tomago, or East Maitland Coal Measures*, containing six seams of coal, varying from 3 to 7 feet in thickness. In the aggregate they contain about 18 ft. of workable coal	500 to 1 800
4. *Upper Marine Series*, containing an abundance of marine fossils, but specially characterised by the predominance of the brachiopod, *Productus Brachythærus*	5,000 to 6,400
5. *Lower or Greta Coal Measures*, containing an aggregate of about 20 ft. of coal	100 to 300
6. *Lower Marine Series*, containing an abundance of marine fossils, but specially characterised by the predominance of the mollusc, *Eurydesma cordata*	4,800
Total maximum thickness	17,000

In considering the quantity of coal available in New South Wales, Mr. Pittman points out that any such estimate must be based upon very uncertain data. Taking only the palæozoic fields, however, he calculates—adopting a maximum depth of 4,000 ft—a total area of 16,550 square miles, of which 15,800 square miles are upper and middle coal measures, 250 square miles are Greta coal measures (northern district), and 500 square miles Greta measures in the southern district. In their most productive areas the upper coal measures contain about 40 ft. of workable coal, the middle coal measures about 18 ft., and the Greta measures about 20 ft.; but it would be very unsafe to calculate a total thickness of 78 ft. over the whole area mentioned above, and Mr. Pittman adopts instead an average of 10 ft., giving 115,346,880,000 tons of available fuel. Professor David has estimated that in the vicinity of Kurri-Kurri and Cessnock the Greta measures contain 1,893,000,000 tons of workable coal above a depth of 4,000 ft. under an area of 158 square miles, and an additional 1,200,000,000 tons between 4,000 and 6,000 feet under an area of 100 square miles.

The following table has been drawn up from the data given relating to the analyses of the coals examined, showing the average of a considerable number of samples taken in each district:—

	Hygroscopic moisture.	Volatile hydrocarbons.	Fixed carbon.	Ash.	Sulphur.	Calorific value.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	
Upper or Newcastle measures (78 samples	2 01	36 01	53·27	8 71	0·468	12 7
Middle or Tomago measures (Northern coalfield) (five samples)	1·88	35 71	52·77	9 64	1·185	12 5
Lower or Greta measures (Northern coalfield) (51 samples)	1·84	41·61	49 52	7 03	1 291	13·07
Greta seams worked in Northern coalfield (31 samples)	1 89	41 35	50 51	6 25	1·014	13·2
Upper coal measures (Western coalfield) (25 samples)	2 05	32·31	53·08	12 56	0 672	11·9
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A sample of coal from the Borehole seam worked at the Hetton Colliery, Newcastle, after the bands had been picked out gave a calorific value of 14·5 and the following analysis:—Hygroscopic moisture, 1·89; volatile hydrocarbons, 39·60; fixed carbon, 54·61; ash, 3·90; sulphur, 0·369 per cent.; specific gravity, 1·278; yield of coke, 58·51 per cent. Several other samples, however, gave a higher yield of coke, the highest being 66·74 per cent., obtained from the Burwood seam at the Hillside Colliery, Merewether, and 67 per cent. from the Great Northern seam at the Morrisett Colliery, near Lake Macquarie.

This excellent little memoir is splendidly illustrated by coloured maps and sections and several photographs taken personally by Mr. Pittman.

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The first section of the book is devoted to general principles, and includes the necessary description of the geodetical relations of the earth and the projection of great circles upon plane surfaces. This leads up rapidly to triangulation, and in the second section we have detailed descriptions of surveying and measuring instruments, with practical illustration of their use. The magnetic needle is the subject of the seventh chapter. This subject is treated in some detail, and forms an excellent prelude to the description of theodolite measurements which follows. In the ninth chapter levelling is discussed, and various forms of levelling instruments are described.

The mine plan forms the subject of chapter ten, and this is followed by a section on mine surveying and the problems that may be expected to arise in connection therewith. Constructions are given for the calculations of various stratigraphical features arising from dip and disturbance of strata. There are here many useful hints for underground surveyors. The book is an excellent guide to mine surveying and should be welcomed by all who can grapple with the German language. It is written in a clear and easy style, which will be a welcome feature to English students.

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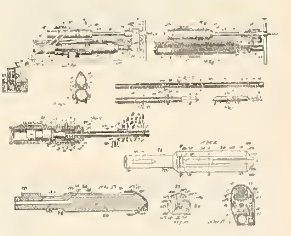

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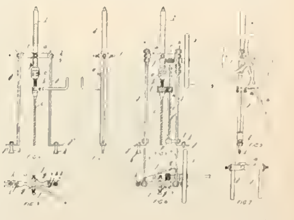

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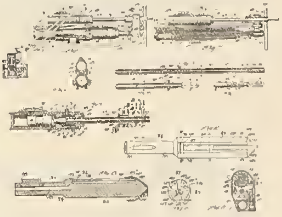

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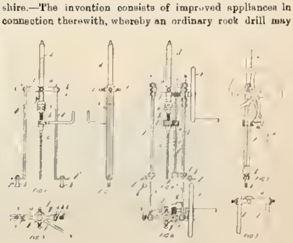

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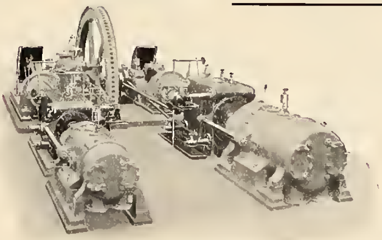

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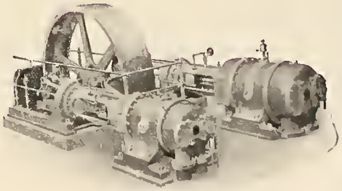

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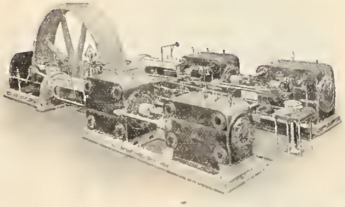

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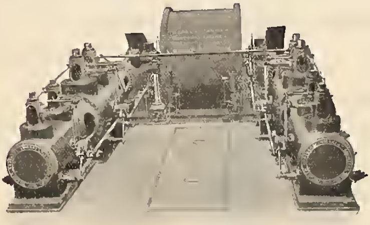
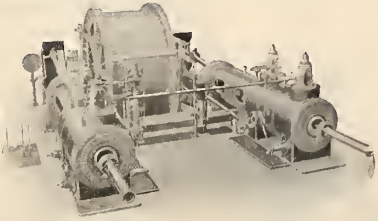


Twin Tandem Compound Winding Engines.



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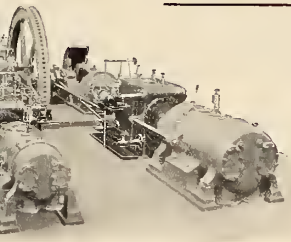

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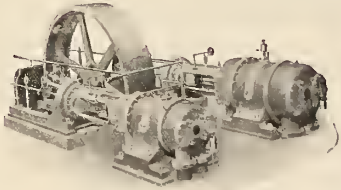

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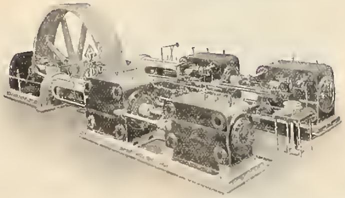

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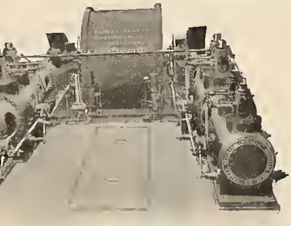

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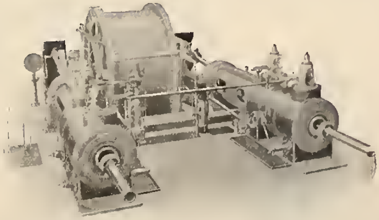

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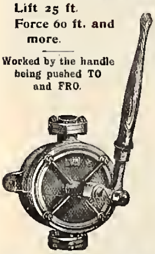

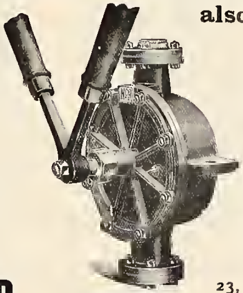

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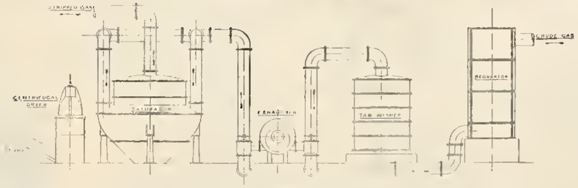

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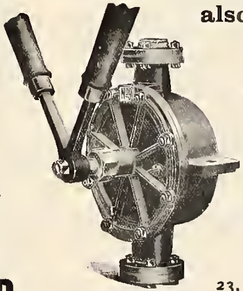

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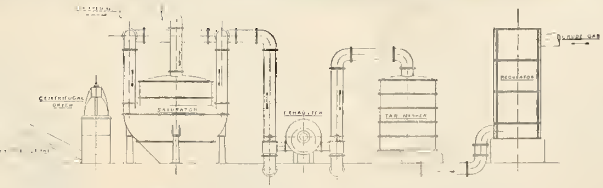

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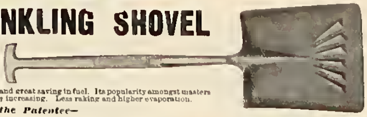

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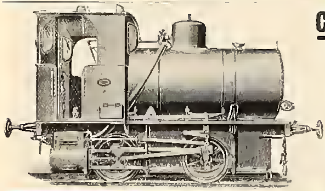

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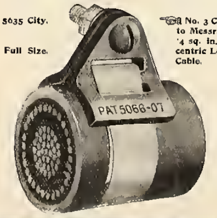

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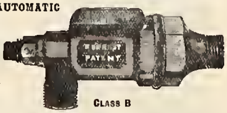

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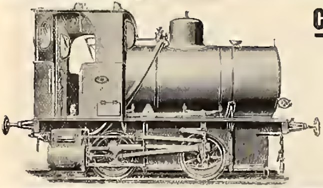

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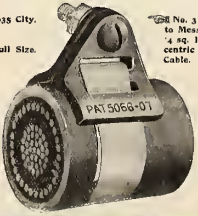

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Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, H., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

Headsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, H. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hoists
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Hooks or Links (Safety)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Loampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Northern Rubber Co., The Wicker, Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Hose (Coal-Cutter)
Northern Rubber Co., The Wicker, Sheffield

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Hydraulic Jacks
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Ryland-street Works, Birmingham

Hydraulic Reducing Valves
Aird, D., and Sons, Whitevale Foundry, Glasgow

Hygrometers
Davis, John, and Son (Derby) Ld., Derby

Incline Rollers
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Northern Rubber Co., The Wicker, Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boniding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

Jointing Cement
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

Jointing (Sheet)
Thomas and Bishop, 119-125, Finsbury Pav., E.C

Joists (Rolled Steel)
Heenan and Froude Ld., Worcester
Renton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Keps (for Winding Cages)
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Lamp Cleaning Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Gauze Brushes
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Glasses
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Oil Filling Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Re-Lighting Apparatus (Underground)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Arc)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Lamps (Electric)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

Lamps (Electric Safety)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent
Photos Miner's Electric Lamp Ld., Queen's-road, Battersea
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Miners' Safety)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Outdoor)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

Lathes
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

Leather Appliances

Lessons by Post
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

Lifting and Hoisting Tackle
Renton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

Lightning Conductors
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Shaw, John, Ld., Sheffield
Theedam, E. C., Ld., Dudley

Locknut Washers
Renton, B. M., and Co., Sheffield

Loose Collars
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Carton House, Westminster S.W.

Lubricators
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boniding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall rd., Liverpool
Trier Bros., Carton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Machinery (Second-hand)
Bute Works Supply Co. Ld., Cardiff
Foot, R. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Renton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

Machine Tools
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

Mathematical Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mechanical Stokers
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

Metal Perforators
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

Metallic Packing
United States Metallic Packing Co. Ld., Soho Works, Bradford

Meteorological Instruments
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mills (Grinding)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

Mining Dials
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C
Thornton, A. G., Ld., King-st. West, Manchester

Mining Machinery
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Hurd Coal-Cutter and Engineering Co. Ld., 188 St. Vincent-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Mining Tools
Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

Motors
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

Motor Starters
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Motor Vans and Wagons
Avonside Engine Co. Ld., Bristol
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.

Nails Spikes, &c.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Frost, Albert, and Co., Howard-street, Sheffield
Renton, B. M., and Co., Midland Works, Sheffield

Office Furniture and Appliances
Glover, M., and Co., Holbeck-lane, Leeds
Thornton, A. G., Ld., King-st. West, Manchester

Oil Bottles
Baker, John, and Son, Bilston, Staffs
Theedam E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Cabinets
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Switches
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Oils and Lubricants
Ackroyd and Best Ld., Morley, nr. Leeds
Asbestos and General Paint Co. Ld., Birmingham
Gaunt and Hickman, Oil Works, Wolverhampton
Trier Bros., Carton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., & Co. Ld., 23, Southwark-st., E.C.

Overhead Travellers
Spencer and Co. Ld., Melksham, Wilts
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Overwinding Gear
Barclay, Andrew, Sons and Co. Ld., Kilmarnock,
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Oxygen Manufacturers
British Oxygen Co. Ld., Elverton-st., Westminster
Knowles Oxygen Co. Ld., Wolverhampton

Packing (Engine)
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Green and Boniding Ld., London, E.C.
Greene, Tweed and Co., Westminster
Lancaster and Tonge Ld., Pendleton, Manchester
Northern Rubber Co., The Wicker, Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E

Paint
Asbestos and General Paint Co. Ld., Birmingham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Kalbitum Paint Co. Ld., Belvedere, Kent
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

Paint (Fireproof)
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent

-lane, Leeds
Pearson-pl., Cardiff
ring Co. Ld., Notts
and Works, Sheffield
Ld., Stoke-on-Trent
Works, Sheffield
Ld., Chorley, Lancs
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Works, Leeds
Ld., Stoke-on-
Works, Sheffield
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Purchasers' Guide to Advertisers' Specialities.—(continued).

GOVERNORS (ENGINE)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

GOVERNORS (HYDRAULIC)

GREASE
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

GRINDING MACHINERY
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

GRINDSTONES

GUNPOWDER
Curtis's and Harvey Ld., Cannon-st. House, E.C.

GUTTA PERCHA
Cort, Arthur, & Co. 303½, Camberwell-rd., London

HARNESS

HAULING DRUMS
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, R., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

HEADGEARS
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

HEADING MACHINES
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

HEAPSTEADS
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, H. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

HOISTS
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

HOOKS ON LINKS (SAFETY)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

HOPPERS
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Loampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

HOSE
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Northern Rubber Co., The Wicker, Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

HOSE (COAL-CUTTER)
Northern Rubber Co., The Wicker, Sheffield

HUMIDIFIERS
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

HYDRO ELECTRIC PLANTS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

HYDRAULIC JACKS
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Hyland-street Works, Birmingham

HYDRAULIC MACHINERY
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Hyland-street Works, Birmingham

HYDRAULIC REDUCING VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow

HYDROMETERS
Davis, John, and Son (Derby) Ld., Derby

INCLINE ROLLERS
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

INDIARUBBER GOODS
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Northern Rubber Co., The Wicker, Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester

INDICATORS (STEAM ENGINE)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

INDUCED DRAUGHT FANS
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

INJECTORS AND EJECTORS
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

INSTRUCTION (POSTAL)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

INSTRUMENTS
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

IRON AND BRASS FOUNDERS
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

IRON AND STEEL
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld.; Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

JACKS (HYDRAULIC)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

JIGS
Ormerod, Edward, Atherton, near Manchester

JIM CROWS
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Hyland-street Works, Birmingham

JOINTING CEMENT
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

JOINTING (SHEET)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

JOISTS (ROLLED STEEL)
Heenan and Froude Ld., Worcester
Benton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

KEPS (FOR WINDING CAGES)
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

LAMP CLEANING MACHINES
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP GAUZE BRUSHES
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

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Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMP OIL FILLING MACHINES
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Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

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Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

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British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

LAMPS (ELECTRIC)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

LAMPS (ELECTRIC SAFETY)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Rd., Ld., Belvedere Works, Belvedere, Kent
Photos Miner's Electric Lamp Ld., Queen's-road, Battersea
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMPS (MINERS' SAFETY)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

LAMPS (OUTDOOR)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

LATHES
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

LEATHER APPLIANCES

LESSONS BY POST
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

LIFTING AND HOISTING TACKLE
Benton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Hyland-street Works, Birmingham

LIGHTNING CONDUCTORS
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Shaw, John, Ld., Sheffield
Theedam, E. C., Ld., Dudley

LOCKNUT WASHERS
Benton, B. M., and Co., Sheffield

LOOSE COLLARS
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster S.W.

LUBRICATORS
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 5 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

MACHINERY (SECOND-HAND)
Bute Works Supply Co. Ld., Cardiff
Foot, R. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Benton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

MACHINE TOOLS
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

MATHEMATICAL INSTRUMENTS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

MECHANICAL STOKERS
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

METAL PERFORATORS
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 39, Victoria-street, S.W.

METALLIC PACKING
United States Metallic Packing Co. Ld., Soho Works, Bradford

METEOROLOGICAL INSTRUMENTS
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

MILLS (GRINDING)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

MINING DIALS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C
Thornton, A. G., Ld., King-st. West, Manchester

MINING MACHINERY
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Hurd Coal-Cutter and Engineering Co. Ld., 188 St. Vincent-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

MINING TOOLS
Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

MOTORS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

MOTOR STARTERS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

MOTOR VANS AND WAGONS
Avonside Engine Co. Ld., Bristol
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.

NAILS SPIKES, &C.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Frost, Albert, and Co., Howard-street, Sheffield
Benton, B. M., and Co., Midland Works, Sheffield

OFFICE FURNITURE AND APPLIANCES
Glover, M., and Co., Holbeck-lane, Leeds
Thornton, A. G., Ld., King-st. West, Manchester

OIL BOTTLES
Baker, John, and Son, Bilston, Staffs
Theedam E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'gham

OIL CABINETS
Valor Co. Ld., Rocky-lane, Aston Cross, B'gham

OIL SWITCHES
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

OILS AND LUBRICANTS
Ackroyd and Best Ld., Morley, nr. Leeds
Asbestos and General Paint Co. Ld., Birmingham
Gaunt and Hickman, Oil Works, Wolverhampton
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., & Co. Ld., 23, Southwark-st., E.C.

OVERHEAD TRAVELLERS
Spencer and Co. Ld., Melksham, Wilts
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

OVERWINDING GEAR
Barclay, Andrew, Sons and Co. Ld., Kilmarnock,
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

OXYGEN MANUFACTURERS
British Oxygen Co. Ld., Elverton-st., Westminster
Knowles Oxygen Co. Ld., Wolverhampton

PACKING (ENGINE)
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Green and Boulding Ld., London, E.C.
Greene, Tweed and Co., Westminster
Lancaster and Tonge Ld., Pendleton, Manchester
Northern Rubber Co., The Wicker, Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E

PAINT
Asbestos and General Paint Co. Ld., Birmingham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Kalbitum Paint Co. Ld., Belvedere, Kent
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

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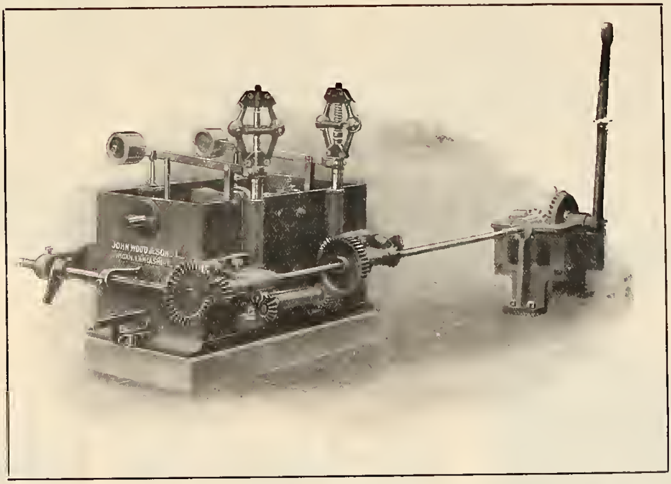

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Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Wright, Joseph, and Co., Tipton

Smoke Helmets
Siebe, Gorman and Co. Ld., Westminster, S.E.

Speed-Reducing Gears
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Sphincter Grip Armoured Hose
Beddaway, F., & Co. Ld., Pendleton, Manchester

Springs
British Wagon Co. Ld., Rotherham
Lancaster and Tonge Ld., Pendleton, Manchester
Skinner, J. P. and Co. Ld., Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Stamping
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Steam Experts
Fell, C. A., Dronfield, near Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan

Steam Fittings
British Mannesmann Tube Co. Ld., London Wall
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Russell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staffs.

Steam Mains and Pipe Installations
Stewarts and Lloyds Ld., Birmingham & Glasgow
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

Steam-Saving Appliances
Pillatt and Co. Ld., Stapleford, Nottingham
Yorkshire Boiler Co. Ld., Bradford

Steam Traps
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster & Tonge Ld., Pendleton, Manchester
Stewarts & Lloyds Ld., Birmingham and Glasgow
United States Metallic Packing Co. Ld., Soho Works, Bradford
Wright, Joseph, and Co., Tipton

Steam Winches
Bridge, David, & Co. Ld., Castleton, Manchester
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Phillips, C. D., Newport, Mon.
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Steel
Cooke, William, and Co. Ld., Tinsley, Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Latch and Batchelor Ld., Hay Mills, nr. B'ham
Mining Engineering Co. Ld. (The), Sheffield
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Stewarts & Lloyds Ld., Birmingham and Glasgow
Thompson and Co., Wigan
Waterfall, H. & H., & Barber, Bridge-st., Sheffield

Steel Blooms, Billets
Benton, B. M., and Co., Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Flats and Rounds
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Tinbars
Scott, Walter, Ld., Leeds Steel Works, Leeds

Stone Breakers
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln

Structural Steel Work
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Wright, Joseph, and Co., Tipton

Sulphate of Ammonia Plant
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Sulphur Recovery Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Superheaters
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
Pulsometer Engineering Co. Ld., Reading
Stringer, John, and Son, Dept. 11, Blackburn

Surgical Appliances
White & Wright, 93, Renshaw Street, Liverpool

Surplus Steam Valves (Full Bore)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Hopkinson, J., and Co. Ld., Huddersfield

Surveying (Books on)
Thomas, Wm., Cambrian Mining School, Porth

Surveying (Instruction)
Thomas, Wm., Cambrian Mining School, Porth

Surveying Instrument Makers
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavement, London
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Switch Boards
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Switch Gear
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Swivels (Ball-Bearing)
Bridge, David & Co., Ld., Castleton, Manchester
Youngs, Hyland-street Works, Birmingham

Tamping Plugs

Tanks
Bagnall, W. G., Ld., Stafford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Harvey, G. A., and Co. Loampit Vale, Lewisham
Isca Foundry & Engineering Co., Newport, Mon.
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Valor Co. Ld., Rocky-lane, Aston Cross, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan
Yorkshire Hennebique Contracting Co. Ld., Leeds

Tanks (Ferro-Concrete)

Tar Distilling Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Technical Education
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Telephones
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Timber (Colliery)
Baird, J. W., and Co., West Hartlepool
Osbeck and Co., Newcastle-on-Tyne

Tipplers.
Bagnall, W. G., Ld., Stafford
Cantrell, W. E., and Co. Ld., Beeston, Notts
Heenan and Froude Ld., Worcester
Spencer and Co. Ld., Melksham, Wilts
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

Tools
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Tram and Wagon Corner Plates
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Theedam, E. C., Ld., Dudley

Transformers (Electrical)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Transport Plant
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Trommels
Barns, W., and Son, Globe Works, Holloway
Heenan & Froude Ld., Worcester and Manchester
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts

Truck Shunting Plants
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Tubbing and Well Cylinders
Head, Wrightson and Co. Ld., Stockton-on-Tees
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Tub Drawbars
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Ormerod, Edward, Atherton, near Manchester
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

Tube Expanders
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Hyland-street Works, Birmingham

Tube Fittings
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Wednesbury
Stewarts & Lloyds Ld., Birmingham and Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tubes (Iron and Steel)
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Lewis, William, and Son, Bilston
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tub Greasers and Controllers
Theedam, E. C., Ld., Dudley

Tubs (Colliery)
Allen, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Humble, Stephen, 9, Victoria-st., London, S.W.
Longbotham, R. H., and Co. Ld., Wakefield
Theedam, E. C., Ld., Dudley
Wigan Wagon Co. Ld., Springs Branch, Wigan
Wright, Joseph, and Co., Tipton

Tunnel Segments
Railway and General Engineering Co. Ld., Notts
Tickle Brothers, Vulcan Ironworks, Wigan

Turbines
Bellis and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester

Turbines (Exhaust)
Bellis and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Turbo Compressors
Tickle Brothers, Vulcan Ironworks, Wigan

Turntables
Heenan and Froude Ld., Worcester
Isca Foundry & Engineering Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Tuyeres
Baker, John, and Son, Bilston, Staffs
Railway and General Engineering Co. Ld., Notts
Russell, John, and Co. Ld., Walsall
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C. Ld. Dudley

Valuers
Radford, R. H., Son, and Squire, Sheffield
Stringer, John, and Son, Blackburn

Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Green and Boulding Ld., 28, New Bridge-st., E.C.
Haslam and Schontheil Ld., Cardiff
Hopkinson, J., and Co. Ld., Huddersfield
Mather and Platt Ld., Manchester
Russell, John, & Co. Ld., Alma Tube Works, Walsall

Vices
Frost, Albert, and Co., Sheffield
Glover, M., and Co., Holbeck-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley
Youngs, Hyland-street Works, Birmingham

Vulcanised Fibre
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Wagons
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Jardine, John, Deering-street, Nottingham
Benton, B. M., and Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Waterproof Garments
Northern Rubber Co., The Wicker, Sheffield

Water Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

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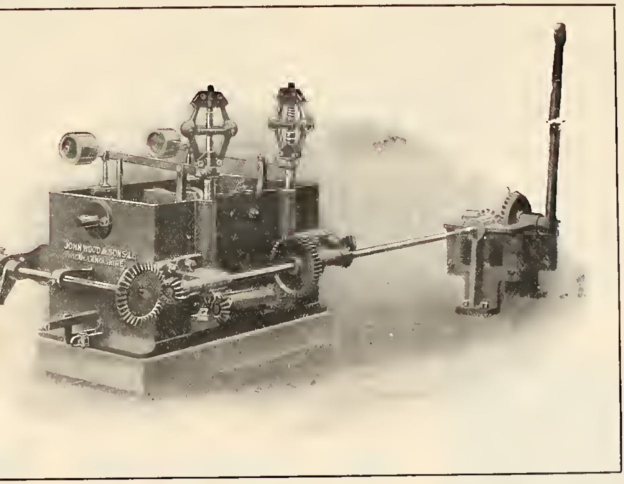

Safety assured with 'THE VISOR.'

The most Effective Machine on the Market.

160 at work.

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Steel Tinbars
Scott, Walter, Ld., Leeds Steel Works, Leeds

Stone Breakers
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Robey and Co. Ld., Lincoln

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Norton's (Tividale) Ld., Tipton
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Coke Oven Construction Co. Ld., Sheffield
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Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
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Hopkinson, J., and Co. Ld., Huddersfield

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Haslam and Schontheil Ld., Cardiff

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Haslam and Schontheil Ld., Cardiff

Swivels (Ball-Bearing)
Bridge, David & Co., Ld., Castleton, Manchester
Youngs, Ryland-street Works, Birmingham

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Daglish, Robert, and Co. Ld., St. Helens, Lancs.
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Isca Foundry & Engineering Co., Newport, Mon.
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
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Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan
Yorkshire Hennebique Contracting Co. Ld., Leeds

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Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

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Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

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Haslam and Schontheil Ld., Cardiff

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Osbeck and Co., Newcastle-on-Tyne

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Cantrell, W. E., and Co. Ld., Beeston, Notts
Heenan and Froude Ld., Worcester
Spencer and Co. Ld., Melksham, Wilts
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

Tools
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
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Theedam, E. C., Ld., Dudley

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Ormerod, Edward, Atherton, near Manchester
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Theedam, E. C., Ld., Dudley

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Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Wednesbury
Stewarts & Lloyds Ld., Birmingham and Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tubes (Iron and Steel)
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Lewis, William, and Son, Bilston
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

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Allen, W. G., and Sons (Tipton) Ld., Tipton
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Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Humble, Stephen, 9, Victoria-st., London, S.W.
Longbotham, H. H., and Co. Ld., Wakefield
Theedam, E. C., Ld., Dudley
Wigan Wagon Co. Ld., Springs Branch, Wigan
Wright, Joseph, and Co., Tipton

Tunnel Segments
Railway and General Engineering Co. Ld., Notts
Tickle Brothers, Vulcan Ironworks, Wigan

Turbines
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester

Turbines (Exhaust)
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Turbo Compressors
Tickle Brothers, Vulcan Ironworks, Wigan

Turntables
Heenan and Froude Ld., Worcester
Isca Foundry & Engineering Co., Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Tuyeres
Baker, John, and Son, Bilston, Staffs
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Russell, John, and Co. Ld., Walsall
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C. Ld. Dudley

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Valves
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Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Green and Boulding Ld., 29, New Bridge-st., E.C.
Haslam and Schontheil Ld., Cardiff
Hopkinson, J., and Co. Ld., Huddersfield
Mather and Platt Ld., Manchester
Russell, John, & Co. Ld., Alma Tube Works, Walsall

Vices
Frost, Albert, and Co., Sheffield
Glover, M., and Co., Holbeck-lane, Leeds
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Youngs, Ryland-street Works, Birmingham

Vulcanised Fibre
Cort, Arthur, & Co., 303½, Camberwell-rd., London

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Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Jardine, John, Deering-street, Nottingham
Renton, B. M., and Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Waterproof Garments
Northern Rubber Co., The Wicker, Sheffield

Water Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

THE

Koppers' Coke Oven

has been proved to be the most successful on the market, as is evidenced by the fact that in the comparatively short period of nine years orders for over 9,000 Ovens have been placed with us, of which number over 4,250 are repeat orders. These orders represent a capital cost of over

£7,500,000.

SIMILAR SUCCESS ATTENDS THE INTRODUCTION OF

KOPPERS' NEW SYSTEM OF BYE-PRODUCT RECOVERY.

In the New System the Scrubbing process is entirely dispensed with, and the Ammonia is recovered direct from the Gas in the form of Sulphate.

ADVANTAGES OF NEW SYSTEM

- Effluent Liquor reduced by 50 per cent. and upwards.
- Great Saving in Steam Consumption.
- Greater Yield of Sulphate and Benzol.
- Consumption of Water is considerably Reduced.
- Less Labour Cost.
- Plant is Simpler to Operate, and requires less Supervision.

Plants already at work and under construction to deal with the Gases evolved from upwards of **20,000,000** tons of coal per annum.

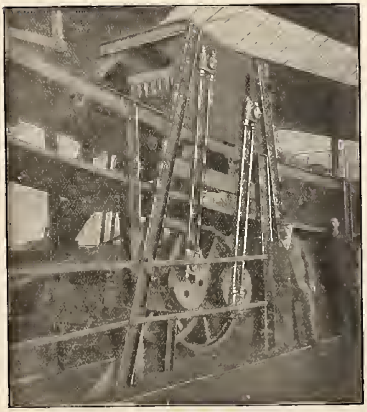
Full Particulars on Application to—

THE KOPPERS' COKE OVEN AND BYE-PRODUCT CO.,

Telephone No. 1035. 301, *Glossop Road, SHEFFIELD.* Telegraphic Address—"KOCHS, SHEFFIELD."

A NEW **COAL BREAKER.**

WHITAKER'S PATENT



Large coal reduced to uniformly sized cobbles or nuts, without any cost for labour.

More equal and saleable cobbles made, with less slack than by other methods.

BREAKERS MAY BE SEEN AT WORK IN SEVERAL DISTRICTS, BY ARRANGEMENT WITH

THE HARDY PATENT PICK Co. Ld.,

SHEFFIELD, ENGLAND.

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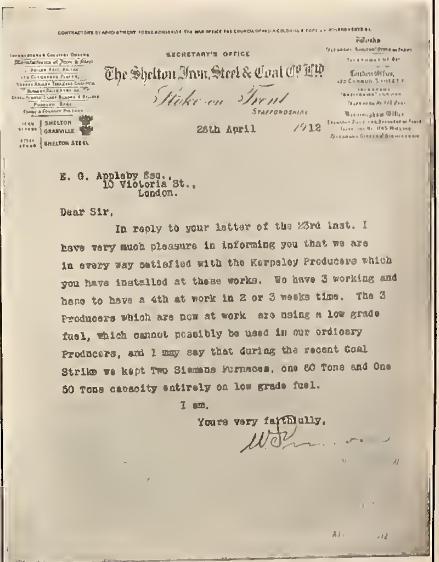

SECRETARY'S OFFICE

The Shelton Iron, Steel & Coal Co Ltd

Stoke-on-Trent

STAFFORDSHIRE

SHELTON
GRANVILLE
SHELTON STEEL

London Office,
Cannon Street

26th April 1912

E. G. Appleby Esq.,
10 Victoria St.,
London.

Dear Sir,

In reply to your letter of the 23rd inst. I have very much pleasure in informing you that we are in every way satisfied with the Kerpeley Producers which you have installed at these works. We have 3 working and hope to have a 4th at work in 2 or 3 weeks time. The 3 Producers which are now at work are using a low grade fuel, which cannot possibly be used in our ordinary Producers, and I may say that during the recent Coal Strike we kept Two Siemens Furnaces, one 60 Tons and One 50 Tons capacity entirely on low grade fuel.

I am,

Yours very faithfully,

LOW GRADE FUEL.

THE

ppers' Coke Oven

proved to be the most successful on the market, as is evidenced by the fact that in
parately short period of nine years orders for over **9,000** Ovens have been placed
of which number over **4,250** are repeat orders. These orders represent a capital
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£7,500,000.

SIMILAR SUCCESS ATTENDS THE INTRODUCTION OF

PERS' NEW SYSTEM OF BYE-PRODUCT RECOVERY.

e New System the Scrubbing process is entirely dispensed with, and the Ammonia is recovered direct from the Gas in the form of Sulphate.

ADVANTAGES OF NEW SYSTEM

Liquor reduced by 50 per cent. and upwards.	**Consumption of Water is considerably Reduced.**
aving in Steam Consumption.	**Less Labour Cost.**
Yield of Sulphate and Benzol.	**Plant is Simpler to Operate, and requires less Supervision.**

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on Application to—

KOPPERS' COKE OVEN AND BYE-PRODUCT CO.,

301, *Glossop Road, SHEFFIELD.*

Telegraphic Address—
"KOCHS, SHEFFIELD."

NEW COAL BREAKER.

WHITAKER'S PATENT

coal reduced to uniformly sized cobbles or nuts,
any cost for labour.

equal and saleable cobbles made, with less slack
other methods.

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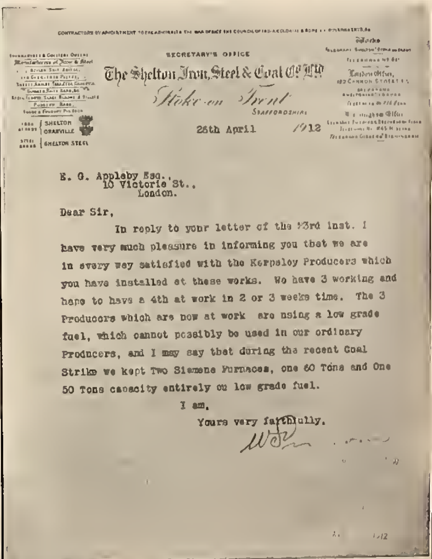
KERPELY GAS PRODUCERS

EFFECTIVELY GASIFY



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STAFFORDSHIRE

SHELTON
GRANVILLE
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I am,
Yours very faithfully,

LOW GRADE FUEL.

ANTHRACITE COAL.

BREAKING, SIZING AND WASHING PLANT.

We have Specialised in this class of Machinery, and have designed and made more than all other firms combined.

Reference to users are invited. Established 50 Years.

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LUBRICATORS, ETC.
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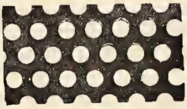

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New Forms, &c., recently issued under the Coal Mines Acts.

This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c.

Continued from Page 922.

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C.G., 24	Report of Inspection of Ventilation, &c. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 27	Foreman Enginewright's Daily Report to Manager. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 28	Foreman Smith's Daily Report. Books of 200 pages	4s. each.	By post 4s. 5d.
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C.G., 31*	The same as C.G. 31, but without rules on back	4s. each.	By post 4s. 5d.
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C.G., 32	Authority to have charge of Detonators. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 4d.
C.G., 34	Appointment of Deputy, Fireman, &c. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 4d.
C.G., 35	Workmen's Contracts and Workmen's Deductions. Books of 200 pages, Forms 35A and 35B combined	4s. each.	By post 4s. 5d.
C.G., 35A	Workmen's Contracts. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 35B	Workmen's Deductions. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 42	Certificated Manager's Daily Report. Books containing 200 pages	4s. each.	By post 4s. 5d.
C.G., 43	Certificated Under-Manager's Daily Report. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 47	Veterinary Surgeon's Weekly Report. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 48	Daily Return of Early Riders and Damaged Lamps. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 49	Accident Report to Manager. Books of 50 Reports and duplicates	4s. each.	By post 4s. 5d.
C.G., 50	Daily Record of Male Persons above 16 Employed Above and Below Ground. Books of 48 pages, covering 12 years	2s. each.	By post 2s. 3d.
C.G., 50A	Abstract of all Persons Employed, to facilitate the making of the Annual and other Returns. Books of 96 pages	3s. each.	By post 3s. 4d.
C.G., 50B	Register of Officials, with Particulars of Engagement. Books of 96 pages	3s. each.	By post 3s. 4d.
C.G., 50C	Register of Persons Employed, with Particulars of Engagement. Books of 96 pages	3s. each.	By post 3s. 4d.
C.G., 50C*	Ditto ditto 24 Hours' Notice. Books of 96 pages	3s. each.	By post 3s. 4d.
C.G., 50D	Book made up of 48 pages 50A; 24 pages each 50B and 50C; indexed for easy reference	3s. each.	By post 3s. 4d.
C.G., 51	Coal-cutter's Daily Report. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 70	Appointment of Winding Engineman. Books of 100 Certificates with counterfoils	4s. each.	By post 4s. 4d.
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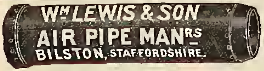

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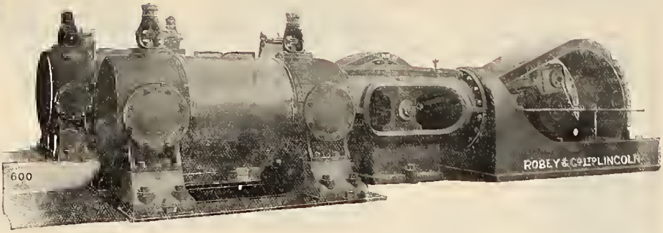

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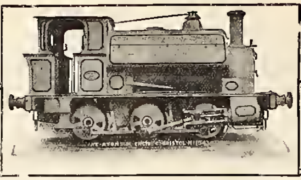

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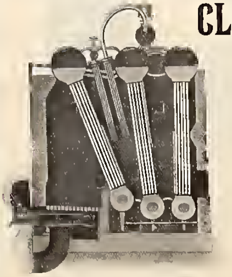

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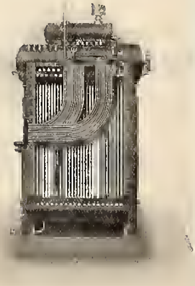

Sectional view of Boiler showing Superheater in position.

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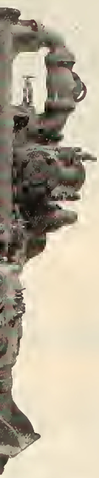

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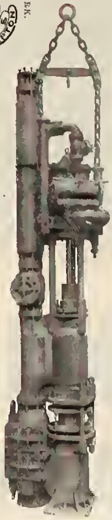

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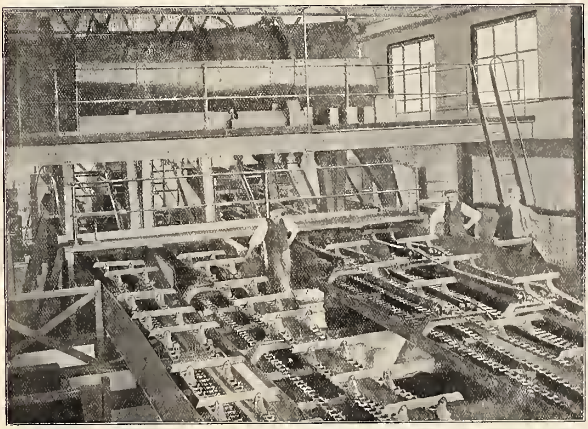

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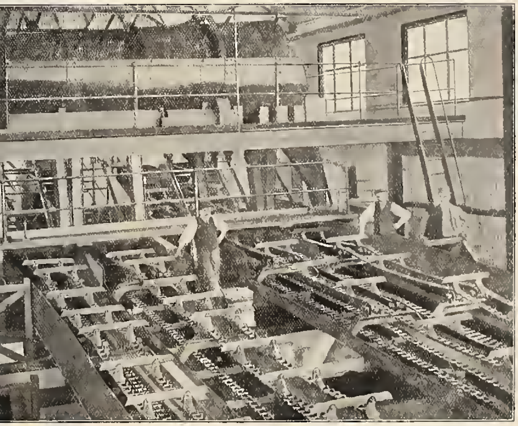

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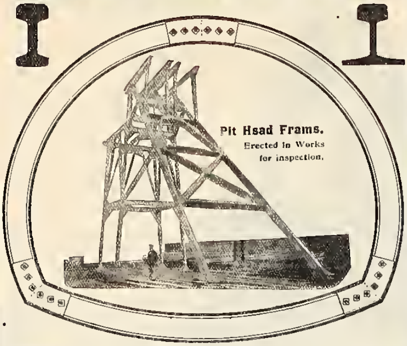


Example of 10 in. × 6 in. 42 lb. R S Joists curved for Framework to Roadway.

ROLLED STEEL JOISTS for PIT PROPS, FRAMEWORK TO ROADWAYS, &c.

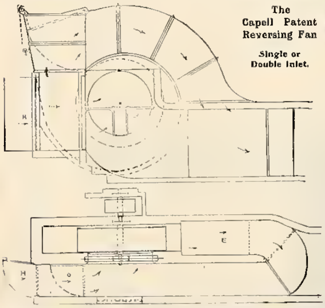
STRUCTURAL STEELWORK FOR BUILDINGS, &c.

Mild Steel Blooms, Billets, Slabs, Tinbars, Rounds & Flats.
Rolls cut for Special Sections and to approved quantities.

Books of Sections and other information on application.

Which Collieries Lead the Way?

There is one answer that cannot be gainsaid. It is those that eliminate deterrent influences that militate against progress. There's plenty of room at the front; don't be in the rear with the witless. Take advantage of good opportunities; they come to all. Here is one:—The "Exol" System offers clean steam, recovered oil, economy in the water bill, purified feed-water heated by exhaust, and guarantees to effect what it claims to do. Write for *What to do with Exhaust Steam* pamphlets to Exol Company, 66, Fenchurch Street, E.C.



The Capell Patent Reversing Fan

Single or Double Inlet.

CAPELL PATENT FANS (1906-1907).

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These give larger Volumes and higher Manometric Effects. The Result is a Smaller Fan is now used for all duties. Fans—Rope or Belt or Direct Driven.

SOME RESULTS OF THESE NEW FANS ARE NOW GIVEN.

1. IN ENGLAND.
Fan, 12 ft. 6 in. × 7 ft. 0 in.
Date, Oct. 5th, 1907.

Revols.	265
W.G.	8 inches
Cubic ft. per min.	376,000
H.P. in av.	472
H.P. indicated .	579
Useful Effect	81·5 %

2. IN PENNSYLVANIA.
Fan, 16 ft. 0 in. × 8 ft. 0 in.
Direct Driven.
Date, October 6th, 1907.

Revols.	158
Cubic ft. ..	431,700
W.G.	4·3 inches
Useful Effect	80 %

3. IN ENGLAND.
Single Inlet Fan.
16 ft. 0 in. × 5 ft. 6 in.

Revols.	170
Cubic ft. ...	298,000
W.G.	5¼ inches
Useful Effect	74 %

INDUCED DRAUGHT. IN-BYE FANS, CUPOLA FANS, FORGE FANS, HAND MINING FANS, AND DUPLICATE MINE FANS.

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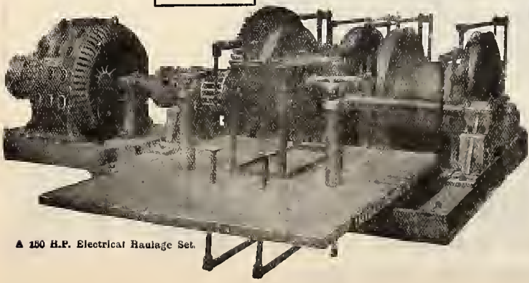

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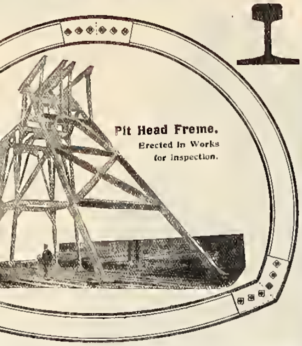

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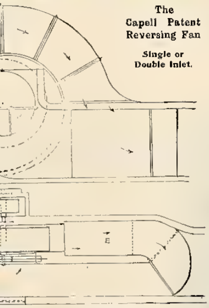

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Revols. 265	Revols. 158	Revols. 170
W.G. ... ... 8 inches	Cubic ft. .. 431,700	Cubic ft. ... 298,000
Cubic ft. per min. 376,000	W.G. ... .. 4·3 inches	W.G. ... ... 5¼ inches
H.P. in av. .. . 472	Useful Effect 80 %	Useful Effect 74 %
H.P. indicated . 579		
Useful Effect 81·5 %		

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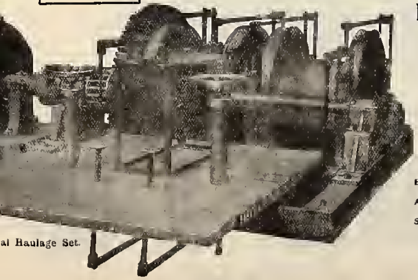

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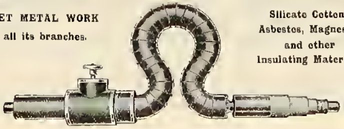

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60,000 ft., from 500 to 3,600 ft.

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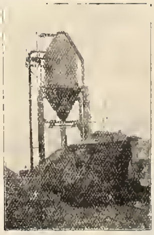
THE MOST POPULAR COAL GETTER.

EXPLOSIVES



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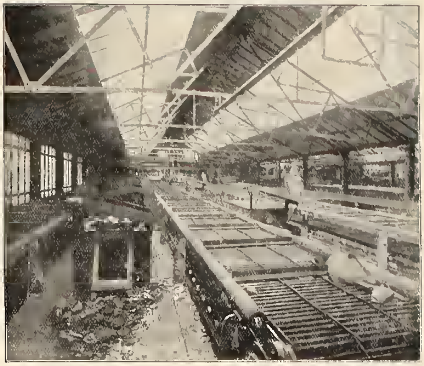

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Suitable for any Pressure.

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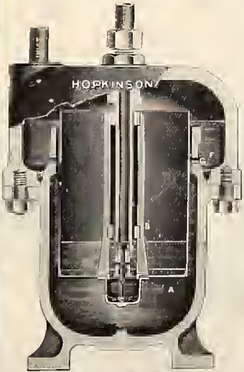

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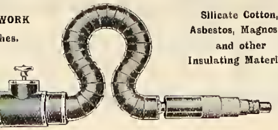

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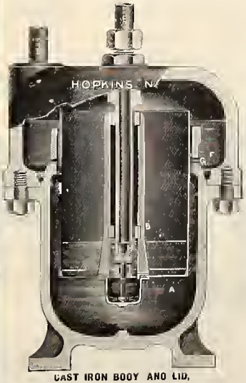

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No. 236.

THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CIV. FRIDAY, NOVEMBER 8, 1912 No. 2706.

INSURANCE OF GERMAN MINERS.

In view of the new British National Insurance Act, more than usual interest attaches to the report for 1911 of the German Mining Assurance Corporation (*Knappschafts-Berufsgenossenschaft*). In 1911 the corporation covered 342 coalmines, employing 625,597 workmen, receiving wages amounting to £45,050,400, or £72 per head per annum; 524 lignite mines, employing 71,242 workmen, receiving wages amounting to £4,450,386 (£62 per head); 463 metalliferous mines and metallurgical works, employing 88,075 workmen (£61 per head); 224 salt mines and salt works, employing 39,649 workmen (£70 per head); and 455 other mineral workings, employing 13,711 workmen (£54 per head). The following table shows the totals and averages for a number of different years:—

Year.	Establishments.	No. of workmen.	Wages. Total. £	Wages. Per head. £
1886	1,658	343,709	12,540,124	36·4
1896	1 822	446,342	20,831,827	46·6
1906	2,186	689,248	44,561,102	64·6
1910	1,937	825,777	55,517,824	67·2
1911	2,008	838,274	58,489,642	69·7

The increase in the size of individual establishments is very marked in the case of coalmines, for which the figures, corresponding to the above, are as follow:—

Year	Establishments	No. of workmen	Total	Per head
1886	357	221,364	8,508,594	38·4
1896	337	311,233	15,396,723	49·4
1906	342	505,509	34,634,471	68·5
1910	359	618,114	42,919,105	69·4
1911	342	625,597	45,050,400	72·0

It will be seen that the wages have practically been doubled since 1886; but it is necessary to remark that for 1886 and 1896 the figures shown record the estimated expenditure in wages, whilst for 1906, 1910 and 1911 they are the actual sums paid over.

Turning to the accident statistics, we have some interesting facts recorded. Thus, the following shows the number of accidents reported—of accidents for which compensation was paid, and of those from which death resulted:—

	1901.	1910.	1911.
Number of accidents reported	68,898	111,641	114,669
Ditto per 1,000 employed	113·44	135·2	136·7
Number of accidents for which compensation was paid	7,933	12,155	12,213
Ditto per 1,000 employed	13·06	14·72	14·57
Fatal accidents:—			
Within year of accident	1,289	1,571	1,689
Ditto per 1,000 employed	2·12	1·90	2·01
Including those after lapse of year	1,363	1,595	—
Ditto per 1,000 employed	2·24	1·93	—

Of the 12,213 accidents for which compensation was paid in 1911, 1,688 were those in which death occurred, 58 were followed by permanent total disablement, 2,849 by permanent partial disablement, and 7,618 by temporary disablement.

Taking the whole of the reported accidents (114,669) according to the day of the week, they were as follow: Sunday, 2,314; Monday, 17,790; Tuesday, 19,391; Wednesday, 18,789; Thursday, 18,595; Friday, 18,381; Saturday, 19,412. The figures for Saturday are surprisingly high.

The cost of insurance per workman and per £50 of wages has been as under:—

	Per workman. s.	d.	Per £50 of wages. s.	d.
1890	15	0	16	7
1895	20	4	22	8
1900	19	1	17	3
1905	33	3	28	0
1909	39	0	29	5
1910	38	3	28	6
1911	39	10	28	7

In 1911 112,043 persons were indemnified, as against 97,892 in 1910, the distribution being as follows:—

	Number.	Total sums paid. £
Injured workmen	71,262	757,591·5
Widows	12,840	139,209·5
Orphans	26,954	266,543·5
Dependants	987	10,783·5
Total	112,043	1,174,628

In addition, relief was afforded during the time that the injured head of the family was in hospital or sanatorium, in the following proportions:—3,357 wives (£6,975), 9,422 children (£16,848), and 62 dependants (£273).

On December 31, 1911, 51,538 workmen were in receipt of compensation, the average sum paid in cases of entire compensation being £40 9s.; the average sum paid was £12 6s., the mean amount of compensation thus being 30·43 per cent of the maximum.

The total cost levied on the employers during 1911 was as follows:—

	£	£
Compensation, aid, funeral allowances, &c.		1,324,322·8
Aid granted during the 13 weeks following accident		15,632·4
Enquiries in regard to accidents		31,179 7
Expenses of litigation		13,961·3
Prevention of accidents		5,187·4
Expenses of administration		51,384·6
Paid to general fund		125,000·0
Various expenses		1,939·4
Carried to reserve fund		220,570·3
		1,788,313·1
Less: Interest on (general) fund and other sums	21,247·7	
Ditto on reserve fund	95,954·5	
		117,202·3
Total		1,671,110·8
Balances at December 31, 1912:		
General fund		411,744·8
Reserve fund		3,363,650·1

Further information on the same subject is given in the report of the Bochum Miners' General Relief and Pension Fund (*Algemeiner Knappschaftsverein zu Bochum*) for 1912, the central organisation which is charged with the distribution of relief in the Ruhr coalfield; that is, with the exception of the employers' liability for accidents of employment, covered exclusively by the employers, through the *Knappschafts-Berufsgenossenschaft*.

The Relief Fund has three distinct branches, for which separate accounts are kept, viz.:—(1) Sickness Fund (*Krankenkasse*); (2) Pension and Relief Fund (*Pensionskasse*); and (3) Invalidity Insurance Fund (*Invalidenversicherungskasse*), the latter being in compliance with the law.

Sickness Fund.—The number insured in this fund in 1911 was 357,321, the contributions being in the following proportions: Insured persons, £503,179; employers, £503,152—total, £1,006,331, or £2 16s. 4d. per head. It is noted that the number of cases of sickness continues to increase, as will be seen from the following table:—

	No. of cases of sickness.	Per cent.	No. of cases of ankylostomiasis included.	Per cent.
1907	201,814	65·2	1,851	0·6
1908	210,768	61·3	1,171	6·3
1909	225,814	64·8	953	0·3
1910	231,606	65·9	1,252	0·36
1911	254,248	71·2	1,086	0·3

Of the total, 66,550 cases had their origin in accidents of employment (18·6 per cent. of those employed), also a notable increase. The number of days for which compensation was paid was 4,369,569, or 12·2 days per assured person (as against 11·8 in 1910). Each case, in other words, lasted 23·9 days, for which the member received compensation for 17·9 days. Per day of sickness indemnified, the average compensation was 2s. 4d., and the cost to the fund 3s. 11½d. Per case, the corresponding figures were £2 1s. 9d. and £3 11s. 1d. respectively. On the basis of the numbers insured, these figures were £1 8s. 7d. to £2 6s. 3d. per head respectively.

The following shows details of the expenditure in 1910 and 1911:—

	1910. £	1911. £
Monetary compensation	486,011·4	510,736·6
Honoraria to doctors*	70,745·6	71,687·9
Do. specialists*	23,305·4	24,654·3
Travelling expenses	1,976·5	2,355·5
Minor surgical expenses	1,726·3	1,773·2
Medicaments, bandages, &c.	76,546·9	84,680·1
Hospital expenses	162,458·6	173,108·4
Expenses for special diseases	531·5	547·8
Total	823,302·3	869,539·8

* The medical staff of the fund includes 446 doctors, of whom 339 are ordinary district doctors, 86 specialists, and, including therein the chief doctors, 21 other medical men.

The deaths of assured persons in 1911 numbered 2,266, as against 2,097 in 1910.

The balance of receipts over expenditure in 1911 was £87,887, as against £105,314 in 1910. The reserves, which at the end of 1909 amounted to £281,133, at December 31, 1911, had reached the total of £496,728.

Pension and Relief Fund.—The number insured in this fund in 1911 was 294,549, as against 288,869 in 1910. The weekly cost per worker insured was just short of 1s. Contributions in the total were as follow:—Insured persons, £766,788; employers, £765,546. The following table shows the number of pensions granted in 1911:—

	Invalidity not caused by accident. No. of pensions.	Invalidity not caused by accident. Amount paid in pensions.	Invalidity following accident. No. of pensions.	Invalidity following accident. Amount paid in pensions.
Invalids	28,307	500,686	5,928	9,993
Widows	18,229	182,036	3,809	7,443
Children of invalids	19,777	38,232	4,148	8,301
Children of widows	13,918	27,273	6,142	—
Orphans	982	3,882	203	—
Total	81,213	752,109	20,530	25,737
Total, 1910	82,217	726,481	20,204	24,746

The average age of invalidity was 42·7 years in 1911—45·1 years when the cause was sickness and 34 when due to accident.

The fund showed a surplus in 1911 of £697,523, as compared with £662,731 in 1910.

Invalidity Insurance Fund.—The average number of insured in this fund (which deals with invalidity and old age) in 1911 was 348,387, and the total contributions, £320,767, were made up of £162,824 from the assured and £157,943 from employers.

The number of persons pensioned in 1911 was 16,154, comprising the following:—Holders of pensions for old age (70 years), 228; pensions on account of permanent disablement, 15,910; pensions on account of temporary disablement, 16; the total being 4·65 per cent. of the total number insured, as against 4·59 per cent. in 1910.

The average value of the pensions accorded has been:—

For	Pensions granted during the year. £	s.	d.	Pensions already granted. £	s.	d.
Old age	10	10	6	10	4	2
Permanent invalidity	12	1	6	10	7	3
Temporary invalidity	10	19	3	11	10	2

The average age at which pensions were granted in 1911 was 52 years—40·1 years for temporary and 52·1 years for permanent invalidity.

The fund showed a surplus in 1911 of £74,860, as against £71,936 in 1910. The expenditure of the fund was as follows:—Invalidity pensions, £170,447; old-age pensions, £2,210; paid to foreign pensioners after leaving German territory, £127; medical attendance and relief of families, £24,365; pecuniary relief, £7,870; transferred to other funds, £51,251 (as against this the State furnished £42,291 and other funds); various, £873—total, £257,151, as against £251,089 in 1910.

The Three Funds.—Taking the three funds collectively, their total value at the end of 1911 was £9,836,766, as against £8,653,639 at the end of 1910, divided as follows: Sickness fund, £496,728; pension fund, £6,605,529; invalidity fund, £2,734,509.

It is interesting to note that in 1911 the members of the sickness fund included 336,161 persons of German nationality and 30,632 foreigners; of the former 134,897 came from the East of the Empire (East and West Prussia, Posen and Upper Silesia); of the latter 21,524 were natives of Austria-Hungary, 4,989 were Dutch, 2,535 Italian, 1,081 Russian, and 209 Belgian. Of the total, it may be added, 36·7 per cent. were bachelors, 62·3 per cent. married men, 0·9 per cent. widowers, and 0·1 per cent. divorced.

HE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

FRIDAY, NOVEMBER 8, 1912 No. 2706.

GERMAN MINERS.

tish National Insurance Act, attaches to the report for ing Assurance Corporation *renschaft*). In 1911 the cor-lmines, employing 625,597 amounting to £45,050,400, or 524 lignite mines, employing ages amounting to £4,450,386 lliferous mines and metal- ; 88,075 workmen (£61 per salt works, employing 39,649 d 455 other mineral workings, £54 per head). The following d averages for a number of

of nen.	Wages. Total. £	Per head. £
709	12,540,124	36·4
342	20,831,827	46·6
248	44,561,102	64·6
777	55,517,824	67·2
274	58,489,642	69·7

individual establishments is of coalmines, for which the e above, are as follow :—

364	8,508,594	38·4
233	15,396,723	49·4
509	34,634,471	68·5
114	42,919,105	69·4
597	45,050,400	72·0

wages have practically been is necessary to remark that es shown record the estimated lst for 1906, 1910 and 1911 aid over.

nt statistics, we have some Thus, the following shows orted—of accidents for which d of those from which death

	1901.	1910.	1911.
cted	68,898	111,641	114,669
	113·44	135·2	136·7
hich			
	7,933	12,155	12,213
	13·06	14·72	14·57
	1,289	1,571	1,689
	2·12	1·90	2·01
e of			
	1,363	1,595	—
	2·24	1·93	—

for which compensation was ose in which death occurred, rmanent total disablement, l disablement, and 7,618 by

e reported accidents (114,669) he week, they were as follow: 17,790; Tuesday, 19,391; sday, 18,595; Friday, 18,381; figures for Saturday are

per workman and per £50 of

Per kman. d.	Per £50 of wages. s. d.
0	16 7
4	22 8
1	17 3
3	28 0
0	29 5
3	28 6
10	28 7

were indemnified, as against tion being as follows :—

Number.	Total sums paid. £
71,262	757,591·5
12,840	139,209·5
26,954	266,543·5
987	10,783·5
112,043	1,174,628

fforded during the time that family was in hospital or sanatorium, in the following proportions:—3,357 wives (£6,975), 9,422 children (£16,848), and 62 dependants (£273).

On December 31, 1911, 51,538 workmen were in receipt of compeneation, the everage sum paid in cases of entire compensation being £40 9s.; the average sum paid was £12 6s., the mean amount of compensation thus being 30·43 per cent of the maximum.

The total cost levied on the employers during 1911 was as follows:—

		£
Compensation, aid, funeral allowances, &c.		1,324,322·8
Aid granted during the 13 weeks following accident		15,632·4
Enquiries in regard to accidents		31,179 7
Expenses of litigation		13,961·3
Prevention of accidents		5,187·4
Expenses of administration		51,384·6
Paid to general fund		125,000·0
Various expenses		1,939·4
Carried to reserve fund		220,570·3
		1,788,313·1
Less: Interest on (geueral) fund and other sums	£ 21,247·7	
Ditto on reserve fund	95,954·5	
		117,202·3
Total		1,671,110·8
Balances at December 31, 1912:		
General fund		411,744·8
Reserve fund		3,363,650·1

Further information on the same subject is given in the report of the Bochum Miners' General Relief and Pension Fund (*Algemeiner Knappschaftsverein zu Bochum*) for 1912, the central organisation which is oharged with the distribution of relief in the Ruhr coalfield; that is, with the exception of the employers' liability for accidents of employment, covered exclusively by the employers, through the *Knappschafts-Berufsgenossenschaft*.

The Relief Fund has three distinct branches, for which separate accounts are kept, viz.:—(1) Sickness Fund (*Krankenkasse*); (2) Pension and Relief Fund (*Pensionskasse*); and (3) Invalidity Insurance Fund (*Invalidenversicherungskasse*), the latter being in compliance with the law.

Sickness Fund.—The number insured in this fund in 1911 was 357,321, the contributions being in the following proportions: Insured persons, £503,179; employere, £503,152—total, £1,006,331, or £2 16s. 4d. per head. It is noted that the number of cases of sickness continues to increase, as will be seen from the following table:—

	No. of cases of sickness.	Per cent.	No. of cases of ankylostomiasis included.	Per cent.
1907	201,814	65·2	1,851	0·6
1908	210,768	61·3	1,171	0·3
1909	225,814	64·8	953	0·3
1910	231,606	65·9	1,252	0·36
1911	254,248	71·2	1,086	0·3

Of the total, 66,550 cases had their origin in accidents of employment (18·6 per cent. of those employed), also a notable increase. The number of daye for which compensation was paid was 4,369,569, or 12·2 days per assured person (as against 11·8 in 1910). Each case, in other words, lasted 23·9 days, for which the member received compensation for 17 9 days. Per day of sickness indemnified, the average compensation was 2s. 4d., end the cost to the fund 3s. 11½d. Per case, the corresponding figures were £2 1s. 9d. and £3 11s. 1d. respectively. On the basis of the numbers insured, these figures were £1 8s. 7d. to £2 6s. 3d. per head respectively.

The following shows details of the expenditure in 1910 and 1911:—

	1910. £	1911. £
Monetary compensation	486,011·4	510,736·6
Honoraria to doctors*	70,745·6	71,687·9
Do. specialists*	23,305·4	24,654·3
Travelling expenses	1,976·5	2,355·5
Minor surgical expenses	1,726·3	1,773·2
Medicaments, bandages, &c.	76,516·9	84,686·1
Hospital expenses	162,158·6	173,108·4
Expenses for special diseases	531·5	547·8
Total	823,302·3	869,539·8

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Pension and Relief Fund.—The number insured in this fund in 1911 was 294,549, as against 288,869 in 1910. The weekly cost per worker insured was just short of 1s. Contributions in the total were as follow:—Insured persons, £766,788; employers, £765,546. The following table shows the number of pensions granted in 1911:—

	Invalidity not caused by accident. No. of pensions.	Amount paid in pensions.	Invalidity following accident. No. of pensions.	Amount paid in pensions.
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The average age of invalidity was 42·7 years in 1911—45·1 years when the canse was sickness and 34 when due to accident.

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The number of persone pensioned in 1911 was 16,154, comprising the following:—Holdere of pensione for old age (70 years), 228; pensions on account of permanent disablement, 15,910; pensione on account of temporary disablement, 16; the total being 4·65 per cent. of the total number insured, as against 4·59 per cent. in 1910.

The average value of the peneions accorded has been:—

For	Pensions granted during the year. £ s. d.	Pensions already granted. £ s. d.
Old age	10 10 6	10 4 2
Permanent invalidity	12 1 6	10 7 3
Temporary invalidity	10 19 3	11 10 2

The average age at which pensions were granted in 1911 was 52 years—40·1 years for temporary and 52·1 years for permanent invalidity.

The fund showed a surplus in 1911 of £74,860, as against £71,936 in 1910. The expenditure of the fund wae as follows:—Invalidity pensions, £170,447; old-age pensions, £2,210; paid to foreign peneionors after leaving German territory, £127; medical attendance and relief of families, £24,365; pecuniary relief, £7,870; transferred to other funds, £51,251 (as against this the State furnished £42,291 and other funds); various, £873—total, £257,151, as against £251,089 in 1910.

The Three Funds.—Taking the three funde collectively, their total value at the end of 1911 was £9,836,766, as against £8,653,639 at the end of 1910, divided as follows: Sickness fund, £496,728; pension fund, £6,605,529; invalidity fund, £2,734,509.

It is interesting to note that in 1911 the members of the sickness fund included 336,161 persons of German nationality and 30,632 foreigners; of the former 134,897 came from the East of the Empire (East and West Prussia, Posen and Upper Silesia); of the latter 21,524 were nativee of Austria-Hungary, 4,989 were Dutch, 2,535 Italian, 1,081 Russian, and 209 Belgian. Of the total, it may be added, 36·7 per cent. were bachelors, 62·3 per cent. married men, 0·9 per cent. widowers, and 0·1 per cent. divorced.

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* The medical staff of the fund includes 446 doctors, of whom 339 are ordinary district doctors, 86 specialists, and, including therein the chief doctors, 21 other medical men.

The total value of the figures shown may be roughly taken as representing about 910 millions sterling.

A table shows the loss of life from accidents in mines and quarries, and the death-rates from accidents per 1,000 persons employed. Taking coalmines for which the figures are fairly complete, it will be seen that the death-rate of the United Kingdom was 1·70, and for the British Empire 1·79; while for Austria it was 1·17, for Belgium 0·95, for France 1·08, for Japan 2·23, for Germany 1·95, and for the United States 3·79. The death-rate for foreign countries generally was 2·45. In the case of goldmines, complete figures are only available for the British Empire. They show a decrease in the death-rate from 4·38 in 1909 to 3·55 in 1910.

The following table shows the output of coal in the British Empire and in foreign countries during the year 1910:—

Country.	Coal. Metric tons.
Great Britain and Ireland	268,676,528
British colonies, dependencies, and possessions:—	
Australia	9,915,602
British Borneo	165,281
Canada	11,710,993
India	12,240,744
New Zealand	2,232,624
Rhodesia	163,355
South Africa	6,508,383
Total for British Empire	311,613,510
Foreign countries:—	
Austria-Hungary	47,943,109
Bosnia and Herzegovina	706,659
Belgium	23,916,560
Brazil	15,000*
Bulgaria†	227,362
Chile†	898,971
China‡	13,190,000*
France	38,349,942
Indo-China	498,551
German Empire	222,375,076
Greece	1,500
Holland	1,292,289
Dutch East Indies	535,226
Italy	562,153
Japan	15,681,324
Formosa	231,641
Korea	73,932
Mexico	919,338†
Peru	307,320
Philippine Islands	27,000
Portugal	8,149
Roumania	160,783§
Russia	24,026,000
Servia	276,815
Spain†	4,125,894
Spitzbergen†	2,316
Sweden	302,786
Switzerland	2,500*
Turkey‖	702,722
United States	455,045,219
Total for foreign countries	852,406,107
Total for the world	1,164,019,677

Estimated. † Figures for 1909. ‡ Output for certain provinces only. § Output for 1908. ‖ Figures for 1908 except copper.

The following shows the output of coal and other minerals in the British Empire and foreign countries:—

	British Empire. Metric tons.	Foreign countries. Metric tons.	Total. Metric tons.
Coal	311,613,510	852,406,107	1,164,019,677
Copper	78,914	853,349	932,463
Fine gold (kilos.)	393,152	300,224	693,376
Iron	5,824,394	58,230,756	64,055,150
Lead	250,305	809,305	1,059,610
Petroleum	923,046	42,532,507	43,455,553
Salt	3,921,378	13,831,737	17,753,115
Fine silver (kilos.)	1,596,611	5,147,547	6,744,158
Tin	60,523	56,233	116,756
Zinc	194,342	730,880	925,222

The next table shows the death rates from accidents in coalmines in the British Empire and in foreign countries during 1909 and 1910:—

Country.	Death-rates per 1,000 persons employed.	
	1909.	1910.
Great Britain and Ireland	1·43	1·70
British colonies, dependencies, and possessions:—		
Australia:—		
New South Wales	0·75	1·16
Queensland	1·17	1·65
Victoria	—	1·96
Western Australia	—	3·84
British Borneo:—		
Labuan	11·88	17·7
Canada:—		
British Columbia	8·88	3·61
Nova Scotia	2·98	2·73
Alberta	1·73	10·48
India	1·07	1·53
New Zealand	1·67	3·48
South Africa:—		
Cape Colony	1·23	1·33
Natal (including Zululand)	3·08	3·98
Transvaal	4·44	3·52
Total for British Empire	1·48	1·79
Foreign countries:—		
Austria-Hungary:—		
Austria	1·13	1·17
Bosnia and Herzegovina	2·77	2·12
Belgium	0·95	0·95
France	1·17	1·08
German Empire	2·30	1·95
Holland	1·03	1·50
Japan	3·51	2·23
United States	3·35*	3·79*
Total for foreign countries	2·48	2·45
Total for the world	2·11	2·20

[*] The figures relate to the principal coal-producing States.

THE SECOND CENSUS OF PRODUCTION

The Second Census of Production, under the Census of Production Act, 1906, will be taken in 1913 in respect of production carried on in the present year. The schedules to be issued to manufacturers and others for the purpose of this census, cover, in the main, the same ground as those for the First Census. The instructions have been simplified, and the majority of the schedules have been reduced from eight pages to four pages of somewhat larger size. In certain schedules particulars are now required of the total make of important semi-manufactured products, such as yarns, pig iron, steel ingots, &c., whether further worked up by the makers or not.

By arrangement with the Home Office, the particulars of the numbers of persons employed will also serve as the ordinary return required for 1912 under section 130 of the Factory Act, and manufacturers will thus be saved the trouble of making two separate returns.

Small firms employing not more than five persons besides the employer, on making a declaration to that effect on the schedules issued to them, will be exempted from the requirement to furnish returns.

At the present time the schedules are being issued in draft to chambers of commerce and trade associations in order to afford them an opportunity for the consideration of the details of the information required before these are finally settled. The schedules on which manufacturers will be required to make their returns will not be sent out until the beginning of next year.

Taking first the schedule relating to coal and ironstone mining, particulars must be furnished as to the output and value of coal (classified according to variety and including colliery and "allowance" coal), and other minerals raised; the make and value of the coke and other products of coke works, the property of the colliery occupier; the cost of construction and repair work carried out by the collieries themselves; the estimated aggregate cost of materials and stores used at collieries and coke works respectively; the number of persons employed as (1) underground wage-earners, (2) aboveground wage-earners, and (3) salaried persons, at work on Monday and Wednesday in the last week in January, April, July, and October, 1912, with as regards (1) the number of absentees on each day, and giving the respective numbers of boys and adults, and males and females in each instance; the numbers of wage-earners and salaried persons employed at cokeworks on the last Wednesday in the same months; and the capacity of engines, &c., at mines or works.

In addition, voluntary information is asked for in regard to the quantities of fuel consumed at mines and cokeworks (exclusive of coal converted into coke); the numbers of the various types of coke ovens in operation during the year and effective at the end of the year; and the coal used in cokemaking.

The iron and steel schedule requires particulars as to the total make of semi-manufactured products, viz., pig iron (whether basic, forge and foundry, hæmatite or spiegeleisen, ferro-manganese, and ferro-silicon), steel ingots and direct castings, puddled bars and coke; the production and value of all products made for sale or for stock; the estimated cost of materials; the estimated amount paid to other firms for tilting, rolling, and other work done "on hire" or materials given out to them; the numbers of wage earners and salaried persons at work on the last pay-day in January, April, July and October, distinguishing adults, males, females, half-timers, and full timers; and the capacity of engines, &c.

Voluntary information is asked for in regard to the quantities of ore and coal used; the number and capacity of furnaces, mills and ovens in operation and "effective"; and the output of different kinds of steel.

MESSRS. W. H. WILLCOX AND CO.'S NEW PREMISES.

We reproduce below a photograph of the extended premises in Southwark-street, S.E., which have just been acquired by Messrs. W. H. Willcox and Co. Limited, whose semi-rotary wing pumps are so well-known in the mining world.

ELECTRICAL REGULATIONS IN BELGIAN MINES.[*]

Coal-cutting Machines.—On the advice of the Consulting Electrical Commission, the Minister of Industry and Labour has decided electrical coal-cutting machines shall not be permitted for use in fiery mines of class 3. For mines of classes 1 and 2, such machines will be permitted under the following conditions:—Triphase motors must be used, the effective difference of tension between two conductors not to exceed 250 volts. No sliding contacts may be used; and the rotors must be of the squirrel-cage type, the motors themselves to be completely enclosed in hermetical casings. The cables for connecting the motors with the fixed mains must have an insulation corresponding to 500 megohms, and be strongly sheathed to prevent accidental injury. Each cable must contain four conductors, one serving as an earth connection for the metallic masses of the coal-cutting machines and the circuit breakers. The contacts connecting the flexible cables with the mains must be fitted with circuit breakers, and arranged in such a way that they cannot be connected or disconnected until the current has been turned off. The circuit breakers must be mounted in closed, solid metallic casings, filled with oil of best quality. The working of the cutting machines must be suspended directly firedamp appears in any part of the working place.

High-tension Alternating Current with Portable Transformers.—It has been decided to permit the use of alternating current mains of high-tension in the intake airways of mines other than those of class 3, for operating electrical coal-cutters by means of portable step-down transformers giving a maximum difference of 250 volts between phases, provided these transformers comply with the following conditions:—They must be housed in well-ventilated cabins constructed of incombustible materials, the internal temperature of the cabins must not exceed 25 degs. Cent., and admittance is prohibited to all but duly authorised persons. The secondary circuits of the transformers must be submerged in oil, and the metallic casing must be carefully earthed through the sheathing of the high-tension cables. Automatic maximum circuit breakers must be provided on the primary and secondary circuits, which, in each transformer, must not supply more than one portable apparatus. The cable junctions must be housed in strong metal boxes, hermetically closed and the figures shown may be roughly g about 910 millions sterling.

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[*] From the *Annales des Mines de Belgique.*

loss of life from accidents in mines ne death-rates from accidents per yed. Taking coalmines for which y complete, it will be seen that the ted Kingdom was 1·70, and for the ; while for Austria it was 1·17, for France 1·08, for Japan 2·23, for for the United States 3·79. The n countries generally was 2·45. In s, complete figures are only available pire. They show a decrease in the in 1909 to 3·55 in 1910.

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Ireland	268,676,528
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	9,915,602
	165,281
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	163,355
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	23,916,560
	15,000*
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	13,190 000*
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	498,551
e	222,375,076
	1,500
	1,292,289
ndies	535,226
	562,153
	15,681,324
	231,641
	73,932
	919,338†
	307,320
nds	27,000
	8,149
	160,783§
	24,026,000
	276,815
	4,125,894
	2,316
	302,786
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British Empire. tric tons.	Foreign countries. Metric tons.	Total. Metric tons.
1,613,510	852,406,107	1,164,019,677
78,914	853,349	932,463
393,152	300,224	693,376
5,824,394	58,230,756	64,055,150
250,305	809,305	1,059,610
923,046	42,532,507	43,455,553
3,921,378	13,831,737	17,753,115
1,596,611	5,147,547	6,741,158
60,523	56,233	116,756
194,342	730,880	925,222

s the death rates from accidents British Empire and in foreign and 1910 :—

	Death-rates per 1,000 persons employed.	
	1909.	1910.
land	1·43	1·70
endencies, and		
es	0·75	1·16
	1·17	1·65
	—	1·96
lia	—	3·84
	11·88	17·7
ia	8·88	3·61
	2 98	2·73
	1·73	10·48
	1·07	1·53
	1·67	3·48
	1·23	1·33
g Zululand)	3·08	3·98
	4·44	3·52
ish Empire	1·48	1·79
:—		
	1·13	1·17
zegovina	2·77	2·12
	0·95	0·95
	1·17	1·08
	2·30	1·95
	1·03	1·50
	3·51	2·23
	3·35*	3·79*
gn countries	2·48	2·45
vorld	2·11	2·20

to the principal coal-producing

THE SECOND CENSUS OF PRODUCTION

The Second Census of Production, under the Census of Production Act, 1906, will be taken in 1913 in respect of production carried on in the present year. The schedules to be issued to manufacturers and others for the purpose of this census, cover, in the main, the same ground as those for the First Census. The instructions have been simplified, and the majority of the schedules have been reduced from eight pages to four pages of somewhat larger size. In certain schedules particulars are now required of the total make of important semi-manufactured products, such as yarns, pig iron, steel ingots, &c., whether further worked up by the makers or not.

By arrangement with the Home Office, the particulars of the numbers of persons employed will also serve as the ordinary return required for 1912 under section 130 of the Factory Act, and manufacturers will thus be saved the trouble of making two separate returns.

Small firms employing not more than five persons besides the employer, on making a declaration to that effect on the schedules issued to them, will be exempted from the requirement to furnish returns.

At the present time the schedules are being issued in draft to chambers of commerce and trade associations in order to afford them an opportunity for the consideration of the details of the information required before these are finally settled. The schedules on which manufacturers will be required to make their returns will not be sent out until the beginning of next year.

Taking first the schedule relating to coal and ironstone mining, particulars must be furnished as to the output and value of coal (classified according to variety and including colliery and "allowance" coal), and other minerals raised; the make and value of the coke and other products of coke works, the property of the colliery occupier; the cost of construction and repair work carried out by the collieries themselves; the estimated aggregate cost of materials and stores used at collieries and coke works respectively; the number of persons employed as (1) underground wage-earners, (2) aboveground wage-earners, and (3) salaried persons, at work on Monday and Wednesday in the last week in January, April, July, and October, 1912, with as regards (1) the number of absentees on each day, and giving the respective numbers of boys and adults, and males and females in each instance; the numbers of wage-earners and salaried persons employed at cokeworks on the last Wednesday in the same months; and the capacity of engines, &c., at mines or works.

In addition, voluntary information is asked for in regard to the quantities of fuel consumed at mines and cokeworks (exclusive of coal converted into coke); the numbers of the various types of coke ovens in operation during the year and effective at the end of the year; and the coal used in cokemaking.

The iron and steel schedule requires particulars as to the total make of semi-manufactured products, viz., pig iron (whether basic, forge and foundry, hæmatite or spiegeleisen, ferro-manganese, and ferro-silicon), steel ingots and direct castings, puddled bars and coke; the production and value of all products made for sale or for stock; the estimated cost of materials; the estimated amount paid to other firms for tilting, rolling, and other work done "on hire" or materials given out to them; the numbers of wage earners and salaried persons at work on the last pay-day in January, April, July and October, distinguishing adults, males, females, half-timers, and full timers; and the capacity of engines, &c.

Voluntary information is asked for in regard to the quantities of ore and coal used; the number and capacity of furnaces, mills and ovens in operation and "effective"; and the output of different kinds of steel.

MESSRS. W. H. WILLCOX AND CO.'S NEW PREMISES.

We reproduce below a photograph of the extended premises in Southwark-street, S.E., which have just been acquired by Messrs. W. H. Willcox and Co. Limited, whose semi-rotary wing pumps are so well-known in the mining world.

ELECTRICAL REGULATIONS IN BELGIAN MINES.*

Coal-cutting Machines. — On the advice of the Consulting Electrical Commission, the Minister of Industry and Labour has decided electrical coal-cutting machines shall not be permitted for use in fiery mines of class 3. For mines of classes 1 and 2, such machines will be permitted under the following conditions :—Triphase motors must be used, the effective difference of tension between two conductors not to exceed 250 volts. No sliding contacts may be used; and the rotors must be of the squirrel-cage type, the motors themselves to be completely enclosed in hermetical casings. The cables for connecting the motors with the fixed mains must have an insulation corresponding to 500 megohms, and be strongly sheathed to prevent accidental injury. Each cable must contain four conductors, one serving as an earth connection for the metallic masses of the coal-cutting machines and the circuit breakers. The contacts connecting the flexible cables with the mains must be fitted with circuit breakers, and arranged in such a way that they cannot be connected or disconnected until the current has been turned off. The circuit breakers must be mounted in closed, solid metallic casings, filled with oil of best quality. The working of the cutting machines must be suspended directly firedamp appears in any part of the working place.

High-tension Alternating Current with Portable Transformers.—It has been decided to permit the use of alternating current mains of high-tension in the intake airways of mines other than those of class 3, for operating electrical coal-cutters by means of portable step-down transformers giving a maximum difference of 250 volts between phases, provided these transformers comply with the following conditions :—They must be housed in well-ventilated cabins constructed of incombustible materials, the internal temperature of the cabins must not exceed 25 degs. Cent., and admittance is prohibited to all but duly authorised persons. The secondary circuits of the transformers must be submerged in oil, and the metallic casing must be carefully earthed through the sheathing of the high-tension cables. Automatic maximum circuit breakers must be provided on the primary and secondary circuits, which, in each transformer, must not supply more than one portable apparatus. The cable junctions must be housed in strong metal boxes, hermetically closed and equally valuable, that there was a certain area where it would be very foolish to invest any money. He thought both those suggestions from Prof. Dawkins were of very great value to any one who had any notion of speculating in coalfields.

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* From the *Annales des Mines de Belgique.*

Mr. KNOX asked if the boreholes were surveyed. It was important, he thought, to know if any means were taken to verify the fact or otherwise, that the boreholes went down straight. If they had wobbled, that wobbling might vitiate some of the conclusions as to dips.

The LECTURER said that boreholes were not surveyed because of circumstances which he explained to the meeting.

WORKMEN'S COMPENSATION.

(SPECIALLY CONTRIBUTED.)

Serious and Wilful Misconduct.

1. *Preliminary.*—Amongst the numerous compensation cases which have been noted in this column during the last five years, there have been many in which the question of "serious and wilful misconduct" has been considered. As the law now stands, the victim of an accident caused by such conduct is entitled to no compensation unless the result was death or serious and permanent injury. It follows that to prove misconduct is one of the few avenues of escape open to an employer. Misconduct is a subject of special importance in relation to those who are employed in mines, having regard to the fact that men have to be more subjected to the discipline of rules in this industry than probably any other.

It is now proposed to summarise the leading *mining* cases in which misconduct has been discussed. References to the cases are omitted for the sake of brevity, but can be given if required.

2. *Meaning of Serious and Wilful Misconduct.*—It may be mentioned, in the first place, that the word "wilful" imports that the misconduct was deliberate, not merely a thoughtless act on the spur of the moment. The word "serious" has been held to imply not that the actual consequences were serious, but that the misconduct itself was so. Finally the judges of the Court of Appeal have declared that serious and wilful misconduct outside the sphere of the employment does not bring within the sphere of the employment that which, but for the serious and wilful misconduct, would be outside of it.

3. *Breach of Rules as to Props.*—That "holing" without setting props in breach of rules may be serious and wilful misconduct, appears from a case decided under the 1897 Act. It there appeared that a special rule was in force forbidding holing more than 6 ft. without setting props; 17 ft. had already been holed when he started, without any props being set. He holed 3 ft. more and was then killed by a fall of coal. This was held to be serious and wilful misconduct. But it is clear that, in order to enable the employer to recover, he must be able to show that the accident was due to the misconduct. So in a later case, a miner was holing under a bed of shale above which was the "stoop." A special rule of the mine provided that he should have set props to support the shale; but he did not do so. Later on he had to pass under the shale to place props to support the stoop. The shale fell, and injured him. It was held that there was serious and wilful misconduct, but that the accident was not directly due to it, but was due to the subsequent work of supporting the roof. Consequently the employer was held liable. The mere fact that there is a breach of a rule relating to props is not of itself evidence of misconduct. In a later case a miner, in breach of rules made under the Coal Mines Regulation Act, 1887, moved certain props in order to be able to work some tram lines. The roof fell in the place whence the props had been taken, and injured him. The county court judge held that he had not been guilty of serious and wilful misconduct, and the Court of Appeal supported him, saying: "Every breach of the rules does not as a matter of law amount to serious and wilful misconduct."

4. *Riding on Hutches.*—A breach of the rules of every mine which prohibits riding on a hutch has frequently been decided to amount to serious and wilful misconduct; but it must be shown that the accident was due to that breach. So where a miner who rode on top of a loaded hutch was killed by a fall of stones from the roof, it was proved that his so riding did not in any way cause the fall. It was held that, although he was guilty of misconduct, the injury was not caused thereby, and that he was entitled to compensation.

5. *Passing along Haulage Road.*—To pass along a haulage road is a dangerous proceeding, and an accident then occurring may or may not be attributed to misconduct. In one case a collier had to pass from one place in the mine to another along a haulage road. When he arrived at the road he was told some trucks were coming. He did not wait, but went along the road. As he was making for a manhole to let the trams pass him the rope jerked, and he was injured. It was held that there was here no evidence of serious and wilful misconduct. With this may be contrasted another case, where, after having been warned to get into a manhole to avoid certain trams which were coming, a miner went on and passed six manholes. Before he could reach the seventh he was overtaken and killed. In this case it was held that the victim had been guilty of serious and wilful misconduct.

6. *Improper Use of a Sump Shaft.*—It is unwise for colliery officials to omit to forbid the doing of any act which is obviously dangerous. The fact that its use is obviously dangerous does not apparently make the miner guilty of misconduct. In one case it was shown that the proper way to pass from one level to another in a mine was by a ladder. There was also a sump shaft with a cage in it communicating between two levels. The men often used this, although it was dangerous. They knew that they were not supposed to use it, but there was no notice expressly forbidding the use of it. They did not use it when officials were present. A man was injured while using this shaft, but the Court held that he was not guilty of serious and wilful misconduct.

7. *Breaches of Rules as to Explosives, Naked Lights, &c.*—The decisions as to breaches of rules with regard to explosives, naked lights, &c., are very contradictory. For instance, in one case a miner lighted a train for blasting in a mine, and retired into safety to await the explosion. He only waited six minutes, and then returned and was injured by the explosion. By a rule posted in a conspicuous place at the pithead, he should not have returned for 30 minutes; but it appeared that he did not know of the rule, and that it was habitually disregarded in the pit. He was held *not* to have been guilty of misconduct. In another case a miner carried cartridges, having in his cap a naked light. As he was crawling through a narrow road 2 ft. high, a spark from the lamp exploded one of the cartridges, and he was injured. He did not know of the special rule, or of the rule at all, forbidding what he was doing, and it was the usual practice of the men in that mine to carry cartridges and naked lights together in that way. It was held that he was guilty of misconduct. These two decisions can only be reconciled by supposing that the court came to the conclusion that to expose cartridges in the vicinity of a naked light was misconduct in itself, apart from any rule on the subject.

A mere foolish act done in ignorance of the danger which attends the use of explosive will not necessarily expose a man to charge of serious and wilful misconduct. For instance, it appeared in one case that in the absence of the proper foreman, a workman was in charge of the blasting operations in a mine. The system was to bore holes, and to fill them with charges of an explosive with a detonator at the bottom of the charge, and wires carried up from the detonator, by means of which a fireman with a pocket electric battery set off the charge. The workman, apparently in fun, had told the fireman that there was no charge for him to set off, and when a charge was ready the fireman could not be found. The workman went to the charge, took the wires, and tried by pulling them to withdraw the charge, and was killed. He did not understand the detonator, nor did he know that what he was doing was dangerous. It was held that he was not guilty of serious and wilful misconduct.

A workman in a mine in a place where it was safe to carry a naked light was killed by an explosion caused by a man under his charge going further on with a naked light to a place where there was gas about, and where safety lamps should accordingly have been used. It was not proved that the deceased knew that the other man was going forward or told him to go. It was held in these circumstances that the deceased was not guilty of serious and wilful misconduct.

8. *Conclusion.*—What is the moral to be drawn from all the foregoing cases? It is clear that the first duty of the employer who would avoid accidents, is to not only frame rules, but take steps to see that his men read and understand them. To post a large printed notice on a wall behind a door is not an effective way of bringing rules to the knowledge of a pitman. Moreover, the rule itself should be drawn as to be easily understood; and the foremen should be instructed to explain to the men, if need be, the reason why a particular rule is insisted on. It must be confessed, however, that when the employer finds it enunciated as a proposition of law that the breach of a rule which is made to protect his workmen is not necessarily serious and wilful misconduct, he is likely to lose heart. Of course one can understand that cases may arise when a breach of rules is not only necessary but justifiable; but the rulings of the judges in the various cases which we have considered would seem to show that the question has to be considered afresh whenever it arises.

Liabilities of Insurance Companies.

Daff v. Midland Colliery Owners' Mutual Indemnity Company Limited.—This case, which was heard in the Court of Appeal on July 25, involved a question of considerable interest to insurance companies who may become liable to take over the liability of an employer who becomes bankrupt.

It appeared that the applicant met with an accident on June 15, 1909, at the Alma Colliery Company, and half wages were paid to him as compensation by that company down to a date in October 1911. The Alma Company, who were insured by the defendant company, went into liquidation on July 24, 1911. In October 1911 the applicant claimed compensation from the defendants on the ground that, by virtue of section 5 of the Act of 1906, the liability became vested in them. The claim was resisted on the ground that the liability of the defendants to indemnify the Alma Company had been determined, in accordance with the rules prior to July 24, on the ground that the Alma Company had failed to pay certain calls. The county court judge held that the liability of the defendants had been duly determined, and that therefore they were under no obligation to pay anything to the applicant. The Master of the Rolls, giving judgment in the Court of Appeal, affirmed the decision of the county court judge.

Lump Sum Agreements.

In a case at Sunderland (*Kierson v. Thompson and Sons*, July 26), Judge Bonsey made some interesting observations about lump sum agreements. It appeared that in March last the applicant had one eye put out in an accident. Being over 70 years of age, he was entitled to an old age pension, and he was also entitled to a bonus of £60, which, however, would not accrue if he continued to receive compensation by instalments The Registrar refused to record an agreement for the payment of £100 in full settlement. The matter being adjourned to the court, Judge Bonsey said he thought the Registrar was amply justified in having refused to record the agreement without further enquiry. Had the compensation been redeemed under the Act the man would be entitled to over £200, but he had now agreed to accept half that sum. He thought these agreements were far too frequently entered into. When a man was in a state of extreme poverty he (the judge) did not blame him trying to do the best he could for himself by accepting a lump sum, and going into a business or something, but in a great many instances the amounts accepted were inadequate. When, however, the Court had fully investigated the matter and was satisfied the man thoroughly understood what he was doing, then he (the judge) supposed the agreement must be recorded. He therefore granted the application for the recording of the agreement.

An Extraordinary Case.

Fife Coal Company v. McClure.—In this case (Kirkcaldy, August 1) the employers made application for the reduction of compensation in peculiar circumstances. Six years ago the applicant suffered from carbon-monoxide poisoning, as a result of which he was incapacitated and was paid 18s. a week. The employers applied for a reduction on the ground that the man had recovered. The Sheriff, in the course of a "note," said that the applicant was normally a healthy man, but he complained of pains which had no physiological relation to their producing causes. The employers' case was that he was but a clumsy malingerer, and that work would be the best thing for him. The Sheriff reduced the compensation to 12s., coming to the conclusion that the symptoms were to a large extent the product of a habit of exaggerated symptoms which had developed into the practice of grotesque simulation—that was to say, dropping on the floor, losing the power of speech, yelling or groaning, feeling pains in one part of the body when another part was touched, and such eccentricities were an acquired habit.

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COALMINING IN THE UNITED STATES.

Census Statistics.

The complete results of the census of mines and quarries have been issued by the Director of the Bureau of the Census of the United States Department of Commerce and Labour. It was prepared under the supervision of I. A. Hourwich, expert special agent for mining.

In 1909 in the United States, exclusive of Alaska, Hawaii, Porto Rico and other outlying non-contiguous territory, 23,682 operators conducted 27,240 mines and quarries and 160,448 petroleum and natural gas wells. The total expenditures connected with the operations of the 19,933 productive enterprises in 1909 were 1,042,642,693 dols. Of this amount, 586,774,079 dols. were paid to wage earners and 53,393,551 dols. were paid to salaried employees for services. Supplies and materials utilised, including cost of fuel and rent of power, were valued at 247,866,304 dols.; royalties and rent of mines amounted to 63,973,585 dols., contract work amounted to 28,887,898 dols.; and miscellaneous expenses, including taxes, rent of offices, and other sundry expenses, to 61,747,276 dols. The total amount expended by those operators engaged solely in development work during 1909 was 31,548,736 dols., of which 15,416,837 dols. went to salaried employees and wage earners, and 16,131,899 dols. for other expenses.

The gross value of products of mines and quarries, including petroleum and natural gas wells, in 1909 was 1,238,410,322 dols. This amount includes a duplication of 29,318,316 dols., representing the value of ore and natural gas produced by one operator and used as material by another. With this amount deducted from the gross value there remains 1,209,092,006 dols. as the net value of the products.

Coalmining was the leading industry in 1909. The value of coal sold as such and of the coke produced at the mine amounted to 577,142,935 dols., of which anthracite contributed 149,180,471 dols., and bituminous 427,962,464 dols. Petroleum and natural gas came next with a product valued at 185,416,684 dols.

In the distribution of the value of products by States, Pennsylvania, with a product valued at 349,059,786 dols., or 28·2 per cent. of the product of all States, ranked first. Of Pennsylvania's products, bituminous and anthracite coal contributed 296,424,311 dols., or 84·9 per cent. of the total for the State. Other States with a product of over 25,000,000 dols., with the value of their products, were as follows: Illinois, 76,658,974 dols.; West Virginia, 76,287,889 dols.; Michigan, 67,714,479 dols.; Ohio, 63,767,112 dols.; California, 63,382,454 dols.; Minnesota, 58,664,852 dols.; Montana, 54,991,961 dols.; Colorado, 45,680,135 dols.; Arizona, 34,217,651 dols.; Missouri, 31,667,525 dols.; Oklahoma, 25,637,892 dols.

The total number of persons engaged in connection with producing mines, quarries and wells, as reported on December 15, 1909, or nearest representative day, was 1,139,332; of whom wage-earners numbered 1,065,283, proprietors and firm members 29,922, and salaried employees 44,127. In mines, quarries, and wells for which development work only was carried on there were a total of 27,616 persons, of whom 21,499 were wage-earners. Of the total number of persons, 1,166,948, employed in productive and non-productive mines, 1,158,775 were men 16 years of age and over, and 8,173 were boys under 16 years of age. Distributed by sex, 1,162,840 were male and 4,108 female, the latter being employed in supervisory and clerical capacities, none being reported as wage-earners in mining operations proper.

The total capital invested in all mining enterprises on December 31, 1909, as reported, was 3,662,527,064 dols., of which 3,380,525,841 dols. was invested in productive enterprises and 282,001,223 dols. in those in which development work only was carried on.

The total acreage of land controlled by all mining enterprises in 1909 was 26,185,000 acres, of which 24,216,000 were connected with producing enterprises. Of the total amount of land utilised 10,220,000 acres were owned by the operators and 15,965,000 were leased.

Of the 4,699,910 aggregate primary horse-power connected with the mining industry, 4,483,807 dols. was owned by mine operators and 216,103-horse power, all of which was electric, was rented.

For those mining industries for which statistics are included in the Census reports for both 1909 and 1902, the value of products increased from 771,480,926 dols. to 1,175,475,001 dols., or 52·4 per cent.; while the payments for salaries and wages increased from 401,225,547 dols. to 625,610,068 dols., or 55·9 per cent.

The most important absolute increase in value of products occurred in the coal industry, the value of products of this industry increasing from 366,600,000 dols. in 1902 to 550,500,000 dols. in 1909. The value of bituminous coal exclusive of coke, which was not included among mining products in 1902, increased from 195,934,190 dols. in 1902 to 302,796,278 dols. in 1909, while the value of anthracite increased from 41,623,406 dols. to 96,900,406 dols. A portion of this latter increase is doubtless due to the fact that in 1902, on account of the strike, the figures for the production of anthracite coal did not represent normal conditions. Other important increases in value of products were: Petroleum and natural gas from 102,034,590 dols. to 175,527,807 dols.; iron from 65,460,985 dols. to 106,947,082 dols.; copper from 51,178,036 dols. to 99,493,799 dols.

The following table gives particulars in regard to coal, peat and natural gas:—

	Coal, anthracite.	Coal, bituminous.	Petroleum & natural gas.*	Peat.
Operators	192	3,503	7,793	10
Mines	123	6,013	166,320	10
Expenses.. Dols.	139,324,467	395,907,026	135,638,644	96,034
Output.. Dols.	149,180,471	427,962,464	185,416,684	109,047
Employees	178,004	592,877	62,172	203

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Forty-five tests were made in gas and air mixtures other than the most explosive. These mixtures contained from 3 per cent. to 12·4 per cent. of gas. Mixtures containing as little as 5 per cent. of gas and others containing as much as 12·4 per cent. of gas were ignited by 1·5 candle-power, 3·5 volt 0·3 ampere bulbs that were smashed while burning at rated voltage.

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[FROM OUR OWN CORRESPONDENT.]

Coal-mixing Charges Resisted by Cardiff Shippers—Coalowners Demand 2½ per cent. Reduction of Wages—Abnormal Places Question Once More—Fresh Development of Cambrian Combine—Lack of Shipping Stops Thousands of Men—Grievances of Bankemen: Appeal to the Federation—Federation Dissensions—Advance in Wage of Tippers—Contest for the Martin Challenge Shield.

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COALMINING IN BRITISH COLUMBIA IN 1911.

According to the annual report to the Minister of Mines by Mr. W. F. Robertson, Provincial Mineralogist, minerals valued at 23,499,072 dols. were produced in British Columbia in 1911, as compared with 26,377,066 dols. in 1910. This included 2,193,062 tons of coal, valued at 7,675,717 dols., as against 2,800,046 tons, valued at 9,800,161 dols., in 1910; and 66,005 tons of coke, valued at 396,030 dols., as against 218,029 tons, valued at 1,308,174 dols. This decrease is entirely due to the labour troubles in the East Kootenay field, whereby the collieries of that district were shut down for over eight months. The decrease of the output in the East Kootenay field amounted to 923,062 tons of coal, which was only partly offset by an increased production in the Coast District of 81,545 tons.

The greater portion of this production—about 72 per cent.—was mined by three companies—the Canadian Collieries and the Western Fuel Company in the Coast District, and the Crow's Nest Pass Coal Company in East Kootenay. Of the other collieries, in the Coast District, the Pacific Coast Coalmines produced 208,116 tons; the Nicola Valley Coal and Coke Company, 191,290 tons; and the Vancouver-Nanaimo Coal Company, 72,918 tons, with smaller productions by the Princeton Colliery, the Inland Coal and Coke Syndicate, and the Diamond Vale Colliery. In the East Kootenay field, the Hosmer Mines and the Corbin Coal and Coke Company made very appreciable productions, although not nearly as large as in the preceding year. The collieries of the Coast District are to be credited this year with about 80 per cent. of the total output of coal, due in a large measure to the labour troubles in East Kootenay having diminished the output of that district. The Coast collieries made no coke this year, although some was sold from a large stock that had been left over from previous years

The gross output of the coalmines of the province for the year 1911 was 2,297,718 tons (of 2,240 lb.), in addition to which 748 tons were drawn from stock, making the gross amount of coal distributed 2,298,466 tons. Of this gross amount, there was sold as coal for consumption in Canada 1,373,779 tons; sold for consumption in the United States, 573,888 tons; while 38,808 tons were exported to other countries, making the total coal sales for the year 1,986,475 tons. In addition to the coal sold, there was used in the manufacture of coke 104,656 tons, and 178,242 tons were used under the boilers, &c., of the producing companies, while 29,093 tons were lost in washing.

As has already been noted, there was no coke made in the Coast District, the total coke production having been made in the East Kootenay field, where from 104,656 tons of coal there was produced 66,005 tons (2,240 lb.) of coke—only about 30 per cent. of last year's production, as the mines were closed down for eight months on account of labour troubles. The coke sales for the province amounted to 73,454 tons, of which amount 7,486 tons was drawn from stock

The following table indicates the markets in which the coal and coke output of the province was sold :—

Coal.	Coast district. Tons.*	Crow's Nest Pass district. Tons.*	Total for province. Tons.*
Sold for consumption in Canada	1,278,640	95,139	1,373,779
Sold for export to United States......	363 994	209 894	573,888
Sold for export to other countries	38 808	—	38 808
Total coal sales...	1,681,442	305,033	1,986,475
Coke.			
Sold for consumption in Canada	6,153	66,034	72,187
Sold for export to United States.....	—	1,267	1,267
Sold for export to other countries	—	—	—
Total coke sales...	6,153	67,301	73,454

* Tons = 2,240 lb.

The consumption of coal in that portion of British Columbia served by the Coast collieries—despite the introduction of Californian fuel oil—shows this year an increase of 222,779 tons, or about 21 per cent over the preceding year; the amount exported to the United States is almost exactly the same, only 272 tons greater, but the amount exported to other countries has decreased by 21,482 tons. From these figures it is apparent that the growth of the province's coal consuming enterprises has more than offset the inroads of fuel oil on the market. Only one company in the Coast District—the Canadian Collieries Limited—has ever made coke, but this year the ovens have not been in operation, although the company sold 6,153 tons of coke from stock, and still has 4,636 tons in stock. The coke sold was entirely for consumption in Columbia, no export sales having been made.

On Vancouver Island four companies produced coal this year—the Canadian Collieries Limited, the Western Fuel Company, the Pacific Coast Coalmines and the Vancouver-Nanaimo Coal Company; the majority of these companies each operate two, or more, collieries. The combined output of the island quarries was 1,625,122 tons.

In the Nicola and the Princeton valleys of the Coast District, the Nicola Valley Coal and Coke Company produced 191,290 tons of coal, the Princeton Colliery 23,396 tons, the Inland Coal and Coke Syndicate (formerly Coal Hill Syndicate) 10,433 tons and the Diamond Vale Colliery 4,970 tons. The total output of this portion of the district was 230,539 tons. The Pacific Coast Colliery Company of Nicola and the Columbia Coal and Coke Company of Coalmont, on the Tulameen River, each mined coal in development work, but have not as yet entered the market as producers.

In the East Kootenay coalfield the production of the mines during the past year only represents the output for the four months of the year in which the mines were in operation. There were three companies operating in this district—the Crow's Nest Pass Coal Company, operating two separate collieries, the combined output of which was 320,940 tons; the Corbin Coke and Coal Company, which made an output of 81,718 tons; and the Hosmer Mines Limited, which produced 39,399 tons of coal, making a gross output for the district for 1911 of 442,057 tons of coal. This gross output is 923,062 tons, or about 67 per cent. less than the output of the previous year. In addition to the coal mined, 3,259 tons were taken from stock, making the amount of coal distributed from the collieries 445,316 tons. Of this gross tonnage, 104,656 tons were used in the manufacture of coke, of which there was produced 66,005 tons (2,240 lb.). In addition to the coke made this year, 1,333 tons were taken from stock, making the coke sales for this year 67,338 tons, as compared with sales in 1910 of 213,677 tons.

It is pointed out that steamships are now equipped with oil-burning boilers, and the Government has under consideration a Bill requiring the railways to use oil fuel as a safeguard against the forest fires, which does not seem to have brought out any serious protests—as far as being obliged to use oil is concerned—from any of the railways. As a matter of comparison, California fuel oil is being sold in British Columbia, delivered in bulk, for 75 c. a barrel; and the experience of the large users is that it takes from 3½ to 4 barrels of such oil to do the work of 1 ton of local coal, which costs on the coast from 4 to 4·50 dollars a ton. Notwithstanding the heavy consumption of fuel oil, the coal sales of the Coast District this year show an increase over those of last year of 201,569 tons, or about 13·6 per cent. The export to the United States remains almost the same as it was last year (only 272 tons greater), the export to "other countries" than the United States shows a decrease of about 35 per cent., while the home consumption of coal sold shows an increase of 222,779 tons, or 21 per cent., this latter giving some criterion as to the growth of home industries, despite the extended use of fuel oil already mentioned. It would appear, therefore, that the present price of coal on the seaboard of from 4 to 4·50 dollars a ton f.o.b. is not liable to decrease for some time.

The East Kootenay Collieries, owing to their distance from the seaboard and the costs of transportation, do not enter into competition with the coast collieries, nor *vice versa*, each having separate interests. The East Kootenay Collieries are, however, brought into direct competition with the collieries of Alberta just over the provincial boundary line, all these collieries being in the same coalfield, with practically the same grade of coal and working under similar conditions. This competition has kept the price obtainable for coal at from 2·25 to 2·50 dollars a ton, with little probability of any material increase in price, owing to the facility with which new collieries can be opened up and the very large reserve areas of coal limits in that district.

The production "per employee" has steadily and materially increased during the past three years. This increased effectiveness of the labour employed is largely due to better methods, better equipment, and greater volume of output. In the Coast District in 1911 the effectiveness of the total employees was increased from 382 tons to 397 tons *per capita*, and for underground employees it was increased from 502 to 511 tons *per capita*

In the East Kootenay field it is not possible this year to give definite figures, but it would appear that the effectiveness of the employee in that field has also materially increased, as is also the case with the whole province.

In addition to the coalmines actually producing, there are a number of important fields which have not as yet reached the producing stage—some of these partly developed and equipped, and others only prospected. That these fields contain a large reserve of coal there is absolutely no doubt, and many of them will be developed and producing as soon as the market demands it and the transportation facilities can be provided.

INDIAN AND COLONIAL NOTES.

Africa.

South African Coke.—Until quite recently, says our correspondent, all the good coke used in South Africa was imported from Europe, and on the Rand, where the bulk was consumed for assaying purposes, the price was exorbitant, ranging from £8 to £10 per ton. Inferior Westphalian cokes were frequently sold as English cokes by many of the local German firms, and this only tended to add to the discontent aroused by the high prices charged Naturally, a good many attempts have been made to manufacture coke in the Transvaal, but whilst coke is comparatively easy to make, it was never of first-class quality, and was more akin to char and little better than local makes of gas coke. Even this, however, sold at prices varying from £4 to £6 per ton on the Rand, and when the loss in weight and waste, together with the high cost of manufacture, were considered, the coal put into ovens represented quite a satisfactory price. Of late years, however, cokemaking in the Transvaal has been abandoned, owing to the limited market which was easily met by the use of gas coke. The attempts to build up an iron industry in the Transvaal again called attention to the subject, and the Government took the matter in hand and conducted certain experiments and tests with Transvaal coals—which however, met with little success, although it was concluded that if no better coke could be made from Transvaal coals, other countries, similarly placed, used equally inferior coke under compulsion for ironmaking purposes. Transvaal coals carry a far too high percentage of ash and too low fixed carbon to produce a satisfactory coke, and this fact has been recognised all along, the clean coal, suitable for coking only, occurring, as a rule, in thin bands in the coal-seams, making their mining difficult and expensive, and, if sorted out closely, materially deteriorating the average quality of the rest of the coal put on to the market. In Natal, where the coal is more suited for cokemaking, some success has attended recent efforts, and a fair amount of coke made in Natal is now sold in the Transvaal. It is, of course, much inferior to English and Welsh cokes, but quite equal to the German makes sold as English at somewhat cheaper rates on the Rand. The first to make a good coke in Natal was a syndicate using St George's Colliery coal at Sweetwaters, near Maritzburg, the smalls being washed and burnt in a rectangular oven. The following coke is the result:—Fixed carbon 88·09 per cent., ash 10·86 per cent., moisture 0·35 per cent., sulphur 0·90 per cent., volatile matter 0·16 per cent It is a remarkably dense and compact coke, its specific gravity reaching as high as 1·6. Lately a similar quality of coke has been made near Vryheid, the coal being first crushed, washed, and then burnt in a beehive oven. The coke gives the following analysis:—Fixed carbon 87·75 per cent., ash 10·20 per cent., moisture 1·75 per cent., sulphur 0·69 per cent., and volatile matter 0·30 per cent. It is a hard and compact coke of a dull and very dark appearance, with a specific gravity of 1·2 A fair coke has also been made for some time at the Natal Navigation Colliery, near Hatting Spruit, where the coal is first washed and then crushed before being put into an ordinary beehive oven. The coke, by analysis, gives the following results:—Fixed carbon 80·45 per cent., ash 12·82 per cent., moisture 3·00 per cent., volatile matter 2·28 per cent., sulphur 1·45 per cent. This is a hard and compact coke, with a specific gravity of 1·228 If the coal was crushed before being washed, it is possible that the coke would be cleaner and of better quality. The total amount of coke made in Natal is in the neighbourhood of 5,000 tons per year. Arrangements are also being made to make coke at the Wankie Colliery in Rhodesia for copper smelting purposes in the Congo, and judging from the quality of Wankie coal, the coke ought to be but little if any inferior to that at present being made in Natal. The coals of the Orange Free State and the Cape Province are far too inferior in quality to make a saleable coke, and this is an industry which never seems likely to come within their reach.

Cheaper Railway Rates for Coal.—One of the conditions arranged as depending upon the union of the British Colonies in South Africa, was that the railways should be worked at cost within a stipulated period of the union becoming an accomplished fact. Under this condition, as coal constitutes one of the most profitable forms of traffic—the principal coal-carrying line to the Rand earning a profit of over £10,000 per mile as against *nil* for many of the other sections—a substantial reduction in the railway rate for the conveyance of coal from the collieries to the Rand was looked for. On August 1 this reduced coal rate came into force, and it is calculated that this reduction averages 1s. 4d. per ton of coal used at the goldmines on the Rand. Now the goldmines constitute the most important market for coal in the Transvaal, their average consumption being in the neighbourhood of a quarter million tons per month

COALMINING IN BRITISH COLUMBIA IN 1911.

According to the annual report to the Minister of Mines by Mr. W. F. Robertson, Provincial Mineralogist, minerals valued at 23,499,072 dols. were produced in British Columbia in 1911, as compared with 26,377,066 dols. in 1910. This included 2,193,062 tons of coal, valued at 7,675,717 dols., as against 2,800,046 tons, valued at 9,800,161 dols., in 1910; and 66,005 tons of coke, valued at 396,030 dols., as against 218,029 tons, valued at 1,308,174 dols. This decrease is entirely due to the labour troubles in the East Kootenay field, whereby the collieries of that district were shut down for over eight months. The decrease of the output in the East Kootenay field amounted to 923,062 tons of coal, which was only partly offset by an increased production in the Coast District of 81,545 tons.

The greater portion of this production—about 72 per cent.—was mined by three companies—the Canadian Collieries and the Western Fuel Company in the Coast District, and the Crow's Nest Pass Coal Company in East Kootenay. Of the other collieries, in the Coast District, the Pacific Coast Coalmines produced 208,116 tons; the Nicola Valley Coal and Coke Company, 191,290 tons; and the Vancouver-Nanaimo Coal Company, 72,918 tons, with smaller productions by the Princeton Colliery, the Inland Coal and Coke Syndicate, and the Diamond Vale Colliery. In the East Kootenay field, the Hosmer Mines and the Corbin Coal and Coke Company made very appreciable productions, although not nearly as large as in the preceding year. The collieries of the Coast District are to be credited this year with about 80 per cent. of the total output of coal, due in a large measure to the labour troubles in East Kootenay having diminished the output of that district. The Coast collieries made no coke this year, although some was sold from a large stock that had been left over from previous years.

The gross output of the coalmines of the province for the year 1911 was 2,297,718 tons (of 2,240 lb.), in addition to which 748 tons were drawn from stock, making the gross amount of coal distributed 2,298,466 tons. Of this gross amount, there was sold as coal for consumption in Canada 1,373,779 tons; sold for consumption in the United States, 573,888 tons; while 38,808 tons were exported to other countries, making the total coal sales for the year 1,986,475 tons. In addition to the coal sold, there was used in the manufacture of coke 104,656 tons, and 178,242 tons were used under the boilers, &c., of the producing companies, while 29,093 tons were lost in washing

As has already been noted, there was no coke made in the Coast District, the total coke production having been made in the East Kootenay field, where from 104,656 tons of coal there was produced 66,005 tons (2,240 lb.) of coke—only about 30 per cent. of last year's production, as the mines were closed down for eight months on account of labour troubles. The coke sales for the province amounted to 73,454 tons, of which amount 7,486 tons was drawn from stock.

The following table indicates the markets in which the coal and coke output of the province was sold:—

Coal.	Coast district. Tons *	Crow's Nest Pass district. Tons.*	Total for province Tons.*
Sold for consumption in Canada	1,278,640	95,139	1,373,779
Sold for export to United States	363 994	209 894	573,888
Sold for export to other countries	38 808	—	38 808
Total coal sales	1,681,442	305,033	1,986,475
Coke.			
Sold for consumption in Canada	6,153	66,034	72,187
Sold for export to United States	—	1,267	1,267
Sold for export to other countries	—	—	—
Total coke sales	6,153	67,301	73,454

* Tons = 2,240 lb.

The consumption of coal in that portion of British Columbia served by the Coast collieries—despite the introduction of Californian fuel oil—shows this year an increase of 222,779 tons, or about 21 per cent. over the preceding year; the amount exported to the United States is almost exactly the same, only 272 tons greater, but the amount exported to other countries has decreased by 21,482 tons. From these figures it is apparent that the growth of the province's coal consuming enterprises has more than offset the inroads of fuel oil on the market. Only one company in the Coast District—the Canadian Collieries Limited—has ever made coke, but this year the ovens have not been in operation, although the company sold 6,153 tons of coke from stock, and still has 4,636 tons in stock. The coke sold was entirely for consumption in Columbia, no export sales having been made.

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INDIAN AND COLONIAL NOTES.

Africa.

South African Coke.—Until quite recently, says our correspondent, all the good coke used in South Africa was imported from Europe, and on the Rand, where the bulk was consumed for assaying purposes, the price was exorbitant, ranging from £8 to £10 per ton. Inferior Westphalian cokes were frequently sold as English cokes by many of the local German firms, and this only tended to add to the discontent aroused by the high prices charged. Naturally, a good many attempts have been made to manufacture coke in the Transvaal, but whilst coke is comparatively easy to make, it was never of first-class quality, and was more akin to char and little better than local makes of gas coke. Even this, however, sold at prices varying from £4 to £6 per ton on the Rand, and when the loss in weight and waste, together with the high cost of manufacture, were considered, the coal put into ovens represented quite a satisfactory price. Of late years, however, cokemaking in the Transvaal has been abandoned, owing to the limited market which was easily met by the use of gas coke. The attempts to build up an iron industry in the Transvaal again called attention to the subject, and the Government took the matter in hand and conducted certain experiments and tests with Transvaal coals—which however, met with little success, although it was concluded that if no better coke could be made from Transvaal coals, other countries, similarly placed, used equally inferior coke under compulsion for ironmaking purposes. Transvaal coals carry a far too high percentage of ash and too low fixed carbon to produce a satisfactory coke, and this fact has been recognised all along, the clean coal, suitable for coking only, occurring, as a rule, in thin bands in the coal-seams, making their mining difficult and expensive, and, if sorted out closely, materially deteriorating the average quality of the rest of the coal put on to the market. In Natal, where the coal is more suited for cokemaking, some success has attended recent efforts, and a fair amount of coke made in Natal is now sold in the Transvaal. It is, of course, much inferior to English and Welsh cokes, but quite equal to the German makes sold as English at somewhat cheaper rates on the Rand. The first to make a good coke in Natal was a syndicate using St George's Colliery coal at Sweetwaters, near Maritzburg, the smalls being washed and burnt in a rectangular oven. The following coke is the result:—Fixed carbon 88·09 per cent., ash 10·80 per cent., moisture 0·35 per cent., sulphur 0·90 per cent., volatile matter 0·16 per cent. It is a remarkably dense and compact coke, its specific gravity reaching as high as 1·6. Lately a similar quality of coke has been made near Vryheid, the coal being first crushed, washed, and then burnt in a beehive oven. The coke gives the following analysis:—Fixed carbon 87·75 per cent., ash 10·20 per cent., moisture 1·75 per cent., sulphur 0·69 per cent., and volatile matter 0·30 per cent. It is a hard and compact coke of a dull and very dark appearance, with a specific gravity of 1·2. A fair coke has also been made for some time at the Natal Navigation Colliery, near Hatting Spruit, where the coal is first washed and then crushed before being put into an ordinary beehive oven. The coke, by analysis, gives the following results:—Fixed carbon 80·45 per cent., ash 12·82 per cent., moisture 3·00 per cent., volatile matter 2·28 per cent., sulphur 1·45 per cent. This is a hard and compact coke, with a specific gravity of 1·228. If the coal was crushed before being washed, it is possible that the coke would be cleaner and of better quality. The total amount of coke made in Natal is in the neighbourhood of 5,000 tons per year. Arrangements are also being made to make coke at the Wankie Colliery in Rhodesia for copper smelting purposes in the Congo, and judging from the quality of Wankie coal, the coke ought to be but little if any inferior to that at present being made in Natal. The coals of the Orange Free State and the Cape Province are far too inferior in quality to make a saleable coke, and this is an industry which never seems likely to come within their reach.

Cheaper Railway Rates for Coal.—One of the conditions arranged as depending upon the union of the British Colonies in South Africa, was that the railways should be worked at cost within a stipulated period of the union becoming an accomplished fact. Under this condition, as coal constitutes one of the most profitable forms of traffic the principal coal-carrying line to the Rand earning a profit of over £10,000 per mile as against nil for many of the other sections—a substantial reduction in the railway rate for the conveyance of coal from the collieries to the Rand was looked for. On August 1 this reduced coal rate came into force, and it is calculated that this reduction averages 1s. 4d. per ton of coal used at the goldmines on the Rand. Now the goldmines constitute the most important market for coal in the Transvaal, their average consumption being in the neighbourhood of a quarter million tons per month

THE COAL AND IRON TRADES.

Thursday, November 7.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 132,734 tons of coal and 1,548 tons of coke were despatched from Tyne Dock, an increase of 10,230 tons of coal and 54 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 67,208 tons of coal and 1,972 tons of coke, a decrease of 1,746 tons of coal and 613 tons of coke. The Blyth shipments totalled 96,111 tons of coal and coke, an increase of 5,700 tons. The Royal Portuguese Railways are stated to have renewed their contract with the North Walbottle Coal Company for 32,000 tons of Whorlton unscreened coal for delivery at Lisbon over the ensuing year. The contract price is said to be based on current values and to show a substantial advance on the closing year's rate. The exact figure cannot be given, as it is complicated with stipulations as to bonuses on results. The contract to supply the Stockholm Gasworks with 130,000 tons of gas coal has been divided amongst local collieries as follows:—45,000 tons Old Pelton coal at 19s. 6d. per ton c.i.f., 10,000 tons Holmside at 19s. 11d., 45,000 tons Ravensworth Pelaw at 19s. 8d., 20,000 tons Thornley at 30s. 9d., and 10,000 tons Easington at 19s. 11d. Some 44,000 tons of steam smalls have been arranged for for the Stockholm Electric Works, 20,000 tons Lambtons and 24,000 tons Scottish coal being taken. Prices, however, have not transpired. All these coals are for delivery at Stockholm over next year. The Berlin Gasworks have contracted for an additional quantity of 100,000 tons of Durham gas seconds for delivery over next year at c.i.f. prices ranging from 18.50 to 18.90 marks per ton. This brings the total quantity of Durham coal taken for these works up to 330,000 tons. It will be remembered that 270,000 tons of Silesian coal also have been arranged for. The Berlin works are still negotiating for another 100,000 tons of gas coal for similar delivery. Other coal sales are as follow:—Several small lots of coking unscreened and smalls for November shipment at 14s. f.o.b.; 40,000 tons of best Durham bunkers, sold direct by the colliery, for delivery over next year at 14s. 3d. f.o.b., the highest price yet realised for such coal for this delivery; quantities of best Blyth steams for shipment over next year at 14s. f.o.b.; 50,000 tons of similar coal for like shipment at 13s. 7½d. f.o.b. Blyth; and an additional quantity of 50,000 tons of Durham gas coal for delivery to the Newcastle and Gateshead Gas Company over next year at from 13s. 6d. to 13s. 9d. delivered. Details as to the requirements of the Swedish State Railways show that an additional quantity of 125,500 tons of steam coals is asked for as follows:—To Stockholm, 40,000 tons; Gothenburg, 38,000 tons; Uddevalla, 1,500 tons, all for January-March shipment; to Holmstad, 8,000 tons; Helsingborg, 12,000 tons; Malmo, 20,000 tons; and Norrkoping, 8,000 tons, all for December-March delivery. The local coal market is quiet and easier at present. Prices have reached the point where they are acting somewhat as a check to business, especially for prompt shipment. It is said that Welsh coals are offering for next year's delivery to Mediterranean coaling stations at about the same prices as best Durham bunkers. Under these conditions, business may be diverted from this district to Cardiff. House coal, too, is being beaten by Yorkshire competition at rather lower prices. For forward loading, the market is very firm. Best Blyth steams for next year's shipment are quoted at 14s. f.o.b., whilst Tyne primes are firm at 13s. 6d. Other classes of fuel are similarly maintained. F.o.b. quotations for prompt shipment are as follow:—Best steams, Blyths (D.C.B.), 14s. per ton, rather firmer on the week; Tynes (Bowers, &c.), 14s., unaltered; seconds, Blyths, 12s. 9d. to 13s., weaker; Tynes (Hastings or West Hartleys), 13s. to 13s. 6d., easier; unscreened, 12s. to 12s. 6d., 8d. reduced; smalls, Blyths, 10s. 6d. to 10s. 7½d., from 7½d. to 9d. increased; Tynes, 9s. 6d., harder; specials, 11s., in seller's favour; smithies, 14s. 6d., a decline of 6d.; gas bests (New Pelton or Holmside), 15s., 3d. lower; seconds (Pelaw Main or similar), 14s. 6d., 3d. decreased; specials, 15s., 6d. fallen; unscreened bunkers, Durhams, 13s. 6d. to 14s., 6d. cheaper; Northumbrians, 12s. 6d. to 13s., inclined to fall; coking coal, 14s. 6d., unchanged; smalls, 14s., steady; households, 14s. 6d., unaltered; coke, foundry, 27s., 1s. lower; blastfurnace, 25s., firm; and gas coke, 22s. 6d. to 23s., from 6d. to 1s. less.

Later.—The contract to supply the Gefle Gasworks with 6,000 tons of Wear gas specials has been secured by local merchants at 21s. per ton, c.i.f., delivery over next year. Tenders are invited by the Helsingborg Gasworks of 10,000 tons of gas coal for delivery over next year. The Skutskar Gasworks want 70,000 tons of smithies and 30,000 tons of gas coal for similar delivery. The Trieste Gasworks have allotted contracts for 10,000 tons of good ordinary Durham gas coal, but, owing to the high prices tendered, have postponed allotment of the contract for the balance of 60,000 tons required by them for next year's delivery. Negotiations for the 100,000 tons of Durham coking coal required by the Northern Railways of France are stated to be approaching completion.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 110,380 tons of coal and 1,300 tons of coke, as compared with 106,850 tons of coal and 1,640 tons of coke for the corresponding period of 1911, being an increase of 3,530 tons of coal and a decrease of 340 tons of coke. If anything, the coal trade is a shade quieter; this, no doubt, is owing chiefly to the difficulty in arranging loading turns for early positions, thus throwing a small surplus of coal on the market for sale. Generally speaking, however, the tone of the market is firm with a full forward enquiry. Best gas coals are as firm as ever. Coking sorts are very firm, and in strong demand for export. Household coals have a rather better demand. Bunkers are still scarce and firmly held. Coke is also in good request for local use, and with the supply inadequate better prices have been obtainable. The Newcastle and Gateshead Gas Company have purchased 50,000 tons of gas coals at 13s. 6d. to 13s. 6d. for prompt delivery, and the Stockholm Gasworks have accepted tenders for 125,000 tons at 19s. 8d. to 19s. 9d. c.i.f. according to quality and for shipment over next year, while the Stockholm Electric Works have purchased 20,000 tons of Lambton steam smalls, but the price has not yet transpired; there are several other big contracts still under negotiation. Quotations are as follow:—Special Wear gas, 16s.; seconds, 14s. to 14s. 8d.; coking unscreened, 14s. 6d. to 14s. 6d.; smalls, 14s. to 14s. 6d.; smithies, 15s.; peas and nuts, 16s.; foundry coke, 26s. to 27s. 6d.; gashouse coke, 23s. 6d.; blastfurnace coke, 25s.; households, ordinaries, 15s.; best, 16s.; Durham bunkers: Ordinary, 13s. 6d. to 14s.; best, 14s. 3d. to 15s.; superiors, 15s. to 16s.—all free on board South Dock. There is no perceptible change to report in the freight market. Tonnage in all directions is short in supply, with a keen demand by shippers, especially for the Mediterranean ports, on the basis of Genoa 13s. 6d., Civita Vecchia 14s., Naples 13s. 6d., Oran 11s. 3d., Port Said 13s. 4½d. The Bay is represented by: St. Nazaire 7s. 3d., Bordeaux 7s. 9d., Bayonne 8s. 3d. There are now only few fixtures to the Baltic, Swinemunde paying 5s. 9d., Memel 5s. 9d. Coasting freights are steady, as shown by: London 5s., Dieppe 6s. 9d., and Hamburg 5s. 6d.

Middlesbrough-on-Tees.

COAL.

The fuel trade is brisk and prices are firm. It is reported that the full quantity of coal required for next year by the Trieste Gas Company is not being contracted for, but that the company is negotiating for small portions of their requirements for comparatively early shipment. Best gas coal is quoted 15s. f.o.b., and second quality ranges from 14s. 3d. to 14s. 6d. Bunker coal continues in good request, and ordinary Durhams run from 13s. 6d. to 14s. 3d. f.o.b. Coking coal is in good demand and there are many complaints of inadequate supply, with the result that a good deal of Yorkshire coal is being converted into coke at Teesside works, where Durham coal is generally used. Coking unscreened is 14s. 9d., and smalls 14s. 6d. to 14s. 9d. Household coal is moving upward. Coke is scarce, and with a full demand for local consumption average blastfurnace kinds are strong at 26s. delivered at Teesside works; whilst best foundry coke for shipment is in the neighbourhood of 25s. 8d. f.o.b., and gashouse coke 23s.

IRON.

Pig iron shipments from the Tees last month were very satisfactory, the total clearances amounting to 129,656 tons, 120,542 tons of which went from Middlesbrough, and 9,314 tons from the neighbouring little port of Skinningrove. For the previous month the loadings of pig were returned at 118,079 tons, whilst the shipments for October a year ago amounted to 115,003 tons. Last month's despatches were within 4,000 tons of the clearances in March last, which were the heaviest shipments of the year. Of the Skinningrove loadings last month, 6,234 tons went to Scotland, and 1,080 tons to Holland. Of the pig loaded at Middlesbrough last month, 82,429 tons went abroad, and 38,113 tons coastwise. Once more, Scotland was the largest receiver, taking 27,231 tons; whilst Germany received 17,990 tons, Sweden 9,710 tons, Belgium 8,138 tons, France 7,661 tons, Japan 7,140 tons, the the United States 8,085 tons, and Italy 5,309 tons. Of the 16,070 tons of manufactured iron shipped last month, 6,557 tons went to foreign countries and 9,513 tons coastwise, by far the largest buyer being India, with an import of 3,132 tons. The quantity of steel cleared at Middlesbrough during October reached 47,977 tons, 42,610 tons going abroad and 5,167 tons to coastwise buyers. India was also the largest purchaser of steel, taking 10,532 tons. Other principal importers of steel were:—West Australia 5,601 tons, the Argentine 3,694 tons, New South Wales 3,463 tons, Canada 2,483 tons, New Zealand 2,400 tons, and South Australia 2,189 tons. Values of Cleveland pig iron are somewhat unsteady, due to rather unexpected fluctuations in warrants. No. 3 g.m.b. Cleveland pig was early this week sold at 87s. 6d., and later a rather large business occurred at 67s. The price now is 66s. 9d., and buyers are somewhat backward. No. 4 foundry and No. 4 forge are scarce, and both are fully the same price as No. 3; whilst mottled and white iron each stand at 66s. 3d. With No. 1 very plentiful, that quality is offered rather freely at 70s. 6d. There would be a fairly good business passing in east coast hæmatite pig if iron was available for this year; but there is next to none to be had. Second-hand quotes 80s for this year's delivery of mixed numbers, and makers, as a rule, name 81s. For spring business the price is quite 82s. 6d. Market quotations for foreign ore are still based on 23s. ex-ship Tees, but there is no business passing. Producers of manufactured iron and steel are very busily employed, but few new contracts are being made. Quotations are unchanged.

South-West Lancashire.

COAL.

There seems still a lack of animation in the inland household coal trade. Prices are without change and at or near the following:—Best 16s. 3d., medium 14s. 6d. to 14s. 9d. and kitchen coals 12s. 3d.—all into wagons at the pit. Forges and manufactories using screened coal continue to take very satisfactory deliveries. With regard to shipping, the state of affairs generally remains much as last reported, there being a strong demand for bunkering fuel under contract, with only a moderate open sale business doing. There is probably no great surplus of steam coal on the market, though supplies are more readily available than they were a short time ago. For prompt shipment current quotations for screened Lancashire steam coals still rule from 12s. 6d. to 13s. 3d. or 13s. 6d. f.o.b., but there has been a little forward buying for delivery before the end of the year at some advance on present prices. The coastwise and cross-Channel shipments of household coals continue very fair. Prices for prompt shipment for best coals rule at from 16s. to 16s. 6d., with good seconds best coals 14s. 9d. to 15s. In slacks contracts are freely entered into for deliveries which commence and cover the year 1913. For open sale, prices rule at from 9s. 9d. to 10s. for best rough qualities, good medium grades 9s. to 9s. 3d. and the commoner qualities at about 8s. 6d.—all into wagons at the pit.

South Lancashire and Cheshire.

COAL.

The house coal trade is somewhat sluggish for the time of the year, but prices are firm at 16s. 6d. to 17s. for the best house grades, with good medium qualities at 15s. 3d. to 16s., and the commoner sorts from 12s. 6d. to 13s.—all into wagons at the pit. Furnace coal meets with good enquiry, the price being about 12s. 6d. per ton at the pit. There is also a good business passing in shipping coal, and the price is steady at about 14s. f.o.b. Partington. Slack is in fair demand and prices are firm at 9s. to 6s. 6d. for the best qualities, with the commoner grades at from 8s. to 8s. 6d.—all into wagons at the pit.

IRON.

There was a good attendance on 'Change in Manchester on Tuesday last. Pig iron continues firm with no alteration in prices. Forges are very busy on crown bars at £8 10s., second quality £8, hoops £8 12s. 6d., sheets £9, and are much behind with orders. Steelworks are also busy on bars at £8 5s., less 2½ per cent, and billets £6 10s. net. Wagon works fully occupied. Heavy engineers and foundries moderately employed.

Yorkshire and Derbyshire.

Leeds.

COAL.

The market on Tuesday was again well attended, all sections of the trade being represented. There was a strong tone about prices generally, especially in relation to forward business. The industrial position throughout the district was never better, and the large consumers of manufacturing fuel, some of whom were present on the market, are seeking to cover their requirements over next year. There were numerous enquiries for slacks, small nuts and washed fuel for inland consumption, and the available supply of coking slacks is quite inadequate to meet the growing demand. The pits have worked nearly full time this week. All the output, with the exception of a small tonnage of house coal, has been cleared. London merchants and factors have taken rather more house coal since the turn of the month, chiefly ex contracts. Reports from London indicate a very quiet state of things in the retail trade. Factors' stocks at Toton, Willesden, Peterborough, Whitemoor and other re-labelling points are said be light, but there is very little buying in the open market. Pit prices are maintained and average as under:—Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. to 14s.; Silkstone best, 13s. to 14s. (special qualities up to 14s. 6d.); Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. 6d. to 12s. In the coastwise trade nine out of ten enquiries are for the secondary sorts, best qualities being neglected. For fairly prompt shipment at Hull representative collieries quote the following approximate f.o.b. prices:—Haigh Moor house coal, 16s. 6d. to 17s.; Silkstone best, 15s. 8d. to 16s. 3d.; Silkstone house, 14s. 9d. to 15s. 3d.; house nuts, 13s. 6d. to 14s. In Leeds, Bradford, Halifax, Huddersfield and the West Riding generally there has been some improvement in the public demand, but business is still on the quiet side. Pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to

AND IRON TRADES.

ay, November 7.

Durham and Cleveland.

COAL.

,734 tons of coal and 1,548 tons of
m Tyne Dock, an increase of 10,230
of coke when compared with the
ponding week of last year. The
ounted to 67,208 tons of coal and
decrease of 1,746 tons of coal and
lyth shipments totalled 96,111 tons
crease of 5,700 tons. The Royal
e stated to have renewed their
rth Walbottle Coal Company for
n unscreened coal for delivery at
year. The contract price is said
values and to show a substantial
ear's rate. The exact figure cannot
ated with stipulations as to bonuses
t to supply the Stockholm Gasworks
as coal has been divided amongst
:—45,000 tons Old Pelton coal at
10,000 tons Holmside at 19s. 11d.,
th Pelaw at 19s. 6d., 20,000 tons
10,000 tons Easington at 19s. 11d.
am smalls have been arranged for
ctric Works, 20,000 tons Lambtons
tish coal being taken. Prices,
nspired. All these coals are for
ver next year. The Berlin Gasworks
additional quantity of 100,000 tons
for delivery over next year at c.i f.
50 to 18 90 marks per ton. This
y of Durham coal taken for these
. It will be remembered that 270,000
lso have been arranged for. The
egotiating for another 100,000 tons
delivery. Other coal sales are as
ots of coking unscreened and smalls
at 14s. f.o.b.; 40,000 tons of best
direct by the colliery, for delivery
f.o.b., the highest price yet realised
delivery; quantities of best Blyth
ver next year at 14s. f.o.b.; 50,000
like shipment at 13s. 7½d. f.o.b.
al quantity of 50,000 tons of Durham
the Newcastle and Gateshead Gas
year at from 13s. 6d. to
Details as to the requirements
ate Railways show that an
f 125,500 tons of steam coals
s: — To Stockholm, 40,000 tons;
s; Uddevalla, 1,500 tons, all for
t; to Holmstad, 6,000 tons; Helsing-
mo, 20,000 tons; and Norrkoping,
ember-March delivery. The local
nd easier at present. Prices have
re they are acting somewhat as a
cially for prompt shipment. It is
are offering for next year's delivery
g stations at about the same prices
s. Under these conditions, business
this district to Cardiff. House coal,
y Yorkshire competition at rather
-ward loading, the market is very
ams for next year's shipment are
ilst Tyne primes are firm at 13s. 6d.
are similarly maintained. F.o.b.
shipment are as follow:—Best
.), 14s. per ton, rather firmer on the
o.), 14s., unaltered; seconds, Blyths,
Tynes (Hastings or West Hartleys),
; unscreened, 12s. to 12s. 6d., 6d.
s, 10s. 6d. to 10s. 7½d., from 7½d. to
9s. 6d., harder; specials, 11s., in
s, 14s. 6d., a decline of 6d.; gas
Holmside), 15s., 3d. lower; seconds
r), 14s. 6d, 3d. decreased; specials,
ned bunkers, Durhams, 13s. 6d. to
umbrians, 12s. 6d. to 13s., inclined
14s. 6d., unchanged; smalls, 14s.,
6d., unaltered; coke, foundry, 27s.,
25s., firm; and gas coke, 22s. 6d. to

to supply the Gefle Gasworks with
specials has been secured by local
ton, c.i.f., delivery over next year.
y the Helsingborg Gasworks of
for delivery over next year. The
t 70,000 tons of smithies and 30,000
lar delivery. The Trieste Gasworks
for 10,000 tons of good ordinary
owing to the high prices tendered,
t of the contract for the balance of
y them for next year's delivery.
0,000 tons of Durham coking coal
n Railways of France are stated to
on.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 110,380 tons of coal and 1,300 tons of coke, as compared with 106,850 tons of coal and 1,640 tons of coke for the corresponding period of 1911, being an increase of 3,530 tons of coal and a decrease of 340 tons of coke. If anything, the coal trade is a shade quieter; this, no doubt, is owing chiefly to the difficulty in arranging loading turns for early positions, thus throwing a small surplus of coal on the market for sale. Generally speaking, however, the tone of the market is firm with a full forward enquiry. Best gas coals are as firm as ever. Coking sorts are very firm, and in strong demand for export. Household coals have a rather better demand. Bunkers are still scarce and firmly held. Coke is also in good request for local use, and with the supply inadequate better prices have been obtainable. The Newcastle and Gateshead Gas Company have purchased 50,000 tons of gas coals at 13s. 6d. to 13s. 9d. for prompt delivery, and the Stockholm Gasworks have accepted tenders for 125,000 tons at 19s. 6d. to 19s. 9d. c.i.f. according to quality and for shipment over next year, while the Stockholm Electric Works have purchased 20,000 tons of Lambton steam smalls, but the price has not yet transpired; there are several other big contracts still under negotiation. Quotations are as follow:—Special Wear gas, 16s.; seconds, 14s. to 14s. 6d.; coking unscreened, 14s. 6d. to 14s. 9d.; smalls, 14s. to 14s. 6d.; smithies, 15s.; peas and nuts, 16s.; foundry coke, 26s. to 27s. 6d.; gashouse coke, 23s. 6d.; blastfurnace coke, 25s.; households, ordinaries, 15s.; best, 16s.; Durham bunkers: Ordinary, 13s. 6d. to 14s.; best, 14s. 3d. to 15s.; superiors, 15s. to 16s.—all free on board South Dock. There is no perceptible change to report in the freight market. Tonnage in all directions is short in supply, with a keen demand by shippers, especially for the Mediterranean ports, on the basis of Genoa 13s. 6d., Civita Vecchia 14s., Naples 13s. 6d., Oran 11s. 3d., Port Said 13s. 4½d. The Bay is represented by: St. Nazaire 7s. 3d., Bordeaux 7s. 9d., Bayonne 8s. 3d. There are now only few fixtures to the Baltic, Swinemunde paying 5s. 9d., Memel 5s. 9d. Coasting freights are steady, as shown by: London 5s, Dieppe 6s. 9d., and Hamburg 5s. 6d.

Middlesbrough-on-Tees.

COAL.

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IRON.

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South-West Lancashire.

COAL.

There seems still a lack of animation in the inland household coal trade. Prices are without change and at or near the following:—Best 16s. 3d., medium 14s. 6d. to 14s. 9d. and kitchen coals 12s. 3d.—all into wagons at the pit. Forges and manufactories using screened coal continue to take very satisfactory deliveries. With regard to shipping, the state of affairs generally remains much as last reported, there being a strong demand for bunkering fuel under contract, with only a moderate open sale business doing. There is probably no great surplus of steam coal on the market, though supplies are more readily available than they were a short time ago. For prompt shipment current quotations for screened Lancashire steam coals still rule from 12s. 6d. to 13s. 3d. or 13s. 6d. f.o.b., but there has been a little forward buying for delivery before the end of the year at some advance on present prices. The coastwise and cross-Channel shipments of household coals continue very fair. Prices for prompt shipment for best coals rule at from 16s. to 16s. 6d., with good seconds best coals 14s. 9d. to 15s. In slacks contracts are freely entered into for deliveries which commence and cover the year 1913. For open sale, prices rule at from 9s. 9d. to 10s. for best rough qualities, good medium grades 9s. to 9s. 3d. and the commoner qualities at about 8s. 6d.—all into wagons at the pit.

South Lancashire and Cheshire.

COAL.

The house coal trade is somewhat sluggish for the time of the year, but prices are firm at 16s. 6d. to 17s. for the best house grades, with good medium qualities at 15s. 3d. to 16s., and the commoner sorts from 12s. 6d. to 13s.—all into wagons at the pit. Furnace coal meets with good enquiry, the price being about 12s. 6d. per ton at the pit. There is also a good business passing in shipping coal, and the price is steady at about 14s. f.o.b. Partington. Slack is in fair demand and prices are firm at 9s. to 9s. 9d. for the best qualities, with the commoner grades at from 8s. to 8s. 6d.—all into wagons at the pit.

IRON.

There was a good attendance on 'Change in Manchester on Tuesday last. Pig iron continues firm with no alteration in prices. Forges are very busy on crown bars at £8 10s., second quality £8, hoops £8 12s. 6d., sheets £9, and are much behind with orders. Steelworks are also busy on bars at £8 5s., less 2½ per cent, and billets £6 10s. net. Wagon works fully occupied. Heavy engineers and foundries moderately employed.

Yorkshire and Derbyshire.

Leeds.

COAL.

The market on Tuesday was again well attended, all sections of the trade being represented. There was a strong tone about prices generally, especially in relation to forward business. The industrial position throughout the district was never better, and the large consumers of manufacturing fuel, some of whom were present on the market, are seeking to cover their requirements over next year. There were numerous enquiries for slacks, small nuts and washed fuel for inland consumption, and the available supply of coking slacks is quite inadequate to meet the growing demand. The pits have worked nearly full time this week. All the output, with the exception of a small tonnage of house coal, has been cleared. London merchants and factors have taken rather more house coal since the turn of the month, chiefly ex contracts. Reports from London indicate a very quiet state of things in the retail trade. Factors' stocks at Toton, Willesden, Peterborough, Whitemoor and other re-labelling points are said be light, but there is very little buying in the open market. Pit prices are maintained and average as under:—Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. to 14s.; Silkstone best, 13s. to 14s. (special qualities up to 14s. 6d.); Silkstone house, 12s. to 12s. 6d.; house nuts, 11s 6d. to 12s. In the coastwise trade nine out of ten enquiries are for the secondary sorts, best qualities being neglected. For fairly prompt shipment at Hull representative collieries quote the following approximate f.o.b. prices.—Haigh Moor house coal, 16s. 6d. to 17s.; Silkstone best, 15s. 6d. to 16s. 3d.; Silkstone house, 14s. 9d. to 15s. 3d.; house nuts, 13s. 6d. to 14s. In Leeds, Bradford, Halifax, Huddersfield and the West Riding generally there has been some improvement in the public demand, but business is still on the quiet side. Pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to

Forest of Dean.

Lydney.

COAL.

A fair trade can still be reported for all classes of household coals, but the demand is not sufficient to enable the pits to work full time, the average for the district would only run to about five days. There is a complete absence of pressure in the enquiry, and, generally, considering the period of the year, the trade lacks buoyancy. Shipments are fairly good, but stems continue easy. Railborne orders are about an average. Prices continue at—block 16s. 6d., rubbles 15s. 9d., nuts 14s., and rough slack 6s. 6d. at pit. All steam qualities are in good request, and the collieries are putting in full time.

THE WELSH COAL AND IRON TRADES.

Thursday, November 7.

North Wales.

Ruabon.

COAL.

There is very little change in the coal trade of this district to report this week, and the collieries still continue to work practically full time, and have no lack of orders on their books. In the household coal trade the demand exceeds the supply. Merchants are pressing for deliveries, and good household fuel finds a ready market, the best quality of this class of fuel realising 16s. and 17s. per ton, while cobbles of the same grade of fuel, and large seconds quality coal is sold at 1s. per ton less than the figures quoted, as no further advances have yet been made in prices. The railway companies are relieving the collieries of a goodly quantity of steam coal on contract, and the gas companies are doing the same, and owing to the continued good state of trade, there is very little steam coal or slack available at the present time for the open market, nor has there been for the past month or two. With regard to the small quantity of available slack this is particularly due to the heavy demand which the iron and steel manufacturers are making for furnace coke, and those people who make this commodity have more orders than they can supply, with a result that prices are advancing and it pays to divert the slack into this channel. If the present demand for coke continues, it is highly probable that the record price for contracts will be reached in the near future, namely £1 per ton and upwards. Those collieries who have slack to sell are getting good prices, ranging from 6s. 6d. up to 9s. 6d. for the best rough grades. With regard to contracts in general a good number have been fixed up to commence on January 1, 1913, but in all cases a substantial advance is being obtained, ranging from 2s. to 3s. per ton according to the figure at which the expiring contract was held. The landsales connected with the various collieries of the locality are doing a good trade, especially with the schools of the county, these contracts being now in full swing at about 17s. 6d. per ton for coal of average quality, and gas coke has a good sale at from 17s. to 19s. per ton delivered.

◆

Monmouthshire, South Wales, &c.

Newport.

COAL.

The position in the steam coal market now is rather better than when last writing. Tonnage has come along in much larger quantity, while the heavy chartering which has taken place presages further large arrivals. There are ample supplies of coal ready to hand—so much so, in fact, that there will be no drawback on this account for some little time. Colliery stems have now filled remarkably well, making sellers speak more independently regarding forward business, for which they show no inclination whatever to relax their quotations. There is a fairly good enquiry for smalls, which rule relatively firmer than last week. Pitwood is, if anything, a shade easier. Coke and patent fuel are nominally unaltered, the little free coke available for sale being disposed of without difficulty at advantageous rates. In the freight market there has been a good deal of outward chartering, more steamers have been offered, and although there was a good enquiry, rates for the Mediterranean showed a slightly weaker tendency. Latest approximate ruling quotations are as follow, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. to 15s. 3d.; western-valleys, ordinaries, 14s. 3d. to 14s. 6d.; eastern-valleys, best, 14s. to 14s. 3d.; other sorts, 13s. 6d. to 13s. 9d.; colliery smalls, best, 9s. 3d. to 9s. 9d.; seconds, 8s. 9d. to 9s.; inferiors, 8s. 3d. to 8s. 6d.; screenings, 9s. 6d. to 10s.; through coals, 11s. 3d. to 11s. 9d.; nuts, best washed, 12s. to 12s. 3d.; house coals, best, 18s. to 18s. 6d.; seconds, 17s. to 17s. 6d.; patent fuel, 17s. 6d. to 18s. Coke: Furnace, 22s. to 24s.; foundry, 25s. to 28s. Pitwood: Best French fir, 22s. to 23s. ex-ship.

IRON.

The conditions of the local iron and steel trades show very little alteration since last writing, but the tone is manifestly a steady one. With full order books in all departments, naturally only small business is passing, but there is some inclination shown on the part of buyers to enquire for still more forward delivery. At tin-plate bar and sheet bar mills unabated activity continues, and great pressure is being brought to bear for delivery of specifications in arrear. Values remain unaltered on the week on the basis of £5 17s. 6d. Bessemer and £6 Siemens for Welsh bars. Work at rail mills is again satisfactory, and here the market is somewhat harder. Heavy sections are firm at £6 10s. to £6 15s., with light sections at the usual extra money. Continued activity is reported at blast furnaces, where pressure for deliveries is being experienced. Welsh hæmatite is now quoted 86s. to 87s. delivered to works in the district. Iron ore shows no variation, and is firm at 22s. to 22s. 6d. for best rubio c.i.f. Newport. Tin-plates continue steady. A fair enquiry is on the market, and makers are adhering firmly to last quoted prices, official figures being based upon 15s. 9d. Bessemer and 15s. 9d. to 15s. 10½d. Siemens for I C 20 × 14 × 112. Finished blackplate £11 12s. 6d. to £11 15s. per ton.

Cardiff.

COAL.

Tonnage is arriving more satisfactorily, the number of vessels in port when the week opened being over 200, but the majority of them had been several days overdue and their cargoes were already on the sidings. For a time there was great difficulty in obtaining tips, but the belief was prevalent that a large number of the wagons standing under load would be cleared within the next few days. The general tone of the market is far more confident than it was last week, with the result that although even now concessions are obtainable from coalowners, orders which would have been gladly accepted a few days ago at as low as 16s. for best qualities are not now considered. Sellers are keeping a keen eye on the Eastern question. In view of possible complications it is expected that a good demand for best steam coals may be forthcoming in the near future. Not much attention perhaps is paid to the reports of British naval mobilisations, and up to the time of writing there had been no unusual activity amongst the Admiralty agents, only about a dozen steamers, with a carrying capacity of about 28,000 tons, having been chartered. But a considerable quantity of coal has been shipped for the Greek Government at very satisfactory prices, and it is believed that purchases on their account have by no means terminated. Unfortunately the tonnage question still exercises great influence. As already pointed out in these columns, notwithstanding the fact that in the north prices have been advancing by leaps and bounds and orders have been refused on all sides, up to the present the South Wales collieries have not benefited in the slightest. On the contrary, owing to the great demand for tonnage in more remunerative markets, the boom in trade, instead of being an advantage to the Welsh district, has been a positive detriment. In several instances the rates paid for tonnage have beaten all records for 20 years past. As high as 14s. has been paid for Genoa, which is only 6d. below the highest figure received during the last two decades. Torre-Annunziata and Civita Vecchia have been fixed three times at 15s., whilst Nantes has been done at 10·37½ fr., which represents an advance of 1·37½ fr. on the previous highest rate during the current year. There is, however, every reason to expect that the tonnage question will become easier in the near future, and should that happen, prices will immediately respond. On Tuesday, steamers with an aggregate carrying capacity of over 115,000 tons, were chartered on the Cardiff freight market alone, being by far the heaviest day's business for a considerable time. 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st of Dean.

COAL.

reported for all classes of house-
d is not sufficient to enable the
e average for the district would
ys. There is a complete absence
y, and, generally, considering the
rade lacks buoyancy. Shipments
continue easy. Railborne orders
Prices continue at—block 16s. 6d.,
s., and rough slack 6s. 6d. at pit.
good request, and the collieries

AL AND IRON TRADES.

AY, NOVEMBER 7.

rth Wales.

COAL.

change in the coal trade of this
week, and the collieries still
ally full time, and have no lack of
In the household coal trade the
ply. Merchants are pressing for
sehold fuel finds a ready market,
lass of fuel realising 16s. and 17s.
the same grade of fuel, and large
sold at 1s. per ton less than the
ber advances have yet been made
y companies are relieving the
antity of steam coal on contract,
are doing the same, and owing to
of trade, there is very little steam
at the present time for the open
been for the past month or two.
quantity of available slack this is
heavy demand which the iron and
naking for furnace coke, and those
commodity have more orders than
result that prices are advancing
e slack into this channel. If the
e continues, it is highly probable
r contracts will be reached in the
per ton and upwards. Those
k to sell are getting good prices,
o 9s. 6d. for the best rough grades.
e in general a good number have
nce on January 1, 1913, but in all
ce is being obtained, ranging from
ding to the figure at which the
ld. The landsales connected with
he locality are doing a good trade,
ols of the county, these contracts
at about 17s. 6d. per ton for coal
gas coke has a good sale at from
red.

◆

re, South Wales, &c.

COAL.

steam coal market now is rather
riting. Tonnage has come along
while the heavy chartering which
further large arrivals. There are
ady to hand—so much so, in fact,
rawback on this account for some
ns have now filled remarkably well,
re independently regarding forward
show no inclination whatever to
There is a fairly good enquiry for
ely firmer than last week. Pitwood
easier. Coke and patent fuel are
little free coke available for sale
t difficulty at advantageous rates.
ere has been a good deal of outward
rs have been offered, and although
iry, rates for the Mediterranean
er tendency. Latest approximate
s follow, coal prices f.o.b. cash in
:—Coal: Very best Newport Black
s. 3d.; western-valleys, ordinaries,
tern-valleys, best, 14s. to 14s. 3d.;
s. 9d.; colliery smalls, best, 9s. 3d. to
to 9s.; inferiors, 8s. 3d. to 8s. 6d.;
; through coals, 11s. 3d. to 11s. 9d.;
to 12s. 3d.; house coals, best, 18s.
to 17s. 6d.; patent fuel, 17s. 6d. to
22s. to 24s.; foundry, 25s. to 28s.
r, 22s. to 23s. ex-ship.

IRON.

local iron and steel trades show
ince last writing, but the tone is
e. With full order books in all
nly small business is passing, but
shown on the part of buyers to
rward delivery. At tin-plate bar
ated activity continues, and great
t to hear for delivery of specifica-
remain unaltered on the week on
Bessemer and £6 Siemens for Welsh
s is again satisfactory, and here the
rder. Heavy sections are firm at
light sections at the usual extra
vity is reported at blast furnaces,
eries is being experienced. Welsh
86s to 87s. delivered to works in
hows no variation, and is firm at
t rubio c.i.f. Newport. Tin-plates
r enquiry is on the market, and
rmly to last quoted prices, official figures being based upon 15s. 9d. Bessemer and 15s. 9d. to 15s. 10½d. Siemens for I C 20 × 14 × 112. Finished black-plate £11 12s. 6d. to £11 15s. per ton.

Cardiff.

COAL.

Tonnage is arriving more satisfactorily, the number of vessels in port when the week opened being over 200, but the majority of them had been several days overdue and their cargoes were already on the sidings. For a time there was great difficulty in obtaining tips, but the belief was prevalent that a large number of the wagons standing under load would be cleared within the next few days. The general tone of the market is far more confident than it was last week, with the result that although even now concessions are obtainable from coalowners, orders which would have been gladly accepted a few days ago at as low as 16s. for best qualities are not now considered. Sellers are keeping a keen eye on the Eastern question. In view of possible complications it is expected that a good demand for best steam coals may be forthcoming in the near future. Not much attention perhaps is paid to the reports of British naval mobilisations, and up to the time of writing there had been no unusual activity amongst the Admiralty agents, only about a dozen steamers, with a carrying capacity of about 28,000 tons, having been chartered. But a considerable quantity of coal has been shipped for the Greek Government at very satisfactory prices, and it is believed that purchases on their account have by no means terminated. Unfortunately the tonnage question still exercises great influence. As already pointed out in these columns, notwithstanding the fact that in the north prices have been advancing by leaps and bounds and orders have been refused on all sides, up to the present the South Wales collieries have not benefited in the slightest. On the contrary, owing to the great demand for tonnage in more remunerative markets, the boom in trade, instead of being an advantage to the Welsh district, has been a positive detriment. 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determining the fees to be paid by applicants for certificates of competency; (2) prescribing fees to be paid for copies of lost certificates of competency; and (3) prescribing the time and manner of serving notices under Section 116.

In the Court of Appeal on the 4th inst., an appeal by Les Entreprises de Constructions de Fours à Coke et d'Usines Métallurgiques (Société Anonyme) against an order made by Mr. Justice Warrington in an action brought by them against the South Kirkby, Featherstone and Hemsworth Collieries Limited was dismissed.

The Greek Government announces that the regulations regarding conditional contraband have been abrogated. Coal has been declared contraband of war, but only when it is consigned to the Dardanelles.

A meeting of Lancashire colliery surgeons at Wigan during the week-end passed the following resolution by 43 to 2 votes:—"That accidents and industrial diseases under the Workmen's Compensation Act, 1906, shall not be entitled to medical benefit under the National Insurance Act, 1911."

In the House of Lords on 1st inst., judgment was given in an appeal by the Howley Park Coal and Cannel Company against an order of the Court of Appeal in favour of the present respondents, the London and North Western Railway Company. The appeal was dismissed with costs.

At the House of Commons on the 31st ult. the Home Secretary received a deputation representing the owners and miners of Northumberland and Durham, who object to the prohibition in the Explosives Order of the use of squibs in open-light mines. The Home Secretary said he thought of appointing a small committee, probably of about three members, viz., the representative of the owners, the men, and the inspectors, and that committee could enquire into the subject and present a report.

The Home Office has issued an additional Order regarding the use of explosives in mines. In this there are two important modifications of the original order. In mines other than coalmines the use of squibs will be permitted, and in all mines where safety lamps are not in use, fuses can be ignited by naked lights. In the first Order there had to be a special igniter attached to the fuse end, and men were not allowed to ignite fuses with candles in naked-light mines.

Last month the total of coal, coke and manufactured fuel exported amounted to 7,058,442 tons, valued at £4,522,135, as compared with 5,875,867 tons, valued at £3,389,591, in October 1911, and 5,616,651 tons, valued at £3,243,724, in October 1910.

During the first ten months of the present year there were exported 15,020,522 tons, valued at £34,461,901, as against 55,442,836 tons, valued at £31,556,256, and 58,939,050 tons, valued at £31,710,828, respectively, in the corresponding periods of 1911 and 1910.

Mr. Asquith, replying yesterday to a question by Sir J. D. Rees, M.P., said time could not be found this session for passing the Railways Bill, which provides for the raising of rates to meet increased expenditure, but it would be reintroduced next session in an amended form. In order, therefore, to carry out the undertaking given to the railway companies at the time of the railway strike and the appointment of the Royal Commission the Government hoped to pass this session a one-clause Bill, which would give full effect to their undertaking.

Mr. John Wilson, M.P., was yesterday, at Newcastle-on-Tyne Assizes awarded £200 damages in an action for libel against Mr. George Harvey, who was described as a working miner, editor of the *Socialist*, and a member of the trade union group holding Syndicalist opinions. The libel was in a pamphlet by the defendant, entitled "Does Mr. John Wilson, M.P.. serve the working classes?" The defendant called no evidence.

Right of Support.

Elsewhere we give the judgment of the House of Lords in the appeal by the Howley Park Coal and Cannel Company against an order of the Court of Appeal, dated April 8, 1911.

This confirmation of a decision which is of far-reaching importance, refers to an action in the Chancery Division of the High Court of Justice, brought by the London and North-Western Railway Company against the Howley Park Coal and Cannel Company. In giving judgment, on June 13, 1910,* Mr. Justice Eve said that the question to be determined was the extent, if any, to which the plaintiffs, the London and North-Western Railway Company, were entitled, without making any further payment to the defendants, to have the Morley Tunnel—part of their undertaking—supported by subjacent and adjacent minerals of which the defendants were the lessees. The plaintiffs claimed, first, an injunction to restrain the defendants from working the minerals in such a manner as to withdraw vertical or lateral support from the tunnel, and alternatively in such a manner as to withdraw lateral support from the tunnel outside a distance of 40 yards therefrom. They further claimed an injunction to restrain the defendants from working the minerals so as to withdraw vertical or lateral support from two seams of coal lying under the tunnel but above the minerals which the defendants now desire to work. The short grounds upon which the plaintiffs based their claim to be entitled to one or other of the three injunctions were as follow: as to the first injunction, they contended that the site of the tunnel or the right to make the tunnel was acquired by voluntary and not compulsory purchase; that the relations thereby established between them and their grantor as regards the obligation on the latter to do nothing in derogation of his grant were the ordinary ones subsisting between purchaser and vendor, and that the sections of the Railways Clauses Consolidation Act, 1845, relating to mines (sections 78 to 85) have no application to this purchase; as to the second injunction, they contended that even if the sections just referred to do apply, their application is limited to the area in respect of which a right to prevent working by paying compensation is substituted for the right of support—in this case 40 yards on each side of the railway—and that they ought not so to be construed as to leave the railway company without any right of support from minerals outside the prescribed area, and at the same time without any statutory right to prevent the working of such minerals by the payment of compensation. In other words, the argument on the part of the plaintiffs proceeded upon the footing that according to the true construction of the sections referred to, the area over which no right of support is implied is limited to and co-extensive with the area in which working may be prevented by the payment of compensation, and that outside that area the right of support remained wholly unaffected by the Statute; as to the third injunction, the plaintiffs claimed that they were the purchasers from the defendants and others of the two seams of coal overlying the minerals which the defendants now contemplate working, and that as purchasers they are entitled to have such seams supported by the subjacent and adjacent minerals.

Regarding the claim to the first injunction, the learned judge considered that the question whether the purchase was voluntary or compulsory was immaterial, there being nothing to restrict the application of the mining sections of the Railways Clauses Act to that which is acquired compulsorily.

Regarding the claim to the third injunction, the learned judge considered that it was of no importance whether the transaction was a payment of compensation evidenced by a conveyance, or whether it was in fact a sale and purchase of the two seams of coal, and that in either case it carried no right of support from the underlying minerals.

With regard to the claim for the second injunction, the learned judge thought that he was bound to have regard to all that the decision in the Great Western Railway *v.* Bennett involved, and to hold that in the circumstances of this case, as in Bennett's case, the railway company enjoys no common law right of support from minerals vested in the defendants lying beyond the prescribed distance, and accordingly are not entitled to an injunction restraining the defendants from working the same. The action, therefore, failed on each point, and was dismissed with costs.

The London and North-Western Railway Company carried the matter to the Court of Appeal as to claims to the second and third injunctions. The appeal was heard before the Master of the Rolls and Lords Justices Fletcher Moulton and Buckley. In giving judgment,* the Master of the Rolls said that it was held by the House of Lords in Bennett's case, which had since been repeatedly followed, that the rights given by section 78 of the Railways Clauses Consolidation Act, 1845, to the railway company were in substitution for the common law right of support, whether vertical or lateral, within the 40 yards limit, and that it was only within that limit that the railway company could claim the right to pay compensation without actually purchasing the minerals. Beyond the 40 yards the owner could work without giving 30 days' notice, and indeed he could not give any statutory notice, and, of course, no counter-notice could be given by the railway company. On principle it seemed that the common law right of lateral support was only taken away to the extent to which the notice and the counter-notice could relate.

On the other hand, the owner of the lower seam was entitled to work within the 40 yards on giving 30 days' notice, unless the railway company gave a counter-notice and paid compensation.

As the result, the Court allowed the appeal as to the claim for lateral support outside the 40 yards limit (second injunction), and dismissed the appeal as to the claim for support for the seams of coal lying under the tunnel.

Against this judgment the Howley Park Coal and Cannel Company appealed to the House of Lords, and the case was heard before the Lord Chancellor, Lord Halsbury, Lord Atkinson and Lord Shaw of Dunfermline. Judgment was given on November 1 by the Lord Chancellor affirming the decision of the Court of Appeal. The Lord Chancellor said that what was called the Mining Code, Sections 77 to 85 of the Railways Clauses Act, 1845, was passed to facilitate transactions between mineowners and railway companies. The railway company was not to acquire the

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* *Colliery Guardian*, June 24, 1910, p. 1237.

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Against this judgment the Howley Park Coal and Cannel Company appealed to the House of Lords, and the case was heard before the LORD CHANCELLOR, Lord HALSBURY, Lord ATKINSON and Lord SHAW OF DUNFERMLINE. Judgment was given on November 1 by the LORD CHANCELLOR affirming the decision of the Court of Appeal. The LORD CHANCELLOR said that what was called the Mining Code, Sections 77 to 85 of the Railways Clauses Act, 1845, was passed to facilitate transactions between mineowners and railway companies. The railway company was not to acquire the

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CONTINENTAL MINING NOTES.

Germany.

Ruhr Coal Market.—The market situation continues highly satisfactory, the demands of consumers being as great as to be difficult to meet promptly even if a full supply of wagons were available, which is not the case, the shortage being occasionally as much as 25 per cent., so that buyers are frequently inconvenienced, the more so as their stocks are generally low. Business is fairly well distributed among all classes of fuel, house coal being in active request, owing to the early setting-in of the cold weather; whilst in industrial coals the iron industry is taking large deliveries of its particular grades, and large quantities of gas and allied coals are required for the export trade. Finally, the extremely favourable situation of the cokeries has created an increased demand for coking coals. Shipments to South Germany have been on a large scale of late, the state of the river having improved, and business in that market is very brisk—sufficiently so, indeed, to absorb the oncoming consignments and take a portion of the stocks as well. Deliveries to Northern Germany continue on a large scale, and are unaffected by English competition, whilst Holland and Belgium are good customers. The condition of the coke market is equally good, the blast furnaces requiring considerable quantities and leaving an insufficient remainder for other buyers. Briquettes are selling normally, and stocks are generally small.

Coal Market in Upper Silesia.—In consequence of the opposition of the Fiscus, the Coal Convention has not been able to recommend any increase in the price of coal, although the situation is favourable to such a step. The matter has been relegated to the next meeting, and it is anticipated that any change in the existing list will be confined to discontinuing rebates to exporters. Bulgaria and Roumania have been trying to buy coal in this market, but unsuccessfully, owing to the necessity of German neutrality being maintained. The demand for fuel is unprecedentedly large, and practically no stocks are left at the pits. Railway wagons are scarce, and there is also a shortage of craft for the water-borne traffic. The iron industry continues one of the largest buyers, but house coal is attracting more interest, and gas coal is in growing demand; whilst the whole output of coking coals is taken up at once, and other kinds have to be supplied as well to meet buyers' needs. In the coke market, both blastfurnace and foundry coke can hardly be produced fast enough to satisfy the demand.

Saar State Collieries' Settling Prices.—Open-burning coals: Large, 14·40 to 15·60 marks per metric ton f.o.r. at pit; screened through-and-through, 12·60 to 14·20 marks; through-and-through, 10·80 to 13·40 marks; fines, 8·60 to 10·80 marks. Washery coals: Cubes, 50/80 mm. 15·60 to 17·20 marks; nuts I., 35/50 mm. 15·60 to 18 marks; II., 15/35 mm. 14·80 to 16·80 marks; III., 8/15 mm. 13·60 marks; III., 4/15 mm. 13 to 13·80 marks; IV., 4/8 mm. 12 marks; nuts slack, 2/35 mm. 13·40 marks; 2/15 mm. 12 to 12·60 marks; fine slack, 0/6 mm. 9 marks. Bituminous coals: Large, 15 to 16 marks; through-and-through, 11·80 to 13·40 marks. Washery coals: Cubes, 50/80 mm. 16 to 16·40 marks; nuts I., 35/50 mm. 16 to 16·40 marks; II., 15/35 mm. 15·20 marks; III., 8/15 mm. and 4/15 mm. 14 marks; IV., 0/8 mm. 10·80 marks; nuts slack, 2/15 mm. 12·80 marks. The discounts to wholesale dealers are to be reduced from 10 or 12 marks to 1 to 4 marks per 10 tons, and only customers who sell State coal exclusively will be supplied.

Spain.

Coal Trade of the Canaries.—Mr. Consul Croker states that the amount of coal supplied to steamers at Las Palmas and Teneriffe for bunkering purposes during the past five years has been as follows:—1907, 681,000 tons; 1908, 537,000; 1909, 484,000; 1910, 1,082,643; and 1911, 1,073,000 tons. British firms supplied 952,369 tons of the 1,073,000 tons, the balance (120,631 tons) coming from the German coaling depot at Las Palmas. A rate war broke out in Las Palmas in April 1910, with the result that the contract price for the year was reduced from £1 4s. finally to 17s. 6d. on September 23, and this price was maintained until the end of the year. The position, so far as competition at Las Palmas was concerned, continued in the early months of 1911 and finally led to the total collapse of the combined arrangement which has existed for some years past. It came to an end on December 31, 1911. The result has been that coaling firms are now keenly competing one with another, and contracts for the current year have been made at figures so extremely low as to entail very heavy losses upon the coaling depots. It is said that South Wales coal is being supplied in some cases for bunkering at about £1 per ton, a price which involves the loss of several shillings per ton to the trade here. This loss has been considerably augmented by the fact that for some months past collier freights have been extremely high. The reduction in price has had a natural consequence in a largely increased demand for coal, and in the calling at these ports of a much greater number of steamers than usual, particularly at Las Palmas, where the price was first reduced, and the sales there during 1911 reached a grand total of 825,000 tons. Altogether the coaling business is in a very disturbed condition, and it is obvious that the coaling depots, unable to bear the strain much longer, will be compelled to come to some arrangement. In the meantime the shipowner is having a profitable innings. Presumably, however, existing contracts must continue throughout the current year, but it is only reasonable to suppose that prices will be much increased for 1913. A new feature of the trade which has been brought about by this competition is the introduction of north of England coal from Newcastle-on-Tyne. The firm which first broke away from the combination introduced this coal in 1910, and now it is being imported by several of the coaling firms both at Las Palmas and Teneriffe.

THE SCOTCH COAL AND IRON TRADES.

Thursday, November 7.

Glasgow and Lanarkshire.

COAL.

There has been a further shrinkage in the shipments of coal from Scotch ports, due to a variety of causes. Clearances for the Baltic are practically at an end for the season. In other directions business has been hampered by a want of railway wagons, and this difficulty has grown so intolerable that traders are now taking measures to effect a remedy. It is urged that if the railway companies are unable to supply sufficient trucks for the traffic, then the Railway Commissioners, in the interests of the public, ought to intervene and insist that the free use of traders' wagons on the railways ought to be allowed. The railway companies have not been able to cope with the coal traffic and attend to their other business at the same time. The traders ought therefore to be allowed to furnish wagons of their own if they see fit, and the companies should either haul these or allow facilities for private haulage. Some of the railway companies have been ordering new wagons, but it is doubtful if these will be sufficient to meet the case, and in the meantime trade is being lost to the country. The past week's aggregate shipments at Scotch ports reached 321,073 tons, compared with 330,888 in the preceding week, and 339,246 tons in the corresponding week of 1911. The total is thus down 9,815 tons compared with the previous week, and 18,173 tons behind the quantity despatched in the corresponding week of last year. A portion of the falling off in the shipments is a result of trouble with dock labourers, but the chief difficulty is said to be due to the scarcity of wagons. The clearances at Glasgow amounted to 74,255 tons, against 73,626 in the preceding week, and 81,061 in the corresponding week of last year. Of the total of 74,255 tons cleared in the past week, 38,827 tons went abroad and 35,428 coastwise. There has been a good demand for steam coal and for the better qualities of house coal for shipment, and prices are steady. Steam coal is quoted f.o.b. at Glasgow 11s. 6d. to 12s., ell coal 12s. 6d. to 12s. 9d., splint coal 13s. 6d. to 14s., treble nuts 13s. to 13s. 6d., doubles 12s. 6d. to 13s., and singles 12s. to 12s. 6d. per ton. The inland demand for house coal has been quiet in consequence of the open nature of the weather. There is no abatement in the amount of consumption of coal and dross suitable for manufacturing purposes. The colliers have been granted an increase of 6¼ per cent. in their wages—equal to 3d. per day—which will bring the rate up to 6s. 9d., and take effect on 13th current. In the meantime both parties will allow the wages question to rest until the end of the year, and they are to address themselves to the selection of a permanent neutral chairman of the Conciliation Board, and the drafting of a new wages agreement.

IRON.

The Glasgow pig-iron market has had a somewhat easier tendency, with a moderate business doing. Since last report Cleveland warrants have sold at 67s. to 67s. 2½d. and 66s. 4d. cash, 67s. 3d. to 67s. 7½d. and 66s. 10½d. one month, and 67s. 10½d. to 68s. and 67s. 1½d. three months. Cumberland hæmatite warrants were done at 81s. cash and 82s. 3d. three months. The quantity of Cleveland pig iron brought into Scotland in the past week was 7,333 tons, being 81 tons less than in the corresponding week of 1911. There are 88 furnaces in blast in Scotland, compared with 79 at this time last year, and as regards ordinary brands of Scotch pig iron, the entire output is reported to be going into consumption. Prices are accordingly firm for G.M.B., while special brands show little change. Free at ship at Glasgow, Govan and Monkland Nos. 1 are quoted 75s. 6d., Nos. 3, 74s.; Carnbroe, No. 1, 79s., No. 3, 75s.; Clyde, Calder and Summerlee, Nos. 1, 81s., Nos. 3, 76s.; Gartsherrie and Langloan, Nos. 1, 82s. 6d., Nos. 3, 77s. 6d.; Coltness, No. 1, 97s. 6d., No. 3, 79s. 6d.; Eglinton, at Ardrossan or Troon, No. 1, 75s., No. 3, 74s.; Glengarnock, at Ardrossan, No. 1, 82s. 6d., No. 3, 77s. 6d.; Dalmellington, at Ayr, No. 1, 76s., No. 3, 74s.; Shotts, at Leith, and Carron at Grangemouth, Nos. 1, 81s., Nos. 3, 76s. per ton. The past week's shipments of Scotch pig iron were 3,418 tons foreign and 1,917 coastwise, the total of 5,335 tons being 2,705 less than in the corresponding week, and the total shipments for the past ten months are 17,538 tons less than in the corresponding period of last year. The finished iron and steel departments are very fully employed, and the steelmakers are much behind with deliveries. Only a moderate amount of new business is being placed for the home market, but a good export trade is being done in malleable iron and steel.

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Renfrew, Ayr and Dumbarton.

COAL.

Business in the shipping department of the coal trade has been much obstructed at Ardrossan and Irvine by strikes of dock labourers. The men have been agitating for advanced wages, and the harbour authorities have made efforts to replace their labour, and these have led to disturbances, without greatly improving facilities for shipment. No doubt the trouble will soon be overcome. The week's coal shipments have been at Bowling 104 tons, Greenock 6,168, Ardrossan 905, Troon 5,681, Irvine 845, Ayr 15,222—total 28,925 tons, compared with 30,000 in the preceding week, and 31,676 in the corresponding week of 1911. The troubles at the ports mentioned have resulted in larger shipments at Greenock and Troon, so that the total falling away is thus less than might have been anticipated. Colliers are working steadily as a rule, and the outputs are being got rid of in a fairly satisfactory manner. Prices of coal are generally steady.

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Stirling, the Lothians and Fife.

COAL.

There has been a good general business in coals, although the closing of the Baltic season must necessarily curtail the volume of shipments in that direction. Unfavourable weather has delayed a number of vessels that were expected in port for cargoes. The Firth of Forth shipments have been at Granton 7,514 tons, Bo'ness 19,187, Grangemouth 37,729, Leith 50,000—total 113,430 tons, against 116,050 in the preceding week, and 99,874 in the corresponding week of last year. A large amount of coal is being contracted for at present, for future delivery about current prices. Best screened steam coal is quoted f.o.b. at Leith 12s. 9d. to 13s., secondary qualities 11s. 6d. to 12s., treble nuts 13s. 3d. to 13s. 6d., doubles 12s. 9d. to 13s., and singles 12s. 3d. to 12s. 6d. per ton. The Fife shipments have been, at Methil, 52,574 tons, Burntisland 47,800, Dysart 1,868, Alloa 1,272, Wemyss 1,315, and Tayport 634—total 105,463 tons, compared with 113,634 in the preceding week, and 126,635 in the corresponding week of last year. First-class screened navigation coal is quoted f.o.b. Methil or Burntisland 16s. to 16s. 6d., unscreened 13s. 9d. to 14s. 3d.; steam coal, 11s. 6d. to 13s.; treble nuts, 13s. 6d. to 14s. 3d.; doubles, 12s. 6d. to 13s. 3d.; and singles, 12s. to 12s. 6d. per ton. A fair inland business is passing at steady prices.

THE LONDON COAL TRADE.

Thursday, November 7.

The London coal trade for the past week has shown some some little signs of improvement, but the advantage gained during the brief spell of cold weather has not been sufficiently maintained. Orders were far more plentiful at the earlier part of the week than towards the close of it, and the return to milder weather has undoubtedly a great influence upon the market generally. Manufacturing qualities still continue in good demand, but house coals respond very quickly to the changes in the weather. The closing days of October showed a very great reduction in the volume of trade at all the principal London depots, and merchants were slow to order except for actual requirements, and factors who were holding any stocks in hand were inclined to sell often at a loss, so as to clear the loaded wagons before any serious siding rents accrued, but with the opening days of November, especially as the first few days were cold and severe, the demand revived steadily, and buying became more general. Some little difficulty was experienced also in some of the west London depots by a conflict of opinion as to underselling amongst the trolley men, and this, coupled with the change to milder weather, led some of the principal merchants to advocate a reduction in the advertised prices, and for a time the buoyancy of the market was considerably endangered. The continuance of the milder weather, and the consequent diminishment in the public orders, has left the market very depressed. Bakers' nuts, however, have retained their usual firm tone, and the extra supply available has kept pace with the demand. Kitchener cobbles have been left untouched very largely, so that stocks have accumulated. The small nuts, however, have had a very strong demand, and the recent damp weather, together with a good deal of fog, has made the electric lighting stations unusually busy. In the seaborne market very little has been on offer, the market quotations remain nominally the same—21s. 6d. for best Durham Wallsend, 20s. 6d. for seconds. On Monday there were reported 40 vessels in the port, and on Wednesday 8. The difficulty of navigating the Thames has been sadly interfered with by the constant fog hanging over the river. Slacks are still maintaining their full list prices, and the demand seems likely to continue, for in many cases the renewal of the contracts, which terminate at the end of the current year, have been entered into for the whole of next year at the present full prices. The somewhat earlier closing of the Baltic ports, and the uneasy condition of all the Mediterranean ports, has slackened the demand for best coal in the north and in the Humber ports, and it is feared that a large quantity will be forced on the London market and the various coasting towns in the south, so that merchants are hesitating a good deal before purchasing to any great extent just now. The business done on the London market has been very disappointing during the whole of the current week, and the attendance has been comparatively small. The dense fog on Wednesday led to a very small attendance, and the business done was of the slightest dimensions.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, November 1.—The sudden change in the weather caused a little better enquiry for seaborne house coal to-day, but no cargoes were available. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston (W.E. Yorks) 21s. 6d. Cargoes 4.

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Wednesday, November 6.—There was no alteration in the seaborne house coal market to-day; no sales reported. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston (W.E. York) 21s. 6d. Cargoes 8.

THE TIN-PLATE TRADE

Liverpool.

Business is very slow just now, buyers preferring to hold back as much as possible. Makers, on the other hand are comfortably booked up for some weeks to come, and in face of the high costs ruling for raw materials are not disposed to reduce their quotations to any extent in order to try and tempt forward buying. Following are about the figures at present being quoted:—Coke tin-plates: I C 14 × 20 (112 sh. 108 lb.), 15s. 6d. per box; I C 28 × 20 (112 sh. 216 lb.) 31s. 3d. to 31s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 10½d. to 16s. per box; I C 14 × 19¼ (120 sh. 110 lb.), 15s. 9d. to 16s. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. 9d. to 16s. per box; I C 20 × 10 (225 sh. 156 lb.), 23s. per box; I C squares and odd sizes, 16s. to 16s. 1½d. basis for approved specifications. Terne-plates rule quiet at 26s. 3d. to 26s. 6d. for I C 28 × 20, and charcoal tins stand at 18s. 6d. basis and upwards, according to tinning. Coke wasters are in moderate demand:—Quotations:—C W 14 × 20, 14s. 6d. per box; C W 28 × 20, 28s. 9d. per box; C W 14 × 18¾, 14s. 6d. per box; C W 14 × 19¼, 14s. 6d. per box; C W 20 × 10, 20s. 9d. per box—all f.o.b. Wales, less 4 per cent.

L MINING NOTES.

Germany.

The market situation continues
demands of consumers being as
to meet promptly even if a full
ailable, which is not the case, the
ly as much as 25 per cent., so that
onvenienced, the more so as their
Business is fairly well distributed
house coal being in active request,
g-in of the cold weather; whilst in
ndustry is taking large deliveries
and large quantities of gas and
'or the export trade. Finally, the
ation of the cokeries has created
coking coals. Shipments to South
large scale of late, the state of the
d business in that market is very
leed, to absorb the oncoming con-
portion of the stocks as well.
Germany continue on a large scale,
glish competition, whilst Holland
ustomers. The condition of the
good, the blast furnaces requiring
d leaving an insufficient remainder
uettes are selling normally, and
l.

Silesia.—In consequence of the
the Coal Convention has not been
crease in the price of coal, although
'e to such a step. The matter has
xt meeting, and it is anticipated
isting list will be confined to dis-
porters. Bulgaria and Roumania
coal in this market, but unsuccess-
ssity of German neutrality being
l for fuel is unprecedentedly large,
e are left at the pits. Railway
ere is also a shortage of craft for
The iron industry continues one of
house coal is attracting more
in growing demand; whilst the
oals is taken up at once, and other
as well to meet buyers' needs. In
astfurnace and foundry coke can
nough to satisfy the demand.
ttling Prices.—Open-burning coals:
arks per metric ton f.o r. at pit;
rough, 12·60 to 14·20 marks;
80 to 13 40 marks; fines, 8·60 to
coals: Cubes, 50/80 mm. 15 60 to
5/50 mm. 15·60 to 18 marks; II.,
marks; III., 8/15 mm. 13·60 marks;
marks; IV., 4/8 mm. 12 marks;
40 marks; 2/15 mm. 12 to 12 60
m. 9 marks. Bituminous coals:
s; through-and-through, 11 80
bery coals: Cubes, 50/80 mm.
I., 35/50 mm. 16 to 16·40 marks;
rks; III., 8/15 mm. and 4/15 mm.
10·80 marks; nuts sleck, 2/15 mm.
nts to wholesale dealers are to be
marks to 1 to 4 marks per 10 tons,
sell State coal exclusively will be

Spain.

aries.—Mr. Consul Croker states
upplied to steamers at Las Palmas
ring purposes during the past five
ows:—1907, 681,000 tons; 1908,
910, 1,082,643; and 1911, 1,073,000
plied 952,369 tons of the 1,073,000
l tons) coming from the German
nas. A rate war broke out in Las
with the result that the contract
luced from £1 4s. finally to 17s. 6d.
e price was maintained until the
ition, so far as competition at Las
continued in the early months
l to the total collapse of the
hich has existed for some years
nd on December 31, 1911. The
coaling firms are now keenly
nother, and contracts for the
made at figures so extremely
heavy losses upon the coaling
outh Wales coal is being supplied
ring at about £1 per ton, a price
f several shillings per ton to the
been considerably augmented by
nths past collier freights have been
uction in price has had a natural
ncreased demand for coal, and in
ts of a much greater number of
icularly at Las Palmas, where the
and the sales there during 1911
f 825,000 tons. Altogether the
very disturbed condition, and it is
depots, unable to bear the strain
pelled to come to some arrange-
he shipowner is having a profitable
owever, existing contracts must
urrent year, but it is only reason-
s will be much increased for 1913.
A new feature of the trade which has been brought about by this competition is the introduction of north of England coal from Newcastle-on-Tyne. The firm which first broke away from the combination introduced this coal in 1910, and now it is being imported by several of the coaling firms both at Las Palmas and Teneriffe.

THE SCOTCH COAL AND IRON TRADES.

THURSDAY, NOVEMBER 7.

Glasgow and Lanarkshire.

COAL.

There has been a further shrinkage in the shipments of coal from Scotch ports, due to a variety of causes. Clearances for the Baltic are practically at an end for the season. In other directions business has been hampered by a want of railway wagons, and this difficulty has grown so intolerable that traders are now taking measures to effect a remedy. It is urged that if the railway companies are unable to supply sufficient trucks for the traffic, then the Railway Commissioners, in the interests of the public, ought to intervene and insist that the free use of traders' wagons on the railways ought to be allowed. The railway companies have not been able to cope with the coal traffic and attend to their other business at the same time. The traders ought therefore to be allowed to furnish wagons of their own if they see fit, and the companies should either haul these or allow facilities for private haulage. Some of the railway companies have been ordering new wagons, but it is doubtful if these will be sufficient to meet the case, and in the meantime trade is being lost to the country. The past week's aggregate shipments at Scotch ports reached 321,073 tons, compared with 330,888 in the preceding week, and 339,246 tons in the corresponding week of 1911. The total is thus down 9,815 tons compared with the previous week, and 18,173 tons behind the quantity despatched in the corresponding week of last year. A portion of the falling off in the shipments is a result of trouble with dock labourers, but the chief difficulty is said to be due to the scarcity of wagons. The clearances at Glasgow amounted to 74,255 tons, against 73,626 in the preceding week, and 81,061 in the corresponding week of last year. Of the total of 74,255 tons cleared in the past week, 38,827 tons went abroad and 35,428 coastwise. There has been a good demand for steam coal and for the better qualities of house coal for shipment, and prices are steady. Steam coal is quoted f.o.b. at Glasgow 11s. 6d. to 12s., ell coal 12s. 6d. to 12s. 9d., splint coal 13s. 6d. to 14s., treble nuts 13s. to 13s. 6d., doubles 12s. 6d. to 13s., and singles 12s. to 12s. 6d. per ton. The inland demand for house coal has been quiet in consequence of the open nature of the weather. There is no abatement in the amount of consumption of coal and dross suitable for manufacturing purposes. The colliers have been granted an increase of 6¼ per cent. in their wages—equal to 3d. per day—which will bring the rate up to 6s. 9d., and take effect on 13th current. In the meantime both parties will allow the wages question to rest until the end of the year, and they are to address themselves to the selection of a permanent neutral chairman of the Conciliation Board, and the drafting of a new wages agreement.

IRON.

The Glasgow pig-iron market has had a somewhat easier tendency, with a moderate business doing. Since last report Cleveland warrants have sold at 67s. to 67s. 2½d. and 66s. 4d. cash, 67s. 3d. to 67s. 7½d. and 66s. 10½d. one month, and 67s. 10½d. to 68s. and 67s. 1½d. three months. Cumberland hæmatite warrants were done at 81s. cash and 82s. 3d. three months. The quantity of Cleveland pig iron brought into Scotland in the past week was 7,333 tons, being 81 tons less than in the corresponding week of 1911. There are 88 furnaces in blast in Scotland, compared with 79 at this time last year, and as regards ordinary brands of Scotch pig iron, the entire output is reported to be going into consumption. Prices are accordingly firm for G.M.B., while special brands show little change. Free at ship at Glasgow, Govan and Monkland Nos. 1 are quoted 75s. 6d., Nos. 3, 74s.; Carnbroe, No. 1, 79s., No. 3, 75s.; Clyde, Calder and Summerlee, Nos. 1, 81s., Nos. 3 76s.; Gartsherrie and Langloan, Nos. 1, 82s. 6d., Nos. 3, 77s. 6d.; Coltness, No. 1, 97s. 6d., No. 3, 79s. 6d.; Eglinton, at Ardrossan or Troon, No. 1, 75s., No. 3, 74s.; Glengarnock, at Ardrossan, No. 1, 82s. 6d., No. 3, 77s. 6d.; Dalmellington, at Ayr, No. 1, 76s., No. 3, 74s.; Shotts, at Leith, and Carron at Grangemouth, Nos. 1, 81s., Nos. 3, 76s. per ton. The past week's shipments of Scotch pig iron were 3,418 tons foreign and 1,917 coastwise, the total of 5,335 tons being 2,705 less than in the corresponding week, and the total shipments for the past ten months are 17,538 tons less than in the corresponding period of last year. The finished iron and steel departments are very fully employed, and the steelmakers are much behind with deliveries. Only a moderate amount of new business is being placed for the home market, but a good export trade is being done in malleable iron and steel.

◆

Renfrew, Ayr and Dumbarton.

COAL.

Business in the shipping department of the coal trade has been much obstructed at Ardrossan and Irvine by strikes of dock labourers. The men have been agitating for advanced wages, and the harbour authorities have made efforts to replace their labour, and these have led to disturbances, without greatly improving facilities for shipment. No doubt the trouble will soon be overcome. The week's coal shipments have been at Bowling 104 tons, Greenock 6,168, Ardrossan 905, Troon 5,681, Irvine 845, Ayr 15,222—total 28,925 tons, compared with 30,000 in the preceding week, and 31,676 in the corresponding week of 1911. The troubles at the ports mentioned have resulted in larger shipments at Greenock and Troon, so that the total falling away is thus less than might have been anticipated. Colliers are working steadily as a rule, and the outputs are being got rid of in a fairly satisfactory manner. Prices of coal are generally steady.

◆

Stirling, the Lothians and Fife.

COAL.

There has been a good general business in coals, although the closing of the Baltic season must necessarily curtail the volume of shipments in that direction. Unfavourable weather has delayed a number of vessels that were expected in port for cargoes. The Firth of Forth shipments have been at Granton 7,514 tons, Bo'ness 19,187, Grangemouth 37,729, Leith 50,000—total 112,430 tons, against 116,050 in the preceding week, and 99,874 in the corresponding week of last year. A large amount of coal is being contracted for at present, for future delivery about current prices. Best screened steam coal is quoted f.o.b. at Leith 12s. 9d. to 13s., secondary qualities 11s. 6d. to 12s., treble nuts 13s. 3d. to 13s. 6d., doubles 12s. 9d. to 13s., and singles 12s. 3d. to 12s. 6d. per ton. The Fife shipments have been, at Methil, 52 574 tons, Burntisland 47,800, Dysart 1,868, Alloa 1,272, Wemyss 1,315, and Tayport 634—total 105,463 tons, compared with 113,634 in the preceding week, and 126,635 in the corresponding week of last year. First-class screened navigation coal is quoted f.o.b. Methil or Burntisland 16s. to 16s. 6d., unscreened 13s. 9d. to 14s. 3d.; steam coal, 11s. 6d. to 13s.; treble nuts, 13s. 6d. to 14s. 3d.; doubles, 12s. 6d. to 13s. 3d.; and singles, 12s. to 12s. 6d. per ton. A fair inland business is passing at steady prices.

THE LONDON COAL TRADE.

THURSDAY, NOVEMBER 7.

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THE TIN-PLATE TRADE

Liverpool.

Business is very slow just now, buyers preferring to hold back as much as possible. Makers, on the other hand, are comfortably booked up for some weeks to come, and in face of the high costs ruling for raw materials are not disposed to reduce their quotations to any extent in order to try and tempt forward buying. Following are about the figures at present being quoted:—Coke tin-plates: I C 14 × 20 (112 sh. 108 lb.), 15s. 6d. per box; I C 28 × 20 (112 sh. 216 lb.) 31s. 3d. to 31s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 10½d. to 16s. per box; I C 14 × 19¼ (120 sh. 110 lb.), 15s. 9d. to 16s. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. 9d. to 16s. per box; I C 20 × 10 (225 sh. 156 lb.), 23s. per box; I C squares and odd sizes, 16s. to 16s. 1½d. basis for approved specifications. Terne-plates rule quiet at 26s. 3d. to 26s. 6d. for I C 28 × 20, and charcoal tins stand at 18s. 6d. basis and upwards, according to tinning. Coke wasters are in moderate demand:—Quotations:—C W 14 × 20, 14s. 6d. per box; C W 28 × 20, 29s. 9d. per box; C W 14 × 18¾, 14s. 6d. per box; C W 14 × 19¼, 14s. 6d. per box; C W 20 × 10, 20s. 9d. per box—all f.o.b. Wales, less 4 per cent.

Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

THE CASE OF THE FIREMEN.—II.

SIR,—The existing firemen further complain of being exploited by the "approved institutions" to whom the Home Office has relegated the control of the firemen's examinations. That complaint, however, is not the second point in their case. The second point is that they have good ground for it.

Personally, I do not condemn any one of these approved authorities. They may, and probably have, been actuated by most excellent motives. On the other hand, I unhesitatingly aver that, in many instances, the procedure of those authorities has been, and continues to be, woefully wrong. Wrong, because unpractical in its modes, and therefore, naturally, evil in its effects. The way to a certain place is said to be paved with good intentions; and so, it would appear, is the orthodox road to the firemen's certificate. In both cases alike, a most undesirable "haven" is reached in the end.

Let us first enquire why these modes of procedure are "unpractical." The answer is easy. The prime reason lies in the fact that the Home Office has set these people an impossible standard of examination. The approved authority is empowered by the Act to grant the fireman a certificate "certifying his ability to make accurate tests (so far as practicable with a safety lamp) for firedamp."[*] A later regulation requires that the man shall be able to detect 2 per cent. of firedamp in the atmosphere. The requirements are thus stated with precision and defined with nicety. It seems a great pity to upset such a pretty arrangement; but, at the risk of disturbing the general complacency, one is bound to point out that a previous question remains to be settled before the approved authorities, generally, can even begin to carry out the pretty arrangement referred to. I may here anticipate the retort that the scheme has already been carried out and that thousands of firemen are now in actual possession of the certificates required by the law. That these men are already in possession of certificates, I cheerfully grant; whether such certificates are those required by the law is another question. That question will be discussed at a later stage. Meantime, the *previous* question, above alluded to, remains for answer. The Home Office must answer it, and the question is

What is Firedamp?

From the wording of the Act, one might imagine that "firedamp"[*] was the name of some definite chemical combination, or, at any rate, of some standard mechanical mixture of specific gases in definite proportions. But Prof. Redmayne, the Chief Inspector of Mines, and the principal mining adviser to the Home Office, agrees with other mining men in declaring it to be nothing of the kind. In his book on *The Ventilation of Mines* (published only last year) he states, as "demonstrating the variation in the composition of firedamp," that in 33 samples, gathered from different localities, the proportion of inflammable gases contained therein varied between the limits of 5 per cent. and 98 per cent. In purely British samples the range of variation lay between the limits of 78·8 per cent. and 98·2 per cent. Note also that the only inflammable gases found in British firedamp were methane and hydrogen. This point is important.

What the public desires to know is whether we are expected to believe that all "firedamps" are equally inflammable, irrespective of the amount of inflammable matter they contain? If not, then, which of the various firedamps forms the standard at the Home Office? And which particular composition of firedamp is to be employed at the firemen's gas tests? The Home Office issues a card showing the heights of gas cap when 1½, 2, 2½ or 3 per cent. respectively of firedamp is present in the atmosphere. Do these represent percentages of firedamp containing 78 per cent. of methane, or of firedamp containing 98 per cent. of that inflammable gas? Or are we to understand that 78 per cent. and 98 per cent. of methane give gas caps of equal heights? In the one case 4 per cent of firedamp gives 3·1 per cent. of inflammable gas in the atmosphere, and in the other case the same percentage of firedamp gives 3·9 per cent. inflammable gas.

If we include in our survey Mr Redmayne's quoted analyses of foreign firedamps, the inflammable matter in equal volumes of different firedamps varies from 5 per cent. to nearly 20 times as much. Obviously, then, it is not the "firedamp" that counts, but only that proportion of it which is contributed by combustible gases. Seeing that the Chief Inspector has "*demonstrated*" the wide limits between which the combustible proportion ranges in different firedamps, what does the Home Office mean by speaking of "firedamp" as if it were a standard mixture of definite gases in constant proportions?

It is therefore difficult to imagine what commonsense mode of procedure could have been adopted by the approved authorities. They were instructed to test the man's ability to find in the atmosphere 2 per cent. and upwards of firedamp. Quite so; but they were never instructed as to what was meant by the term "firedamp." Neither were they instructed as to the means whereby they might make it available for the purpose of the gas test on the surface. This difficulty is an essentially practical difficulty, and it is one which the Government (evidently) altogether overlooked when they concocted this hasty legislation. But as soon as their hastily-drafted Bill materialised into an Act of Parliament, the approved authorities immediately found these two difficulties staring them in the face—the difficulty of defining "firedamp," and the difficulty of finding supplies of the same.

What, then, were they to do? Here were thousands of firemen having the dismal prospect of being thrown out of employment at the end of the year, unless the approved authority certified their several abilities to make "accurate tests for firedamp." And, on the other hand, here were the approved authorities willing, and waiting, but unable to move, not having in their possession any "firedamp," nor any prospect of getting it, wherewith to test the men. What did they do? Nay, ask rather: What *could* they do? They simply cut the Gordian knot—it was impossible to untie it. Knowing neither what "firedamp" really was, nor from where they could possibly obtain it, they pretended (to the world) that they were equally ignorant of what it was *not*. *So they tested the men with coal gas!* You see, Sir, it was a case of Hobson's choice—"that or nothing." They made the wrong choice, however, for certainly, in this case, *that* was infinitely worse than *nothing*.

The result is that thousands of men have been officially certified "able to make accurate tests for firedamp" as required by the Mines Act, whereas the only fact proved at their examination was that they could make "accurate tests for coal gas"—a qualification of no mining value whatever. Any other man, "tinker, tailor or bonny-white sailor," not actually blind, could pass a similar test, and yet be totally unable to "make accurate tests for firedamp" in a mine, or out of it.

Such a mode of procedure is not only futile, it is obviously illegal; and not only so, it forms a distinct count in the case of the existing firemen—a count which, with your permission, Sir, I will explain in another letter.

H. W. HALBAUM.

Cardiff, October 30, 1912.

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[*] It is necessary to point out that the word "firedamp" is not actually used in the Coal Mines Act, 1911, nor in the Coal Mines Order (No. 450) issued on May 2, 1912. The word first appears in the circular issued in August 1912 *re* "Firemen's, Examiners' and Deputies' Certificates."—ED. *C.G.*

THE STATUS OF COLLIERY SUREYORS.

SIR,—I have been interested in the correspondence in your columns as to the desirability of forming an institution.

Although I am in sympathy with any movement having for its object the ensuring of a more highly trained and capable colliery surveyor, and thereby raising his status, I do not agree with the proposal of admitting those who only have the Home Office certificate for mine surveyors, or have served an apprenticeship with a firm of mining surveyors, for the following reasons:—

1. The Government certificates are granted *without examination* to applicants who at the time of the passing of the Act (December 16, 1911) were engaged as colliery surveyors, and have had at least two years' experience.

2. The ground covered by the examination set by the new Board for Mining Examinations, although it should ensure a more reliable mine surveyor, is not wide enough to warrant possessors of the certificate forming an institution, and that members of such an institution should, in addition to being thoroughly competent and practical surveyors, possess a knowledge of mining law, colliery leases, &c.

3. It is possible for a student to complete an apprenticeship with a firm of mining surveyors, and yet not appreciate the opportunities at his disposal.

4. The basis of membership should be by examination, and all applicants for membership should satisfy the examiners of their knowledge of the subjects mentioned in No. 2.

As an alternative to forming an independent society, I have approached the Surveyors' Institution, London, asking them if there is any prospect of their council forming a sub-division No. 4, the subjects being more applicable to mining engineers engaged in surveying, and have received a reply from the secretary that my letter will be placed before the council.

The Direct Fellowship examinations of the Surveyors' Institution are as under:—

Sub-division 1. Chiefly Land Agency;
" 2. Chiefly Valuation;
" 3 Chiefly Building or Chiefly Quantities;

and if an additional sub-division No. 4 is formed on the lines suggested, I feel confident that there are many who would readily avail themselves of this opportunity admitting them to Direct Fellow of the Surveyors' Institution, thus raising their status.

W. H. GALLETLY, Chief Surveyor,
Messrs. Pope and Pearson,
West Riding and Silkstone
November 6, 1912. Collieries, Normanton.

MINERS' NYSTAGMUS.

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E. A. HAILWOOD,
Manager to Ackroyd & Best Ltd.
Morley, near Leeds,
November 5, 1912.

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Leacroft, Trentham, Staffs. T. L. LLEWELLYN.
November 6, 1912.

o the Editor.

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THE FIREMEN.—II.

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cent. of inflammable gas in the atmosphere, and in the other case the same percentage of firedamp gives 3·9 per cent. inflammable gas.

If we include in our survey Mr. Redmayne's quoted analyses of foreign firedamps, the inflammable matter in equal volumes of different firedamps varies from 5 per cent. to nearly 20 times as much. Obviously, then, it is not the "firedamp" that counts, but only that proportion of it which is contributed by combustible gases. Seeing that the Chief Inspector has "*demonstrated*" the wide limits between which the combustible proportion ranges in different firedamps, what does the Home Office mean by speaking of "firedamp" as if it were a standard mixture of definite gases in constant proportions?

It is therefore difficult to imagine what commonsense mode of procedure could have been adopted by the approved authorities. They were instructed to test the man's ability to find in the atmosphere 2 per cent. and upwards of firedamp. Quite so; but they were never instructed as to what was meant by the term "firedamp." Neither were they instructed as to the means whereby they might make it available for the purpose of the gas test on the surface. This difficulty is an essentially practical difficulty, and it is one which the Government (evidently) altogether overlooked when they connected this hasty legislation. But as soon as their hastily-drafted Bill materialised into an Act of Parliament, the approved authorities immediately found these two difficulties staring them in the face—the difficulty of defining "firedamp," and the difficulty of finding supplies of the same.

What, then, were they to do? Here were thousands of firemen having the dismal prospect of being thrown out of employment at the end of the year, unless the approved authority certified their several abilities to make "accurate tests for firedamp." And, on the other hand, here were the approved authorities willing, and waiting, but unable to move, not having in their possession any "firedamp," nor any prospect of getting it, wherewith to test the men. What did they do? Nay, ask rather: What *could* they do? They simply cut the Gordian knot—it was impossible to untie it. Knowing neither what "firedamp" really was, nor from where they could possibly obtain it, they pretended (to the world) that they were equally ignorant of what it was *not*. *So they tested the men with coal gas!* You see, Sir, it was a case of Hobson's choice—"that or nothing." They made the wrong choice, however, for certainly, in this case, *that* was infinitely worse than *nothing*.

The result is that thousands of men have been officially certified "able to make accurate tests for firedamp" as required by the Mines Act, whereas the only fact proved at their examination was that they could make "accurate tests for coal gas"—a qualification of no mining value whatever. Any other man, "tinker, tailor or honey-white sailor," not actually blind, could pass a similar test, and yet be totally unable to "make accurate tests for firedamp" in a mine, or out of it.

Such a mode of procedure is not only futile, it is obviously illegal; and not only so, it forms a distinct count in the case of the existing firemen—a count which, with your permission, Sir, I will explain in another letter. H. W. Halbaum.

Cardiff, October 30, 1912.

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Coal Mines Act, 1911, nor in the
0) issued on May 2, 1912. The
cular issued in August 1912 *re*
and Deputies' Certificates."—

THE STATUS OF COLLIERY SUREYORS

Sir,—I have been interested in the correspondence in your columns as to the desirability of forming an institution.

Although I am in sympathy with any movement having for its object the ensuring of a more highly trained and capable colliery surveyor, and thereby raising his status, I do not agree with the proposal of admitting those who only have the Home Office certificate for mine surveyors, or have served an apprenticeship with a firm of mining surveyors, for the following reasons:—

1. The Government certificates are granted *without examination* to applicants who at the time of the passing of the Act (December 16, 1911) were engaged as colliery surveyors, and have had at least two years' experience.

2. The ground covered by the examination set by the new Board for Mining Examinations, although it should ensure a more reliable mine surveyor, is not wide enough to warrant possessors of the certificate forming an institution, and that members of such an institution should, in addition to being thoroughly competent and practical surveyors, possess a knowledge of mining law, colliery leases, &c.

3. It is possible for a student to complete an apprenticeship with a firm of mining surveyors, and yet not appreciate the opportunities at his disposal.

4. The basis of membership should be by examination, and all applicants for membership should satisfy the examiners of their knowledge of the subjects mentioned in No. 2.

As an alternative to forming an independent society, I have approached the Surveyors' Institution, London, asking them if there is any prospect of their council forming a sub-division No 4, the subjects being more applicable to mining engineers engaged in surveying, and have received a reply from the secretary that my letter will be placed before the council.

The Direct Fellowship examinations of the Surveyors' Institution are as under:—

Sub-division 1. Chiefly Land Agency;
" 2. Chiefly Valuation;
" 3. Chiefly Building or Chiefly Quantities;

and if an additional sub-division No. 4 is formed on the lines suggested, I feel confident that there are many who would readily avail themselves of this opportunity admitting them to Direct Fellow of the Surveyors' Institution, thus raising their status.

W. B. Galletly, Chief Surveyor,
Messrs. Pope and Pearson,
West Riding and Silkstone
November 6, 1912. Collieries, Normanton.

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EXPLOSIVES IN COALMINES.

An Explosives in Coal Mines Order has been issued by the Home Secretary, dated October 15, 1912, under section 61 of the Coal Mines Act, 1911. It is as follows:—

1. The Explosives in Coal Mines Order of May 21, 1912, shall take effect subject to the following amendments:

(1) At the end of clause 2, paragraph (*h*), there shall be added the words "For the push button there may be substituted an arrangement by which the firing contact is automatically made at the end of the travel of the handle and on the release of the handle is automatically broken."

(2) In clause 3, paragraph (*a*), after the word "electricity" the words "or (in mines other than coalmines) by a squib" shall be added.

(3) In clause 6, paragraph (*c*), at the end there shall be added the following proviso: "Provided that in mines where mechanical power is used for the purpose of hauling mineral from the face, and the movement of the strata renders it necessary to maintain the height of the roads by ripping, this provision shall not apply to men who may remain in the mine for the purpose of carrying on the ripping within such distance of the face as may be fixed by the manager with the approval of the inspector, or for the purpose of repairs."

(4) At the end of the Third Schedule, there shall be added the words "or, in the case of a mine or part of a mine in which the use of safety lamps is not required, the fuse may be ignited by means of a naked light subject to the conditions that in such mine or part of a mine no person while charging a shothole or handling any explosive not contained in a securely closed case or canister shall smoke or allow any naked light to be within a distance of 4ft. of the shothole or explosive, and before a light is brought near to the hole for the purpose of firing the shot all other explosive shall be removed from the neighbourhood of the shothole."

2. This Order may be cited as the Explosives in Coal Mines Order of October 15, 1912.

R. McKenna,
One of His Majesty's Principal
Secretaries of State.

Whitehall,
October 15, 1912

BOOK NOTICES.

The Physics and Chemistry of Mining. By T. H. Byrom, F.I.C. Second edition revised. London: Crosby Lockwood and Son. 1912. Price 3s. 6d. net.

This work was designed as an elementary class-book for the use of mining students, and the fact that a second edition has been published is in itself an indication that such a book supplies a want. It is the natural tendency of books to grow in size in successive editions, owing to the necessity for the provision of space for new matter and to the reluctance of authors to sacrifice any part of the old. Mr. Byrom has met this difficulty in an heroic way. Finding that the subjects of magnetism and electricity have grown so much in recent years as to be beyond satisfactory treatment in the space at his disposal, the author has decided to omit this section entirely. With regard to the treatment of the subjects dealt with in this volume, the author appears to cling sometimes to certain doctrines which are not supported by modern investigation, as, for instance, with the nature of matter, in which the properties of amorphous solids, as distinct from crystalline bodies, are not explained. It is misleading, moreover, to state, as is done on page 1, that solids possess ductility, implying that this is a property of all solids. The incorporation of a set of hygrometric tables, with clear examples of their use, is a useful feature of this edition The chapters on the atmosphere and on water are quite good, and well suited to the purpose of this book, so also are the pages on carbon and its compounds; but we wonder what Mr. Leonard Hill would say to the statement that "it is possible to exist for a while in an atmosphere which will not support the combustion of a candle, but it is extremely dangerous." In fact, the author himself contradicts this assertion on the following page. The chapter on firedamp has been much improved, and the inclusion of Mr. Winstanley's photographs of gas caps, and other information is quite a good feature. This section of the book has been brought quite up to date, and will be much appreciated by students in view of the rigorous conditions attaching to firemen's qualifications under the new Coal Mines Act. The concluding chapters of the book cover an immense field, and are necessarily to be regarded as mere outlines of the subjects treated. Thus we find coaldust dismissed in four pages, explosives in 12 pages, coal analysis in 11 pages. Chapter XI. is devoted to the nature of coal, but we do not find here the same evidence of up-to-date revision that characterises many of the other sections of the book. The pages devoted to modern coking practice do not seem to come strictly within the requirements of the ordinary mining student, and this space might well have been devoted to a fuller treatment of other and more directly appropriate subjects. There is a set of questions taken from papers set in various examinations, which the student will doubtless be glad to have, and, although we have found occasion to criticise some points in the volume, we can thoroughly recommend it as a useful preliminary to more advanced and specialised treatises.

High Explosives. By W R. Quinan. Critchley Parker, Melbourne. Price 21s., net.

On no subject would an authoritative hand-book be more welcome than on that of high explosives. We say "hand-book" for we cannot hope for a comprehensive treatise until considerably more and better ordered research on the nature and properties of high explosives has been accomplished; but it should be possible for someone well-versed in the manufacture and use of explosives to collect together such information as exists scattered throughout technical and scientific journals and Government publications.

The author of the book before us, Mr. W. R. Quinan, had had about 30 years' practical experience in explosives works in California, South Africa and Australia. We are told in the introduction that the concluding chapters were written while the author was in the last stages of a severe illness, to which he succumbed on August 15, 1910. This disarms criticism. When we are told further that Mr. Quinan was as distinguished for his scientific attainments as for his loving characteristics as husband and father, criticism becomes almost an impertinence.

And yet we must perforce record as our opinion that the theoretical portions of this book should not have been published. Without going into details, it may be said that they are based upon an entire misconception of the laws of gases, and are unintelligible—numerous misprints and misquotations heighten a mystification which grows as one reads.

Scattered amongst the earlier chapters—which are written with a naivety of style that has a certain charm—are various practical hints and dicta which the author's experience renders valuable. But these earlier chapters are also marred by misprints, whole lines being omitted or transposed, with occasionally curious effect; thus, we read (p. 8) that:

"Liquid nitro-glycerin, in fact, has been more or less of a puzzle to practical men. confined in tin cans, regarded as the quickest of all high"

A deplorable production.

COLLIERY ACCIDENTS.

Dowlais.

Evidence was given at a Dowlais inquest on the 1st inst. regarding a pit cage fatality at Rheslas pit, Fochriw, in which the victim was Evan Evans (31), collier, Ivor-street, Dowlais. In compliance with the new Mines Act, Messrs. Guest, Keen and Nettlefolds have fixed a bar, which has been in use in Abercynon Collieries for some two years, to all the cages used in their Dowlais Collieries. The accident happened through the bar becoming loose.

The jury returned a verdict of "Accidental death," with a rider hoping that the proprietors of collieries would be enabled to provide as good a method of preventing accidents of that kind as the experience of officials could invent.

Walsall.

The Walsall Coroner (Mr. J. F. Addison) conducted an inquest recently at the Walsall Hospital relative to the death of William Rounds, 48, who was injured at the Wood Farm Colliery, where he was employed as a stallman. Deceased had stated that pieces of rock kept falling whilst he was at work, and eventually more rock came and brought gas with it, which caught his light and caused an explosion. He also said he was not aware of any gas being in the pit.

A loader named Ernest Argyle, of Parker-street, Bloxwich, said he was working at the same stall with the deceased a week last Monday when he saw him test the gas. It was 7 o'clock when the man made the examination, and 10 o'clock when the fall took place which brought the gas. The candles were unprotected.

Robert Burgess, of Pelsall, a fireman in the pit, deposed to making an examination to detect gas in the stall, but could not find any; 3 or 4 tons of rock fell.

A verdict of "Accidental death" was returned, and an expression of sympathy passed with the widow and relatives.

Partnerships Dissolved.—The *London Gazette* announces the dissolution of the following partnerships:—J. Willows and W. Pullan, carrying on business as coal dealers at Bramley, Leeds, under the style of Wilfred Pullan; T. Graham, J. Young, G. Artingstall, and F. A. Pidding, carrying on business as electrical engineers at Market-street and Great Western-street, Moss Side, Manchester, under the style of the Imperial Electric Lamp Company.

MINING AND OTHER NOTES.

North of England colliery officials have decided, in view of recent legislation and for other reasons, to form an association, under the title of the "Colliery Officials' Mutual Aid Society for Northumberland and Durham." At the meeting at which this step was taken several speakers mentioned that under the new Act the certificates and diplomas of under-managers were depreciated, as the Act required the "supervision of a manager, and of an under-manager, if any." One official declared that it meant that under-managers were reduced to the position of fore-overmen, with a reduction of £1 a week in salary. Mr. J. Riddle, Lintz Green, has been elected secretary, and a committee of management appointed.

A meeting of the chairmen and general managers of the principal railway companies was held on the 1st inst at the offices of the Railway Companies' Association, Whitehall. The object of the meeting was to consider the situation arising from the "hanging up" of the Railways Bill. The meeting, which was private, lasted about an hour and a-half. No official statement was issued, but it is understood that the representatives of the companies discussed the possibility, in view of delayed legislation, of increasing rates on goods and minerals, notwithstanding the provisions of the Rates and Charges Act.

The colliery surgeons of Lancashire adopted by 48 votes to two, at a conference at Wigan, a resolution declaring that accidents and industrial diseases under the Workmen's Compensation Act, 1906, should not entitle the sufferers to medical benefit under the Insurance Act.

Mr. H. L. Faulkner, late assistant manager and surveyor, Dinnington, has taken over the management at Norwood, in succession to Mr. W. L. Halpin, who has been appointed to the position of manager to the Manton Colliery Company, near Worksop.

It is stated that No. 3 pit at Tilmanstone is through the sand bed, and is now sinking in coal measures. The other pits are about a week behind.

Prof. Percy F. Kendall, of the Leeds University, on the 4th inst., delivered the first of a series of lectures on "Coal and Coal-bearing Rocks" at the Bradford Mechanics' Institute. Referring to the question of resources and coal substitutes, the lecturer criticised Sir William Ramsay's proposal to make boreholes to the coal measures, igniting the coal underground. He said that very ingenious suggestion overlooked some fundamental facts. The scheme was impossible. No mining engineer in his senses—or out of his senses—had ever contemplated such a preposterous idea as burning coal at the bottom of a borehole.

Several Cadeby Colliery workmen were summoned at the Doncaster West Riding Police Court recently for breaches of colliery rules at Cadeby. A Decaby filler was accused of improperly using a safety lamp. Defendant had had his lamp glass smashed by some means, and instead of reporting it immediately to some one in charge below he brought it up with him, and said nothing until he handed it to the lampman. A fine of 20s. and costs was imposed. George Farmer, of Conisboro', who pleaded guilty to taking a box of matches down the mine, had to pay an inclusive penalty of 20s. For a similar offence Jos. Gladwin, tub repairer, Conisboro', was also fined 20s. inclusive.

At the last meeting of the Staffordshire Education Committee, attention was drawn to a recommendation of the finance committee for the purchase of 2,000 square yards of freehold land (mines and minerals being reserved) at Quarry Bank from Lord Dudley at 2s. per square yard. It was now suggested the education committee complete the purchase by including the whole of the mines. The chairman said such a course in this case was absolutely impossible, because the minerals were leased to another party, or other parties. The committee were protected by two things—first of all, the land that had been purchased, and under which there were alleged to be minerals, was land which would never be used for building purposes The committee were further protected by part of the clause of the section which said—"The purchasers being satisfied that there is no danger, or likelihood of danger, from mining operations."

Mr. Archibald Barrie, manager of the Kinnedar pit, belonging to the Oakeley Collieries, has obtained an important situation as manager of a large colliery near Cardiff

A presentation took place at Doncaster on Saturday night, Mr. W. Bunting, who recently left the Edlington Colliery to take charge of the sinking of the new pit at Barnborough, being presented with a walnut sideboard and an inlaid barometer, subscribed for by the officials and workmen at Yorkshire Main. Mr. Bunting had been three and a-half years at Edlington Pit, which he sunk.

Developments are projected at the Old Silkstone Colliery, Dodworth, where it is anticipated that a seam of coal, covering an area of upwards of 20 miles. Owing to the limitation of space in the immediate vicinity, the company has decided to open works at Barugh, two miles from Barnsley. These works will also serve for the output of the Stanhope pit, which is about a mile and a quarter away. It will be connected by a private railway line, which, in turn, will be joined to the Lancashire and Yorkshire, the Great Central, and North-Eastern systems. The works comprise a washery, capable of dealing with 120 tons of

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R. McKENNA,
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NOTICES.

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on revised. London: Crosby
1912. Price 3s. 6d. net.
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High Explosives. By W R. QUINAN. Critchley Parker. Melbourne. Price 21s., net.

On no subject would an authoritative hand-book be more welcome than on that of high explosives. We say "hand-book" for we cannot hope for a comprehensive treatise until considerably more and better ordered research on the nature and properties of high explosives has been accomplished; but it should be possible for someone well-versed in the manufacture and use of explosives to collect together such information as exists scattered throughout technical and scientific journals and Government publications.

The author of the book before us, Mr. W. R. Quinan, had had about 30 years' practical experience in explosives works in California, South Africa and Australia. We are told in the introduction that the concluding chapters were written while the author was in the last stages of a severe illness, to which he succumbed on August 15, 1910. This disarms criticism. When we are told further that Mr. Quinan was as distinguished for his scientific attainments as for his loving characteristics as husband and father, criticism becomes almost an impertinence.

And yet we must perforce record as our opinion that the theoretical portions of this book should not have been published. Without going into details, it may be said that they are based upon an entire misconception of the laws of gases, and are unintelligible—numerous misprints and misquotations heighten a mystification which grows as one reads.

Scattered amongst the earlier chapters—which are written with a naivety of style that has a certain charm—are various practical hints and dicta which the author's experience renders valuable. But these earlier chapters are also marred by misprints, whole lines being omitted or transposed, with occasionally curious effect; thus, we read (p. 8) that:

"Liquid nitro-glycerin, in fact, has been more or less of a puzzle to practical men. confined in tin cans, regarded as the quickest of all high"

A deplorable production.

COLLIERY ACCIDENTS.

Dowlais.

Evidence was given at a Dowlais inquest on the 1st inst. regarding a pit cage fatality at Rhoslas pit, Foohriw, in which the victim was Evan Evans (31), collier, Ivor-street, Dowlais. In compliance with the new Mines Act, Messrs. Guest, Keen and Nettlefolds have fixed a bar, which has been in use in Abercynon Collieries for some two years, to all the cages used in their Dowlais Collieries. The accident happened through the bar becoming loose.

The jury returned a verdict of "Accidental death," with a rider hoping that the proprietors of collieries would be enabled to provide as good a method of preventing accidents of that kind as the experience of officials could invent.

Walsall.

The Walsall Coroner (Mr. J. F. Addison) conducted an inquest recently at the Walsall Hospital relative to the death of William Rounds, 48, who was injured at the Wood Farm Colliery, where he was employed as a stallman. Deceased had stated that pieces of rock kept falling whilst he was at work, and eventually more rock came and brought gas with it, which caught his light and caused an explosion. He also said he was not aware of any gas being in the pit.

A loader named Ernest Argyle, of Parker-street, Bloxwich, said he was working at the same stall with the deceased a week last Monday when he saw him test the gas. It was 7 o'clock when the man made the examination, and 10 o'clock when the fall took place which brought the gas. The candles were unprotected.

Robert Burgess, of Pelsall, a fireman in the pit, deposed to making an examination to detect gas in the stall, but could not find any; 3 or 4 tons of rock fell.

A verdict of "Accidental death" was returned, and an expression of sympathy passed with the widow and relatives.

Partnerships Dissolved.—The *London Gazette* announces the dissolution of the following partnerships:—J. Willows and W. Pullan, carrying on business as coal dealers at Bramley, Leeds, under the style of Wilfred Pullan; T. Graham, J. Young, G. Artingstell, and F. A. Pidding, carrying on business as electrical engineers at Market-street and Great Western-street, Moss Side, Manchester, under the style of the Imperial Electric Lamp Company.

MINING AND OTHER NOTES.

North of England colliery officials have decided, in view of recent legislation and for other reasons, to form an association, under the title of the "Colliery Officials' Mutual Aid Society for Northumberland and Durham." At the meeting at which this step was taken several speakers mentioned that under the new Act the certificates and diplomas of under-managers were depreciated, as the Act required the "supervision of a manager, and of an under-manager, if any." One official declared that it meant that under-managers were reduced to the position of fore-overmen, with a reduction of £1 a week in salary. Mr. J. Riddle, Lintz Green, has been elected secretary, and a committee of management appointed.

A meeting of the chairmen and general managers of the principal railway companies was held on the 1st inst at the offices of the Railway Companies' Association, Whitehall. The object of the meeting was to consider the situation arising from the "hanging up" of the Railways Bill The meeting, which was private, lasted about an hour and a-half. No official statement was issued, but it is understood that the representatives of the companies discussed the possibility, in view of delayed legislation, of increasing rates on goods and minerals, notwithstanding the provisions of the Rates and Charges Act.

The colliery surgeons of Lancashire adopted by 43 votes to two, at a conference at Wigan, a resolution declaring that accidents and industrial diseases under the Workmen's Compensation Act, 1906, should not entitle the sufferers to medical benefit under the Insurance Act.

Mr. H. L. Faulkner, late assistant manager and surveyor, Dinnington, has taken over the management at Norwood, in succession to Mr. W. L. Halpin, who has been appointed to the position of manager to the Manton Colliery Company, near Worksop.

It is stated that No. 3 pit at Tilmanstone is through the sand bed, and is now sinking in coal measures. The other pits are about a week behind.

Prof. Percy F. Kendall, of the Leeds University, on the 4th inst., delivered the first of a series of lectures on "Coal and Coal-bearing Rocks" at the Bradford Mechanics' Institute. Referring to the question of resources and coal substitutes, the lecturer criticised Sir William Ramsay's proposal to make boreholes to the coal measures, igniting the coal underground. He said that very ingenious suggestion overlooked some fundamental facts. The scheme was impossible. No mining engineer in his senses—or out of his senses—had ever contemplated such a preposterous idea as burning coal at the bottom of a borehole.

Several Cadeby Colliery workmen were summoned at the Doncaster West Riding Police Court recently for breaches of colliery rules at Cadeby. A Denaby filler was accused of improperly using a safety lamp. Defendant had had his lamp glass smashed by some means, and instead of reporting it immediately to some one in charge below he brought it up with him, and said nothing until he handed it to the lampman. A fine of 20s. and costs was imposed. George Farmer, of Conisboro', who pleaded guilty to taking a box of matches down the mine, had to pay an inclusive penalty of 20s. For a similar offence Jos. Gladwin, tub repairer, Conisboro', was also fined 20s. inclusive.

At the last meeting of the Staffordshire Education Committee, attention was drawn to a recommendation of the finance committee for the purchase of 2,000 square yards of freehold land (mines and minerals being reserved) at Quarry Bank from Lord Dudley at 2s. per square yard. It was now suggested the education committee complete the purchase by including the whole of the mines. The chairman said such a course in this case was absolutely impossible, because the minerals were leased to another party, or other parties. The committee were protected by two things—first of all, the land that had been purchased, and under which there were alleged to be minerals, was land which would never be used for building purposes. The committee were further protected by part of the clause of the section which said—"The purchasers being satisfied that there is no danger, or likelihood of danger, from mining operations."

Mr. Archibald Barrie, manager of the Kinnedar pit, belonging to the Oakeley Collieries, has obtained an important situation as manager of a large colliery near Cardiff.

A presentation took place at Doncaster on Saturday night, Mr. W. Bunting, who recently left the Edlington Colliery to take charge of the sinking of the new pit at Barnborough, being presented with a walnut sideboard and an inlaid barometer, subscribed for by the officials and workmen at Yorkshire Main. Mr. Bunting had been three and a-half years at Edlington Pit, which he sunk.

Developments are projected at the Old Silkstone Colliery, Dodworth, where it is anticipated that a seam of coal, covering an area of upwards of 20 miles. Owing to the limitation of space in the immediate vicinity, the company has decided to open works at Barugh, two miles from Barnsley. Those works will also serve for the output of the Stanhope pit, which is about a mile and a quarter away. It will be connected by a private railway line, which, in turn, will be joined to the Lancashire and Yorkshire, the Great Central, and North-Eastern systems. The works comprise a washery, capable of dealing with 120 tons of

The Materials of "Sentinel" Valves

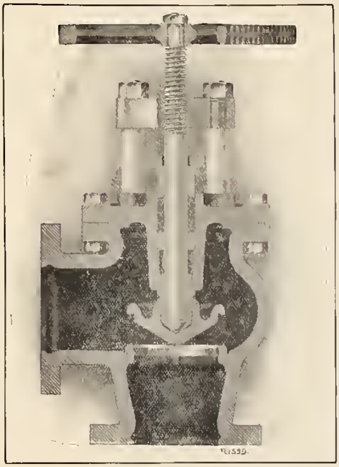
THE CHESTS are of a special mixture of iron, which is much tougher than ordinary cast iron.

THE SEATS in the Low-Pressure Type are of hard Admiralty bronze, cast under licence by the "Etonia" process which gives castings of exceptional density. In the High-Pressure Type the seats are made of "Nicalloy," an alloy of nickel and special iron, extremely hard and having a coefficient of expansion between cast iron and cast steel. The seats of "Sentinel" Valves cannot work loose after exposure to high temperatures.

THE SPINDLES are made of nickel steel and are, roughly speaking, three times as strong as spindles made of bronze and immensely tougher.

Strength is secured not only by selection of materials, but also by careful designing. The metal, even at the flanges, flows in easy curves and there are no sharp bends to cause risk of crystallisation and fracture.

These and the other noteworthy features of "Sentinel" Valves—elimination of erosion, chattering and water-hammer—rotating valve—non-binding spindle—fool-proof gland etc.—are fully described and illustrated in List 25 S, sent free on application.



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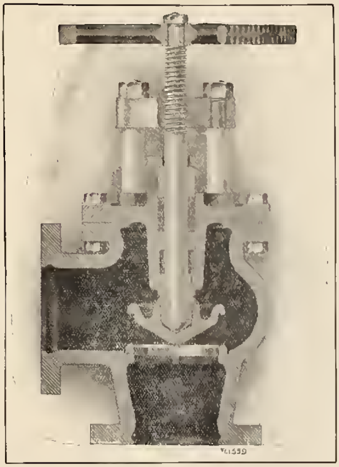

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power scheme. Forms can be seen by British manufacturers at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Walsall, November 18.—*Lancashire Boiler.*—For a Lancashire boiler, for the Guardians.

Whitehaven (Cumb.), November 13.—*Cast Iron Pipes.*—For about 15 tons of 3 in. cast iron spigot and socket pipes, together with the necessary bends, junctions, valves and other specials, for the Rural District Council (Contract No. 1).

COAL, IRON AND ENGINEERING COMPANIES.

Anglo-Argentine Coal Company Limited.—This private company has been registered, with a capital of £200,000 (£10), as coal merchants and miners, colliery proprietors, coke and patent fuel manufacturers, pitwood merchants, &c. First directors, T. J. Callaghan (chairman) and D. A. Thomas (deputy-chairman), both permanent. In the event of either of the said directors ceasing to act, the vacancies to be filled by persons nominated by L. Gueret Limited. £500.

Bordesley Engineering Company Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business indicated by the title. First directors: A. C. Wright, J. A. C. Wright, J. D. Rowland, and F. A. Griffin. Registered office, 35, New Bond-street, Birmingham.

Canada Iron Corporation Limited.—The report for the year ended May 31 last shows a profit of 375,100 dols. After meeting interest charges and making various appropriations, there remains a surplus of 46,600 dols., making with 359,800 dols. a credit balance of 406,400 dols. to be transferred to the 1912-13 accounts. It is stated that business has improved during the past six months.

Collieries Improvements Limited.—This private company has been registered, with a capital of £1,625 in 5s. shares, to carry on the business of manufacturers of and dealers in colliery equipment and accessories, electrical and general engineers, &c.

Commercial Electric Company Limited.—This private company has been registered, with a capital of £5,000 in £1 shares, to take over the business of an electrician, mechanical engineer, and manufacturer carried on by J. H. Kloet at 18, King-street East, Manchester, and elsewhere as the Commercial Electric Company. First directors, J. H. Kloet (managing director) and E. Oldfield.

Fairfield Shipbuilding and Engineering Company Limited.—The report for the year ended June 30 discloses a loss of £21,373, thus reducing the credit balance of £70,048 brought forward to £48,675. This is appropriated in the payment of debenture interest £23,750, preference dividend £15,000, transferred to income-tax account £3,000, directors' fees £2,100, and carried forward £4,625.

Hanley Collieries Limited.—This private company has been registered, with a capital of £20,000 in £10 shares, to take over the business of a colliery proprietor carried on by T. B. Barton at Northwood, Stoke-on-Trent, as the Hanley Collieries. The first directors are T. B. Barton (permanent) and Mrs. K. E. Barton.

Hydronite Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of coal and iron masters, engineers, fuel manufacturers, &c., and to adopt an agreement with A. E. Hills. First directors, A. E. Hills, Lieut.-Col. R. L. Tottenham and S. A. Stevens (all permanent).

New Hucknall Colliery Company Limited.—The directors have announced a second interim dividend of 2½ per cent., payable on November 1.

Norris, Henty and Gardners Limited.—This private company has been registered, with a capital of £45,000 in £1 shares (20,000 preference), to take over the business carried on at 87, Queen Victoria-street, E.C., as Norris and Henty, and to carry on the business of mechanical, electrical, gas and oil engineers, iron and brass founders, machine makers, tool manufacturers, and to adopt an agreement with E. H. Norris and C. G. Henty.

Oldham Boiler Works Limited.—After allowing £450 for depreciation, the directors report a loss for the half-year of £607.

Parkgate Iron and Steel Company Limited.—The directors have decided to pay an interim dividend of 1s. 6d. per share, free of tax, for the half-year ended September 30.

Pulsector Limited.—This private company has been registered in Edinburgh, with a capital of £5,000 in £1 shares, to acquire from John J. Ferguson, engineer, 50, Wellington-street, Glasgow, patent rights in combined aerostatic and hydrostatic low-pressure hot water pump and boiler. First directors, J. J. Ferguson and Alan A. Ferguson. Qualification £50. Registered office, 113, St. Vincent-street, Glasgow.

Roberts (William) (Tipton) Limited.—The directors announce an interim dividend at the rate of 10 per cent. per annum, free of income tax, on the ordinary shares for the past half-year.

Rotherham Electrical Engineering Company Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of electricians, mechanical engineers, manufacturers, and workers of and dealers in electricity, motive power and light, &c., and to adopt an agreement with S. Walford Grout and J. E. Tongue. First directors, S. W. Grout (chairman) and J. E. Tongue (both permanent governing directors, subject to holding £500 shares).

Scott (John G.) and Co., Colliery Stores, Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to take over the business of a colliery, iron, steel, metal, &c., merchant, carried on by C. D. Beane at 30, Broad Chare, Newcastle-on-Tyne, as John G. Scott and Co. First director, G. D. Beane (chairman). Qualification, £100. Registered office, Milburn House, Newcastle-on-Tyne.

Ship Canal Sand Company Limited.—This private company has been registered, with a capital of £5,000 in £1 shares, to carry on the business of engineers, ironmasters, steelmakers and convertors, scrap iron merchants, &c., to acquire the lease of certain premises at Weaste, Manchester, belonging to the Manchester Ship Canal Company, and to adopt an agreement between W. Robertson and D. H. Irwin. First directors, D. H. Irwin, E. Shackleton, E. Mitchell, and W. Robertson (managing director). Qualification, £100.

South Durham Steel and Iron Company Limited.—The directors recommend a final dividend of 10 per cent., making 20 per cent. for the year.

Tweefontein Colliery Company Limited.—The directors have resolved to declare an interim dividend for the half-year ended June 30, 1912, at the rate of 12½ per cent. per annum, less income tax.

United Transport Company Limited.—This private company has been registered, with a capital of £2,500 in £10 shares, to carry on the business of wholesale and retail coal, &c., merchants, shippers, exporters, &c. Secretary, E. W. Bliault.

THE FREIGHT MARKET.

The outward freight market on the north-east coast has not been especially active this week. Rates, however, are well maintained for most directions. At South Wales, chartering has been of very heavy dimensions. Rates are easier for the River Plate, but firm in other directions. The Clyde reports a good demand for tonnage, especially on time charter. At the Humber, Baltic rates have drooped and business generally is quiet. Homeward chartering has been busy. At the Black Sea the market is easier, with tonnage offering more freely, but shippers hesitating to operate on the basis of current high rates. The Eastern markets are quiet, but steady. The Mediterranean and ore trades are firm. The Baltic is steady. America has a strong enquiry and an improving tone. The River Plate is unaltered.

Tyne to Algiers, 2,700, 11s. 3d.; Amsterdam, 1,500, 5s 7½d.; Bordeaux, 2,000, 8s. 3d.; 3,000, 7s. 9d.; Barcelona, 2,200, 13s., 500, spot; Dunkirk, 1,450, 6s. 9d.; Genoa, 3,000, 13s. 6d.; 3,800, 13s. 6d.; Gibraltar, 2,000, 10s. 3d.; Helsingfors, 2,700, 7s. 3d., 600; Hamburg, 2,600, 5s. 6d.; Las Palmas, 2,800, 12s. 4½d.; 2,200, 12s., early December; 2,400, 12s. 4½d.; London, 1,700, 5s.; 2,600, 4s. 9d., from Dunston; 2,000, 4s. 6d.; 1,900, 4s. 9d.; Memel, 1,800, 6s. 9d.; Naples, 4,300, 13s. 3d. if 600, 13s. if 1,000; 3,600, 13s. 6d., 800, river loading; Oran, 1,600, 11s. 3d., 400; 2,300, 11s. 3d.; Port Said, 4,500, 13s. 4½d.; 5,300, 13s. 4½d., from Dunston; Pozzuoli, 3,600, 14s. 6d. coal, 15s. 6d. goods, from Dunston and Elswick; Swinemunde, 1,400, 5s. 6d.; St. Nazaire, 2,900, 7s. 3d., from Dunston; Tarragona, 1,550, 4s.

Cardiff to Alicante, 1,400, 13s. 6d.; Algiers, 2,000, 14 fr., ppt.; 3,000, ditto; 3,600, ditto; 4,800, ditto; 5,500, 13¾ fr.; Ancona, 5,600, 15s. 6d., November 25; Bordeaux, 3,100, 10½ fr.; 1,800, 10½ fr., 400; 3,400, 10½ fr.; 2,800, ditto; Barcelona, 2,100, 13s. 6d., ppt.; Bahia Blanca, 5,000, 24s. 3d.; sail, 19s., November; Cape Verde, 5,800, 12s., November 20; Civita Vecchia, 3,000, 15s., ppt.; 4,300, ditto; 2,500, ditto; 2,000, ditto; Cagliari, 3,000, 14s. coal, 14s. 9d. fuel, ppt.; 1,900, ditto; Cherbourg, 1,200, 7s. 6d.; Campana, 3,600, 23s. 6d., November; 3,400, 24s., with option; 24s., November; Cadiz, 1,800, 12s. 3d., ppt.; Dakar, 1,400, 13s. coal, 13s. 9d. fuel, November; Devonport, several vessels, 3s. 6d., Admiralty; Dieppe, 2,300, 6s. 6d.; Felixstowe, 900, 5s. 9d.; Genoa, 6,500, 13s. 6d., ppt.; 5,800, 13s. 9d., ppt.; 3,500, 14s., spot; 4,300, ditto; 5,500, ditto; 4,800, ditto; Havre, 800, 7s., ppt.; Harwich, 2,000, 5s.; Itapagipe (Bahia), sail, 19s., coal; Islands, 2,500, 11s. 9d., ppt.; Invergordon, 950, 6s. 6d.; La Guayra, sail, 16s., fuel; Leghorn, 13s. 9d., reported; 3,000, 14s. 3d., 500, spot; 3,000, 13s. 9d., 700, spot; Lisbon, 2,600; 9s. 9d., 350, November 11; 4,000, 9s. 3d.; 1,900, 9s. 9d., 800, ppt.; Las Palmas, 2,500, 11s. 9d.; Malta, 5,700, 11s. 9d.; 2,800, 13s., ppt.; several vessels, 10s. 6d., Admiralty; 2,900, 11s. 3d., fuel, Admiralty; Marseilles, 3,800, 15·37½ fr., ppt.; 15½ fr.; Malaga, 1,250, 13s. 6d., November 11; Monte Video, 22s. 9d., November; 5,200, 22s., November 20; 4,500, 22s., end November; Naples, 13s. 9d., reported; 3,800, 13s. 6d., 800, November 12; Oporto, 2,000, 11s.; Port Said, 13s. 3d.; 5,700, 13s. 6d., November 11; 4,600, 13s. 6d., spot; 5,000, 13s. 3d., November 15; 5,000, 13s. 6d., ppt.; Porto Ferrajo, 4,000, 14s., ppt.; Passages, 1,500, 10s.; Portland, several steamers, 4s. 7½d.; Portsmouth, several steamers, 4s. 7½d.; Rio de Janeiro, 5,000, 23s. 6d., 300, ppt.; 24s., November 12; 6,200, 23s. 9d., end November; 8,000, 24s., ppt.; 6,800, 23s. 6d., November 25; Rosario, 5,200, 23s. 6d., November 20; River Plate, 23s., December; 4,500, 23s. 9d., spot; 6,000, 23s. 6d., November 20; 3,500, 22s. 9d.; 5,000, 23s. 6d., mid-November; 5,000, 23s. 9d.; St. Malo, 1,100, 7s. 6d.; 2,200, 6s. 9d., spot; 2,800, 7s.; Savona, 5,000, 14s., spot; 5,600, 13s. 9d.; Sfax, 2,600, 13¾ fr., November 14; Santos, 5,000, 23s. 6d., 300, ppt.; Seville, 1,800, 11s. 9d., November 12; St. Nazaire, 2,900, 11 fr.; 2,200, 10 fr.; Torre Annunziata, 3,000, 15s., ppt.; 4,300, ditto; 2,500, ditto; 2,000, ditto; Villa Constitucion, 3,400, 24s., with option; 24s., November; 3,600, 23s. 6d., November; Venice, 5,000, 15s. 6d., November 25; 3,900, 15s. 9d., 400, spot.

Glasgow to Alexandria, 2,700, 14s.; Genoa, 3,000, 13s.; Savona, 3,000, 13s.; Leghorn, 3,000, 13s.; Barcelona, 1,900, 12s. 9d.; Bordeaux, 2,000, 9½ fr.

Swansea to Barletta, 2,200, 15s. 3d. coal, 16s. fuel; Tunis, 1,700, 17 fr., ppt.; Marseilles, 2,100, 16 fr., ppt.; Bordeaux, 1,800, 11 fr.; 2,000, 10¾ fr.; Chantenay, 1,250, 10¾ fr.; 2,000, 10¾ fr., ppt.; Catania, 2,100, 14s. 3d. coal, 15s. fuel, ppt.; Oporto, 1,150, 11s. 6d.; Rouen, 1,650, 8s.; St. Brieux, 750, 6s. coal, 8s. 6d. fuel; Dieppe, 980, 7s. 6d.; London, 3,300, 5s.; Alicante, 1,400, 13s. 9d.; Stettin, 1,200, 6s. 3d.; Charente, 1,250, 11 fr.

Newport to Torre Annunziata, 4,200, 15s.; 2,000, do.; 2,500, do.; Civita Vecchia, 4,200, 15s.; 2,000, do.; 2,500, do.; Dartmouth, 5,000, 5s. 6d.; Portland, 5,000, 5s. 6d.; Gibraltar, 2,600, 10s. 3d.; Bahia Blanca, 6,600, 23s. 9d., November 10-20; 24s. 3d., November; Naples, 5,000, 13s. 6d., 800, November 10; Seville, 1,200, 12s., ppt.

Wear to Bordeaux, 3,300, 7s. 9d.; Aarhuus, 1,200, 8s.

Leith to Civita Vecchia, 2,700, 14s.

Seaham Harbour to Abus, 1,250, 8s.

Warkworth Harbour to Tonning, 1,450, 8s.

Tees to Hamburg, 1,650, 6s. 9d., pig iron.

Fife port to Nice, 1,900, 14s. 3d.

Hull to Leghorn, 2,100, 13s. 10½d.; Riga, 2,200, 5s. 9d., ppt.; 5,000, 5s. 6d.; 1,700, 5s. 10½d.; Reval, 2,200, 6s. 6d., ppt.; London, 1,450, 5s., spot; 1,400, 5s. 3d., ppt.; Rotterdam, Amsterdam, Schiedam or Ymuiden, 2,000, 4s. 6d.

Wales to Monte Video, sail, 20s. 6d., ppt.; Bahia, sail, 20s.

Goole to Copenhagen, 1,200, 7s., mid November.

Cadiz to Monte Video, sail, 22s. 6d.

Methil to Genoa, 3,800, 13s. 6d.; Savona, 3,800, 13s. 6d.; Leghorn, 3,800, 13s. 6d.; Alexandria, 3,700, 14s.

Forth to Cronstadt, 3,000, 5s. 6d.

Port Talbot to Cagliari, 1,900, 14s. coal, 14s. 9d. fuel; Genoa, 5,000, 14s., end November; Sfax, 2,600, 16¾ fr.

Grimsby to Helsingborg, 2,200, 7s.

Burntisland to Monte Video, f.o., about 24s., reported; Helsingborg, 1,700, 7s.

Blyth to Helsingborg, 6s. 9d., 500, November.

Liverpool to Melbourne, sail, £1,950.

Hamburg to West Coast South America, copper port, sail, 20s. 3d., coke, January-February.

Grangemouth to Venice, 15s.

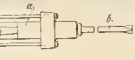
Rotterdam to Nantes, 2,300, 7s. 9d., ppt.; Chantenay, 3,000, 7s. 6d., November 15; Pauillac, 2,000, 10s. 4½d., coke, ppt.; Livorno, 4,000, 13s. 3d. coal, 14s. fuel, 15s. 3d. coke, November 5-11; Genoa, 3,800, 13s. 3d., including 500 tons fuel, November 8-11; Marseilles, 3,200, 14½ fr. with 600, 14¼ fr. with 900, ppt.; 4,000, ditto, November 5-15; 5,500, 15 fr. with 600, 14¾ fr. with 900, including 500 tons coke and 200 tons fuel, November 16; Honfleur, 1,350, 7s., ppt.; time charter, Calcutta coal trade, 5s. 3¾d., 12 months, delivery January.

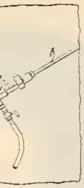
Homeward charters:—Azof, 3,500, 22s. n.c. or any, 22s. 6d. Hamburg, in case of ice to complete outside at 3s. less, cancelling November 16; 4,100, Rotterdam, 22s., Weser 22s. 6d., ppt.; 3,500, 20s. n.o. or any, 20s. 6d. Hamburg, ppt.; 6,400, Hamburg, 26s., ppt., reported; Novorossisk, 6,400, Weser 20s., Hamburg 20s. 3d., with 3d. less barley, ppt.; 5,000, Denmark, basis 25s. 6d., oilcake, ppt.; 6,000, Marseilles, 17½ fr., ppt.; Nicolaieff, 1,983 net, Antwerp, 21s., ore, ppt.; 3,400, Algiers, Tunis coast, 20 fr., ppt.; 7,500, Marseilles, 18 fr., with 2,000 tons oats 2 fr. extra, ppt.; Mauritius, 2,870 net, Bombay, 12 annas, November; Bombay, 8,500, Philadelphia or Baltimore, 27s., ore, November; 2,506 net, 27s., ore, November; 2,764 net, Barrow, 28s. 6d., ore, November; 2,545, U.K.-Cont., two ports, 29s. on d.w., option Dunkirk 29s., November; 6,400, Manchester, 28s. 3d., ore, November; 2,474 net, Manchester or Garston, about 28s. 3d., ore, November; 2,316 net, Dunkirk or Antwerp or Hull, two ports, 29s. on d.w., January; Kurrachee, 2,105 net, United Kingdom-Continent, 24s. one port, 24s. 6d. two ports, 6d. less if half seed, December; 2,338 net, 23s. 6d. p.p., November-December; Buenos Ayres, 3,800, 10 per cent., Bristol, 26s., ppt.; 6,400, 10 per cent., United Kingdom-Continent, 25s., no reduction, mid November; 5,800, 10 per cent., 24s. o.c., less 6d., November 10-30; San Lorenzo, 4,500, 10 per cent., U. K.-Cont., 27s. 6d. o.o., less 6d., spot; 4,500, 10 per cent., 26s. 6d. o.o., less 6d., November-December; 4,400, 10 per cent., 26s. 6d. o.o., less 6d., November 20-December 20; 5,200, 10 per cent., 25s. 3d. o.o., less 6d., December 10-January 10; 4,500, 10 per cent., 26s. 6d. o.c., less 6d., November 25-December 25; 5,400, 10 per cent., 25s. 3d. o.o., less 6d., option full cargo below bar 2s. less, December 10-January 10; 24s. 6d., option West Italy 2s. extra, January-February; Northern Range, 21,000 qrs., 10 per cent., Marseilles 5s. 7½d., option Cardiff 4s., Avonmouth 4s. 1½d., Rotterdam 4s. 3d., November; 32,000 qrs., 10 per cent., Antwerp, Rotterdam, Bremen or Hamburg, 3s. 9d., barley, February; Savannah, &c., 2,411 net, 146 ft., Liverpool or Bremen, 56s. 9d., cotton, November; 2,914 net, 58s. 9d., cotton, November; Alexandria, 1,802 net, Hull 14s. 6d., London 15s., November 10-25; Carthagena, 5,700, Emden, 7s. 6d., ppt.; Santander, 2,000, Glasgow, 7s. 7½d., ppt.; Dicido, 3,000, Rotterdam, 7s. 6d., ppt.; Gulf, 1,983 net, 152 ft., Liverpool or Bremen 72s. 6d., Havre 75s., cotton, November; 1,992 net, Liverpool or Bremen 71s. 3d., Havre 73s. 9d., cotton, November-December; Newcastle, N.S.W., sail, 52s. 6d., nitrate port and home to Mediterranean, August-September loading on coast; Taltal, sail, 29s. 6d., United Kingdom-Continent, November-December; Greece, 5,000, Glasgow, 9s. 6d.; Kustendje, 3,500, Genoa or Palermo, 20 fr., ppt.; Achtari, 3,000, South Spain, 29 fr. one port, 30 fr. two ports, ppt.; Kherson, Nicolaieff, Odessa, Novorossisk or Theodosia, 3,800, basis London or Rotterdam 19s., ppt.; West Australia, 3,134 net, South Africa, 42s. 6d., December; Gulf timber port, 1,000 stds., 10 per cent., Holland or East Coast United Kingdom 143s. 9d., option Holland and West Coast United Kingdom, 145s., December; Baltimore, 23,000 qrs., United Kingdom-Continent; p.p. 4s., Hamburg, 4s. 1½d., Copenhagen, Aarhuus, Aalborg, 4s. 3d. one port, 4s. 4½d. two ports, February; New York, Philadelphia or Baltimore, 32,000 qrs., 10 per cent., Antwerp, Rotterdam, Bremen or Hamburg, 3s. 9d., barley, February; Pensacola, 700 stds., 10 per cent., Antwerp, Rotterdam or Bremen, 145s. one port, 147s. 6d. two ports, December; Calcutta, 35s., Hamburg, jute, November; Sulina, 4,800, 19s., Lisbon, November; 4,000-4,300, 17s. 6d., November-December; 3,600 max., Lisbon or Oporto, 17s., November; Kherson, Nicolaieff or Odessa, 6,800, basis Weser or Hamburg, 19s. on d.w., ppt.; Mariupol, 5,500, Rotterdam, 20s. 6d., spot; Persian Gulf, 2,263 net, United Kingdom-Continent, lump sum, about £10,000, November; Baltimore, 4,043 net, Avonmouth or Rotterdam, 3s. 9d., heavy grain, with part oats 3s. 9d., November-December; Bilbao, 3,000, Middlesbrough, 7s. 7½d., November; 3,100, Rotterdam, 7s., November 15-30; 3,000, 7s., ppt.; 3,500, Dunkirk, 8s. 1½d., ppt.; Alexandria, 1,494 net, Bristol Channel, 15s., direct port 15s. 6d., November; Buenos Ayres, sail, 20s., United Kingdom-Continent; New York, Philadelphia or Baltimore, 4s. Cardiff or Marseilles, 4s. 3d. Rotterdam; time charter, States and West Indies, 7s. 6d., one trip, delivery New York, redelivery Gulf; 11s. 9d., one trip, Philadelphia to United Kingdom-Continent; Poti or Batoum, 6,500, Philadelphia or Baltimore, 22s. 6d., ore, November; Galveston, 2,362 net, Liverpool or Bremen, 70s., cotton, November 10-25; Port Arthur, 29,000 qrs., 10 per cent., Rotterdam, 5s., December 1-31; Hornillo Bay, 4,000, Glasgow, 8s. 3d., ppt.; 3,800, Middlesbrough, 6s. 6d., ppt.; Carthagena, 5,000, Emden, 9s. 1½d., December; La Goulette, 10s. 6d., East Coast United Kingdom, ppt.; Puget Sound, sail, 85s., p.p. United Kingdom-Continent, June-July; nitrate ports, 34s., United States, option United Kingdom-Continent, 35s. 6d.; time charter, Mediterranean trade, 6s. 6d.; time charter, Transatlantic trade, 7s. 10½d. 12s. 6d.; 7s. 6d.

The Westleigh Colliery Company are now opening out new mines at their collieries in the Westleigh district of South Lancashire.

ENT SPECIFICATIONS
ACCEPTED.

in and relating to Percussive
27, Penistone-road, Sheffield.
lates to percussive rock drills
and comprises essentially the
n integral part of the hammer



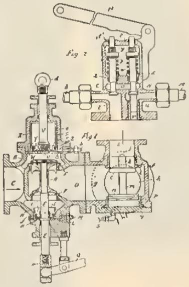


a cushioning spring axially
ed and the drill. Fig. 1 is a
tion showing a hammer drill
, and fig. 2 is a view in side
t work in one position it may
e claims.)

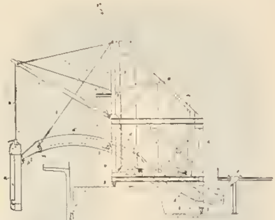
ts relating to Fuel. H. Clarke,
E.C., and J. A. Campbell, 23,
ntion relates to the production
rtial destructive distillation of
ns coal or similar carbonaceous
has for an object to produce a
f volatile matter that will not
r in carriage, and that can be
retort in which it is produced.
he distillation is effected under
ure the retention in the coke
percentage of volatile matter,
f an exterior crust of hard coke.
, moreover, the distillation is
rts tapered outwardly towards
ion is arrested when the charge
extent as to be free from the
o say, at the stage when, upon
charge falls out of the retort as
e necessity of employing special
By arresting the distillation at
uced, having on its exterior a
rying the invention into effect,
ly employed of oblong section,
about 6 in. and of any convenient
g advantageously made up in
d of fireclay, cast iron or other
length or section is connected
ns as a spigot and socket or other
ch a continuous vertical retort
ly towards the bottom door. The
erably in the form of sleck is fed
p, where a gastight cover is
intained at about from 1,300 to
for from about seven to eight
the charge reaches the condition
d sufficiently to fall of its own

nts in and relating to Explosives.
Limited, manufacturers, all of
mingham, Warwickshire.—This
uction of explosives by a process
f nitro-cellulose and a nitro
bringing these into contact in
e resultant product with nitro-
invention has for its object to
tageous method of producing high
lycerine is the preponderating—
by utilising such a process. The
hod of producing explosives of
ch a nitro-cotton is incorporated
ri-nitro-benzene by the process
e product, after any necessary
is incorporated with the nitro-
ormed from 1 part of tri-nitro-
o-cotton, or equal parts of each,
pound and 1 of guncotton, may
nple, a "Lion" blasting gelatine
d from nitro-glycerine, tri-nitro-
—can be made in this way by
tri-nitro-toluene with 4 parts of
nt incorporation of this product
with 13 parts of sodium nitrate and 73½ parts of nitro-glycerine. Such an explosive has substantially the same ballistic properties as a blasting gelatine composed of 94 parts of nitro-glycerine and 6 parts of nitro-cotton. Tri-nitro-benzene may, however, be employed instead of or in conjunction with tri-nitro-toluene. (Two claims.)

23163 (1911). *Improved Means for Controlling the Supply of Fluid to Winding Engines and the like.* D. Cockburn, of Cockburns Limited, Cardonald, near Glasgow, and D. MacNicoll, of Cockburns Limited, Cardonald, near Glasgow.—This invention is applicable to a winding engine or like plant and more particularly relates to improved means for controlling the supply of fluid to winding and like engines of the type provided with braking devices and with overwind-preventing apparatus or the like including a governor adapted to be brought into action when the speed of the engine exceeds a certain limit. In the accompanying drawings fig. 1 is a vertical section, and fig. 2 is a detached detail on an enlarged scale, of devices embodying the invention. The action of the devices is as follows:—During the ascent of the cage or the like connected to the winding engine, the manually-operated combined double-beat throttle and governing valve A is open and fluid pressure passes by way of said valve and also passes the piston rings J of the operating piston G connected therewith, thence to the inlet side of the pilot valve N. The fluid pressure also passes from the inlet branch C to the outer end of the piston Y in the cylinder S, the fluid pressure also passing the rings Z of the piston Y and thence to the inle side of the pilot valve *c*. The fluid pressure further passes from the inlet branch C to the chamber *v* in which the piston *u* on the pilot valve N operates, and the fluid pressure also passes the rings of the piston n of the pressure-breaking valve *e* or of each valve, thence to the outer end of the piston *n* and to the inlet side of the pilot valve *c*. The fluid pressure thus balances the piston *n* and leads the back of the pressure-breaking valve *e*, thus keeping said valve closed on its seat *l*. On the cage reaching a predetermined point, and in the event of the speed of the engine exceeding a certain limit, the governor comes into action, and, by means of suitable rods or the like, not shown, actuates the lever t^2, so that the pilot valve N is opened and fluid pressure is exhausted from the cylinder H in which operates the piston G connected to the double-beat valve A, whereupon the fluid pressure at the inner end of the piston G acts thereon and thus closes the double-beat valve A, until the speed of the engine is reduced. In the event of the cage or the like not being brought to rest at a further predetermined point, the overwind-preventing devices, not shown, are adapted to actuate, through suitable pull rods or the like, the lever t^2 for operating the pilot valves, whereby the pilot valve N is opened (if the governing gear has not already done so) and then the pilot valve *c* is opened, thus permitting the double-beat valve A to be closed. It will be understood that on the valve A being closed and the pilot valve *c* opened, the fluid pressure at the inner end of the piston T adapted to be connected to the brake-actuating gear will be exhausted into the atmosphere, whereupon the fluid pressure at the outer end of the piston T operates thereon and through suitable pull rods or the like causes the brakes to be applied so as to stop the engine. Simultaneously, the fluid at the outer end of the piston *n* connected to the pressure-breaking valve *e*, or to each valve, is exhausted into the atmosphere, whereupon the fluid pressure within the pressure-breaking valve casing *f* acts on the inner end of the piston *n*, which inner end is of greater area than the valve *e*, and thereby opens said valve, so that the fluid between the double-beat valve A and the engine is exhausted instantly and the braking devices may be applied more efficiently, and quickly, to stop the engine. (Two claims.)



23198 (1911). *An Improved Coal-loading Plant.* C. Walton, of Orchard House, Moresby, Whitehaven.—This invention relates to coal-loading plant such as is employed on wharves and quays for transferring coal from the wagons to the ship's hold, and particularly to that description of apparatus which comprises a structure capable of travelling the length of the quay or wharf, a conveyor of the belt or flexible type having a front part pivoted and fitted with a small shoot and an anti-breakage charging machine which with the front part are capable of being raised and lowered, and means for driving the conveyor belt or band and the winding apparatus of the jib or crane which supports the front part of the conveyor. According to the invention, a suitable structure *a* mounted on wheels *b* is arranged to traverse on rails the whole or a part of the length of the quay or wharf *c*, and said structure carries a conveyor *d* of the belt or flexible type which projects rearwardly under a hopper *e* fixed to the rear of the structure. A permanent wagon track or railroad *f* parallel to the track of the structure is provided with delivery shoots *g* arranged to guide the coal from the wagons to the hopper *e* without undue breakage. Where the wagon track is at or about the same level as the quay, the rear part of the structure extends downwardly as shown and runs in a channel way *h* formed in the quay, the channel way being of a width and depth to allow the end of the conveyor and the hopper to project under the delivery shoots of the wagon track. The front part d^1 of the conveyor is jointed or pivoted as a jib at *i* near the front of the structure so that it may be raised and lowered by means of the cables *k* and suitable winding mechanism as required to accommodate tide and varying sizes of ships, and a small shoot *l* is pivoted at *m* to the delivery end of the conveyor and arranged at a suitable inclination to deliver the coal by gravity to a suitable anti-breakage charging machine *n* of known construction which is suspended by means of cables n^1 and a suitable crane or the like *o* to enable the charging machine to be moved to the required position for use or drawn up on to a platform at a^1 in the front of the structure when not in use, as indicated by the dotted lines. Preferably, the extremity *p* of shoot *l* is made to engage with the charging machine *n*, as indicated in full lines. (Two claims.)



28030 (1911). *Improvement in Explosive Charges or Bodies.* The Westfälisch-Anhaltische Sprengstoff-Actien-Gesellschaft, of Potsdamerstrasse 129/130, Berlin, Germany.—Extensive experiments have shown that the explosive body will not produce the greatest effect if its entire face touches the object to be removed or broken up, but that, on the contrary, its effect is materially enhanced if the side facing the object has a cavity, so that actual contact is limited to an annular rim of the explosive body. The cavity has preferably an approximately conical shape, the base of the cone facing the object to be destroyed, but may be prismatic, cylindrical, or of other suitable shape. The blasting or explosive effect of such a body is greater than that of a solid body of the same dimensions, and its total weight is smaller. The cavity may have a lining of sheet metal or other suitable material, or it may be filled with inert material, such as ground cork or cotton. The drawing represents three examples of construction embodying this invention. In the case of explosive charges which are to be fixed to the object to be destroyed—for instance, in dealing with blasting charges for mines—a lining for the cavity need only be provided in order to afford protection from moisture, for which purpose a coating of paraffined paper, linen or similar material is sufficient. Linings made of sheet zinc and adapted to the shape of the explosive charge may also be employed. (Two claims.)

Fig 1

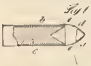


Fig 2

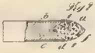
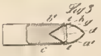


Fig 3



(Continued on page 964.)

THE RECORD

840

square feet in one shift with

one "Siskol" Coal-Cutter.

INTERNATIONAL CHANNELLING MACHINES LD.,

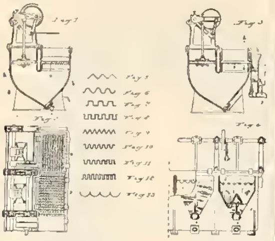
SHEFFIELD.

e OFFICIAL figures
ently published by
I. Home Office show
t in the Manchester Dis=
t, for 1910, there were
Coal Cutters, of eleven
erent types, in use, of
ich 81, or more than half
he total number, were
SKOL" machines.

Is any further proof
ded as to which is the
t Coal Cutter?

RNATIONAL CHANNELLING MACHINES LD.,
SHEFFIELD.

28745 (1911). *Jigging Machine.* K. Schuchard, of 2, Königshütter Chaussee, Beuthen, O.S., Germany.—This invention relates to jigging machines wherein the jigging action is accomplished by the passage of a stream of water through a perforated stationary carrier whereon the material to be separated is supported. By this invention the carrier is enlarged by corrugation or other suitable formation and formed over its whole surface with perforations which allow of the jigging water not only acting vertically, or at any rate approximately vertically, but also obliquely against the material to be separated. The shape, length, width and depth as well as the course of the individual corrugations—that is to say, whether they run in the direction of flow of the material to be jigged or transversely thereto, or are inclined at any angle to it—may be determined according to the particular conditions and purposes. Fig. 1 is a transverse section through a jigging machine of simple constructional form, and fig. 2 is a plan of fig. 1; fig. 3 is a transverse section through another constructional form, and fig. 4 is a front view of fig. 3, partially in section on the line A—B; figs. 5 to 13 are diagrammatic transverse sections of various improved carriers. To enable the machine to be worked conveniently, it is necessary that the delivery of the jigged material shall be effected uniformly from all the troughs of the corrugations. This, however, can only be accomplished when the delivery of the jigged material, which collects in the accumulating receptacle, is so regulated that the surface of the material forms a uniform plane, which is situated at the same level as the delivery openings of the troughs. In order to effect a uniform delivery of the jigged material, damming devices are provided, which purpose is served by the inserted pieces marked *f*. The particular way in which these latter are arranged and their shape depend upon the conditions of the particular work being done. (Seven claims.)



NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

24575. Coke ovens. A. O. Jones.
24599. Coal-cutting machinery operated by hand-power. J. Brace.
24639. Wet carbonisation of peat. T. Rigby and Wetcarbonising Limited.
24649. Compression pumps for exhausting and compressing gases. G. Wood.
24650. Automatic devices for elevators. L. O. Harbaugh.
24673. Compressors for internal-combustion engines using liquid fuel. G. Fornaca.
24686. Centrifugal fans or pumps. S. C. Davidson.
24726. Rock drills. H. Deitz.
24746. Gas-producers. J. B. Jolly.
24797. Gas generators. K. Morgenschweis.
24811. Appliances for coupling and uncoupling railway trucks. J. McEntyre.
24843. Aerial ropeways and appliances for the purposes of recreation and amusement. J. Foster and A. Booth.
24844. Anti-breakage box for large coal or any other material. B. W. Coopey.
24895. Rock-boring machines. T. Dargue.
24906. Pumps. J. H. Hurst.
24976. Grabs. R. P. Strachan and T. Sargent.
25041. Suction pumping apparatus for vacuum cleaners. M. Pohl.
25054. Superheating steam. P. St. G. Kirke and Bonecourt Surface Combustion Limited.
25061. Automatic couplings for railway cars and wagons. J. Willison.
25080. Manufacture of fuel. H. R. Riches.
25081. Safety pocket with bar and gate for pit cages and the like. W. Dando.
25140. Construction of reinforced concrete columns, struts, beams, and other concrete structures, applicable also for fireproofing structural steel or cast iron stanchions and the like. J. R. Gwyther.
25141. Treatment of iron or steel for preventing oxidation or rust. H. Rymer.
25145. Utilisation of peat. M. A. Adam and Wet-carbonising Limited.
25146. Utilisation of peat. T. Rigby, N. Testrup, and Wet-carbonising Limited.
25164. Valveless lubricating pump. E. L. Müller.

Complete Specifications Accepted.

To be published on November 21.

1911.

17021. Production of castings or moulded articles of various kinds and means or apparatus therefor, Millspaugh.
21195. Furnaces for steam boilers. Ramsbottom.
23861. Processes and apparatus for the direct production of iron and steel. Herrmann and Otto.
24064. Apparatus for consuming smoke in steam-generator and other furnaces. Wilde and Hargreaves.
24174. Steam superheaters for locomotive and other boilers. Robinson.
24246. Manufacture of forged car wheels and the like in one forging operation. Hansen.
24248. Manufacture of forged car wheels and the like in two forging operations. Hansen.
24249. Manufacture of car wheels and the like, and particularly to shearing and forging operations and apparatus therefor. Hansen.
24285. Hoisting and transport apparatus. Essberger.
24485. Method and means for cleaning the tubes and other steam-raising surfaces of boilers. Roote, and Internal Combustion Engine Cleaning Company.
28548. Coal-washing plant. Thomson.
28595. Process for producing precious metals. Bloxam.
28981. Pumps for elastic fluids. Cash.

1912.

934. Furnaces of steam-generators. Whitehead.
1279. Gravity conveyors. British Mathews Limited, and Pirrie.
4304. Centrifugal pumps, ventilators or the like. Moller.
6356. Cutters for cutter bars and cutter bars of cutting machines for use in mining coal. Mavor and Coulson Limited, and Davies.
6439. Eye-guards for pit ponies. McKendrick.
17478. Steam-superheaters. Sugden.
17782. Automatic lubricating apparatus for elevators, conveyors, and the like. Wetzel and Kuntz.
19102 Means for telephonic communication with mine cages. Reineke.
19103. Means for telephonic and telegraphic communication with mine cages. Reineke.
19172. Electric furnaces. Massip.
20385. Coal conveyors. Seppel and Dracke.

GOVERNMENT PUBLICATIONS.

⁂ Any of the following publications may be obtained on application to this office at the price named post free.

MINES AND QUARRIES: General Report for 1910 (Foreign and Colonial Statistics), 1s. 10d.

EXPLOSIVES IN COAL MINES ORDER, 15/10/12, 1½d.

Boiler Explosion Report: No. 2160, Steam Pipe at Pontyberem Colliery, 4½d.

Consular Reports: Smyrna, 1911-12, 3d.; Trade of Belgium, 1911-12, 4d.; Hamburg, 1911-12, 7d.

National Insurance Act Index, 4½d.

Report on the Work of the Imperial Institute, 1911, 3d.

Memorandum on Steam Boilers, 1s. 5½d.

"Directions": The Responsibility of Workmen.—An interesting case under the Coal Mines Act, 1911, came up for disposal before Sheriff Shennan last week. Francis Martin, pit brusher, was charged with having, on September 18, in Holytown Colliery, contravened section 74 of the Coal Mines Act, 1911, in respect that, having been directed by Samuel Blair, brusher, with a view to safety, not to allow any person to pass or enter No. 2 road in the bar section of the blackband coalseam in which a shot was about to be fired by Blair, accused failed to observe said direction and allowed John Sturdy, fireman, to enter the said road and to be therein when the shot was fired and when it exploded. Accused pleaded not guilty, objecting to a conviction under this particular section of the Act, on the ground that Blair was not a person in a position to give the directions contemplated by section 74, but was a co-brusher with accused and had no authority over Martin. Sheriff Shennan said it was quite clear to him that accused had committed a careless act in allowing Sturdy to go past; but while there was moral blame on the part of accused, his lordship did not think he could convict under this charge. There were several difficulties. He had great difficulty, for instance, in holding that section 74 justified a charge of this description. He was not going to decide that question just then. The point might come up in the form of a case to the High Court. "Directions in respect of the working" (as section 74 was so worded) must be directions by some official of the mine. The object was not simply to make workmen comply with the instructions or suggestions given them by fellow-miners from time to time in an emergency. He thought the section really applied to "directions in respect of the working" given by some responsible official. His lordship felt very strongly inclined to adopt that view of the section. His next difficulty was this—that if they were to hold that the section did apply in this case, then the prosecution must prove some specific direction, and here he did not think any specific direction had been proved. It was not enough to say that one man told the other "I am going to fire a shot," and that thereby implied a direction to prevent anyone passing into the place. His lordship could not hold that that was a direction. His general view of the case was favourable to the prosecution, but even taking that view, his lordship did not think he could convict. His lordship was satisfied that the new rule (2E) of the Explosives Order, 1911, made under the Coal Mines Act, 1911 (and which did not apply to this colliery at the time of the alleged offence), would largely meet the point, and that made him think that this section 74 was not meant to apply in such circumstances.

PUBLICATIONS RECEIVED.

The "Mechanical World" Pocket Diary and Year Book for 1913. Manchester: Emmott and Co. Limited. Price 6d. net.

Income-Tax. By Thomas C. Jarvis, B.A., LL.B. London: Effingham Wilson Stevens and Sons. Price 6s. net.

Safety in Coalmines. By Daniel Burns. London: Blackie and Son. Price 2s. 6d. net.

Western Australia: Report of the Department of Mines for 1911. Perth: F. W. Simpson (Government Printer).

The Carbonisation of Coal. By Prof. V. B. Lewes. London: John Allan and Co. Price 7s. 6d. net.

Commercial Engineering. By Alfred J. Liversedge. Manchester: Emmott and Co. Limited. Price 7s. 6d. net.

"Annales des Mines de Belgique" (tome 17, No. 4); "Social Economical Studies made by the General Direction of Agriculture of Mexico of the Department of Fomento" (vol. 2); "Mines Department, Union of South Africa: Statistics for the Month of August"; "Bulletin of the Imperial Institute" (Vol. 10, No. 3); New Zealand Geological Survey Branch (Bulletin No. 14 (new series), "The Geology of the New Plymouth Sub-Division," by Edward de Courcy Clarke); "Proceedings of the Staffordshire Iron and Steel Institute" (Session 1911-1912, Vol. 27).

OBITUARY.

The death has occurred at his residence, 97, Bradford-road, Otley, of Mr. Marmaduke Foster, who for over 30 years had been in business at Otley as a coal merchant. Mr. Foster had reached the advanced age of 60 years, having been born at Nessfield, near Ilkley, in 1632. He leaves a widow and four sons.

The death took place at Southport on Friday of Mr. George Edgar Butt, of Cefncoed, Rogermoor Wood, Penarth. Mr. Butt was an engineer by profession, and was well known in South Wales, where he had for a number of years represented P. J. Mitchell and Co., Rateau Exhaust Utilisation Plant, and in this connection had superintended the installation of a number of big plants for colliery companies. Mr. Butt was 44 years of age.

Hull Coal Exports.—The exports of coal from Hull for the week ended Tuesday last were as follows:—Amsterdam, 945 tons; Abo, 308; Antwerp, 722; Aalborg, 561; Barcelona, 2,146; Bombay, 731; Buenos Ayres, 15,154; Bremen, 759; Christiania, 294; Cronstadt, 5,370; Copenhagen, 346; Drontheim, 52; Drammen, 570; Ghent, 1,196; Gefle, 500; Gothenburg, 905; Hamburg, 4,821; Harburg, 4,618; Harlingen, 1,351; Konigsberg, 3,161; Libau, 736; Leghorn, 456; Lulea, 492; Lysekil, 465; Malmo, 1,350; Norrkoping, 1,480; Nordstrand, 146; Nieuport, 929; Odense, 2,921; Oporto, 1,508; Oxelosund, 1,402; Philippeville, 2,139; Reval, 2,696; Rouen, 6,263; Riga, 6,144; Rotterdam, 4,592; Stockholm, 302; Stettin, 153; St. Petersburg, 3,783; Skiensfjord, 486; Trieste, 197; Wasa, 1,326; Westervik, 524; and Wyk, 108; total, 85,125 tons. For the corresponding period of last year the total was 72,521 tons.

Case Under the Minimum Wage Act.—At the Durham County Police Court last week an important case was heard in which the administration of the Minimum Wage Act at the Lady Durham pit, Sherburn, was under consideration. Two hundred and six hewers and putters from Lady Durham pit, Sherburn, were charged with having absented themselves from work at that colliery, the hewers on September 28 and 30 and October 1, and the putters on October 4. The case of William Wilson, a hewer, was made a test case. The owners claimed 15s. from Wilson in respect of the three dates. On September 27, one of the workmen's representatives named Joseph Wilson, who was also a member of the local wage committee, went to the manager and asked if a meeting of the wage committee could be arranged for the following morning (Saturday), pay day. The manager agreed, and if it was found there was an excess pay due to defendant he would get the money that day. The matter affected only six people out of the 200 charged. The men, however, refused to go to work, and the same night Jos. Wilson went to the manager and said that until the minimum wage was made up they were not going to work. The men had decided that in all cases there should be a minimum wage without regard to inefficiency and loss of time. The manager would not agree to that course, and the men absented themselves on that day and two subsequent days. On the return of the men to work on October 2, the material point at issue was put before the umpire, who decided that what the company had paid was the correct amount, and therefore they had no complaint whatever. For the defence it was urged that the men had the Minimum Wage Act to contend with. It was an Act to benefit the working man, who had now found out that it did not give him the benefit he anticipated, but gave the owners an opportunity of using its provisions very severely against him if he was so disposed.—The Chairman said judgment would be given for the amount claimed in each case.

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Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
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Jardine, John, Deering-street, Nottingham
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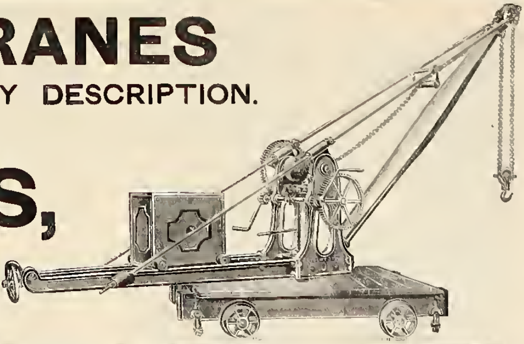

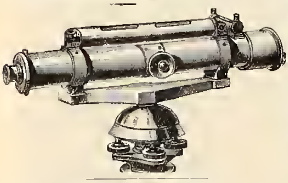

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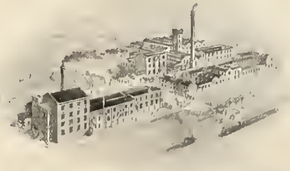

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Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drawing Office Stationery
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drills (Electric)
United States Metallic Packing Co. Ld., Soho Works, Bradford

Driving Pulleys
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Duplex Pumping Engines
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Evans, Joseph, and Sons Ld., Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Pearn, F., and Co. Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Dustbins (Sanitary)
Baker, John, and Son, Bilston, Staffs
Harvey, G. A., and Co., Lewisham, London, S.E.
Lewis, Wm., and Son, Bilston
Theedam, E. C., Ld., Dudley

Dynamite, &c.
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Nobel's Explosives Co. Ld., Glasgow

Dynamos
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Sutcliffe, Richard, Horbury, near Wakefield

Ebonite and Vulcanite
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Electric Detonators and Fuses
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Electrical Earthing Clips
Ingle, Albert E., 18, Albert-place, Bridge street, Manchester

Electrical Engineers
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schonthell Ld., Cardiff
Hurd Coal-Cutter and Engineering Co. Ld., 188, St. Vincent-street, Glasgow
Jardine, John, Deering-street, Nottingham
Mather and Platt Ld., Manchester
Theedam, E. C., Ld., Dudley

Electrical Fault Indicators
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield

Electric Haulages
Avonside Engine Co. Ld., Bristol
Bridge, David, & Co. Ld., Castleton, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davis John, and Son (Derby) Ld., Derby
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, B. H., and Co. Ld., Wakefield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Electric Meters
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Electrical Plant
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Ward, Thos. W., Limited, Albion Works, Sheffield

Electrical Pumps
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Electrical Stores
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schonthell Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C., Ld., Dudley

Emery Wheels

Enamelled Plates for Notices for Mines
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schonthell Ld., Cardiff
Theedam, E.C., Ld., Dudley

Enamel Manufacturers (for all Metals)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalbitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Engineers (Consulting)
Entreprise Générale de Fonçage de Puits, 5, Rue de Surêne, Paris
Fell, C. A., Dronfield, near Sheffield
Radford, R. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

Engines (Blowing)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Gas-Compressing)
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Hauling and Winding)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, B. H., and Co. Ld., Wakefield

Engines (Hauling and Winding)—*continued.*
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, H., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

Engines (Locomotive)
Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Orenstein and Koppel—Arthur Koppel (Amalgamated) 27, Clements lane, London, E.C.
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)
Mather and Platt Ld., Manchester

Engine Merchants
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

Engines (Oil)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping) (See Pumps)

Engines (Rolling Mill)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.

Engines (Steam)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Exhaust Turbine Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allan, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, H.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Ferro-Concrete Constructions
Yorkshire Hennebique Contracting Co. Ld., Leeds

Files
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Wright, Joseph, and Co., Tipton

Fire Appliances
Fell, C. A., Dronfield, near Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

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, Pearson-pl., Cardiff
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lane, London, E.C.
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2, Vauxhall-rd., L'pool
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, New Bridge-st., E.C.
Huddersfield
Bradford
Lorries Cars &c.)
d.) Ld., Huddersfield
y Cables Ld., Prescot
d.) Ld., Huddersfield
Hednesford, Staffs.
Queen Victoria Street
., St. Helens, Lancs.
et, Nottingham
endleton, Manchester
Ld., Nuneaton.
l., Burton-on-Trent
d., Wigan
rook Foundry, Wigan
, St. Helens, Lancs.
e, Leeds
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lland Works, Sheffield
Steel Works, Leeds
al Co. Ld., Stoke-on-
lbion Works, Sheffield
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-pl., Aldersgate, E.C.

Purchasers' Guide to Advertisers' Specialities.—(continued).

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, B., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Nuneaton Engineering Co. Ld., Nuneaton

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hoists
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

Hooks or Links (Safety)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Leampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Northern Rubber Co., The Wicker, Sheffield
Norton's (Tividale) Ld., Tipton
Beddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Hose (Coal-Cutter)
Northern Rubber Co., The Wicker, Sheffield

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Hydraulic Jacks
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Hyland-street Works, Birmingham

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Hyland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hydrometers
Davis, John, and Son (Derby) Ld., Derby

Incline Rollers
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Northern Rubber Co., The Wicker, Sheffield
Beddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Hardy Patent Pick Co. Ld., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Hyland-street Works, Birmingham

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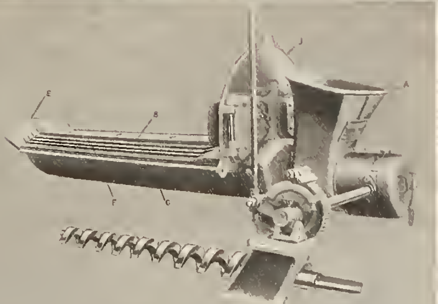

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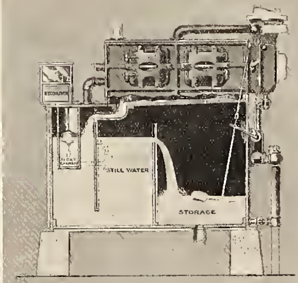

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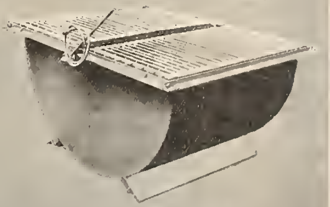

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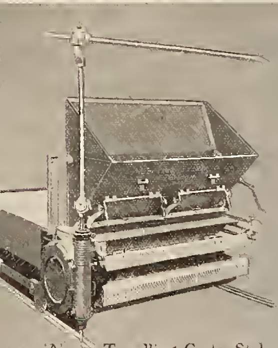

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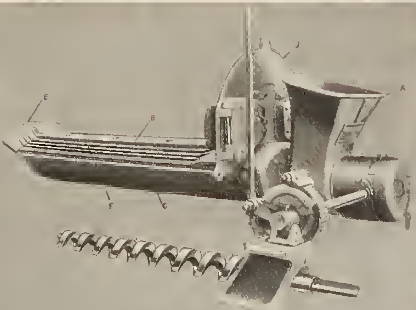

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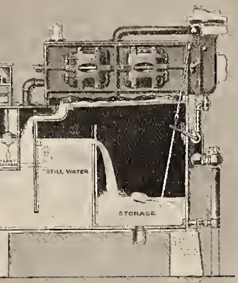

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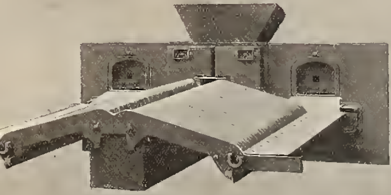

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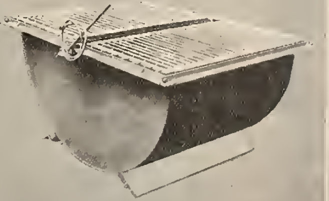

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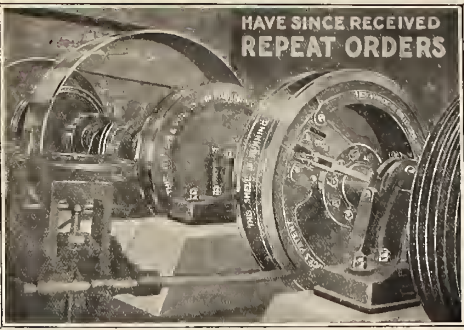

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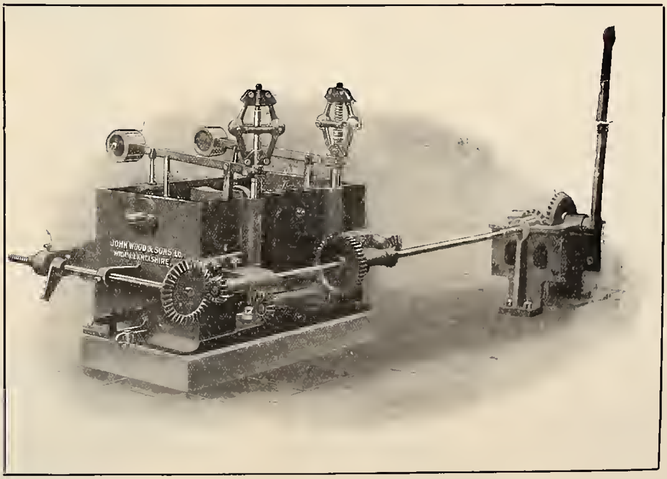

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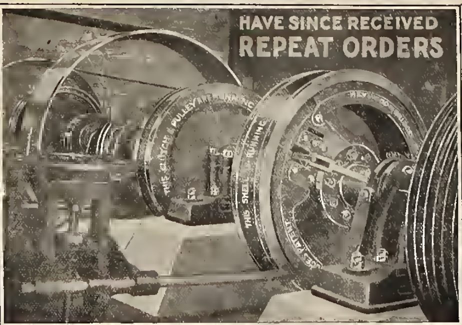

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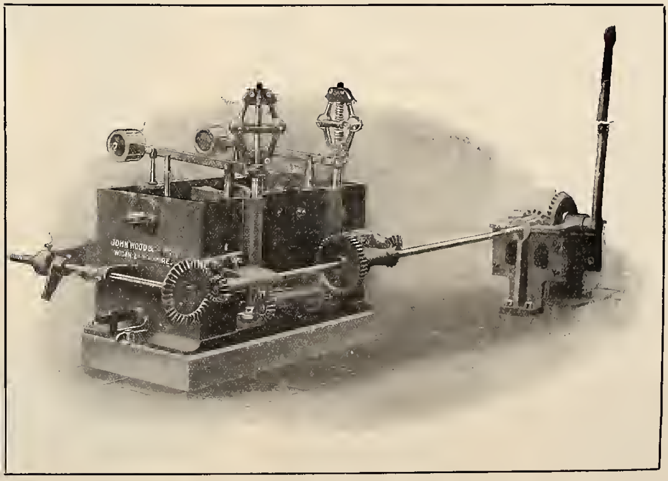

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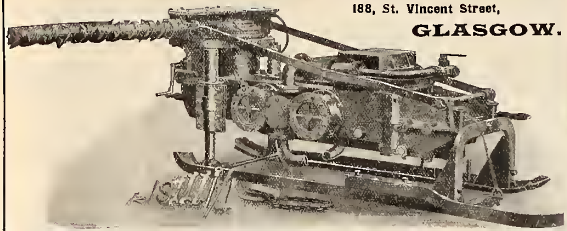

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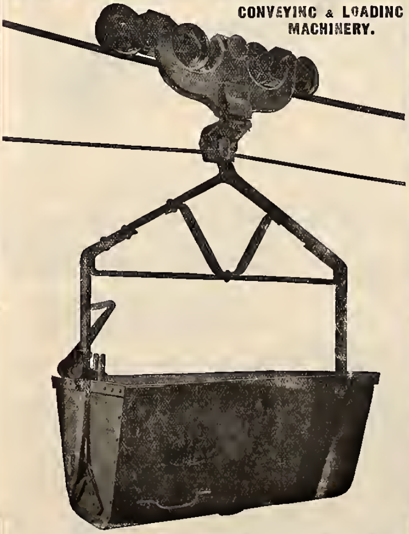

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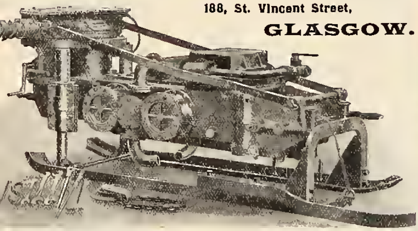

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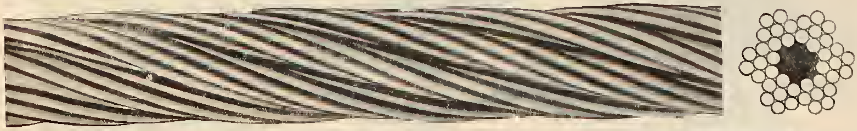

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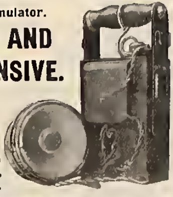

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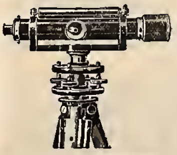

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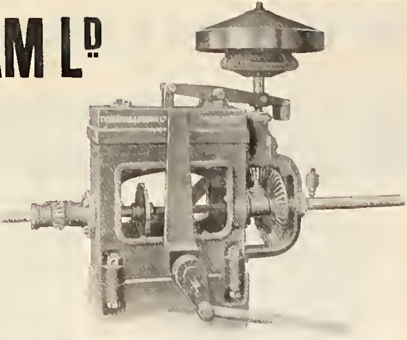

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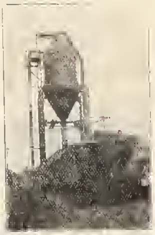

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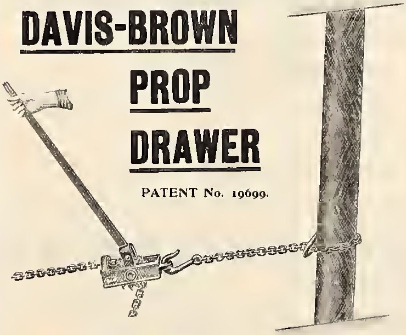

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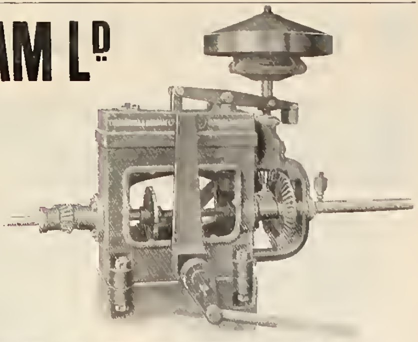

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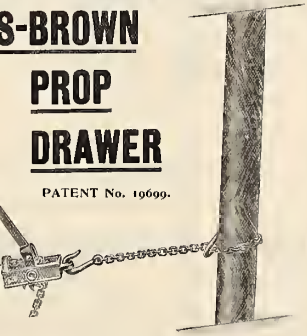

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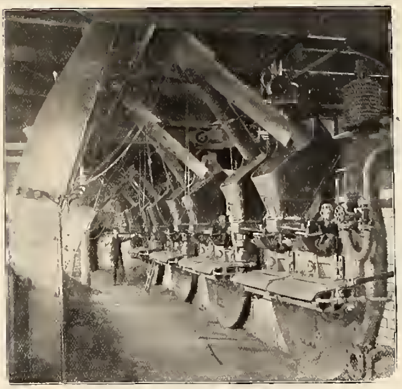

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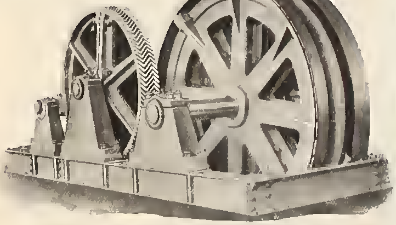

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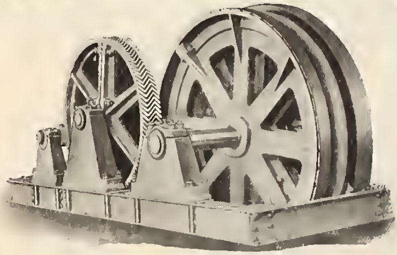

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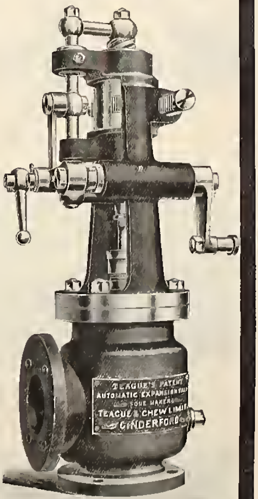

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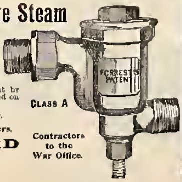

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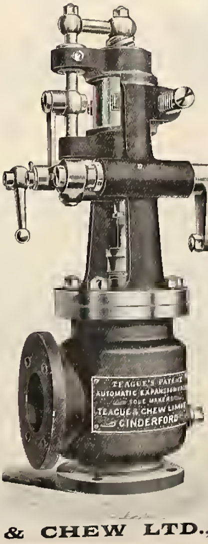
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THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

Vol. CIV. FRIDAY, NOVEMBER 15, 1912 No. 2707.

STORAGE OF EXPLOSIVES AT MINES.

Under the Coal Mines Act, 1911, and the Explosives in Coal Mines Order of May 21, 1912, all explosive used at a mine to which the Act applies must be provided by the owner of the mine, and a suitable place above ground must be provided for the storage of the explosive. A suitable place has also to be provided conveniently near the entrance of the mine, for the storage of the unused explosive which the workmen are required to bring out at the end of each shift.

In making provision for the storage of explosive, the mineowner or manager has to comply with the requirements of the Explosives Act, 1875, and the Orders made under that Act. A memorandum has been issued by the Home Office explaining briefly the nature of those requirements and the methods by which the storage accommodation required can be provided to suit the varying circumstances of different mines.

There are three ways in which explosive in sufficient quantity for mining purposes may be kept:—

1. In premises registered with the local authority.
2. In a "store" licensed by the local authority.
3. In a magazine licensed by the Secretary of State.

1. This method can be adopted where small quantities of explosive only are in store at any one time, and is often a suitable way of providing storage for unused explosive brought out of the mine when the main store is not conveniently near the mine entrance. The amount of explosive kept in this way must not exceed 200 lb. of gunpowder, or 60 lb. of other explosive or of mixed explosives. The conditions to be observed are contained in section 22 of the Act and Order in Council No. 16, which should be consulted, but the main provisions are as follow:—

The place of storage must be registered with the local authority, and (if explosive other than gunpowder is kept) the manager or other responsible person having charge of the premises must hold a certificate from the police that he is a fit person to keep the explosives.

The storage place must be a building substantially constructed of brick, stone, iron or concrete or an excavation made in solid rock, earth, or mine refuse not liable to ignition It must be entirely appropriated* to the keeping of explosive and must be detached from a dwelling house. It must also be situated at a safe distance (say 15 yards, or less if suitable protection intervenes) from any highway, street, public thoroughfare or public place, but there are no further requirements as to the maintenance of certain distances between the storage place and other buildings and works in the vicinity.

The precautions mentioned in paragraphs 8, 11, and 13 of appendix, reproduced hereafter, must be observed.

The second method provides for larger quantities, and includes four different kinds of "stores," named Divisions A, B, C and D. The quantity of explosive that may be kept in a store of Division A is 300 lb. of gunpowder, or half that quantity of other explosives, or if both gunpowder and other explosives are kept, ½ lb. of other explosive may be kept in lieu of each pound of powder not kept. The quantities of explosive allowed in stores of Divisions B, C and D are 1,000 lb., 2,000 lb. and 4,000 lb. respectively of gunpowder, and of other explosives on the same scale as in the case of Division A, *i.e.*, ½ lb. of other explosive for each pound of powder not kept. The conditions which apply to these stores are contained in Order in Council No. 6, and a summary of them is given hereafter.

The most important requirement which mineowners have to consider is that which provides that all stores shall be placed at certain distances from other buildings and works. An important modification in these distances, however, has recently been made which will be of material assistance to mineowners in cases where the surface space at the mine is restricted. By Order in Council No. 6c it is provided that the distances may, in the case of a store of Divisions B, C and D, be reduced by half, provided the protected work is in the occupation of the licensee and is completely screened from the store by a natural or artificial mound of earth, or other suitable material, not less than 3 ft. thick at the height of the eaves of the store. Further, it is provided by the same Order in Council that the distance between a store in any of the four divisions and a mineral or private railway or tramway line worked by the occupier need not be more than 25 yards, if the door or doors of the store be closed and secured when and so long as any locomotive driven by steam is within 50 yards of the store.

In cases where larger quantities than those mentioned above are required or where, owing to special local circumstances, it is impracticable to find a suitable place for a store, it will be necessary to provide a magazine under licence of the Secretary of State. In the first instance, it is advisable to communicate with his Majesty's inspectors of explosives, Home Office, London, S.W., who will be prepared to consider the special requirements of each case and to recommend such conditions to suit the circumstances as may safely be entertained. The quantity of explosive that may be kept in a magazine is limited only by the provisions of the licence. Workmen's canisters may be filled and kept in any place of storage provided as above.

Local Authorities.

An appendix to the memorandum gives the following information in regard to the powers of local authorities:—

1. *England and Wales*

The Town Council is the Local Authority in any
County Borough,
Quarter Sessions Borough (other than a County Borough) having over 10,000 inhabitants according to the Census of 1881,
Borough having over 10,000 inhabitants according to the Census of 1881, for which a special Order has been made under Sec. 68 of the Explosives Act.

Elsewhere the Local Authority is the County Council which has, however, power of delegation under the Act to

(*a*) a Committee of its own body,
(*b*) an Urban or Rural District Council,
(*c*) the Justices in Petty Sessions.

The Councils of County Boroughs have the same power of delegation as County Councils.

2. *Scotland.*

In any Royal or Parliamentary Burgh the Local Authority are the Magistrates and Town Council.

Elsewhere the Local Authority is the County Council which has, however, power of delegation to a Joint Committee of its own body and of any Town Councils within the county.

In Duns and Govan, for which a special order has been made under Sec. 112 of the Act, the Police Commissioners are the Local Authority.

3. *Ireland.*

In any Urban District the Local Authority is the Urban District Council, elsewhere it is the County Council.

(In any harbour, the Harbour Authority is the Local Authority.)

Licensed Stores.

A further appendix summarizes the main requirements as to licensed stores:—

1. The store must be licensed by the Local Authority in the name of the occupier, either for gunpowder or mixed explosives.

2. The licence must be renewed annually.

3. The store must not be situated below ground in any mine or quarry, or in any tunnel, or other underground place in which mine, quarry, tunnel, or underground place any work is being carried on, or in which any persons are employed, or in any place opening into, from, or out of such mine, quarry, tunnel, or underground place, or in communication therewith.

4. All buildings and places adjoining each other and occupied together are deemed to be one store, and must accordingly be included in one licence.

5. The following distances must be maintained from the store:—

Protected Works of Class 1.

Dwelling-house
Shop
Room, of any kind
Workshop, of any kind
*Mineral or private railway, whether or not worked by steam
Furnace or kiln
Fire for boilers, machine or manufacturing purpose
Magazine for explosive
Store for explosive
Registered premises
} In occupation of licensee, or with consent in writing of occupier.
Highway, public footpath, or promenade.
Open place of resort for the public, or for persons carrying on any trade or business.
Canal, or navigable water.
Dock, river-wall, or sea-wall.
Pier or jetty.
Reservoir.

Protected Works of Class 2.

Dwelling-house
Shop
Room, of any kind
Workshop, of any kind
Mineral or private railway, whether or not worked by steam
Furnace or kiln
Fire for boiler, machine or manufacturing purpose
Magazine for explosive
Store for explosive
Registered premises
} Without the consent of the occupier.
Factory.
Public railway.
Church or chapel.
University, college or school.
Hospital, or public institution.
Town hall or Court of Justice.
Theatre or covered market.
Building where persons are accustomed to assemble.
Government public building.

Store belonging to	Distances from protected works of Class 1.* Yards.		Distances from protected works of Class 2. Yards.
Division A	25	...	50
†Division B	50	...	100
†Division C	75	...	150
†Division D	100	...	200

6. Where a store is licensed for gunpowder, only gunpowder, whether or not intended for blasting, and gunpowder cartridges not containing their own means of ignition may be kept.

When any other explosive is kept, with or without gunpowder, the store must be licensed for mixed explosives.

7. Detonators must be kept effectively separated from other explosive. If a considerable quantity of detonators is required, they may be kept in an annexe to the store, which will be regarded as part of the store (the annexe should be of the same construction as the store and at least a few feet away from it); or in a place registered in accordance with the method first mentioned in the memorandum (the colliery office may be registered for the purpose if the gross weight of the detonators does not exceed 15 lb. and the detonators are kept in a locked box or drawer exclusively appropriated to the purpose: *see* footnote, column 1). For a few hundred detonators, however, a cupboard in the porch of the store, so arranged that it cannot be opened unless the inner door of the store is closed, may be allowed. For weights of detonators, *see* Table at the end of the Summary.

8. When any explosive which is liable to be dangerously affected by water is kept, due precautions must be taken to exclude water from the store. This applies specially to ordinary dynamite, which is liable to exude nitro-glycerine under the influence of water.

9. The store must be well and substantially built of brick, stone, or concrete, or excavated in solid rock, earth, or mine refuse not liable to ignition, and so made and closed as to

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* Very small quantities, however, viz., up to 50 lb. of gunpowder or 15 lb. of other explosive or of mixed explosives, may be kept in a building not so appropriated, provided they are kept in a substantial receptacle properly closed and secured and exclusively appropriated to the purpose.

* The store shall not be required to maintain a greater distance than 25 yards from a mineral or private railway worked by the occupier, provided that the door or doors of the said store be kept closed and secured when and so long as any locomotive driven by steam is within a distance of 50 yards of the store. (O. in C. No. 6c.) "Mineral or private railway" includes a tramway or incline.

† When the "protected work" is in the occupation of the licensee, and is completely screened from the store by a natural or artificial mound of earth or other suitable material not less than 3 ft. thick at the height of the eaves of the store, the distances may be reduced by one-half. (O. in C. No. 6c.)

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2. The licence must be renewed annually.

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Protected Works of Class 1.

Dwelling-house
Shop
Room, of any kind
Workshop, of any kind
*Mineral or private railway, whether or not worked by steam
Furnace or kiln
Fire for boilers, machine or manufacturing purpose
Magazine for explosive
Store for explosive
Registered premises
} In occupation of licensee, or with consent in writing of occupier.
Highway, public footpath, or promenade.
Open place of resort for the public, or for persons carrying on any trade or business.
Canal, or navigable water.
Dock, river-wall, or sea-wall.
Pier or jetty.
Reservoir.

Protected Works of Class 2.

Dwelling-house
Shop
Room, of any kind
Workshop, of any kind
Mineral or private railway, whether or not worked by steam
Furnace or kiln
Fire for boiler, machine or manufacturing purpose
Magazine for explosive
Store for explosive
Registered premises
} Without the consent of the occupier.
Factory.
Public railway.
Church or chapel.
University, college or school.
Hospital, or public institution.
Town hall or Court of Justice.
Theatre or covered market.
Building where persons are accustomed to assemble.
Government public building.

Store belonging to	Distances from protected works of Class 1.* Yards.		Distances from protected works of Class 2. Yards.
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7. Detonators must be kept effectively separated from other explosive. If a considerable quantity of detonators is required, they may be kept in an annexe to the store, which will be regarded as part of the store (the annexe should be of the same construction as the store and at least a few feet away from it); or in a place registered in accordance with the method first mentioned in the memorandum (the colliery office may be registered for the purpose if the gross weight of the detonators does not exceed 15 lb. and the detonators are kept in a locked box or drawer exclusively appropriated to the purpose: *see* footnote, column 1). For a few hundred detonators, however, a cupboard in the porch of the store, so arranged that it cannot be opened unless the inner door of the store is closed, may be allowed. For weights of detonators, *see* Table at the end of the Summary.

8. When any explosive which is liable to be dangerously affected by water is kept, due precautions must be taken to exclude water from the store. This applies specially to ordinary dynamite, which is liable to exude nitro-glycerine under the influence of water.

9. The store must be well and substantially built of brick, stone, or concrete, or excavated in solid rock, earth, or mine refuse not liable to ignition, and so made and closed as to

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ities, however, viz., up to 50 lb. of
ther explosive or of mixed explosives,
lding not so appropriated, provided
tantial receptacle properly closed and
appropriated to the purpose.

* The store shall not be required to maintain a greater distance than 25 yards from a mineral or private railway worked by the occupier, provided that the door or doors of the said store be kept closed and secured when and so long as any locomotive driven by steam is within a distance of 50 yards of the store. (O. in C. No. 6c) "Mineral or private railway" includes a tramway or incline.

† When the "protected work" is in the occupation of the licensee, and is completely screened from the store by a natural or artificial mound of earth or other suitable material not less than 3 ft. thick at the height of the eaves of the store, the distances may be reduced by one-half. (O. in C. No. 6c)

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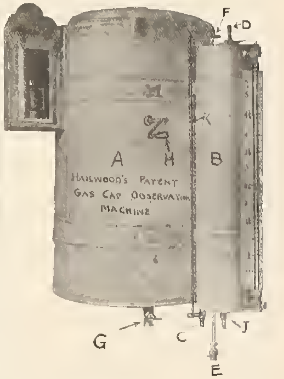

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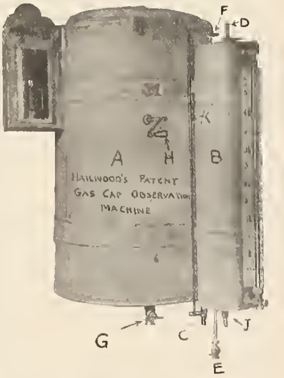

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NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Demand for Reduction of Wages—Steel Trade Wage Questions—Critical Conference of Miners—Serious Disagreement upon Re-organisation Scheme—Forty Thousand Fewer Men Represented—Abstention of Anthracite Representatives—Sir A. Markham Declares that Rescue Apparatus has not Saved Life—Colliers Refuse to Strike when so Recommended—War Demands for Coal and Shipping—Heavy Shipments and Urgent Call—Extraordinary Scene in Miners' Conference: All Agents' Salaries Reduced.

A meeting of the Conciliation Board took place at Cardiff, on Saturday, to consider the employers' demand for a reduction in the wage-rate by 2½ per cent. on the standard, the present rate being 57½ per cent. above, which is only 2½ under the maximum. The demand was based upon the fall in the price of coal which has taken place since the strike, both in large and small. Just before the strike there was the increase in prices occasioned by the pressing orders in anticipation of the stoppage; but since resumption of work, the top average of 17s. 2d. has declined steadily, the average for the last quarter being less than 15s. 11d. large and 9s. 11¼d. small. These were the figures submitted by the men's representatives, who also admitted that this showed a reduction of nearly 9½d. per ton in large and a fractional decrease in small. But their contention was that the prospects were exceptionally bright, and that the volume of trade at the present time as well as during the past quarter showed a heavy increase. Comparing the wage-rate of to-day with the period of August 1907, when it was 57½ per cent., they argued that the market price obtained for the coal has been 1s. 2d. higher; and that for these reasons they could not agree to any reduction.—The Board being unable to agree, Lord St. Aldwyn will be called in to decide, the meeting taking place on November 18.

With reference to the figures submitted, it has since been stated that the average selling price during July-August-September was 15s. 4d. for large, as compared with 15s. 8d. during the preceding quarter.

Mr. Eccles, Briton Ferry, presided on Monday over the meeting of the Siemens Steel Conciliation Board, which took place in Swansea. Upon a claim of 1s. per day advance for "doggers" and also for 3s. 4d. per ton at Briton Ferry Works, it was agreed that for the present the men be paid 4s. 6d. per shift of eight hours, and that the tonnage rate remain unchanged. The whole matter is to be referred to a committee which has been appointed to frame standard rates for the Board. A minimum rate of 6d. per hour being sought for labourers, the employers said they did not consider that amount too high for efficient men, but that all men were not efficient, and they offered to consider individual cases. The branches will therefore submit individual claims. Other matters also discussed were referred to the committee.

Colliery enginemen met at Cardiff on Saturday, when correspondence was read between their secretary and Mr. Gascoyne Dalziel (on behalf of the Coalowners' Association) with regard to an advance of wages; and it was decided to refer the question to the enginemen's committee. Mr. T. S. Davies (Swansea district) will be the president for the next year.

The miners' conference this week at Cardiff is all-surpassing in importance and interest, because of the scheme of centralisation which had been decided upon by a ballot of the men. It will extinguish the administrative independence of the districts and bring all local disputes to the consideration of a central executive. All the agents will be under the control of this central executive, and the feeling in certain areas as to the abolition of local independence is very strong and determined. Above all, it is recognised as being a practical impossibility for any central body to deal with the numerous questions which arise, and large sections of the men, therefore, fear that the consequent delays in settling disputes will be seriously detrimental to their interests.

From the standpoint of the employers, the new scheme must be regarded as a step towards Syndicalism, the object of at least some of its promoters being not so much the prompt and satisfactory settlement of disputes as to keep alive such a state of feeling as will lead to drastic changes in industrial organisation generally. What this means for the trade need not be stated, for the one great requirement is regularity of work and steady output, with such an organisation both of employers and employed as will lead to prompt and satisfactory disposal of any real grievances.

The striking fact in connection with the conference is the heavy drop in numbers represented. Only 90,000 were shown by the roll call; whereas a recent conference had considerably over 100,000, and within the present year as many as 130,000 have been returned. Of the 40,000 reduction since the time of the national strike, the withdrawal of anthracite men's representatives accounts for 13,000, the anthracite district having decided to secede rather than accept centralisation. Partly, also, the difference is due to the protest against admitting representatives of men who are not "in compliance." That that antagonistic feeling is powerfully operative elsewhere is shown by the speech of Mr. Onions, treasurer of the Federation, who explained the scheme to colliers in the Risca district, and secured a unanimous adverse vote. Ebbw Vale, notoriously, is not in sympathy with the new movement; and it is evident that the more the matter is discussed in detail the less is the plan liked.

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ROM SOUTH WALES.

OWN CORRESPONDENT.]

on of Wages—Steel Trade Wage
l Conference of Miners—Serious
on Re-organisation Scheme—
Fewer Men Represented—
hracite Representatives—Sir A.
that Rescue Apparatus has not
rs Refuse to Strike when so
r Demands for Coal and Shipping
and Urgent Call—Extraordinary
Conference: All Agents' Salaries

Conciliation Board took place at
to consider the employers' demand
wage-rate by 2½ per cent. on the
rate being 57½ per cent. above,
r the maximum. The demand was
the price of coal which has taken
e, both in large and small. Just
nere was the increase in prices
ssing orders in anticipation of the
resumption of work, the top
s declined steadily, the average for
ng less than 15s. 11d. large and
se were the figures submitted by
tives, who also admitted that this
nearly 9½d. per ton in large and a
small. But their contention was
ere exceptionally bright, and that
t the present time as well as during
wed a heavy increase. Comparing
y with the period of August 1907,
ent., they argued that the market
coal has been 1s. 2d. higher; and
ns they could not agree to any
rd being unable to agree, Lord
called in to decide, the meeting
mber 18.

o the figures submitted, it has since
average selling price during July-
as 15s. 4d. for large, as compared
he preceding quarter.

on Ferry, presided on Monday over
Siemens Steel Conciliation Board,
Swansea. Upon a claim of 1s. per
loggers" and also for 3s. 4d. per
Works, it was agreed that for the
aid 4s. 6d. per shift of eight hours,
ge rate remain unchanged. The
referred to a committee which has
me standard rates for the Board.
f 6d. per hour being sought for
yers said they did not consider that
efficient men, but that all men were
ey offered to consider individual
s will therefore submit individual
rs also discussed were referred to

nen met at Cardiff on Saturday,
e was read between their secretary
Dalziel (on behalf of the Coalowners'
gard to an advance of wages; and
r the question to the enginemen's
S. Davies (Swansea district) will be
next year.

ference this week at Cardiff is all-
tance and interest, because of the
ation which had been decided upon
en. It will extinguish the adminis-
of the districts and bring all local
deration of a central executive. All
under the control of this central
feeling in certain areas as to the
ependence is very strong and deter-
t is recognised as being a practical
y central body to deal with the
which arise, and large sections of
ear that the consequent delays in
l be seriously detrimental to their

dpoint of the employers, the new
rded as a step towards Syndicalism,
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Part 1.

Elementary Education and Ventilation

1. Compare the perimeters and areas of the following roadways:—

(a) 7 feet 3 inches diameter.
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State which you would prefer, and find the velocity in feet per second of the air current in each of 15,250 cubic feet of air passed in each per minute.

2. Describe and sketch some form of apparatus for demonstrating on the surface the "caps" on a safety-lamp flame resulting from known percentages of gas. What value would such an apparatus possess? Compare the advantages and disadvantages of relighting lamps electrically underground. What precautions should be observed by the man in charge?

3. If 15,000 cubic feet of air per minute pass along an airway 10 feet by 6 feet, how much will pass through the same airway if it were reduced to 4 feet square, the ventilating power remaining the same?

4. Describe clearly, with sketches, two methods for reversing the air current at a mine, indicating the various appliances you would need. Discuss the advantages and disadvantages of each, and state under what circumstances such arrangements should be used.

5. Ventilate the annexed plan* of a fiery mine ventilated by a fan; coal is raised at the downcast shaft only.

Principles of Mechanics and Machinery.

6. Describe clearly, with sketches, an apparatus for the prevention of overwinding and similar accidents in shafts.

What other features should such apparatus embody besides stopping the engines when too high a speed is attained at certain points?

Sketch the type of brake you would use, and show how its automatic action is obtained without interference with the engineman.

7. A baulk of timber, 12 feet long, 12 inches deep by 6 inches wide, is supported at its extremities, and will carry a weight of 6 tons hung in the centre when the baulk is supported flatways. What weight from the centre will be carried when the baulk is supported edgeways?

8. Describe the haulage plant you would instal to haul 500 tons per day of 8 hours up a road 1,200 yards long, dipping 4 inches per yard from the shaft, the depth of the shaft being 400 yards. Say whether you would use steam or electricity for this, and give your reasons?

9. Describe fully two methods of balancing the loads in deep winding shafts with which you are acquainted, and say what are the advantages and disadvantages of each. Which do you consider the better? Give reasons.

10. What are the requirements of the Coal Mines Regulation Act as to boilers? Would you set a boiler level; if not, at what inclination, and why?

11. Show how you would lay out a pit top, from the shaft to the screens and back to the shaft again, suitable for dealing with 2,000 tons from two mines, one a house coal and the other a steam coal; the house coal to be divided into three sizes and the steam coal into two. Give position of tipplers, screens, belts and creepers, also gradients of the tub roads.

12. Describe, with sketches, a steam engine indicator. Give imaginary diagrams of indications and make a calculation from same.

Part II.

Mine Working.

13. What are chief dangers to be guarded against in the attachment and detachment of tubs on main haulage ways and jigs? Describe fully how you would guard against accidents?

14. What are the requirements of the Coal Mines Regulation Act as to:—

(a) Haulage roads?
(b) Shafts?
(c) Ventilation?
(d) Old Workings?

15. Give a description of the Pillar-and-Stall and also of the longwall method of working coal. Say under what circumstances you would adopt each system.

16. How are accumulations of coal dust formed underground, and what are the dangers that may arise therefrom? What means would you adopt to minimise risk of accidents from dust?

17. If you had to work two seams of coal, each 4 feet thick, at depth of 600 and 675 yards respectively, which would you work the first? Also say how soon you consider it would be advisable to work the second from the same area. Give reasons for your answer.

18. Give a description, with sketches, showing the mouthings you would put in on each side of a shaft, 20 feet diameter, at a depth of 650 yards, where the strata is strong shale. Give principal dimensions.

19. Sketch and describe the coal-cutting machine you would instal to work a fiery seam of coal, 2 feet 4 inches thick, with a strong shale roof, and 7 inches of fairly strong fireclay below the coal. Say whether you would drive this by electricity or compressed air.

Timbering.

20. What are the principal points to be observed by workmen when timbering roads, holing under coal, and withdrawing timber?

21. Give a sketch showing how you would timber a longwall face of a mine 4 feet 9 inches thick, with a shale roof and strong floor, the gateroads being 18 yards apart. Show how you would secure the ends of the gateroads. Give strength of timbers you would use.

22. Under what circumstances would you use reinforced concrete for securing roadways? Describe how you would do this.

Surveying.

23. The following is the booking of a surface levelling from point A to point B:—

	Back sight. Feet.	Fore sight. Feet.	
A.	9·50		
	10 15	3·25	
	8·43	2·18	
	9·25	1·66	
		2·16	B.

What is the difference of level between A and B?

24. What are the errors likely to occur in mine plans and in the work of underground surveying? State how they may best be avoided.

25. Compare the advantages and disadvantages of fast needle and loose needle surveying. Explain the reasons for a scale of 32 yards to the inch, and also one of 44 yards to the inch. In what way does each assist calculations?

Shafts.

26. Describe in detail how you would carry an electric cable to convey about 100 kilowatts down a shaft 15 feet diameter, 500 yards deep. Say what special precautions you would take to avoid accidents whilst in use.

27. Describe how you would ventilate a shaft 18 feet diameter in course of sinking through fiery measures to a depth of 500 yards. Give sizes of fan, pipes, etc. Would you use the fan to blow or draw the air through the pipes? Give reasons.

28. Sketch a mouthing partway down a shaft 500 yards deep from which coal has to be wound, and describe fully the appliances you would use and the means you would adopt to prevent accidents occurring from the use of the mouthing.

For Second-class Certificates.

1. How many tons of coal per day of 8 hours would be delivered by an endless rope haulage which travels at 45 yards per minute, where sets of 3 tubs each are lashed on at intervals of 35 yards; each tub containing 8 cwt. of coal, and allowing 15 per cent. for stoppages?

2. What precautions have to be observed before a shot is fired in a main haulage road? Explain why such precautions are necessary.

3. What precautions have to be taken in the daily use of electricity underground? What are the requirements of the Electrical Special Rules as to switches, cables, and motors underground?

4. Describe how you would fix bricking rings and water rings in sinking a shaft 17 feet diameter. Say how you would temporarily secure the sides below the last bricking ring.

5. Where are accumulations of coal dust most likely to occur underground, and how are these caused? What is the danger that may arise from coal dust? and state fully the best means of guarding against this.

6. Why should longwall faces be kept uniform and regular? Under what conditions is the longwall face worked in steps, and what are the advantages in so doing?

7. Describe fully how you would proceed to repair some damaged brickwork in a winding shaft in which are 2 cages with iron weighted conducting rods and in which an electric power cable is carried down. Say what special precautions you would take to avoid accidents.

8. Make a sketch of a pair of upbrow "straits," rising 7 inches per yard and 18 yards apart, driven 350 yards in a fiery seam of coal. Indicate the positions of the connecting roads and the method of coursing and regulating the ventilation.

9. What are the duties of the Under-Manager as regards timber and explosives?

10. What precautions should be taken in the installation and use of an electrically driven coal-cutter with a view to minimising the risk of accidents?

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* Not shown.

Crutherland Colliery, in the East Kilbride district of Lanarkshire, is to be reopened shortly. The operations have been stopped at this pit for some months, but they are to be resumed again under the management of a strong company.

— PROGRESS. —

The Pyridine Test.

In a note recently presented to the Académie des Sciences, M. A. Wahl remarks that the differences encountered in the properties of coals is explained by the fact that their organic constituents are not always identical, or that they are associated in varying proportions. It has been found that hard and anthracitic coals, with a low content of volatile matter, are those also which yield the weakest pyridine extract. In other cases there does not appear to be any direct relation between the two properties; this is particularly so with boghead.

Coals after treatment were washed with boiling HCl diluted in the proportion of 1 : 1, but even after five or six treatments, followed by washing in boiling water, it still contained traces in pyridine. For examining the effect of the treatment upon the properties of the coals, the samples, dried in vacuo, were submitted to the coking test. Speaking generally, the sum of the volatile matters had diminished but slightly. The caking power had not disappeared, but the coke was more compact, darker, and much less bulky. On the contrary, the pyridine extracts give a coke very swollen, and, on mixing the extract with the original sample in the former proportions, its coking properties were restored (Bedson, Donath).

The pyridine extract is a brown amorphous powder, insoluble in water, alkalis, and acids, except burning nitric acid, which produces a more or less deep oxidation. The brown nitric solution precipitates by water and gives a brown substance which resembles the original product, but, nevertheless, seems to be different. The pyridine extract dissolves partially in organic solvents, giving yellow or brown liquors, with intense fluorescence. The following is the elementary composition of an extract compared with that of the original coal:—

	C.	H.	N.	S.	O.
Béthune coal (mean sample)	85·95	5 55	1·18	0 76	6 56
Pyridine extract	85 55	6 09	1 41	0 53	6 42

It will be seen that the most important variation is in the proportion of hydrogen.

The treatment, which relieves the coal of 20 per cent. of soluble substances, does not appreciably modify the composition, as will be seen from the following:—

	C.	H.	C/H.
Béthune coal, No. 11 pit	85·95	5·49	15·5
Same after treatment	84·66	5 23	16·1

Thus the residue, after treatment, is still remarkably rich in hydrogen. It gives, with boiling nitric acid, a brown liquor which, on dilution, furnishes a copious brown precipitate. This reaction is given equally by hard coals and anthracites. The researches are being continued.

Oil from Coal.

It will be remembered that Dr. Diesel stated in a speech made some little time ago that England had in its coalbeds sufficient oil for all its requirements. An interesting letter on the subject, from Mr. Gilbert R. Redgrave, appeared in a recent issue of the *Times Engineering Supplement*. He says it is becoming generally recognised that a new era in dealing with coal, particularly that of the coking class, is about to arise, and that the whole system of burning coal for power is wasteful in the extreme, and must rapidly become a thing of the past. Hence the development of coke-oven treatment throughout our coalfields, with increased care for the residual products. This is a great step in advance, and is proving profitable both to the colliery owners and to those engaged in the manufacture of coking plant, and this is no doubt one stage in the improved order of things. The present system is, however, by no means an ideal one, seeing that the coke produced is largely destined for one branch of industry—viz., for use in the blastfurnace—and it must be obvious that, beyond a certain point in production, the market for this description of coke is likely to become overstocked, and the usual difficulty in the disposal of the products, even at falling prices, may be encountered. Moreover, coke ovens are generally erected in localities where there is little or no demand for the large volumes of gas produced, and consequently such gas has to be consumed for heating the ovens and disposed of at rates considerably below its real power value, while the yield in tar-oil is too much loaded with the pitch element, and is correspondingly deficient in the lighter and more valuable oils.

What is really required (says Mr. Redgrave), is an oil which can be produced at such a cost as to compete satisfactorily with the imported article, and a means must be discovered whereby this is rendered not only possible but commercially practicable and profitable. Such a result can be obtained by the distillation of coal at a lower temperature than is usual with the coke oven principle, and this has the effect of reducing the

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2. Describe and sketch some form of apparatus for demonstrating on the surface the "caps" on a safety-lamp flame resulting from known percentages of gas. What value would such an apparatus possess? Compare the advantages and disadvantages of relighting lamps electrically underground. What precautions should be observed by the man in charge?

3. If 15,000 cubic feet of air per minute pass along an airway 10 feet by 6 feet, how much will pass through the same airway if it were reduced to 4 feet square, the ventilating power remaining the same?

4. Describe clearly, with sketches, two methods for reversing the air current at a mine, indicating the various appliances you would need. Discuss the advantages and disadvantages of each, and state under what circumstances such arrangements should be used.

5. Ventilate the annexed plan* of a fiery mine ventilated by a fan; coal is raised at the downcast shaft only.

Principles of Mechanics and Machinery.

6. Describe clearly, with sketches, an apparatus for the prevention of overwinding and similar accidents in shafts.

   What other features should such apparatus embody besides stopping the engines when too high a speed is attained at certain points?

   Sketch the type of brake you would use, and show how its automatic action is obtained without interference with the engineman.

7. A baulk of timber, 12 feet long, 12 inches deep by 6 inches wide, is supported at its extremities, and will carry a weight of 6 tons hung in the centre when the baulk is supported flatways. What weight from the centre will be carried when the baulk is supported edgeways?

8. Describe the haulage plant you would instal to haul 500 tons per day of 8 hours up a road 1,200 yards long, dipping 4 inches per yard from the shaft, the depth of the shaft being 400 yards. Say whether you would use steam or electricity for this, and give your reasons?

9. Describe fully two methods of balancing the loads in deep winding shafts with which you are acquainted, and say what are the advantages and disadvantages of each. Which do you consider the better? Give reasons.

10. What are the requirements of the Coal Mines Regulation Act as to boilers? Would you set a boiler level; if not, at what inclination, and why?

11. Show how you would lay out a pit top, from the shaft to the screens and back to the shaft again, suitable for dealing with 2,000 tons from two mines, one a house coal and the other a steam coal; the house coal to be divided into three sizes and the steam coal into two. Give position of tipplers, screens, belts and creepers, also gradients of the tub roads.

12. Describe, with sketches, a steam engine indicator. Give imaginary diagrams of indications and make a calculation from same.

Part II.

Mine Working.

13. What are chief dangers to be guarded against in the attachment and detachment of tubs on main haulage ways and jigs? Describe fully how you would guard against accidents?

14. What are the requirements of the Coal Mines Regulation Act as to:—
   - (a) Haulage roads?
   - (b) Shafts?
   - (c) Ventilation?
   - (d) Old Workings?

15. Give a description of the Pillar-and-Stall and also of the longwall method of working coal. Say under what circumstances you would adopt each system.

16. How are accumulations of coal dust formed underground, and what are the dangers that may arise therefrom? What means would you adopt to minimise risk of accidents from dust?

17. If you had to work two seams of coal, each 4 feet thick, at depth of 600 and 675 yards respectively, which would you work the first? Also say how soon you consider it would be advisable to work the second from the same area. Give reasons for your answer.

18. Give a description, with sketches, showing the mouthings you would put in on each side of a shaft, 20 feet diameter, at a depth of 650 yards, where the strata is strong shale. Give principal dimensions.

19. Sketch and describe the coal-cutting machine you would instal to work a fiery seam of coal, 2 feet 4 inches thick, with a strong shale roof, and 7 inches of fairly strong fireclay below the coal. Say whether you would drive this by electricity or compressed air.

Timbering.

20. What are the principal points to be observed by workmen when timbering roads, holing under coal, and withdrawing timber?

21. Give a sketch showing how you would timber a longwall face of a mine 4 feet 9 inches thick, with a shale roof and strong floor, the gateroads being 18 yards apart. Show how you would secure the ends of the gateroads. Give strength of timbers you would use.

22. Under what circumstances would you use reinforced concrete for securing roadways? Describe how you would do this.

Surveying.

23. The following is the booking of a surface levelling from point A to point B:—

	Back sight. Feet.	Fore sight. Feet.	
A.	9·50		
	10 15	3·25	
	8·43	2·18	
	9 25	1·55	
		2·16	B.

What is the difference of level between A and B?

24. What are the errors likely to occur in mine plans and in the work of underground surveying? State how they may best be avoided.

25. Compare the advantages and disadvantages of fast needle and loose needle surveying. Explain the reasons for a scale of 32 yards to the inch, and also one of 44 yards to the inch. In what way does each assist calculations?

Shafts.

26. Describe in detail how you would carry an electric cable to convey about 100 kilowatts down a shaft 15 feet diameter, 500 yards deep. Say what special precautions you would take to avoid accidents whilst in use.

27. Describe how you would ventilate a shaft 18 feet diameter in course of sinking through fiery measures to a depth of 500 yards. Give sizes of fan, pipes, etc. Would you use the fan to blow or draw the air through the pipes? Give reasons.

28. Sketch a mouthing partway down a shaft 500 yards deep from which coal has to be wound, and describe fully the appliances you would use and the means you would adopt to prevent accidents occurring from the use of the mouthing.

For Second-class Certificates.

1. How many tons of coal per day of 8 hours would be delivered by an endless rope haulage which travels at 45 yards per minute, where sets of 3 tubs each are lashed on at intervals of 35 yards; each tub containing 8 cwt. of coal, and allowing 15 per cent. for stoppages?

2. What precautions have to be observed before a shot is fired in a main haulage road? Explain why such precautions are necessary.

3. What precautions have to be taken in the daily use of electricity underground? What are the requirements of the Electrical Special Rules as to switches, cables, and motors underground?

4. Describe how you would fix bricking rings and water rings in sinking a shaft 17 feet diameter. Say how you would temporarily secure the sides below the last bricking ring.

5. Where are accumulations of coal dust most likely to occur underground, and how are these caused? What is the danger that may arise from coal dust? and state fully the best means of guarding against this.

6. Why should longwall faces be kept uniform and regular? Under what conditions is the longwall face worked in steps, and what are the advantages in so doing?

7. Describe fully how you would proceed to repair some damaged brickwork in a winding shaft in which are 2 cages with iron weighted conducting rods and in which an electric power cable is carried down. Say what special precautions you would take to avoid accidents.

8. Make a sketch of a pair of uphrow "straits," rising 7 inches per yard and 18 yards apart, driven 350 yards in a fiery seam of coal. Indicate the positions of the connecting roads and the method of coursing and regulating the ventilation.

9. What are the duties of the Under-Manager as regards timber and explosives?

10. What precautions should be taken in the installation and use of an electrically driven coal-cutter with a view to minimising the risk of accidents?

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* Not shown.

Crutherland Colliery, in the East Kilbride district of Lanarkshire, is to be reopened shortly. The operations have been stopped at this pit for some months, but they are to be resumed again under the management of a strong company.

— PROGRESS. —

The Pyridine Test.

In a note recently presented to the Académie des Sciences, M. A. Wahl remarks that the differences encountered in the properties of coals is explained by the fact that their organic constituents are not always identical, or that they are associated in varying proportions. It has been found that hard and anthracitic coals, with a low content of volatile matter, are those also which yield the weakest pyridine extract. In other cases there does not appear to be any direct relation between the two properties; this is particularly so with boghead.

Coals after treatment were washed with boiling HCl diluted in the proportion of 1 : 1, but even after five or six treatments, followed by washing in boiling water, it still contained traces in pyridine. For examining the effect of the treatment upon the properties of the coals, the samples, dried in vacuo, were submitted to the coking test. Speaking generally, the sum of the volatile matters had diminished but slightly. The caking power had not disappeared, but the coke was more compact, darker, and much less bulky. On the contrary, the pyridine extracts give a coke very swollen, and, on mixing the extract with the original sample in the former proportions, its coking properties were restored (Bedson, Donath).

The pyridine extract is a brown amorphous powder, insoluble in water, alkalis, and acids, except burning nitric acid, which produces a more or less deep oxidation. The brown nitric solution precipitates by water and gives a brown substance which resembles the original product, but, nevertheless, seems to be different. The pyridine extract dissolves partially in organic solvents, giving yellow or brown liquors, with intense fluorescence. The following is the elementary composition of an extract compared with that of the original coal:—

	C.	H.	N.	S.	O.
Béthune coal (mean sample)	85·95...	5·55...	1·18...	0·76...	6·56
Pyridine extract	85·55...	6·09...	1·41..	0·53...	6·42

It will be seen that the most important variation is in the proportion of hydrogen.

The treatment, which relieves the coal of 20 per cent. of soluble substances, does not appreciably modify the composition, as will be seen from the following:—

	C.	H.	C/H.
Béthune coal, No. 11 pit ...	85·95 .	5·49 ...	15·5
Same after treatment	84·66 ...	5·23 ...	16·1

Thus the residue, after treatment, is still remarkably rich in hydrogen. It gives, with boiling nitric acid, a brown liquor which, on dilution, furnishes a copious brown precipitate. This reaction is given equally by hard coals and anthracites. The researches are being continued.

Oil from Coal.

It will be remembered that Dr. Diesel stated in a speech made some little time ago that England had in its coalbeds sufficient oil for all its requirements. An interesting letter on the subject, from Mr. Gilbert R. Redgrave, appeared in a recent issue of the *Times Engineering Supplement*. He says it is becoming generally recognised that a new era in dealing with coal, particularly that of the coking class, is about to arise, and that the whole system of burning coal for power is wasteful in the extreme, and must rapidly become a thing of the past. Hence the development of coke-oven treatment throughout our coalfields, with increased care for the residual products. This is a great step in advance, and is proving profitable both to the colliery owners and to those engaged in the manufacture of coking plant, and this is no doubt one stage in the improved order of things. The present system is, however, by no means an ideal one, seeing that the coke produced is largely destined for one branch of industry—viz., for use in the blastfurnace—and it must be obvious that, beyond a certain point in production, the market for this description of coke is likely to become overstocked, and the usual difficulty in the disposal of the products, even at falling prices, may be encountered. Moreover, coke ovens are generally erected in localities where there is little or no demand for the large volumes of gas produced, and consequently such gas has to be consumed for heating the ovens and disposed of at rates considerably below its real power value, while the yield in tar-oil is too much loaded with the pitch element, and is correspondingly deficient in the lighter and more valuable oils.

What is really required (says Mr. Redgrave), is an oil which can be produced at such a cost as to compete satisfactorily with the imported article, and a means must be discovered whereby this is rendered not only possible but commercially practicable and profitable. Such a result can be obtained by the distillation of coal at a lower temperature than is usual with the coke oven principle, and this has the effect of reducing the

	September.		January-September.	
	1911. Tons.	1912. Tons.	1911 Tons.	1912. Tons.
Coal	13,614,528	14,906,654	119,791,173	131,301,978
Lignite	6,455,455	6,832,013	53,352,999	59,712,668
Coke	2,041,824	2,499,492	18,726,549	21,187,617
Coal briquettes	425,686	476,083	3,716,935	3,946,938
Lignite ditto	1,540,107	1,607,810	12,306,948	13,971,271

Imports and Exports of Fuel.—The following shows the imports and exports of fuel during the first nine months of 1912 and 1911 respectively:—

	Imports.		Exports.	
	1911. Tons.	1912. Tons.	1911. Tons.	1912. Tons.
Coal	8,078,596	7,471,865	19,750,208	23,4 5,270
Lignite	5,097,179	5,397,183	43,353	39,788
Coke	450,204	439,483	3,325,119	4,179,116
Coal briquettes	75,538	36,793	185,411	254,527
Lignite ditto	80,007	89,965	345,142	415,731

Imports included 6,420,000 tons of coal from Great Britain, as against 6,969,697 tons in the first nine months of 1911. The exports of coal show increased deliveries to Belgium (675,000 tons), Denmark (100,000 tons), France (330,000 tons), Great Britain (75,000 tons), Italy (170,000 tons), Netherlands (700,000 tons), Norway (45,000 tons), Austria-Hungary (1,060,000 tons), European Russia (210,000 tons), Sweden (50,000 tons), Switzerland (100,000 tons), and Spain (58,000 tons). To Egypt exports fell from 122 369 tons to 66,097 tons. In September, imports of coal amounted to 1,077,152 tons (1,097,360 tons); lignite, 618,132 tons (552,991 tons); coke, 50,138 tons (47,578 tons); 957,076 tons coming from Great Britain, as against 952,915 tons. In the same month, 2 860,615 tons of coal were exported (2,410,116 tons), 483,059 tons of coke (359,087 tons), and 167,042 tons of coal briquettes (148 318 tons).

The Fiscus and Coal Prices.—Although the Prussian Minister of Commerce recently announced that the increase of prices by the Syndicate would prevent the renewal of the agreement between that body and the fiscal authorities, it appears that the latter have no uniform policy in respect of prices. Last week we published the new list for the Saar district, in which a not inconsiderable advance has been made by lowering the rebates to wholesalers; and now the Deutsche Bergwerks Zeitung reports that the State colliery administration for the Ibbenburen district has raised prices for 1913-14 by 0·60 mark per ton in the case of through-and-through coal; 0·80 mark for large and nuts I.; nuts II. and briquettes by 0·50 mark; and nuts III. by 1 mark.

Coal Market in Upper Silesia.—The old trouble of autumn shortage of railway wagons is again making its appearance, the supply on several days of late having been deficient to the extent of about 3,000. This, however, has enabled certain pits to create a stock which could not otherwise be done in view of the existing heavy demand. As things are, they will be able to deliver more promptly when the wagons are again available; and the accumulation of stocks may be advantageous if the threatened movement for a rise in wages comes to a head. All grades of fuel are in good request, and coking coal cannot be raised quickly enough to supply the demand. Austria and Russia are buying largely, and, indeed, the demands of the latter country cannot be fully satisfied, as the requirements of the home market could not otherwise be fulfilled.

Ruhr Coal Market.—The favourable condition of the market continues, and business is even more active than heretofore. There is, however, a considerable shortage of railway wagons, and this affects the western district in particular, because the Rhine traffic has suffered interruption for several days, and this led to congestion at the Ruhr harbours. Much inconvenience has also been caused to the South German trade, the demand for house coal being so active that stocks have become very short. The export trade is still very good.

Hamburg Coal Trade.—Mr. H. W. Heidmann, of Hamburg, writes as follows:—The imports of coal into Hamburg have been in October:—

From	1912. Tons.	1911. Tons.
Northumberland and Durham	249,834	148,506
Yorkshire, Derbyshire, &c.	65,639	49,957
Scotland	134,078	103,112
Wales	6,613	4,373
Coke	75	355
Total	456,239	306,303

Russia.

The abnormal activity of the Donetz coal industry is reflected by the statistics relating to production. In the first seven months of the year the output of this coalfield reached 671 million poods (of coal and anthracite), or 74 million poods in excess of the output in the corresponding period of last year. In the same period stocks have been reduced by 17 million poods, bringing them down to the point of extinction. The outbreak of hostilities naturally retarded deliveries to Turkey, Bulgaria and Roumania, but the influence of the war upon the price of oil has been even greater, increased quantities of coal being taken to take its place in the industrial districts of Moscow and the Volga This, however, has been a feature of the present year. In the eight months ended with August no less than 44 million poods of Donetz coal were sent to the Moscow district, as against 14 million poods in the same period of 1911. There has been an exceptional demand for anthracite, which is being largely used as a substitute for metallurgical coke. Donetz coal is also competing more successfully this year than formerly in the St Petersburg district, and it is estimated that at least 10 million poods will this year be consigned to this market. Up to September, 4,700,000 poods of Donetz coal had been exported, including 1,980,000 poods to Turkey, 1,850,000 poods to Bulgaria, 390,000 poods to Austria, 290,000 poods to Roumania, and 200 000 poods to France. In addition, 1½ million poods were supplied to foreign shipping at ports in the Black Sea. The output of coal in European Russia during the first half of the present year (in millions of poods) is given by the *Moniteur des Intérêts Matériels* as follows:—

Districts.	1912.	1911.	1910.
Donetz—			
Coal	549·25	498·03	436·49
Anthracite	100·62	79·43	71·27
Total	649·87	577·46	507·76
Dombrova (Poland)—			
Coal	186·73	171·93	155·86
Lignite	4·78	3·96	3·56
Total	191·51	175·89	159·42
Ural	24·67	15·01	18·38
Moscow	5·67	4·92	6·84
Caucasus	1·97	1·33	1·00
Total (coal, anthracite and lignite)	873·69	774·61	693·39
Coke	113·69	98·52	85·35
Briquettes	3·67	2·19	4·48

A St. Petersburg telegram states that the Minister of Communications has asked the Council of Ministers to allow him to buy from 40,000,000 to 50,000,000 poods of foreign coal for the State railways, in consequence of the rise in the price of Russian coal, as well as 15,000,000 poods for the private railways, which, in consequence of the scarcity of Russian coal and the rise in its price, had been forced to draw upon their reserve stocks. The Council of Ministers decided to permit the purchase of between 10,000,000 and 15,000,000 poods of foreign coal to restore the depleted reserves of the private railways, and to appoint a commission, under the presidency of the Minister of Trade and Commerce, to discuss the question whether the purchase of foreign coal for the State railways can be avoided

MINING AND OTHER NOTES.

An interesting statement has been made as to the procedure of the work of the Cadeby Colliery Disaster Relief Fund. The fund raised by public subscription amounts to £9 000 odd, and this is to be administered by the committee in accordance with the terms of the trust deed. An actuarial valuation is now being made to ascertain the amounts which can be paid weekly to the widows, and to the children under 14. Many of the children are mere infants—some are as yet unborn—whilst many of the widows are comparatively young. Up to the end of September the Denaby and Cadeby Colliery Company had paid out over £1,000 in meeting claims of a necessary character pending the collection of the relief fund. There is at present a call upon the latter fund of over £30 per week, arising from an allowance of 8s. per week for each widow and 1s. 6d. for each child. His Honour Judge Allen has expressed the opinion that he has not the power to hand over to the committee the compensation money awarded to the dependants of the victims. The amount to be paid by the relief committee will, of course, depend upon the report of the actuary, and on the sum paid by order of the county court.

A Local Government Board enquiry was held last week at the colliery village of Maltby into the application of the Parish Council for sanction to borrow £1,250 for the purpose of acquiring land for a burial ground, necessitated by the colliery development of the district. It was stated there were only 15 grave spaces remaining in the churchyard, and that the population of Maltby would be 20,000 in 10 years' time.

On November 6 Mr. Walter Rowley read his presidential address to the members of the Yorkshire Association of Students of the Institution of Civil Engineers. He said that the mining engineer to-day must have some knowledge of practically every branch of the engineering profession, and the Home Office had at last realised the necessity of a man having a thorough training in order to tend to the safety of working minerals. He quoted from the recent circular that had been sent out from the Home Office, and pointed out that the mining engineer was developing more and more into the civil engineer. Going on to deal with the subject of coal firing in the goaf, he mentioned briefly the chief causes, and referred to Dr. Harger's recent papers before the Institution of Mining Engineers, expressing the opinion that although his research was more or less theoretical, he thought that every mining man must greatly appreciate his efforts to obviate what appeared to become one of the greatest dangers in mining. After briefly touching upon the difficulties that had been experienced in sinking in East Yorkshire, and a short reference to electricity, he strongly urged the closing of the engineering profession, and pointed out that practically all the old professions were either protected or closed, yet that of engineering, one of the oldest and highest, was at the mercy of any incompetent person who might choose to designate himself as belonging to it, though there was no profession in which so much money could be saved by a competent man or wasted by incompetency. Referring to education, Mr. Rowley pointed out the disadvantages in a student either taking his practical or his theoretical training without the two being in conjunction with each other.

A local correspondent says the South Lancashire Tramways Company are to be approached with a view to getting them to construct tramways from Leigh, through Bedford, Marsland Green and Astley to Boothstown, connecting with their system at that village. Extensive coalmining developments are now taking place in that part of southern Lancashire.

A pleasant little function has taken place at Woolley, near Barnsley, in the form of a presentation to Mr. John Wood, of Woolley, mining teacher and instructor to the classes for deputies in gas testing. The presentation took the form of a gold pendant, suitably inscribed, for Mr. Wood's watch chain, and was subscribed for by a number of his former pupils, in recognition of the valuable work which Mr Wood has done for the district in his mining instruction.

One of the furnaces at the Lowther Ironworks, at Workington, will be put on blast this week.

Mr. William McKenzie Grant, overman in connection with the Woodhall Colliery, Holytown, Lanarkshire, has, out of a formidable list of applicants, been appointed under-manager of the Sanquhar and Kirkconnel Collieries Limited. Prior to his departure from Holytown he was presented with a well-filled purse of sovereigns, while Mrs. Grant was given a beautiful pendant and necklace.

On the occasion of his leaving to fill a more important position in the Stirling district, Mr. A. D Kinsman, under-manager at Knownoblehill Colliery, Lanarkshire, has been presented by the officials and workmen with a handsome gold watch. Mrs. Kinsman was made the recipient of a gold mounted umbrella

Mr. J. P. Houfton, J P, general manager of the Bolsover Colliery Company, was on Saturday, November 9, duly installed as Mayor of Mansfield, at a special meeting of the Town Council. After assuming his robe of office, the new mayor paid a tribute to the services rendered by the late occupant of the chair—Councillor Hall, who had been known as the miner-mayor. When Councillor Hall was nominated for the mayoralty, said Mr. Houfton, no one had greater pleasure in supporting his nomination than himself. He did this, not merely because of Councillor Hall's character, but because his predecessor was one of the best representatives of a class of men whom no one honoured more highly than he did—a class of men from whom he (the speaker) had sprung and with whom he had been so intimately connected all his life. Alluding to the future of Mansfield as a mining centre, Mr. Houfton prophesied a long spell of good trade.

A local correspondent says the recent falls of coal in the Ladysmith pit at Whitehaven, where the terrible colliery accident occurred over two years ago, appear to have been more serious than they were at first thought to be, and the ground that has collapsed (which extends over a considerable acreage), will not be fit to touch for very many months to come. Two seams of coal, with not a very great thickness of strata between them, were being robbed simultaneously, when creep began to set in. About 400 men were thrown temporarily out of work, but it is good to learn that another drift, which is expected to take three or four weeks to complete, is being driven in another direction, to find solid coal again. The fall has taken place in the royalty belonging to the governors of the St. Bees School.

Messrs. E. G. Appleby and Co., 10, Victoria-street, Westminster, S.W., writing under date of November 7, inform us that they have secured the contract for four 10 ft. diameter Kerpely revolving grate gas producers adapted for ammonia recovery, including all the cleaning plant, sulphate of ammonia recovery plant, and tar dehydrating plant, for dealing with producer gas from 100 tons of South Staffordshire slack per day. The cleaning and scrubbing plant deals with a gas to supply 2,000-horse power gas engines, and the rest of the gas is utilised for heating the furnaces and for firing boilers at the Birmingham Battery and Metal Company's Works, Selly Oak, Birmingham. Messrs. Appleby further inform us that in the short time that has elapsed since the Kerpely producer was introduced to the English market, 25 producers have been sold to eight works in Great Britain, and of these eight works five have given repeat orders. In addition, nine Kerpely producers of the largest size are on order at the present time for English works.

Coal-boring operations are being carried out in the island of Bute on a line between the old coal workings at Ambrisbeg and Ascog. A report was obtained earlier in the year by a Canadian mining engineer regarding probable coal seams in Bute.

A new pit is being opened in the Falkirk district by the Callender Coal Company. It is situated at Wester Glen

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Dombrova (Poland)—			
Coal	186 73	171 93	155·86
Lignite	4 78	3 96	3 56
Total	191·51	175 89	159 42
Ural	24·67	15 01	18·38
Moscow	5 67	4 92	6·84
Cencasus	1·97	1·33	1·00
Total (coal, anthracite and lignite)	873 69	774 61	693 39
Coke	113 69	98 52	85·35
Briquettes............	3 67	2·19	4·48

A St. Petersburg telegram states that the Minister of Communications has asked the Council of Ministers to allow him to buy from 40,000,000 to 50,000,000 poods of foreign coal for the State railways, in consequence of the rise in the price of Russian coal, as well as 15,000,000 poods for the private railways, which, in consequence of the scarcity of Russian coal and the rise in its price, had been forced to draw upon their reserve stocks. The Council of Ministers decided to permit the purchase of between 10,000,000 and 15,000,000 poods of foreign coal to restore the depleted reserves of the private railways, and to appoint a commission, under the presidency of the Minister of Trade and Commerce, to discuss the question whether the purchase of foreign coal for the State railways can be avoided.

MINING AND OTHER NOTES.

An interesting statement has been made as to the procedure of the work of the Cadeby Colliery Disaster Relief Fund. The fund raised by public subscription amounts to £9 000 odd, and this is to be administered by the committee in accordance with the terms of the trust deed. An actuarial valuation is now being made to ascertain the amounts which can be paid weekly to the widows, and to the children under 14 Many of the children are mere infants—some are as yet unborn—whilst many of the widows are comparatively young. Up to the end of September the Denaby and Cadeby Colliery Company had paid out over £1,000 in meeting claims of a necessary character pending the collection of the relief fund. There is at present a call upon the latter fund of over £30 per week, arising from an allowance of 8s. per week for each widow and 1s. 6d. for each child. His Honour Judge Allen has expressed the opinion that he has not the power to hand over to the committee the compensation money awarded to the dependants of the victims. The amount to be paid by the relief committee will, of course, depend upon the report of the actuary, and on the sum paid by order of the county court.

A Local Government Board enquiry was held last week at the colliery village of Maltby into the application of the Parish Council for sanction to borrow £1,250 for the purpose of acquiring land for a burial ground, necessitated by the colliery development of the district. It was stated there were only 15 grave spaces remaining in the churchyard, and that the population of Maltby would be 20,000 in 10 years' time.

On November 6 Mr Walter Rowley read his presidential address to the members of the Yorkshire Association of Students of the Institution of Civil Engineers. He said that the mining engineer to-day must have some knowledge of practically every branch of the engineering profession, and the Home Office had at last realised the necessity of a man having a thorough training in order to tend to the safety of working minerals. He quoted from the recent circular that had been sent out from the Home Office, and pointed out that the mining engineer was developing more and more into the civil engineer. Going on to deal with the subject of coal firing in the goaf, he mentioned briefly the chief causes, and referred to Dr. Harger's recent papers before the Institution of Mining Engineers, expressing the opinion that although his research was more or less theoretical, he thought that every mining man must greatly appreciate his efforts to obviate what appeared to become one of the greatest dangers in mining. After briefly touching upon the difficulties that had been experienced in sinking in East Yorkshire, and a short reference to electricity, he strongly urged the closing of the engineering profession, and pointed out that practically all the old professions were either protected or closed, yet that of engineering, one of the oldest and highest, was at the mercy of any incompetent person who might choose to designate himself as belonging to it, though there was no profession in which so much money could be saved by a competent man or wasted by incompetency. Referring to education, Mr. Rowley pointed out the disadvantages in a student either taking his practical or his theoretical training without the two being in conjunction with each other.

A local correspondent says the South Lancashire Tramways Company are to be approached with a view to getting them to construct tramways from Leigh, through Bedford, Marsland Green and Astley to Boothstown, connecting with their system at that village. Extensive coalmining developments are now taking place in that part of southern Lancashire.

A pleasant little function has taken place at Woolley, near Barnsley, in the form of a presentation to Mr. John Wood, of Woolley, mining teacher and instructor to the classes for deputies in gas testing. The presentation took the form of a gold pendant, suitably inscribed, for Mr. Wood's watch chain, and was subscribed for by a number of his former pupils, in recognition of the valuable work which Mr Wood has done for the district in his mining instruction.

One of the furnaces at the Lowther Ironworks, at Workington, will be put on blast this week.

Mr. William McKenzie Grant, overman in connection with the Woodhall Colliery, Holytown, Lanarkshire, has, out of a formidable list of applicants, been appointed under-manager of the Sanquhar and Kirkconnel Collieries Limited. Prior to his departure from Holytown he was presented with a well-filled purse of sovereigns, while Mrs. Grant was given a beautiful pendant and necklace.

On the occasion of his leaving to fill a more important position in the Stirling district, Mr. A. D Kinsman, under-manager at Knownoblehill Colliery, Lanarkshire, has been presented by the officials and workmen with a handsome gold watch. Mrs. Kinsman was made the recipient of a gold mounted umbrella

Mr. J. P. Houfton, J P., general manager of the Bolsover Colliery Company, was on Saturday, November 9, duly installed as Mayor of Mansfield, at a special meeting of the Town Council. After assuming his robe of office, the new mayor paid a tribute to the services rendered by the late occupant of the chair—Councillor Hall, who had been known as the miner-mayor. When Councillor Hall was nominated for the mayoralty, said Mr. Houfton, no one had greater pleasure in supporting his nomination than himself. He did this, not merely because of Councillor Hall's character, but because his predecessor was one of the best representatives of a class of men whom no one honoured more highly than he did—a class of men from whom he (the speaker) had sprung and with whom he had been so intimately connected all his life. Alluding to the future of Mansfield as a mining centre, Mr. Houfton prophesied a long spell of good trade.

A local correspondent says the recent falls of coal in the Ladysmith pit at Whitehaven, where the terrible colliery accident occurred over two years ago, appear to have been more serious than they were at first thought to be, and the ground that has collapsed (which extends over a considerable acreage), will not be fit to touch for very many months to come. Two seams of coal, with not a very great thickness of strata between them, were being robbed simultaneously, when creep began to set in. About 400 men were thrown temporarily out of work, but it is good to learn that another drift, which is expected to take three or four weeks to complete, is being driven in another direction, to find solid coal again. The fall has taken place in the royalty belonging to the governors of the St. Bees School.

Messrs. E. G. Appleby and Co., 10, Victoria-street, Westminster, S.W., writing under date of November 7, inform us that they have secured the contract for four 10 ft. diameter Kerpely revolving grate gas producers adapted for ammonia recovery, including all the cleaning plant, sulphate of ammonia recovery plant, and tar dehydrating plant, for dealing with producer gas from 100 tons of South Staffordshire slack per day. The cleaning and scrubbing plant deals with a gas to supply 2,000-horse power gas engines, and the rest of the gas is utilised for heating the furnaces and for firing boilers at the Birmingham Battery and Metal Company's Works, Selly Oak, Birmingham. Messrs. Appleby further inform us that in the short time that has elapsed since the Kerpely producer was introduced to the English market, 25 producers have been sold to eight works in Great Britain, and of these eight works five have given repeat orders. In addition, nine Kerpely producers of the largest size are on order at the present time for English works.

Coal-boring operations are being carried out in the island of Bute on a line between the old coal workings at Ambrisbeg and Ascog. A report was obtained earlier in the year by a Canadian mining engineer regarding probable coal seams in Bute.

A new pit is being opened in the Falkirk district by the Callender Coal Company. It is situated at Wester Glen near Falkirk. There are two large seams of coal to be operated, and the pit will be in working order early next year. The Callender Company already own a considerable number of pits in the Falkirk district.

A serious accident, due to something going wrong with a guide rope while coals were being drawn up the shaft, occurred on the 6th inst. at St. Hilda Colliery, South Shields. The cages, one containing full tubs of coal, and the descending cage empty tubs, were midway in the shaft at the moment, when there was a terrible smash, the whole of the framework supporting the guides and electric connections being destroyed. As a result the shaft was completely blocked, though one of the cages dashed its way to the bottom. Happily no one was hurt, and the whole of those below reached the surface some hours later by the new shaft at Harton Colliery, which has underground communication with the St. Hilda pit.

The new form of coasting charter for the east coast, drafted by the Chamber of Shipping, is being strenuously resisted by the Humber Coal Exporters and Shippers' Association. The association is co-operating with the Scottish and Newcastle exporters in opposition to the new charter, with the object of getting it amended. A special sub-committee of Humber coastwise coal exporters has been formed by the association, and, as the result of their consideration of the matter, state that the new form of charter is retrograde, and reverts to the old forms of charter long ago superseded. It ignores the terms of the recently mutually agreed charters, such as the Baltcon and Mediterranean charters. The opinion of the sub-committee is that it is nearly impossible to draw up a uniform coal charter owing to the diverse conditions existing at the various ports, and that the proposed draft charter is so one-sided in its terms that it should be strenuously resisted. If it is necessary to have a coasting charter, it should be modelled on the lines of the Baltcon Charter.

Speaking at the annual meeting of Messrs. Wilsons and Clyde Coal Company Limited, Sir John Wilson, Bart., of Airdrie, chairman of the company, said the local and Imperial taxation on the company's collieries had more than doubled within the past 10 or 12 years, and this of itself meant fully £4,000 a year additional outlay. The addition to the Workmen's Compensation Act in 1906 had resulted in a great increase of the premiums payable for insurance, and while the cost in 1907 was over £2,500, it was now over £6,000 per annum. Then there was a very decided shortage of labour at the mines, which also tended to increase costs due to lesser production. When they knew that the cost of production in the United States was very much less, and the selling price a half of what it was here, there might well be some searching of hearts as to the inevitable end of all this legislative interference. The boring on the Douglas coalfield had resulted in proving a considerable area of coal, so that operations to establish a colliery there would be commenced.

An important meeting of colliery doctors was held at Newcastle Infirmary last week, under the presidency of Dr. Todd of Sunderland. Delegates attended from Scotland, Wales, the Midlands, Lancashire, Yorkshire, and the North of England. The chief point of discussion was to decide as to how an efficient system of medical aid could be best provided for the dependants of insured persons. Considering the great difference in the conditions prevailing in the various colliery districts, it was decided to allow a certain local option to be observed to suit the districts. The general tone of the meeting was that there were conditions favourable for negotiations for a probable settlement under the Act. Another point discussed was the fact that some districts preferred to contract out under the Addison amendment to the Act. This would enable them to carry on the family contract practice on similar lines as obtained in the past.

The announcement is made that a large electrification scheme has been decided upon at the Marquis of Londonderry's colliery at Silksworth, near Sunderland. It is intended to instal two mixed-pressure turbo-generators of large capacity, and to also entirely equip the underground haulages electrically, and to drive the surface machinery and the fans by electric power.

The Great Western Railway Company has placed orders with the Metropolitan Carriage, Wagon and Finance Company Limited, of Birmingham and Manchester, for 600 wagons; with the Birmingham Railway Carriage and Wagon Company Limited, of Smethwick, for 600 wagons; the Gloucester Railway Carriage and Wagon Company Limited, for 750 wagons; and the Bristol Carriage and Wagon Works Company for 175 wagons. All these vehicles are to be of the 10-ton open goods type, equipped with the Dean and Churchward eitherside brake. The first deliveries in two instances are to be effected early in January, and the other firms will commence their deliveries early in February and March respectively.

On the 6th inst., at the colliery office, New Seaham, a presentation was made to Mr. T. Brough, who retired from the position of manager in October, after a service of 41 years with the Londonderry Collieries, during the last 20 years of which he was manager of Seaham Colliery. The presentation, which was from the officials, workmen, and friends, took the form of a handsome carved oak grandfather's chiming clock for Mr. Brough, a beautiful emerald, tourmaline and pearl pendant encased in gold for Mrs. Brough, a mahogany writing bureau for Miss Brough, and a diamond horseshoe scarf pin for Master Jack Brough. During the whole of the 20 years Mr. Brough has been manager at Seaham only two days have been lost through local disputes. Lord Londonderry has supplemented the testimonial by a personal gift from himself, in recognition of Mr. Brough's long and faithful service to himself and his father.

Prof. W. H. Watkinson was installed last week as president of the Liverpool Engineering Society. Prof. Watkinson, in his presidential address, said the battle for supremacy in marine propulsion within the next few years would probably be between geared steam turbines and internal combustion engines. Some preliminary experiments which he had made in the compounding of a gas engine with a turbine seemed to indicate that this method of compounding might be used with great advantage in connection with large engines. We unfortunately, he continued, had no natural supply of oil in this country, and if we were to continue to draw on our stores of coal for marine propulsion we must devote ourselves to the evolution of a suitable gas producer. The introduction of the oil engine for marine purposes, instead of diminishing the value of our deposits of coal, might actually lead to a great increase in their value by compelling us to utilise our coal more scientifically so as to obtain from it the valuable products which it was capable of yielding, in addition to heat for power, metallurgical and domestic purposes. If all the coal consumed in this country were treated, it would be possible to obtain between four million and eight million tons of oil per year, suitable for use in Diesel engines. This weight of oil, if burned in Diesel engines, would be equivalent to nearly five times this weight of coal burned in steam boilers, and would be more than ample for the propulsion of all our ships, both of the navy and mercantile Marine. When this revolution in the methods of using coal was effected, we should warm our houses by coalite, by gas, or by electricity, and should obtain our power for land purposes by gas engines, with the incidental but valuable advantage that the smoke nuisance would entirely vanish. The great supplies of sulphate of ammonia which would then be available would greatly increase the fertility of the land, and we should become less dependent than we now were on other countries for our supplies of food.

The Demurrage Committee of the Scottish Coal Owners' Association met in Glasgow on the 6th inst. to consider the position of the colliery owners in view of the short supply of railway mineral wagons, which has necessitated irregular working at some of the pits in the west of Scotland for some time past. It was generally conceded that there was little or no ground for complaint against the North British and Glasgow and South-Western railway companies, but the number of trucks supplied by the Caledonian Company was stated to be totally insufficient to meet the requirements of the trade at present. The refusal to permit traders to increase the supply of privately owned wagons was also discussed, and in the end a small committee was appointed to investigate complaints and to report to a future meeting.

The new Lord Mayor of Newcastle, Alderman John Frederick Weidner, is prominently connected with the coal export trade. The new sheriff, Mr. O. de Loriol, is engaged in the same line of business.

A new factory, which is to be devoted entirely to the manufacture of high-speed twist drills, milling and other cutters, has lately been erected in Broughton Lane, Sheffield, by Messrs. Seebohm and Dieckstahl Limited.

It is announced that Sir Charles Owens, who was until lately the general manager of the London and South-Western Railway, has been elected to fill the vacancy on the board of that company.

Mr. A. E. Boycott, B.Sc., M.D., Ch.B., has been appointed to the Chair of Pathology at Manchester University, vacant through the resignation of Prof. Lorrain Smith, on his appointment to the Chair of Pathology in the University of Edinburgh. Mr. Boycott is the well-known authority on ankylostomiasis.

Mr. Joseph Jones, of Coton House, Wolverhampton, head of the Wolverhampton Corrugated Iron Company Limited, who died on September 12, aged 75, left estate of the gross value of £206,191, of which £153,617 is net personalty.

The council of Armstrong College have appointed Mr. J. W. Ramsbottom, B.A., to the G. B. Hunter lectureship in commercial and industrial economics.

Messrs. W. T. Glover and Co. Limited, of Manchester, have just issued a neat little handbook of electric mining rules and data. This book, which is bound in red leather, and of a size suitable for the waistcoat pocket, embodies the recently issued rules, with the Home Office memorandum thereon, as well as such data and formulæ as may be of assistance in the choice and selection of colliery cables. Illustrations and information are also given relative to the more usual forms of accessories and fittings relating to the class of work in question.

In distributing the prizes at the Salford Technical School on the 27th ult., Sir William H. Bailey paid an eloquent tribute to James Prescott Joule, who was the son of a Salford brewer. This wonderful discoverer of the laws of the mechanical equivalent of heat and the indestructibility of matter, he said, owed his skill to downright hard work, his fear of error being a religion. Sir William said that his friend Denny Lane, of Cork, had told him that when Joule gave his great discovery to the world at the meeting of the British Association at Cork in 1844, not a single member knew what he meant. Now, wherever the laws of force and heat were taught to the youth in the science schools of the world, the name of Joule, of Salford, was held in reverence. His genius, said Sir William, was the product of study, of love of truth, fear of error, and the fortunate combination of two of the great men of the century, Dalton and Sturgeon, as his tutors.

The annual meeting of members of the Cleveland Institution of Engineers was held at Middlesbrough on Monday, Mr. Stonewall Jackson, the retiring president, presiding. The secretary (Mr. W. H. Burns) presented the annual report for the 49th session. With the honorary and life members there is now a total membership of 316. All the members of the council were re-elected, with the exception of Mr. Henry Crowe, who was elected president. Mr. Crowe, in his presidential address, referred to the recent industrial strikes and declared that Government arbitration was a backward step. It was foolish for the Government to step in to settle wages and other disputes between capital and labour. The actual settlement of differences could only be effected between the two parties. Afterwards Mr. J. E. Stead, LL.D., read a paper on "When Steel Freezes."

Prof. P. F. Kendall delivered the second of his course of Oxford University Extension lectures on "Coal and Coal-Bearing Rocks," at the Bradford Mechanics' Institute on Monday night. Discussing the structure and composition of coal, Prof. Kendall referred to the "ash problem" which confronted geologists in connection with South Wales anthracite. The question, he said, was why it was that ash should decline in quantity as the anthracitic condition of coal increased. He had set himself to try and solve that problem, and he believed he had found a partial answer to it. From an analysis based on a line of investigation that had been first undertaken by two professors of the Yorkshire College, now the Leeds University, it had been found that bright layer coal yielded a very low percentage of ash and that, on the other hand, dull charcoal layers yielded a very high percentage. These results had been borne out by Prof. Thorpe in his investigations undertaken in Yorkshire. "Bright coal," proceeded Prof. Kendall, "is dense and impervious. The charcoal layer is a porous layer. I suggest to your consideration, as I shall suggest to the consideration of my brother geologists, that the difference in regard to ash between anthracitic and non-anthracitic coal is essentially this: That the anthracite at an early stage acquired the impenetrable qualities of the bright layers, while the ordinary coal, consisting in part of the dull charcoal layers, which are very rarely to be found in anthracite, has been receptive to percolating water containing mineral salts." Consequently, he added, the percentage of ash in anthracite had remained very low compared with the percentage in ordinary coal.

The annual meeting of the committee in charge of the Fife and Kinross Miners' Accident (Permanent) Fund was held within the Clydesdale Bank Buildings, Dunfermline, on Saturday. Mr. Charles Carlow, managing director of the Fife Coal Company, presided. From the annual report it appeared that at present there are six widows receiving relief from the fund, which was established to assist the relatives of the Donibristle disaster. In regard to the Permanent Fund, it was stated that since its institution 270 cases had received assistance and that at present there are 36 drawing allowances. Owing to the large number of cases on the fund, the report concludes, the amount of capital is being rapidly exhausted. The statement of funds shows that in connection with the Donibristle fund, while the year was begun with a balance on hand of £1,507 10s. 11d., it finished with that balance reduced to £1,493 7s. As for the Permanent Fund, the year was begun with a balance of £1,597 0s. 5d., and that the total receipts were £2,181 9s. 7d. During the year there had been disbursed in allowances to approved applicants a sum of £764 4s. 9d., and that, together with other outlays, had reduced the balance at the close of the year to £1,402 2s. 4d.

An interesting legal action to test the question whether harbour dues on bunker coal is a legal charge will be submitted on an early date for the decision of the Court of Session. The test case will be raised by the Fraserburgh Harbour Commissioners.

The 159th session of the Royal Society of Arts will open on November 20, when an address will be delivered by Lord Sanderson. On November 27 Mr. Harold Cox will read a paper on "The Interdependence of Morals and Economics." Amongst the papers to be read after Christmas are the following:—"Steel Pipes *v.* Cast Iron Pipes for the Conveyance of Gas, Water and Air," by Mr. C. L. MacCarthy; "Co-partnership," by Mr. Aneurin Williams; "The Physical Qualities of Clay," by Mr. Walter C. Hancock. Cantor lectures will be delivered on December 2, 9 and 16 by Mr. Chas. R. Darling on "Methods of Economising Heat"; by Prof. Lewes on "Liquid Fuel" (January 20, 27 and February 3, 1913); and by Mr. F. W. Goodenough on "Coal Gas as a Fuel for Domestic Purposes" (March 3 and 10, 1913).

THE COAL AND IRON TRADES.

Thursday, November 14.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 148,641 tons of coal and 1,496 tons of coke were despatched from Tyne Dock, an increase of 15,168 tons of coal and 440 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 60,484 tons of coal and 2,901 tons of coke, a decrease of 3,822 tons of coal and an increase of 2,647 tons of coke. The Blyth shipments totalled 87,644 tons of coal and coke, an increase of 6 075 tons. The following important sales of fuel have been recorded this week:—From 10,000 to 12,000 tons of Blyth steam smalls for shipment next year at 9s. 6d. per ton f.o.b.; a small quantity of Blyth unscreened bunkers for similar delivery at 11s.; a parcel of Lambton steams for shipment over the remainder of the present year at 14s. 6d.; a quantity of Towneley bunkers for December loading at 17s.; 34,000 tons of Broombill steams—large and smalls—for shipment over next year at 13s. and 9s. 9d. respectively—the best prices yet realised for these descriptions of coal; and 30,000 tons of Tyne prime steams and 10,000 tons prime smalls for similar delivery at 13s. 6d. and 10s. respectively. It is freely rumoured that the French State Railways' contracts for steam coals for next year have gone to South Wales, Cardiff firms being stated to have secured orders aggregating from 125,000 to 150,000 tons of smalls at 25 05 fr. per ton delivered into trucks at French ports, inclusive of tax. Confirmation is lacking, however. Local tenderers are uneasy as to the allotment of the Swedish State Railways' supplementary contract for about 125,000 tons of steams, shipment to the end of March. The competition for this piece of business is very keen as between this district, Yorkshire and Scotland. Local tenders are stated to have been based on rather over 20s. per ton, c.i.f. Stockholm, for best Northumbrian coal. The Paris, Lyons and Marseilles Railways have not yet allotted their contract for a supplementary quantity of 20,000 tons of Durham smalls. Tenders of 14,000 tons of Durham or Scottish small coal are now being submitted to the Helsingfors Electric Works for next year's shipment. The Norrkoping Gasworks want offers, this week, of 6,500 tons of Wear gas specials. The local coal market is rather weaker this week. Buyers are resolutely holding off, as far as possible, in order to "bear" the market, as they contend that prices are much too high. Another factor which makes for lower figures is the stormy weather which is prevalent, and which has seriously upset tonnage arrangements. Many vessels are being delayed, and quantities of "free" coal are being thrown on the market. Were spot tonnage available to buyers—which it is not, generally speaking—some very nice bargains would be procurable. The enquiry for forward shipment continues good, but prompt business is deadly dull. Quotations for prompt shipment are generally weaker at the following figures:—Best steams, Blythe (D.C.B.), 13s. 9d. per ton f.o.b., a decline of 3d. on the week; Tynes (Bowers, &c.), 13s. 9d. to 14s, easier; seconds, Blyths, 12s. 6d. to 12s. 9d., a fall of 3d.; Tynes (Hastings or West Hartleys), 12s. 9d. to 13s., from 3d. to 6d. lower; unscreened, 12s., 6d. down; smalls, Blyths, 10s. 6d., 1½d. declined; Tynes, 9s. 6d., unaltered; specials, 11s. to 11s. 6d., 6d. advanced; smithies, 14s. to 14s. 6d., weaker; gas bests (New Pelton or Holmside), 15s., unchanged; seconds (Pelaw Main or similar), 14s. to 14s. 6d, in buyers' favour; specials, 15s., steady; unscreened bunkers, Durhams, 13s. to 14s, easier; Northumbrians, 12s. 6d., 6d. decreased; coking coal, 14s. to 14s. 6d., inclined to fall; smalls, 14s., steady; households, 14s. 6d. to 15s., an increase of 6d., the first change since the beginning of June; coke, foundry, 27s., steady; blastfurnace, 25s., unaltered; and gas coke, 22s. 6d., a fall of 6d.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 96,830 tons of coal and 360 tons of coke as compared with 105,175 tons of coal and 720 tons of coke for the corresponding period of 1911, being a decrease of 8,345 tons of coal and 360 tons of coke. The coal market is on the quiet side, owing no doubt largely to the stormy weather having delayed the arrival of vessels, and thus coal for prompt shipment can be bought at 3d. to 6d. cheaper; but, on the whole, the market has a healthy tone, and there is a steady enquiry for coals for delivery up to the end of the year. In the gas coal trade there is now a heavier consumption, and, if anything, the tendency in prices is firmer. Good ordinary bunkers are still in strong demand. Household coals are quiet, with only a moderate demand. Coking unscreened are still very scarce and prices remain about same. Cokes of all classes are scarce and strongly quoted. The following are about the current quotations:—Special Wear gas, 16s.; seconds, 14s. to 14s. 6d; coking unscreened, 14s. 6d. to 14s. 9d.; smalls, 14s. to 14s. 6d.; smithies, 15s.; peas and nuts, 16s.; households, 15s.; ordinaries, 16s.; foundry coke, 27s. to 28s.; blast-furnace coke, 26s. to 27s. 6d.; gas-house coke, 22s. 6d. to 23s.; ordinary bunkers such as Peases, Framwellgate, South Derwent, 13s. 6d.; Priestman, Burnhope, Consett, South Hetton, 14s., Morrisons, Ryhope, Londonderry, 14s. 6d., all free on board South Dock. The outward freight market continues firm, especially for the coast, the high figure of 6s. having been paid for London, Rotterdam 4s. 9d., Havre 6s. The Bay in steady with Bordeaux at 8s. 6d. Mediterranean is still short of tonnage, and good rates are being paid, as shown by Genoa 13s. 9d., Malta 11s. 3d., Marseilles 12s. 6d., Palermo 14s., Civita Vecchia 14s. 6d., and the rate to Las Palmas is 12s. 3d. Baltic is about finished for this season, and few orders are now quoting. Pillau has paid 6s., and Stettin 6s. 3d. Cronstadt has booked up a contract for 20,000 tons over next year at 5s. 9d.

Middlesbrough-on-Tees.

COAL.

On the whole the tone of the fuel market is sound, with fairly good enquiry for delivery before the end of the year, but prompt business has been quieter at the north-east ports during the past few days, chiefly owing to the stormy weather, which has delayed the arrival of vessels, and rendered loading difficult at the more exposed shipping berths. In consequence of the derangement, in odd cases, buyers with ready vessels have been able to pick up cheap cargoes. Thus, best gas coal has been bought at 14s. 6d. f.o.b, but most sellers quote 15s, whilst second qualities are quoted 14s. to 14s. 6d. Bunker coal is in good request, and ordinary Durhams run from 13s. 6d. to 14s. f.o.b., and best kinds are quoted 14s. 9d. and upward. Household coal is firmer. Coking coal is well taken up at 14s. 6d. to 14s. 9d. Coke continues very scarce and strong in price. Local requirements are heavy, and 26s. has to be paid for average blast-furnace qualities delivered at Teesside works, whilst some sellers are inclined to hold out for even a higher figure. Foundry coke for shipment is in the neighbourhood of 27s. f.o b. Gashouse coke is 22s. 6d. to 23s.

IRON.

The political situation at home this week has added to the influences that disturb trade, and the Cleveland market has not escaped the effect. Quotations for Cleveland iron are unsteady. Transactions are still on a limited scale, but buyers are more in evidence than they have been, and the fact that forward quotations are higher than those for early delivery emphasises confidence in the future. No. 3 g.m.b. Cleveland pig is now 67s. 4½d. f.o.b., and that price is also named for No. 4 foundry and No. 4 forge, both of which are very scarce. Mottled and white iron are each 66s. 10½d.; No. 1 is in full supply, and is offered freely at 70s. 10½d. The foregoing quotations are for prompt business, quite 6d. higher being named for delivery ahead. There is good demand for east coast hæmatite pig for early delivery, but it leads to little or no business, as there is next to no iron to be had. Any small parcels that come on the market are snapped up at once. For delivery of Nos. 1, 2 and 3 over the first quarter of next year the price is fully 82s. 6d. Foreign ore is steady. A rumour that best rubio had been sold at 22s. 9d. is discredited. Market quotations are still based on 23s. ex ship Tees for rubio of 50 per cent. quality, and contracts have been made at that figure for delivery to the end of March. Freights Bilbao-Middlesbrough have this week been fixed at 7s. 6d. Little new can be reported concerning manufactured iron and steel. Works are going at full pressure, and users are pressing for delivery, but few new contracts are being entered into. Quotations all round are firm, but not quotably advanced.

South-West Lancashire.

COAL.

The change in the weather is tending to improve the condition of the household coal trade, which has been for some few weeks rather below the average for this time of the year. There is no change in prices, which rule at about 16s. 3d. for best coals, with good medium sorts 14s. 6d. to 14s. 9d., and the commoner coals 12s. 3d.—all into wagons at the pit. Users of round coal for forges and manufacturing purposes continue to take full supplies. With regard to shipping, the steam coal market is perhaps slightly easier this week, supplies on the whole being rather more readily available, and while quotations for screened Lancashire steam coal nominally remain at 12s. 6d. to 13s. 3d. f.o.b., spot lots may be picked up at slight reductions. Contract requirements continue heavy, with open sale business only moderate. There is nothing new to report with regard to shipments of household coal for the coastwise and cross-Channel trade. Adequate freights are difficult to procure, otherwise the trade is satisfactory. Best coal rules at 16s. to 16s. 6d., with good seconds 14s. 9d. to 15s., both f o b. The little weakening that was apparent in slack a few weeks ago is passing rapidly away, and the tone is distinctly stronger, not only with regard to present deliveries, but also in regard to renewals of expiring contracts. Open sale prices rule at 9s. 9d. to 10s. for the best qualities, with good medium grades 9s. to 9s. 3d., and the commoner and finer sorts at 8s. 6d.—all into wagons at the pit.

South Lancashire and Cheshire.

COAL.

The Manchester Coal Exchange was well attended on Tuesday. Owing to the colder weather there is an improving demand for house coal. Prices are firm at late rates: 16s. 6d. to 17s. for the best house grades, with good medium qualities at 15s. 3d. to 16s., and the commoner sorts from 12s. 6d. to 13s.—all into wagons at the pit. Furnace coal continues to meet with steady enquiry at about 12s. 6d. per ton at the pit, and shipping coal is in improving demand, the price being about 14s. f.o.b. Partington. Slack is without change, and prices continue firm at about 9s. to 9s. 9d. for the best qualities, with the commoner grades at from 8s. to 8s. 6d.—all into wagons at the pit.

IRON.

Pig iron remains firm, and prices are without alteration. Forges continue very busy, with crown iron bars at £8 10s., second quality £8, hoops £8 12s. 6d., sheets £9, and cannot keep pace with orders. Steelworks are fully occupied, with bars at £8 5s., less 2½ per cent., and billets £6 10s. net. Heavy engineers and foundries fairly well employed. Wagon works are pulled out of the place for wagons.

Yorkshire and Derbyshire.

Leeds.

COAL.

All branches of the coal trade were well represented on 'Change last Tuesday. The tone of the market was cheerful and prices all round firm. The bulk of the enquiries concerned small fuel, particularly nuts and coking smalls. Supplies of the latter are keenly sought after, and higher prices have been paid this week for this class of fuel than at any previous time since 1907, apart from the time of the coal strike. At some of the collieries where coke is manufactured nuts and even large coal is being crushed in order to feed the ovens. The pits have worked about full time this week, and empty wagons have been more plentiful. The house coal trade has improved with the colder weather, and stocks at the pits have not increased. London factors and merchants have taken little beyond contract tonnage; but better reports are to hand with regard to the retail trade. Pit prices are firmly held, and for the distant markets may be summarised as follows:—Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. to 14s.; Silkstone best, 13s. to 14s, (special qualities up to 14s. 6d.); Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. 6d. to 12s. The coastwise trade is still quiet, with best qualities neglected, and only a moderate demand for the cheaper grades. Nearly all the southern enquiries are for medium qualities at about 14s. f.o.b. Hull. For fairly prompt shipment, the following f.o.b. prices have been quoted during the past few days.—Haigh Moor best, 16s. 6d. to 17s.; Silkstone best, 15s. 6d. to 16s. 3d.; Silkstone house, 14s. 9d. to 15s. 3d.; other sorts, 13s. 6d. to 14s. In the West Riding, public buying has been stimulated by the cold weather, and the retailers of coal in bags have been considerably busier. Pit prices are unchanged but very firm, as follow:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; secondary sorts, 13s. to 14s. 6d. As indicated above, the demand for all descriptions of small fuel is well ahead of the supply. In Bradford, Leeds, and other manufacturing centres considerable difficulty is met with in keeping the boilers supplied, and prices have a distinct hardening tendency. Current rates:—Large double-screened engine nuts, 10s. to 11s.; small nuts, 9s. 6d. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 9s. 6d. to 10s.; best rough slacks, 8s. 6d. to 9s.; small slacks, 7s. 6d. to 8s. 3d.; coking smalls, 7s. 6d. to 8s. Washed furnace coke has been sold this week for delivery to the end of June 1613 at 18s. 6d. per ton at the ovens, and one or two spot lots of special brands have realised 16s. There is nothing special to report in the gas coal trade The pits make full time, and have very little to spare for the open market. Pit prices:—Screened gas coal, 11s. to 12s.; gas nuts, 10s. to 11s.; unscreened gas coal, 9s. 6d. to 10s. It is reported that a cargo of best screened gas coal has been sold in Hull this week at 14s. 8d. per ton f.o.b. Other qualities:—Gas nuts, 12s. 6d. to 13s. 6d.; unscreened gas coal, 12s. 6d. to 13s, both per ton f.o.b. Hull.

Barnsley.

COAL.

Considering the period of the year, the business doing in large steam fuel on export account may be regarded as satisfactory. There is not a great deal of tonnage now being sent to the Baltic ports, but in several other directions business is of a fairly active character, whilst rather more than an average has been done on coastwise account. The demand for the home markets also keeps up satisfactorily, and though the collieries are working full time there is not much trouble experienced owing to stocks. Values are therefore of a firm character, and the position is strengthening the hands of the coalowners in regard to arrangements for next year. There has not, however, been much progress made on this account, buyers holding off rather than committing themselves to the demand of 11s. to 11s. 3d. per ton for the best district hards. For current business for best, large steams are making from 10s. 9d. to 11s. per ton, and secondary descriptions 9s. 9d. to 10s. 3d. per ton. The market continues to be firm in regard to all classes of small steam fuel, which continues to be heavily enquired for, and there is no difficulty in sellers being able to obtain the advanced prices. Best washed nuts are about 10s. 6d. per ton, and secondary sorts are making up to 10s. per ton. Best slacks are again quoted at from 8s. to 8s. 3d. per ton, and secondary grades are from 7s. to 7s. 6d. per ton. On gas coal account foreign business continues to be brisk, and, with the output largely placed, buyers on current account continue to have to pay an advance equal to about 1s. per ton for all classes of coal. There has been a slight improvement with regard to house coal, but no material growth in the demand is expected for a little time ahead. Not only merchants but also some collieries have large stocks on hand, which they prefer to hold rather than cause a temporary glut on the market and thus bring down prices. Quotations are generally held as follow:—Best Silkstone, 14s. 6d. to 15s. per ton; best Barnsley softs, 14s. to 14s. 6d. per ton; secondary sorts, 11s. 6d. to 13s. per ton; and best house nuts, 10s. 3d. to 10s. 6d. per ton. The position in the coke trade is unchanged; although locally the output has been considerably augmented, full supplies are still difficult to get hold of, and the production is very easily disposed of. Prices are consequently very strongly held on the basis of of 18s. per ton for ordinary brands.

Hull.

COAL.

The tone of the Humber coal market this week has been of a much more healthy character. The demand for all kinds of coal for export is very good for the time of year, and there does not appear any signs of it slackening. The best Yorkshire steam hards are firm at about the same price as last week, and both Derbyshire and Nottingham steams are still dearer by comparison, and show some improvement on the week. Secondary sorts continue in brisk demand, and the unusual position of washed doubles being equal, or nearly equal, in value to the best Yorkshire steam hards is still in evidence. In fact, nuts and smalls of all descriptions are in great demand and, the supply barely keeping pace with requirements, quotations are very firm. Gas coals are scarce, and business in them fairly brisk; while house coals are stronger on the advent of colder weather. There are plenty of enquiries for forward delivery, but collieries holding out for higher prices than current values, and buyers not being disposed to pay them, negotiations hang fire. Nevertheless, some contracts have been arranged at as low as 14s. 3d., while another is reported at 14s. 9d. for 20,000 tons best South Yorkshire steam hards, for delivery over next year. Considering the time of year a fair amount of coal is being shipped at the docks at all the Humber ports, both foreign and coastwise, the feature of the latter being the large quantities of gas coal sent to London. Loading conditions at the docks are good, with easy turns at the appliances Baltic freight rates are easier since the practical close of the Cronstadt season, Riga having been done at 5s. 9d. and 5s. 6d., but Mediterranean rates remain much about the same, Hull to Genoa having commanded during the week 13s. 3d. and 13s. 4½d., and Naples 13s. 3d. For Buenos Ayres 22s. 6d. to 23s. is asked. The following are the approximate prices for prompt shipment f.o.b. Hull:—South Yorkshire: Best steam hards, 14s. to 14s. 3d.; washed double-screened nuts, 14s. to 14s. 3d.; unwashed double-screened nuts, 12s. 9d. to 13s.; washed single-screened nuts, 13s. 6d.; unwashed single-screened nuts, 12s. 6d.; washed smalls, 11s. 9d. to 12s.; unwashed smalls, 10s. 6d. to 10s. 9d. West Yorkshire: Hartleys, 13s. 6d.; rough slack, 10s. 3d. to 10s. 6d.; pea slack, 9s.; best Silkstone screened gas coal, 13s. 6d.; best Silkstone unscreened gas coal, 12s. 9d. to 13s. Derbyshire and Notts: Best steam hards at Hull, 14s. 6d. to 14s. 9d.; best steam hards at Grimsby, 14s. 3d. to 14s. 6d.; Derbyshire nuts (doubles) at Hull, 13s. to 13s. 3d.; Derbyshire nuts (doubles) at Grimsby, 12s. 9d. to 13s.; Derbyshire large nuts at Hull, 14s.; Derbyshire large nuts at Grimsby, 13s. 6d.; Nottinghamshire hards at Hull, 14s. 6d. to 14s. 9d.; Nottinghamshire hards at Grimsby, 14s. 3d. to 14s. 6d.

Chesterfield.

COAL.

Colder weather has improved the demand for house coal, and orders are coming to hand more freely than they have done for several weeks past. Prices are a shade firmer, and will probably be advanced at an early date. The pits of the district continue to work full time. The position with regard to fuel for manufacturing purposes remains unchanged. The demand is active for all classes, and consumers still experience much difficulty in obtaining full supplies of the coal they require. Neither producer nor consumer holds any stocks, and the large works of Sheffield and district are dependent upon the daily deliveries from the collieries. Prices continue firm, with a hardening tendency. Cobbles and nuts for gas-producers are in particularly urgent demand, but the supply is not by any means equal to the requirements of the market. Slack for boiler firing is as much called for as ever, and customers are most pressing in their demands. The Lancashire demand for the cotton mills is exceptionally active, but it is impossible to meet it satisfactorily owing to the pressing wants of the market generally. Prices are still advancing, and the best brands of Derbyshire hard slack now fetch 8s. per ton at the pit, but even at this figure buyers are unable to purchase as much as they would like. Stocks are absolutely exhausted at the collieries, and consumers hold very little in reserve. Some collieries that have been sellers of slack from the beginning of their operations are now requiring all that they produce, and have none to offer therefore over next year. It is obvious that small fuel will be scarce and dear for some time to come. There is a very satisfactory demand for steam coal for locomotive use, and the various railway companies are calling for heavy deliveries. For the time of year the export trade is in a satisfactory condition, and shipments are on a large scale. Enquiries for prices of steam coal for shipment over next year are now coming to hand, but owing to the wide difference between buyer and seller's idea of the value, it is not yet possible to come to terms. It is, however, a satisfactory sign that foreign buyers are no longer holding off rigidly, but are showing a disposition to enter into serious negotiations with the view to making forward contracts. A large business is being done in washed fuel for next year, substantial sales having recently been made at good prices. There is a strong demand for this class of fuel for current shipment, and home requirements are considerably larger than they have ever been before. The coke market is strong, and a very active demand is experienced for all qualities. Coking fuel is still scarce and dear. Quoted prices are as follow:—Best 14s. 6d., seconds 12s. 6d., cobbles 12s., nuts 11s., slack 8s.

IRON.

There is no change in the condition of the market, which continues good in every department. Prices are firm all round, and the demand is very satisfactory. All the works of the district are running at high pressure, and there is every prospect of this active state of things continuing well into next year.

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Nottingham.

COAL.

A fairly satisfactory tone continues to dominate the trade in Nottinghamshire, and the outlook for the winter is promising. There has not, perhaps, been quite so active a demand in the household section during the past week as is customary at this time of the year, but the comparatively mild weather has been the main factor, and with a spell of colder weather having set in, an improvement in this respect is assured. Better class fuel is in good request and secondary qualities are moving freely, with the result that prices are being well maintained. For best house coal, pit prices are from 12s. 6d. to 13s. 6d. per ton, seconds making from 10s. to 11s., whilst nuts of good quality, for which there is an improving sale, are selling at from 9s. 6d. to 10s. 6d. In the steam coal branch, trade is keeping moderately active, despite the decline in shipments. Industrials are claiming a lot of attention, being in strong request in the home markets, and small steams are selling well. The prices for best hards are from 11s. 6d. to 12s. per ton, seconds making from 9s. 6d. to 10s. Slacks of most descriptions are moving with freedom, and late quotations are being maintained. There is a good sale for gas fuel and coke.

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Leicestershire.

COAL.

There has been but little alteration in the conditions of business since last report. Orders are fairly full and frequent, and buyers who have season orders placed are generally taking a good delivery. Some merchants are more in the market than they have been, and there is, on the whole, an improvement in the enquiry for best household coals. The demand for the middle qualities of households is better, and for small household cobbles and nuts there is, and has been, a very good demand, and deliveries have been pressed for. The demand for steam coals is continuing, and shows no signs of decline. All sorts of steam cobbles are in very good request, and there is a specially good enquiry for nut slacks used for automatic feeders. Also there is a good market for the ordinary slacks. On the whole, local merchants are busier than for the past week or two. The prices ruling are generally quite fully up to the late high level, and there is every appearance of the present rates continuing. The outlook is quite cheerful.

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South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL.

There has been no material change during the past week in the condition of the coal trade of the Cannock Chase district. On the whole, a very satisfactory business is being done, and, excepting for the best qualities of house coal, orders are coming freely to hand. Most of the collieries are working full time. A number of trucks of best house coal are standing in stock on some of the colliery sidings, but it is expected that these will soon be cleared away. The demand for the second-class qualities of house coal continues satisfactory, and there is a brisk demand for fuel for manufacturing purposes. Canal sales are fairly satisfactory, and business is improving at the landsale depots.

Birmingham.

COAL.

Within the last few days there have been signs of greater activity in the household department, due to the colder weather, and the outlook is encouraging. For all kinds of works fuel the demand continues unabated. Slacks in particular are very scarce and dear, prices ranging from 6s. 6d. to 9s. 6d. There is the usual ante-Christmas rush for the electrical department, the dark, dull days necessitating an enormous consumption of electric light. Forge coal is quoted at 10s. to 11s. People with contracts at the lower figure cannot get all they want, and have to give higher prices outside.

IRON.

There has been a good deal of buying during the week, so that a smaller attendance at Thursday's market did not portend any decline in business or in interest. A rather anomalous circumstance is that, while pig iron values are firmly upheld, in one or two of the other departments there has been a weakening, slight, it is true, but still perceptible. It is obvious that the "bearing" movement, so far as pigs are concerned, has failed, and the fact that consumers have been buying fairly heavily since last market suggests that they themselves realise this. Coke at an average of 24s. a ton is roughly 10s. more than before Christmas 12 months ago, so that smelters have every reason to resist attempts to force down prices. These are:—Staffordshire common 60s. 6d., part-mine 65s. to 66s., Northamptonshire 64s. to 65s., Derbyshire 66s. to 67s. In the bar iron industry the output is kept up at an active rate, and further orders are given out for good quantities for execution at a later date. Of course, the work is specified for only as occasion requires, but producers have plenty to keep them going at full pressure. For standard bars the basis remains at £9 10s., and for merchant qualities it varies from £8 2s. 6d. to £8 7s. 6d. delivered. Despite the arrival of considerable quantities of Belgian iron in the Darlaston district, common iron for nuts and bolts keeps up at £7 15s. to £8 a ton. For galvanised sheets the official business is still £13 a ton, but £12 17s. 6d. is not refused. Similarly, black sheets are slightly easier. Good lines for galvanising may be had for £8 7s. 6d. and £8 10s., which is about 2s 6d. below recent prices. Difficulty is still experienced in getting supplies of billets, and the small quantities of foreign material coming into the district are readily snapped up. No alteration has been made in the price of gas strip. Steelmakers are booked for several months ahead, and have received further enquiries from rolling stock builders, who have taken some good orders for railway trucks.

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Forest of Dean.

Lydney.

COAL.

The demand for the house coal of this district continues comparatively quiet, and the working of the pits is restricted to proportion the output to the enquiry in force; about five days' work is still the average each week. Stocks, generally, are light, and a cold snap would soon have the effect of clearing all coal on hand. At the time of writing the weather has taken a colder turn, but the high winds are detrimental to the shipping business, which has been quiet this week. Orders from the inland districts continue to come in steadily. Prices remain on the basis of—block 16s. 6d. at pit and 18s. 3d. f.o.b. Lydney or Sharpness. Slacks are selling well at 6s. 6d. at pit. Steam coals are in heavy demand, and the pits are kept at regular work.

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Gloucestershire, Somersetshire and Wilts.

Plymouth.

COAL.

Messrs. W. Wade and Son report that there is only an average wholesale demand for house and steam coal at the south coast ports, and for some kinds of coal buyers have been able to obtain concessions in prices on such quantities as they required outside their contracts. Steam freights remain firm in consequence of the gales and resultant scarcity of tonnage.

THE BY-PRODUCTS TRADE.

Tar products:—There is very little change in the market. Benzols are the turn easier. Pitch steady. Naphthas firm and in fair request. Creosote steady and well held. Carbolics have but little life about them and are practically unchanged. Closing prices are:—

Benzols, 90's, 10½d. to 11d.; ditto 50's, 10d. to 10½d.; toluol, 11½d.; carbolic acid, crude (60 per cent.), 1s. 10½d. to 2s.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 1s. 1d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 3½d. for ordinary qualities; pitch, 44s. 6d. to 45s. f.o.b. east coast; ditto, 44s. to 44s. 6d. f.a.s. west coast; ditto, 47s. 6d. gas companies.

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

Sulphate of ammonia:—Quiet but very steady expresses the situation as near as can be. Business is quiet, but the easing off in prices is very gradual, and more or less nominal in the absence of much business. Beckton quotation is for the time being withdrawn. The forward position remains much about the same. Nearest closing prompt prices are:—

London (ordinary makes), £13 5s.; Liverpool, £13 18s. 9d. to £14; Hull, £13 17s. 6d.; Scotch ports, £14 to £14 2s. 6d.; nitrate of soda (ordinary), 11s. 9d. per cwt.

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent discount; 24 per cent. ammonia. good grey quality; allowance for refraction. nothing for excess.]

Institution of Mechanical Engineers.—An ordinary general meeting will be held in the meeting hall of the institution on Friday evening, November 22, at 8 o'clock, when the following papers will be read and discussed:—"Vapour-compression Refrigerating Machines," by J. Wemyss Anderson, M.Eng., Dean of the Faculty of Engineering, University of Liverpool; and "A Contribution to the Theory of Refrigerating Machines," by John H. Grindley, D.Sc., Principal of the Crawford Municipal Technical Institute, Cork.

THE WELSH COAL AND IRON TRADES.

THURSDAY, NOVEMBER 14.

North Wales.

Ruabon.

COAL.

The coal trade has been fairly brisk during the last week; there is a good demand for best house coal, steam coal and locomotive quality. Nuts are hard to get owing to the majority of the product going to gas coal contracts. The average ruling prices are best household 16s., seconds 1s. per ton less, nuts 12s., slack 8s. per ton f.o.r. Gas coke 16s.

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Monmouthshire, South Wales, &c.

Newport.

COAL.

The tonnage factor is again the determining factor of the market to-day. Those collieries who are shipping away their current outputs are in a comfortable position, and able to demand firm rates for their coals, but some others, fortunately a few only, whose stems are not working so favourably, while equally firm for all forward business, are showing a willingness to concede 3d. here and there where they can obtain a prompt clearance. A good deal of tonnage is now due here, much having been delayed by unfavourable weather, so the present weakness should not be of long duration. Certainly the general tone of the market is firm, with no material change in quotations. For end of month and December shipments sellers are asking 15s. 6d. for best Black Veins and up to 14s. 9d. for best eastern-valleys, the relative firmness of the latter being a marked feature of the trade. Smalls too are firmer on a good demand and rather scantier supply. Coke and patent fuel show no change worth remarking, pitwood ruling 1s. a ton higher. In the freight market the prevailing tendency on the small amount of tonnage offering is again towards higher rates, more especially for Mediterranean ports, while for South American destinations also firmness is the leading note. Latest ruling quotations may be taken approximately as follow, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 3d. to 15s. 6d.; western-valleys, ordinaries 14s. 6d. to 14s. 9d., eastern-valleys, best, 14s. 3d. to 14s. 6d; other sorts, 13s. 9d. to 14s.; colliery smalls, best, 9s. 6d. to 9s. 9d.; seconds, 8s. 9d. to 9s.; inferiors, 8s. 3d. to 8s. 6d.; screenings, 9s. 9d. to 10s.; through coals, 11s. 6d. to 11s. 9d; nuts, best washed, 12s. to 12s. 3d.; house coals, best, 18s. to 18s. 6d.; seconds, 17s. to 17s. 6d.; patent fuel, 17s. 6d. to 18s. Coke: Furnace, 22s. to 24s.; foundry, 25s. to 27s. 6d. Pitwood: Best French fir, 22s. to 23s. ex-ship.

IRON.

The local conditions of the iron and steel trades continue much the same as have ruled for the past month. With most works well committed both for present and forward output, only a small amount of business is passing, but at the moment there is rather more enquiry on the market. The tone is quite satisfactory, and consumers are still paying high prices for any lots that can be secured for prompt delivery. Work continues at full pressure at the bar mills, and values are again firm on the basis of £5 17s. 6d. Bessemer and £5 17s. 6d. to £6 Siemens for Welsh bars, while foreign quotations, too, are inclined upwards. Output is above the average at the rail mills, and satisfactory order books are the rule. Quotations are unaltered at £6 10s. for heavy sections and £6 15s. for light. With more pressure being brought to bear for arrears of deliveries of Welsh hæmatite, quotations have advanced 6d. to 1s. per ton and are now 86s. 6d. to 87s. 6d. delivered to works in the district. No easing of the situation can be expected until the furnaces now preparing are blown in, which is to be anticipated somewhere very near New Year's Day. Iron ore is unaltered at 22s. to 22s. 6d. c.i.f. Newport for best rubio. Only small fresh business is passing in tinplates, and forward enquiry is not as large as could be wished. Works are, however, uniformly well sold for the rest of the year, all the mills being fully engaged. Foreign makers are competing more in our usual markets, but with the continued high prices of raw material local makers are making no concessions in any department. Values now are firm at 15s. 9d. Bessemer and 15s. 9d. to 16s. Siemens for I C 20 × 14; and 31s. 6d. Bessemer and 31s. 6d. to 31s. 9d. Siemens for 28 × 20. Finished blackplate £11 12s. 6d. to £11 15s. per ton.

Cardiff.

COAL.

A much more hopeful and confident view is now taken of the coal market. Tonnage has been arriving in satisfactory quantities, the number of vessels in port last week never falling below 200, and though the boisterous weather on Sunday last compelled many boats to run for shelter, it is not expected that they will be very much delayed. It is true that for the week the shipments from Cardiff only amounted to about 360,000 tons, or some 40,000 tons below what is required to keep the trade in a healthy condition; but considering that there are now 100 warships, apart from the four stationaries, in Turkish waters, it is anticipated that the exports of coal will be very materially increased for some time to come. There has also been a good deal of chartering, particularly for the Mediterranean ports, the tonnage taken up last week being over 420,000 tons, with the result that there is much less difficulty in providing full work at the collieries than existed a few weeks ago. Buyers say that it is far harder, except in a very few instances, to obtain concessions for cargoes for spot shipment, and this is borne out by the prices at present ruling. Unfortunately, however, the provision of tips has once more become a burning question, and it is declared that vessels have been on demurrage notwithstanding the fact that there was abundance of coal in readiness for shipment. In consequence of the very heavy traffic on the railways, some of the collieries have found it very difficult to keep their men fully employed, notwithstanding that they had plenty of wagons available, but the fact is the railway companies have been unable to cope with the very large amount of traffic that required to be handled. Additional engine power, as well as more tips, is no doubt urgently needed, and when one takes into account the rapid development which is taking place all over the Welsh coalfields, and the constantly increasing demand for coal that is coming forward from all quarters, it is amazing that the dock and railway companies do not more energetically seek to provide the necessary equipment for dealing with the traffic. It goes without saying that there is at present great pressure for coal at all the Mediterranean ports. So great, in fact, is the demand that in some cases depot owners have been compelled to limit shippers' requirements to just sufficient coal as would enable them to get to their next destination. Foreseeing the pressure which was likely to ensue as long as the Balkan war continued, one well-known German firm with a branch at Cardiff is credited with having shipped over 100,000 tons of coal to ports in the Mediterranean within a period of about one month; and this is no isolated case. Our own Government, as well as the Turkish, Greek, Russian—in fact practically all the Continental Governments—have deemed it essential to procure additional quantities of coal, so as to be prepared for whatever emergency may arise. Collieries generally are well booked for the second half of this month and for December. It is not surprising, therefore, to learn that prices have taken a decided turn for the better, and some of the best collieries, which a week or two ago would gladly have accepted 16s. 3d. for their coals, are now holding out firmly for 16s. 9d. and even 17s. per ton. Some sellers show no great desire to transact business even at these figures, so convinced are they that, on account of the large assembly of war vessels in the East, prices will show a decided advance in the near future. In second-class steam coals there is no material change. Superior Admiralties are 16s. to 16s. 6d., ordinary seconds 15s. 9d. to 16s. Up to the present, as has before been pointed out in these columns, the South Wales coalfield has derived no benefit whatever from the boom in trade which at present exists. Whilst values on the Newcastle market have gone up 2s. 6d. to 3s. a ton—no doubt as the result mainly of the excessive demands for coal for works purposes on our own market—prices have for some time been practically stationary. But the feeling is now very strong that the Welsh coalowners are within measureable distance of better times, and that the boom in trade will soon be reflected in the higher prices that will be obtained for their own coals. In fact, buyers are to-day willing to pay at least 1s. to 1s. 6d. per ton above recent current values. At the time of writing nothing was known as to the result of the tenders for the Admiralty contracts for next year, and it is conjectured that the delay has been occasioned by the much higher prices tendered than was anticipated. Whether the Admiralty officials hope to procure some modification of the terms, no one can say, but if they do indulge any such hope it is doomed to disappointment. Were fresh tenders to be asked for—which is, of course, quite inconceivable—there is no doubt that the prices would be substantially higher than those already sent in. This feeling was reflected to some extent at the meeting of the Conciliation Board on Saturday last, when the coalowners put in a claim for a reduction of 2½ per cent. in the wage rate, on and from December 1 next. The workmen's representatives opposed the claim on the ground that, though during the past quarter there had been a fall in the prices of coal, it was pretty evident, from the conditions at present prevailing, that the prospects of a boom in the near future had never been better. The coalowners based their demand entirely on the fall in prices, both of large and small coal. Although at the time of the national strike prices jumped 1s. 2d. per ton, and reached 17s. 5d., they pointed out that in July they fell to 16s. 2d., and in August to 16s., while in September the price was only 16s. 1d. They therefore refused to withdraw their demand, and as the men declined as firmly to concede the reduction the matter will have to be arbitrated upon by Viscount St. Aldwyn. Notwithstanding the large output at present recorded, prices of small coal keep up remarkably well. Best bunkerings are 10s 9d. to 11s., cargo qualities 9s. 3d. to 9s. 6d. Of the French States Railway contracts, it is stated that Messrs. E. W. Cook and Co. have secured the supply of considerable quantities for delivery over next year, but the price has not been disclosed. Best washed nuts are 14s. to 14s. 6d., and best washed peas 12s. 6d. to 13s. per ton. In sympathy with the advance in Cardiff steams, a decided improvement has taken place in Monmouthshire coals. Best Black Veins are quoted at from 15s. 9d. to 16s., western-valleys 14s. 9d. to 15s., and eastern-valleys (best) 14s. to 14s. 3d. f.o.b. Cardiff. In Rhondda bituminous coals there is no alteration. No. 3 large is 16s. 6d to 17s., through-and-through 14s. 3d. to 14s 6d., and small 11s. 6d. to 12s. No. 2 large is 12s. 3d. to 12s. 6d., through-and-through 10s. 3d. to 10s. 6d., and small 9s. 6d to 9s. 9d. per ton. Shipments of patent fuel for the week have been very heavy, Swansea despatching no less than 24,300 tons, Cardiff 7,981, and Newport 7,600 tons. It is reported that the Graigola Merthyr Company have secured from the Austrian Marine an order for 15,000 to 18,000 tons of patent fuel, at about 16s. to 16s. 6d per ton. Crown brands for prompt shipment are selling at from 18s. 9d. to 19s.; other qualities are 17s. 6d. to 18s. Foundry coke is 27s. to 28s., special 30s. to 31s. Furnace qualities are 21s. to 22s. per ton. Pitwood remains steady at 23s.

IRON.

Although shipments of tinplates last week amounted to 141,369 boxes, or 32,013 boxes in excess of the receipts from works, the market is very quiet. Most manufacturers are working on old contracts and very little new business is coming forward, the fear of complications in the Near East making buyers disinclined to purchase for forward delivery. As a rule makers are adhering to their quotations, which for 14 × 20 cokes are 15s. 6d., and for oil sizes 16s. per box, but instances are numerous in which buyers have been able to obtain concessions of 3d. per box. The increased competition by German and American makers is a very serious factor. It is reported that the American Tinplate Company have received orders for 150,000 boxes of plates for salmon packing in Vancouver. Imports of foreign steel for the week were under 6,000 tons, and this is having a marked effect on local works. Although all the mills are working at high pressure, most tinplate makers complain of difficulty in getting deliveries, and for prompt supplies of Siemens bars as much as £6 2s. 6d. has been paid. For later delivery, however, from £5 17s 6d. to £6 is quoted. Trouble has arisen at the Swansea spelter works. For abstaining from work last Sunday as a protest against Sunday labour, a number of men have been locked out, and they have since been demonstrating before the Dillwyn works. It is not believed, however, that the dispute will be of long duration, as overtures have already been made for a conference. There is very little enquiry for galvanised sheets. Foreign consumers are offering £12 7s. 6d. for 24-gauge corrugateds, but works will not consider anything under £12 15s. The Swansea Harbour Trust have accepted the tender of a Cardiff firm for the repair of one of their dredgers at a cost of £8,695. The rail trade is fairly good. Messrs. Guest, Keen and Nettlefolds have secured orders from the Swansea Harbour Board for double-headed rails at £5 7s., and flat bottomed rails at £5 2s. per ton; also for fishplates at £8 6s. per ton. Welsh pig iron is firmer, being quoted now at from 86s. 6d. to 87s. 6d. f.o.t. New steel crop ends are firmly quoted at 70s.

Swansea.

COAL.

The returns of the trade of the port during the past week were highly satisfactory. Both the coal and patent fuel trades were extremely active, the shipments together amounting to 136,580 tons. There was a capital attendance on 'Change this morning, and there was a little better enquiry on the anthracite coal market. The undertone generally was a shade firmer. Swansea Valley large was moving off well, and quotations were slightly higher. Red Vein large maintained its firm position. Machine-made varieties were in more active request. There was a very poor demand for beans and peas, and the position of rubbly culm was very bad. Duff also was a little weaker. In the steam coal department there was very little business doing, and this market closed easy. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. 6d. to 25s. 6d. net; second quality ditto, 20s. 6d. to 22s. 6d. net; Big Vein large, 18s. to 19s. 3d., less 2½ per cent.; Red Vein large, 15s. to 15s. 6d., less 2½ per cent.; machine-made cobbles, 21s. 6d. to 23s. 6d.; Paris nuts, 23s. 6d. to 26s. 9d.; French nuts, 23s. 6d. to 27s.; German nuts, 23s. 6d. to 26s. 6d.; beans, 21s. to 23s. 3d.; machine-made large peas, 12s. 6d. to 14s.; ditto fine peas, 11s. to 12s. 6d., all net; rubbly culm, 5s. to 5s. 6d., less 2½ per cent.; duff, 4s. 6d. to 5s., net. Steam: Best large, 17s. to 18s.; seconds, 13s. to 14s.; bunkers, 10s. 6d. to 11s. 6d.; small, 9s. 6d. to 10s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. to 18s.; through-and-through, 14s. to 15s.; small, 11s. 6d. to 13s.; No. 2 Rhondda large, 13s. 6d. to 14s.; through-and-through, 10s. 9d. to 11s. 6d.; small, 9s. 3d. to 10s. 6d., all less 2½ per cent. Patent fuel, 16s. to 17s., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

The general trade of the district last week compared very favourably with any similar period of the last six months. Full work was registered at the blast furnaces, and the aggregate production of steel ingots was equal to any week of the past quarter. In the tin-plate trade the same number of mills were in operation as in the preceding week, and regular work for all hands was seen at the intermediate and finishing departments. At the Mannesmann Tube Works both the mills and cold-drawing departments were fully operating. Foundries generally were more regularly employed, and usual activity was observable at every engineering establishment in the neighbourhood. Last week the shipments of tin-plates were 141,369 boxes, receipts from works 109,356 boxes, and stocks in the dock warehouses and vans 171,535 boxes.

Llanelly.

COAL.

The local market has been somewhat stronger during the past week. Tonnage has been more plentiful since the gales of the previous week and the quantity of coal sent for shipment has been very heavy, very large consignments having been sent to the Continental market. There is every prospect of the coming months being exceptionally brisk, but this will of course depend to a large extent on the kind of weather we experience. Several of the pits have already got their outputs sold and others are booking up quickly. The inland trade is also getting busier, and there is but very little doubt that this market will be stronger than it has been for some time. There is an excellent demand for manufacturing coals, and many of the works are trying to book up their requirements over the greater part of next year. Prices this week are:—Best malting large, 23s. to 25s; second malting large, 21s. to 23s.; Big Vein large, 17s. 6d. to 19s.; Red Vein large, 15s. to 15s 6d.; machine-made cobbles, 21s. to 22s.; German nuts, Paris nuts, French nuts, 25s. to 26s. 6d.; machine-made beans, 23s. to 23s. 6d.; ditto, second quality, 21s. to 22s.; machine-made peas, 12s. 6d to 13s.; rubbly culm, 6s. to 6s. 6d.; duff, 4s. 6d. to 5s. 6d.; large steam, 16s. to 16s. 6d.; through-and-through, 10s. 9d. to 11s. 3d.; small steam, 9s. 6d. to 10s. 6d.; bituminous small, 10s. 6d. to 11s. 6d.—all f.o.b.

THE TIN-PLATE TRADE.

Liverpool.

The tone of the market is easier on the week. Some works are standing out for full prices, but others are now becoming inclined to lower quotations. Second-hand parcels are being disposed of cheaply, which, of course, has a weakening effect. Spot lots are offering at low figures, but for plates to make over first half of 1913 the following may be taken as about the general run of prices quoted by makers:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 15s. 3d. per box; I C 28 × 20 (112 sh. 216 lb.), 30s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 9d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. 9d. per box; I C 14 × 19¾ (120 sh. 110 lb.), 15s. 9d. per box; I C 20 × 10 (225 sh. 156 lb.), 22s. 6d. per box; I C squares and odd sizes, 15s. 9d to 16s. basis. Ternes rule quiet at 26s. for I C 28 × 20, and charcoal tins are barely steady at 18s. to 18s. 6d. basis and upwards. Coke wasters are in moderate request; the following figures are being quoted:—C W 14 × 20, 14s. 3d. per box; C W 28 × 20, 28s. 6d. per box; C W 14 × 18¾, 14s. 3d per box; C W 14 × 19¾, 14s. 3d. per box; C W 20 × 10, 21s. 6d. per box—all f.o.b. Wales, less 4 per cent.

Industrial Agreements.—The Industrial Council on Wednesday heard evidence as to industrial agreements in the iron and steel trades. Mr. James Cox, of Darlington, secretary of the Associated Iron and Steel Workers of Great Britain, numbering about 10,000 members, said the relations existing between employers and men in the North of England in the iron and steel trades were very amicable. He deprecated any legislation introducing compulsion. The council adjourned until November 26

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⁂ *For other Miscellaneous Advertisements see Last White Page.*

Forthcoming Annual Meetings.

Institution of Mining and Metallurgy, March 13, 1913
International Geological Congress—
August 21, 1913 (Toronto)
Geological Society ... ... Feb. 21, 1913
North of England Institute of Mining and Mechanical Engineers .. ... August 2, 1913
South Wales Institute of Engineers—
Annual Dinner ... ... Jan. 23, 1913
Annual Meeting ... ... March 18, 1913
Institution of Mechanical Engineers Feb. 14, 1913
Annual Dinner ... ... April 17, 1913
Mining Institute of Scotland—
Annual Dinner ... ... Dec. 7, 1912
Manchester Geological and Mining Society—
October 14, 1913
Institution of Mining Engineers—
June 5 & 6, 1913 (London)
Sept. 24, 25 & 26, 1913 (Manchester)

The Colliery Guardian.

LONDON, FRIDAY, NOVEMBER 15, 1912.

The average value of coal, coke and manufactured fuel exported from the United Kingdom during October was 12s. 9·7d. per ton, as compared with 11s. 6·4d. in October 1911 and 11s. 6·4d. in October 1910.

The value during the first ten completed months of the present year is 12s. 7·4d. per ton, as compared with 11s. 4·6d. and 11s. 9·09d. respectively in the corresponding periods of 1911 and 1910.

Of the total exports of coal during October, the mean value of the large coal exported was 14s. 3·1d.; through-and-through (unscreened) coal, 10s. 10·8d.; and small coal, 10s. 3·6d. The average value of all kinds of coal exported was 12s. 8·03d., an increase of 1·4d. as compared with the preceding month. Otherwise divided, it fetched the following values:—Steam coal, 12s. 11·2d.; gas coal, 10s. 10·3d.; anthracite, 16s. 6·2d.; household coal, 12s. 1·4d.; and other sorts of coal, 11s. 3·005d. The value of the coke exported was 17s. 6·1d. per ton, and of the manufactured fuel 15s. 9·2d. per ton.

The Doncaster Town Council have decided upon a housing scheme at Balby and Carr House. A meeting of the Royal Sanitary Institute will be held in the Mansion House at Doncaster, on Saturday, November 23, when Dr. A. B. Dunne, the medical officer for the Doncaster Rural District Council, will open a discussion on "Town Planning in relation to the development of the South Yorkshire Coal Field."

We regret to announce the deaths of Lord Furness, chairman of the Broomhill Collieries and many other North of England colliery enterprises, and of Mr. T. H. Bainbridge, vice-chairman of the Consett Iron Company.

An Irish Industrial Exhibition was opened on Tuesday at the Horticultural Hall, and will close to-morrow (Saturday). Included amongst the exhibits are specimens of Irish minerals, and last night Mr. St. John Lyburn introduced a discussion on "Irish Mines and Minerals."

At a quarterly meeting of the Durham Coal Trade Conciliation Board, held in Newcastle on Friday, miners' wages in the county were advanced $3\frac{3}{4}$ per cent., commencing with last week's pay. The advance makes the wages of underground workers and banksmen $46\frac{1}{4}$ per cent., and the wages of other surfacemen $43\frac{1}{4}$ per cent. above the standard of 1879.

The Conciliation Board for the South Wales coal trade met at Cardiff on Saturday to consider an application of the owners for a reduction of $2\frac{1}{2}$ per cent. in the wage rate, which now stands at $57\frac{1}{2}$ per cent. above the standard of 1879, and $2\frac{1}{2}$ per cent. below the maximum. The Board failed to agree, and the matter will be referred to the independent chairman, Lord St. Aldwyn.

At the conference of the South Wales Miners' Federation held at Cardiff on Tuesday and Wednesday, a proposal was made to reduce the salaries of agents to £4 a week. A delegate said he had been instructed to propose an amendment that the salary should be £3 a week. A card vote showed a majority representing 32,600 members in favour of £3 a week. A further amendment fixing the salaries at £3 15s. a week was defeated, and the conference abruptly adjourned.

In view of representations which have been made to the Home Office on the subject of the probibition of the use of squibs for the purpose of firing shots in coalmines where safety lamps are not required to be used, the Home Secretary has appointed a committee to enquire and report on the matter, and particularly as to whether the use of squibs in these mines is attended with such special danger as to make it desirable that this method of firing shots should be prohibited, and, if not, whether any special conditions in regard to the manufacture and use of squibs should be laid down. The committee consists of Mr. H. Johnstone, H.M. inspector of mines for the Midland and Southern division; Mr. A. M. Lamb, and Mr. S. Walsh, M.P.

A meeting of the South Wales Institute of Engineers will be held at Cardiff on the 21st inst Lord Merthyr is to be elected an honorary member of the institute at a special meeting preceding the ordinary session.

Text-books. A TEXT-BOOK is defined as a volume on which a teacher lectures or comments; hence, any manual of instruction. Originally all instruction was oral or by example, and the text-book gradually arose from the teacher's notes which he prepared in the first instance for his own use, but employed afterwards as a guide for his pupils. Hence the tendency has been for every lecturer to write his own text-book upon his special subject. In proportion as each subject of instruction has become differentiated, so the roll of special lecturers has increased, and the list of text-books has multiplied, until the number of the last has become legion.

In coalmining especially, the number of centres providing instruction has enormously increased, with a consequent proportional increase in the number of professors of and lecturers on mining, and text-books general and special.

If the use of these text-books were in each case confined to the students attending the author's lectures or classes, comparatively little harm would ensue from inaccuracy or want of clearness of expression in the compilation of the text-books, for such faults would usually be corrected or explained verbally in the classes; but, unfortunately, these books are used in self-education by a large and growing class who have not always the time or the opportunity for attending the classes. In such cases, any statement of fact made in the book is apt to receive the implicit belief of the reader, although such statement may—say, in consequence of a printer's error—be entirely wrong. The reader—from the want of wider knowledge to provide a criterion—cannot always detect this error, and he stores the false statement in his memory for future use, often with lamentable results. Knowledge, in order to be serviceable, must have a wide basis, and the tendency of modern times to require special knowledge from men whose general knowledge is circumscribed is like building tall chimneys without foundations. If text-books must be widely disseminated in the manner described above, it is morally obligatory upon the writers to ensure the absolute accuracy of their contents by avoiding loose or ambiguous statements and by rigidly correcting the final "proofs." The provisions contained in the Coal Mines Act, 1911, relating to firemen's, examiners' and deputies' certificates foreshadowed a new accession of text-books for class and general use, and as these certificates were to be obtainable only from one of the mining schools, institutions, or authorities approved by the Secretary of State, and as in order to obtain a certificate the candidate must pass an examination for the purpose held by one of the approved schools, institutions, or authorities, it is not surprising that the mining professors and lecturers should seize the opportunity for writing books.

One of the first—if not the first—of these text-books[*] has been provided by Mr. DANIEL BURNS, professor of mining at the Royal Technical College, Glasgow, and is intended to constitute "a text-book of fundamental principles for firemen and other workers in mines." In the preface the author says: "For some considerable time there has been a steadily growing opinion that more scientific knowledge should be brought to bear on his everyday work by the colliery fireman, until finally that opinion has been partly embodied in the clauses dealing with the duties and qualifications of a fireman contained in the new Mines Act. To meet the new requirements, colliery firemen will require to undergo some scientific training, and the object of this work is to furnish that particular class of workmen with such details of the scientific principles underlying their practical instruction as will enable them to obtain some conception of the causes of experimental phenomena with which they will have to make themselves familiar." But the scope of the work does not end with the zealous fireman, but is intended also to cover some instruction for his teachers, and in order that the more advanced information may be "skipped by the ordinary reader, it has been placed in sections marked by an asterisk, so that each class of reader can see at a glance what he should read, and what, if he so desires, may be omitted." This is true humour!

The method of instilling scientific knowledge into minds which have not been previously prepared to receive it, and that of assisting more advanced students, are so essentially different, that any attempt to combine the two objects in one work must be unsatisfactory.

If, however, books of this class must be written, it is above all things essential, as previously stated, that their contents should be accurate, clear, and not ambiguous. We have no desire, however, to be hypercritical in the present instance, or to run down Mr. BURNS' book. It possesses the distinct merit of interesting the reader and of stimulating a desire for a further acquaintance with the wonders of physical science, which are always in evidence in the work of coalmining. Generally speaking, however, the book is more adapted to class use than to private study.

The book contains five chapters, the first dealing with the elementary, physical and chemical facts relating to matter in general and its gaseous form in particular, and the others with mine gases, air measurement, and safety lamps; and the text of the Government memorandum referring to firemen's, examiners', and deputies' certificates is appended. In referring to the effect of temperature on the volume of gases, the writer says (p. 19): "We can thus imagine that if it were possible to lower the temperature to a sufficient extent, a point would be reached at which the volume of the gas would have become zero." What, then, would become of the theory of the indestructibility of matter? As a fact CHARLES' law is only applicable within certain limits, for the gas would change its physical state before arriving at that point, and other laws would stop in.

In describing the experiment to show that hydrogen is lighter than air (p. 28), by pouring the contents of a jar of the gas upwards into another jar, it is stated that, after this operation has been performed, the jar "originally filled with the gas (hydrogen) is empty. . . ." As this section is not marked with an asterisk, the use of the word *empty* here is unnecessarily misleading.

On page 29 the atomic weight of oxygen is given as 1, which, to the unasterisked student, is not *obviously* a printer's error. Again, on page 92, referring to the wide distribution of carbonic dioxide, it is stated that "the air contains normally about 0·25 per cent., or one part in every 2,500." Which is the student (again unasterisked) to believe? The asterisked reader would, of course, know that 0·25 should be 1-25th, or 0·04. The proportion is, however, usually given as 0·03.

We are sorry to notice the lack of precision in the use of such terms as explosive, inflammation, ignition, firedamp, and chokedamp or blackdamp; but this is due rather to a perpetuation of confusion, for which the writers of more pretentious works must be held responsible.

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[*] *Safety in Coalmines*, by Daniel Burns, M.Inst.M.E., Blackie and Son Limited, London. 1912. Price 2s. 6d. net.

On pages 93 and 94 it is stated that "If it is desired to get samples of chokedamp found in the mine, the most convenient method is to burn a lamp or candle in a closed Clowes chamber or other suitable vessel until the light is extinguished. Such samples contain carbon dioxide oxygen and nitrogen, and examination will show that the proportion of nitrogen is higher and that of oxygen lower than exists in ordinary air."

But these are samples not of chokedamp alone, but of chokedamp diluted with air: for chokedamp contains no free oxygen. This is clearly explained in "Methods of Air Analysis," by Dr. HALDANE, where he says that "pure blackdamp, free from air, is still very commonly confused with carbon dioxide, but is really a mixture of nitrogen with a relatively small proportion of carbon dioxide. The following examples illustrate the mode of statement of an analysis in terms of air, blackdamp, &c., and at the same time indicate the justification of this mode of statement:—

1. GAS ISSUING INTO A RETURN AIRWAY FROM OLD WORKINGS THROUGH A PIPE IN A BRICK STOPPING, PODMORE HALL COLLIERY, NORTH STAFFORDSHIRE.

	Per cent.
Oxygen	0·72
Carbon dioxide	11·03
Methane	7·47
Nitrogen	80·78
	100·00

OTHERWISE EXPRESSED.

		P. cent.	P. cent.
Air	Oxygen	0·72	
	Nitrogen	2·72	
			3·44
	Methane		7·47
Blackdamp	Nitrogen	78·06	
	Carbon dioxide	11·03	
			89·09
			100·00

……. . . . . ……"

In this example it will be observed that the free oxygen contained in the sample of mine air is appropriated to unexhausted air. We believe, however, that the scanty leisure which is afforded by professorial duties must be made accountable for the oversights to which we have drawn attention, and we have no doubt but that they will be rectified in future editions. We are in hearty agreement with the views expressed by Mr. BURNS in the chapter on "Safety Lamps," where he refers to the introduction under the new Mines Act of safety lamps into many collieries that are comparatively free from gas. He says "in such cases there may be little apparent necessity for using safety lamps, and there is always the chance of diminished vigilance being exercised both in the matter of the detection of gas and the production of ventilation. Further, it is under such circumstances that safety lamps are most likely to get little skilled attention; hence it lies with the firemen to see that, no matter what the conditions, if the mine, or a section of it is worked with safety lamps, every precaution must be taken that would be necessary if the mine was one of the most gaseous class."

The use of safety lamps cannot make a mine safe, though they may, if properly employed, enable the mine to be worked with comparative safety.

Trade Summary.

The London coal market has responded somewhat to the colder weather, and the volume of trade has considerably increased. The prices, however, both for inland and seaborne qualities, remain unaltered, and in many cases are difficult to obtain. Fortunately no seaborne coal is offering on the market, so that inland prices remain fairly firm. The depot trade and the trolley trade have been busier, and public orders have increased. Bakers' nuts and kitchener cobbles are firm. Seconds steams are weaker, but all best qualities remain very steady. Slacks have also sold freely, and all smalls, including peas and double-screened nuts, are in good demand.

The market at Newcastle is rather weaker, buyers attempting to "bear," whilst stormy weather has interfered with shipments. The forward enquiry is good.

The Durham coal trade is quiet, and coals for prompt shipment are a drug on the market. Further ahead the enquiry is steady. Coking coals and cokes are very scarce.

The Lancashire house coal trade has derived advantage from the colder turn in the weather. Shipping business is somewhat easier. Forges and factories continue to take full supplies.

The tone of business in West Yorkshire is cheerful, especially as regards small coal. The house coal trade has also improved with the colder weather.

A large quantity of South Yorkshire steam coal is still being consigned for export, and the home demand shows no abatement. House coal has improved slightly. The output of coke is large.

There is an improved demand for Derbyshire house coal, and prices are rather firmer. An active demand continues for manufacturing fuel, and the export trade in steam coals is satisfactory.

The outlook at Cardiff is encouraging, tonnage being plentiful, whilst chartering is brisk. The shortage of tips, however, is still a burning question. Small coal is steady. Monmouthshire coals are better. Patent fuel shipments have been heavy.

The Scottish coal trade has been rather more active in the shipping department. Wagons, however, are scarce House and manufacturing coals are in good demand.

LABOUR AND WAGES.

North of England.

It is stated that an attempt has been made at some of the collieries in the Durham coalfield by the managers to induce the deputies to leave the Deputies' Association and to receive a weekly wage and other privileges. At a meeting of the executive committee of the association, it was decided to issue a circular guarding their members against "the subtle influences that may be brought to bear upon you by these various managers."

At a quarterly meeting of the Durham Coal Trade Conciliation Board, held in Newcastle on the 7th inst., Sir Lindsay Wood, Bart., presiding, the miners' wages in the county were advanced 3¾ per cent., commencing with the same day's pay. The advance makes the wages of underground workers and banksmen 46¼ per cent., and the wages of other surfacemen 43¾ per cent. above the standard of 1879. The last advance was conceded in May of this year. It amounted to 3¾ per cent., as on the present occasion. The board also sat as an arbitration committee, Sir David Harrel, as umpire, presiding, to hear an application for an advance of wages on behalf of the colliery cokemen of the county. The umpire's award will be communicated in due course.

Members of the Northumberland Coalowners' Association had under consideration again, on Saturday, the dispute at Seghill Colliery. There was a danger of the strike being continued, owing, it was alleged, to the management insisting on some of the men signing certificates before they returned to work, which would prevent them receiving the minimum wage. The men objected, and after the meeting of the owners on Saturday, their officials were informed that the condition had been withdrawn, and that work could be resumed under the system which obtained previous to the strike. The matters left in dispute are to be considered by a joint meeting of owners and men's representatives. The miners resumed work on Tuesday on the old terms, pending arbitration on their alleged grievances.

The Cumberland Coal Trade Conciliation Board has agreed to an eight hours day for the men working on all the by-product plants.

There are indications that there may be further trouble shortly in Northumberland and Durham over the three-shift system. The men contend that the system is highly dangerous to begin with, and has broken up home life in colliery villages. There are nineteen collieries in Durham where this system is in vogue.

The results of the voting at the Northumberland miners' lodges now announced, includes decisions in which a stoppage of work is threatened. On the subject of the "butty" system which is in operation at a few collieries in the county, the men had decided by 658 to 12 that, wherever the owners refused to abolish this system, the men be asked to come out on strike. Regarding the free house and rent and fire coal allowances the following resolution has been adopted by 646 to 24:—"That the time has come when stonemen, shifters, and ridders should be entitled to free houses and fire coal, or rent and fire coal on the same conditions as hewers are entitled to these allowances, and in the case of the owners of any colliery refusing to agree to this and the workmen of such a colliery deciding by vote according to rule, to strike for the same, all our branches be requested to support them by special levies for that purpose." Allegations of infringement of the Eight Hours Act led to a proposal being laid before the lodges in these terms: "That we institute legal action against any colliery owner guilty of violating the Mines (Eight Hours) Act, and that our branches be requested to send to our central offices particulars of cases where they believe this act had been violated." It has been accepted by a unanimous vote—670 to 0.

Federated Area.

At Sedgley Police Court on the 11th inst., Arthur Shephard, underground colliery manager, was summoned for contravening the provisions of the Coal Mines Regulation Act, 1908. The prosecutors, it was stated, were defendant's employers, Messrs. E. Bradley and Co. Dock Colliery, Lower Gornal. On Sunday, October 31, the shift should have commenced at 3 p.m., but the men did not go down until 10 p.m. They finished at six o'clock the following morning, but started again at three o'clock in the afternoon, so that the sixteen hours interim between each shift, as required by the Act, had not been allowed. Defendant said the men did not like starting at 3 o'clock on Sundays, and begged to be allowed to start at night. Mr. Foster, who represented the firm, said the offence was in allowing the men to start again at three o'clock the following day. The plain English of it was that the miners did not like the Eight Hours Act. The Bench dismissed the case on payment of costs, remarking that it was the first of the kind that had come before the Court.

Although there was a preponderating majority of miners employed at Messrs. Andrew Knowles and Sons' collieries in Pendleton and Pendlebury in favour of tendering notices to cease contracts as a protest against the employment of non-unionists, it is confidently expected that the threatened strike will be averted, as many of the non-unionists are rejoining the Federation.

The Yorkshire miners have decided to contest three Parliamentary divisions at the next election, viz., Rotherham, Osgoldcross and Holmfirth. The desirability of running a candidate for the Doncaster division has often been talked about, but no definite decision in regard to it has yet been arrived at.

At the quarterly meeting of the Sheffield council of the National Amalgamated Union of Labour, held recently, Mr. A. J. Bailey (secretary) reported that during the year the membership of the branch had nearly reached 10,000, an increase during the year of 3,000 members. With regard to the agreement arrived at with the South Yorkshire Coalowners' Association, it was reported that at the majority of the collieries the agreement had been fairly interpreted, but several branches reported that there had been difficulties in the interpretation of the clause relating to "able-bodied men." There was also complaint of contravention of the agreement at some collieries, by the management making the minimum rate agreed upon the maximum wage. Mr. Bailey was instructed to approach the coalowners for a further meeting of the joint committee to have these matters cleared up. At Dinnington Colliery, where, it was stated, the men had been working 16½ hours for a shift and three-quarters, arrangement was entered into for the men to work 17 hours and receive pay for two full shifts. All branches in Derbyshire reported that on the percentage advance due and paid last week no advance had been given to shopmen, labourers, or cokemen. Application had been made to the Coalowners' Association, but no satisfactory reply had been received. It was resolved that Mr. Bailey be instructed to press the question of this advance, and meet the coalowners if possible. It was reported that the Butterley Coal and Iron Company were making deductions from the men of 3d. and 3½d. per day on the ground of payment for home coals. The men applied for permission to take a ballot, which has been sanctioned, and this showed an overwhelming majority in favour of handing in notices to secure the full minimum wage. It was resolved that Mr. Bailey should try to negotiate with the management, and, failing a satisfactory settlement, the men should have the full support of the organisation.

At the last monthly meeting of the council of the Leicestershire Miners' Association, the question of entrance fees was discussed, and fresh arrangements made in regard to boys. The question of banksmen's pay was considered, and it was agreed to seek to establish a minimum wage for all banksmen in Leicestershire. The new Explosives in Coal Mines Order, 1912, was considered. The agent said that the Miners' Federation had not taken this matter up yet, but so far as the new Order referred to shot-firing there were many men working at the coal face who agreed with him that the new system proposed would be more dangerous than firing shots by squibs. It was decided to ask the owners to support the council in an application for an interview with the Home Office with a view to reverting to the old system.

Mr. Harvey, M.P., addressing a meeting of Whitwell miners recently, said he was sorry to find in some parts of the Federated area the employers were not carrying out the Minimum Wage Act, and that there were one or two firms in Derbyshire who were also guilty. The point was this: If the haulier, or the loader, did not earn his wage, it was not to be made up by the contractor. It had to be paid by the employer. They were going to have in Derbyshire all that the Act gave them. But if they could not get it by negotiations, he would take the first opportunity of bringing the subject before the House of Commons, and he should not hesitate to name the owners and the managers of any colliery who failed to carry out the Act. He should carry the matter into court before they even did that. But with regard to those employers who had had men for the purpose of driving coal-getting machines at a fixed minimum of 6s. 8d., and who had removed these men and substituted boys at a less price, they would have something to say about them, both to the inspectors of mines and the Home Secretary.

The Joint District Board for Lancashire and Cheshire under the Coal Mines (Minimum Wage) Act met on Monday at the Queen's Hotel, Manchester, and held a prolonged sitting. Mr. Charles Pilkington (employers) presided, and Mr. Thomas Greenall (miners) was the vice-chairman. The report of Judge Bradbury, the independent chairman, on the two questions that were referred to him for decision—that of the supply of free or cheap coal to married men coalworkers, and the other question of the definition of the age for an "adult" worker—had not been received; and the matters were not discussed. The meeting considered the application for the addition of 5 per cent. to the different minimum rates that had been agreed to by the Board. A number of suggestions were made in respect of the case of each class of worker, from the boy of 14 to the adult; and it was resolved that these suggestions should be considered by both parties in the interval between that meeting and the next. The application for an advance in surfacemen's, boys', and youths' wages was also discussed. It had been made by the representatives of the Lancashire and Cheshire Miners' Federation, and had been under the consideration of the employers, who reported at the meeting that they had not definitely decided as to the advisability of a uniform rate for the whole of Lancashire and Cheshire. The employers stated that the conditions of work and the hours varied so much that it was very difficult for them to agree to a uniform rate. The miners' representatives maintained the contention that it was practicable to agree upon a uniform rate. It was resolved that the matter should be considered again, both by the Lancashire and Cheshire Miners' Federation and by the Lancashire and Cheshire Coalowners' Association; and that another meeting should be arranged for as early a date as possible. It is expected that this meeting will be held on either the Thursday or Friday of next week.

On Saturday, a meeting of miners was held at Eckington to hear an address by Mr. Frank Hall, of the Derbyshire Miners' Association. Mr. William Sewell, referring to the Minimum Wage Act, said that, as far as the general wage question went, it was a fair settlement. They had as many safeguards as any county in the country. They were very much better off in that respect than Yorkshire. Their next move should be to get it incorporated in the standard price and do away with percentages altogether. Mr. Frank Hall said he never thought, as a county, they would get much out of the Minimum Wage Act. He believed if they had gone in for an increase in the percentage it would have been better, and they would have got it with less effort. It had not put into the pockets of the workmen of the country ¼d. per ton. What they had recovered in 16 weeks did not equal $\frac{3}{16}$d. per ton. He therefore thought it was not worth all the effort it entailed. They had 50 per cent. on their wages before they got the minimum wage, but 50 per cent. was not what it was ten years ago. The 5 per cent. was equal to 2d. per ton all round, but there were many schedule rates that would not be raised more than ¾d. per ton. While they had received 2d. per ton, the owners had got 1s. 1½d. per ton. It was only in the boys' price list that they had gained anything of consequence. The owners were refusing to pay the minimum to loaders where sufficient money went into a stall to pay all there the minimum. The association were advising contractors not to pay the loaders the difference, but to let them claim from the owners. They were going to fight that question out.

Mr. Mortimer Wilson, of Alfreton, presided at a meeting of the Derbyshire Minimum Wage Board at Chesterfield on Tuesday, when the claim of the miners at the Morton Colliery of the Clay Cross Company was re-discussed. When the matter was debated last week the voting resulted in a tie. On behalf of the men, the minimum wage is claimed for the second week after the settlement of the strike. The miners worked for one day, and then "downed tools" in sympathy with the surfacemen, whose grievance then remained unsettled. The masters submitted that as the men had not made the stipulated 80 per cent. of their time, they were not entitled to the minimum wage under the award. Mr. Wilson, who had been agreed upon as independent chairman, will give his decision in due course.

A strike at the Clay Cross works has come to an end, the men accepting the proffered terms of the management, and it is expected that the works will be again in full swing by next week. The terms of settlement are: (1) That an advance of 5 per cent. be given to furnacemen and foundrymen, (2) that all men be reinstated without victimisation, and (3) that the eight hours day come into operation as soon as the alterations to the blast furnaces are completed, and meanwhile a scheme for bringing the eight hours day into operation is to be drawn up and mutually agreed upon by both parties.

Forest of Dean.

It was decided at a meeting at Bream, West Dean, on Saturday night, to form a new trade union for the Forest of Dean coalfield. An official trustee, a secretary, treasurer, and committee having been appointed, Mr. Sims Banks Jenkins consented to accept the presidency and act as leader without salary for the first 12 months. The colliers were advised to have nothing to do with the present ballot for an agent for the existing miners' union.

Scotland.

A meeting of the executive of the Scottish Miners' Federation was held on the 7th inst., in Glasgow, Mr. John Robertson, vice-president, presiding. It was reported that a "block" was being put into operation in Ayrshire, and the secretary, Mr. Robert Brown, was instructed to at once communicate with the secretary of the Ayrshire Coalowners' Association with the view of getting further information. Some time ago, when the same circumstances existed in Ayrshire, the Miners' Federation of Great Britain decided to support the Ayrshire miners in a strike against this system. Should the intervention of the Scottish Miners' Federation fail in the present case, the matter will be placed before the executive committee of the Miners' Federation of Great Britain in order that they may take action.

ELECTRICITY IN MINES.

Mr. W. C. Mountain, M.I.M.E., in his recent inaugural address as chairman of the Newcastle local section of the Institution of Electrical Engineers, referred to the gratifying activity prevailing in the electrical trades, and expressed a hope that means might be found to diminish excessive competition between British manufacturers. The address related mainly to the application of electricity to mining purposes. He did not think that the West Stanley Colliery explosion was due to the use of electricity, though it led to the revision of the Home Office Rules, which, in their new form, would involve considerable modification in many old installations. After reviewing the requirements embodied in the new Rules, and pointing out the great expense that would have been entailed if collieries, already well equipped and with no accidents recorded against them, had not been exempted from complying with them until 1920, Mr. Mountain discussed the action brought against Mr Imrie, manager of the Chopwell Colliery, by the Home Office on the ground of non-compliance with the Rules, which was decided in favour of the former. He considered that the case had been dealt with by the technical Press in a somewhat harsh manner, as the Consett Company, who owned the colliery, had installed armoured cables, and were as quickly as possible meeting the new requirements.

In the north of England coalowners were fortunate in having one of the largest electric power companies available, and given a cheap supply of electricity, they were well advised to take advantage of it. But in many districts there was a large amount of unsaleable coal which was sufficiently good for steam production, and waste heat and gas could also be profitably utilised; hence it was gratifying to see that private power stations of considerable size were being installed all over the country. With exhaust steam turbines, after allowing for all charges, the cost of generation had been as low as 0·15d. per unit, and in many cases under 0·2d., though the load factor was only about 30 per cent.

Regarding electric winding, for heavy work and with cheap coal or waste heat available, he still thought the modern steam winding engine the cheaper system of winding; but for small outputs there was a very large field for electric winding, and a very considerable amount of work was being done in this direction. The use of helical-cut gearing had assisted greatly, as it enabled smaller and cheaper motors to be used. The simple induction-motor was quite suitable in cases where the peak load when starting did not cause any trouble. The use of a motor-generator introduced risk of breakdown. For cables in mining work he preferred those insulated with bitumen, provided there was no risk of decentralisation of the conductors. The pillar type of switchgear, with draw-out arrangements for isolation, was very satisfactory for use underground. Care must be given to the earth connection of the armouring of the cables to switch cases, as well as to the junction boxes, controller cases and motor frames. The slip-rings of motors should be enclosed if there was any likelihood of gas being present, but he did not consider the total enclosure of large motors satisfactory. Broadly speaking, total enclosure was a mechanical protection only, as doors or covers might be left improperly secured; and where there was any positive danger of gas in part of a colliery, it was better to instal compressed air there. Electrical compressors could be employed near these places, but the average disc coal-cutter consumed about 600 cubic feet of free air per minute at 45 to 50 lb. per square inch, and each such machine would, therefore, require 70 to 75-horse power in the motor-compressor, the resulting efficiency being 30 to 40 per cent. compared with the direct use of electricity. Taking the horse-power at £5 per annum, this meant an additional annual expenditure of about £250 per coal-cutter. Three-phase coal-cutter motors might be wound for as low a pressure as 110 volts, which would not cause a dangerous shock, a small transformer being combined with the gate-end switch. High-pressure current could then be brought by small cables near the working face, and possibly the total cost would be lower than if the standard voltage of 500 volts were adopted.

For high lifts the three-throw plunger pump was better than the centrifugal pump, in point of efficiency, the combined efficiency often being as high as 80 per cent. Single-reduction helical gear had improved the efficiency, but it ought always to run in oil. For large volumes of water at moderate heads the centrifugal pump was better. Portable pumps should be of three-throw type. Electric haulage had made enormous strides, its economy being unapproachable. Some years ago Mr. Mountain substituted an electric for a compressed air haulage, with the result that the engine indicated horse power was reduced from 500 to 100.

Electric refining of steel, electric traction on railways, ship propulsion, and other developments, were also touched upon by Mr. Mountain.

Breach of Contract.—At the Liverpool Assizes, held during the past week, a case came on for trial before Mr. Justice Rowlatt and a special jury. The plaintiffs were Messrs. W. Y. Craig and Sons Limited, owners of the Brynkinallt Colliery, Chirk, and the defendants were Messrs. W. Barker, junr., and Co., coal merchants, Liverpool. Counsel for plaintiffs stated that on March 29 last his clients entered into a contract with defendants to supply them with 1,000 tons of coal, to be delivered in one week at the price of 51s. per ton free on rail at Birkenhead, for sea-going vessels, but it transpired that during that period some of the sailings were cancelled. A few days after the contract was made, a representative of defendants came to Mr. Stockton, plaintiffs' representative, and asked if his firm might be released from their contract, and they would pay compensation but, as a matter of principle, Mr. Stockton refused to accede to this request. Later the defendants gave it as their view that plaintiffs had not sufficient coal at Birkenhead to satisfy their requirements, but Mr. Stockton stated that he himself had seen sufficient wagons at Birkenhead to supply the required quantity, and as a matter of fact during the week in question 1,800 tons were sent to Birkenhead from this colliery, and defendants could have had their full quantity had they so desired, the arrival of which fuel they were duly notified of. They only took 659 tons, however, on account of the 1,000 tons, thus leaving a balance of 341 tons. By the end of the week under notice the strike showed signs of terminating, and the miners began to return to work, consequently markets fell, and as the next quotation was 24s. 9d. per ton, the plaintiffs claimed as damages the difference between that figure and 51s. upon the 341 tons not taken. Mr. Rigby Swift argued on behalf of the defence that it was the defendants who had first made a complaint, and that on April 9 they protested that the plaintiffs were not giving them the quantity of coal they wanted, and maintained that the latter were supplying other customers in Birkenhead from wagons which had been sent for defendants' contract. They further maintained that they had taken all the fuel nominated to them, and contended that they should not be asked to pay the penalty for not accepting more coal when it was not offered to them. Evidence was also called to show that the market price at the expiry of the contract for the quantity not taken by the defendants was 35s. A verdict was given for the plaintiffs, and damages assessed at £225.

THE LONDON COAL TRADE.

Thursday, November 14.

The London coal trade during the past week has partially recovered from the apathy of the past few weeks. Orders have been more plentiful, but the prices have not lifted in any way. The colder weather has helped the house coal market, and tended largely towards clearing off the heavy stocks on hand, but its continuance is somewhat doubtful, and merchants are chary of buying freely for the present. Some of the factors have still a heavy list of loaded wagons on hand, and as many of these are already, or are likely to be very shortly, on siding rent, they refrain from increasing the list until the old wagons are entirely clear. The depot trade has improved slightly, but the public orders are not sufficient yet to warrant any decided movement in prices, and dealers' and trolley trade is still very uncertain. In some districts also a good deal of underselling is noticeable. In the West End of the metropolis, where so many flats are in vogue, the colder weather has given an impetus to the demand, and the consumption of coal has largely increased, so many of the householders being dependant upon the daily or weekly supply, and the trade has therefore benefited accordingly. Manufacturing coal is also in steady demand; the better qualities fully maintain their top prices, but the second qualities have here and there been reduced. The volume of trade, however, continues good, and judging from the disposition to buy forward in fairly large tonnages, the brisk demand is likely to continue. Bakers' nuts and kitchener cobbles command a large amount of attention, and a good trade is done in all kinds of kitchen coal. The lessened output, from various reasons, in the house coal market has led to an increasing demand for slacks, and so many boilers are now fitted with automatic stoking plants, that the prices for smalls are now as high as large coal was fetching a few years back. Double-screened nuts and peas are also proportionately higher. In the seaborne market the demand continues good, but the arrivals are few. Fogs in the river have again seriously interfered with the unloading and despatch of barges and vessels, so that a large number of the factories and large users of fuel have had to fall back upon inland coals to secure sufficient coal for their immediate wants. Thirty vessels were reported as having arrived in the river for Monday's market, and five on Wednesday. The market quotations remain the same, viz., 21s. 6d. for best Wallsend, 20s. 6d. for seconds, but none were open for sale on the market. Retail reports all favour a large flow of public orders. The attendance on the market during the week has been somewhat larger than usual, and a steadier tone has everywhere been noticeable. The actual business done, however, cannot be called active, but the market is steadier. No sales of Durham or Yorkshire cargoes are reported. All the vessels arriving in the Thames are for contract coal or for previous purchases.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, November 8.—The seaborne house coal market was quiet to-day, with no cargoes of either Durham or Yorkshire pressing for sale. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston (W.E. Yorks) 21s. 6d. Cargoes 26.

Monday, November 11.—Although the weather was more in favour of the trade, there was no improvement in the seaborne house coal market to-day, and no sales reported. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston (W.E. Yorks) 21s. 6d. Cargoes 38.

Wednesday, November 13.—The seaborne house coal market was without alteration to-day, no cargoes pressing for sale. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston (W.E. York) 21s. 6d. Cargoes 5.

THE IRISH COAL TRADE

Thursday, November 14.

Dublin.

Business in the coal trade generally is fairly active, and prices of all descriptions are unchanged, but should any severe wintry weather set in it is expected that house coals will be immediately advanced. House coals in the city stand as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 26s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; "ball" coal, 1s. 5d. per sack. Steam coals are about from 20s. per ton upwards, and best coke 23s. per ton, or 18s. per chaldron. The coal from the Wolfhill collieries, Queen's County, is now being very extensively used in many of the inland public institutions, and is giving every satisfaction, as it is free from sulphur. Prices at the pit mouth are:—Best large malting coal, 20s. per ton; best hand-picked breakage, 20s. per ton, and 17s. 6d. per ton; cobbles screened and beans screened, 17s. 6d. per ton; culm, 5s. There has been a good import trade, although labour troubles at one or two of the shipping ports at the other side have interrupted the usual supplies to some extent. The coaling vessels arriving during the week amounted to 69 as compared with 50 the week previously, chiefly from Garston, Newport, Glasgow, Preston, Swansea, Girvan, Workington, Ayr, Neath Abbey, Troon, Cardiff, Irvine, and Point of Aire. The total quantity of coal discharged upon the quays was 28,534 tons.

Belfast.

Business cannot be described as brisk, although there is a fair enquiry for manufacturing, steam and kindred classes. The household trade is rather quiet for the winter season, consequently there appears to be no immediate prospect of any advance in prices. Quotations in the city are:—Giant's Hall Arley coal, 26s. 6d. per ton; Hartley, 25s. 6d.; Wigan, 24s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 22s. 6d.; Orrell slack, 22s. 6d. Current prices ex-quay:—Arley house coal, 22s. 8d. per ton; Scotch household, 19s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; navigation steam, 16s. 6d. to 17s. 6d.; Welsh steam coal, 17s. to 18s. per ton. There is a plentiful supply in the port, cargoes arriving during the week being chiefly from Ayr, Glasgow, Garston, Partington, Preston, Workington, Troon, Girvan, Neath Abbey, West Bank, Ardrossan, Cardiff, Llanelly, Lydney, and Ellesmere Port. From October 13 to November 2 the total number of coaling vessels entering the harbour was 171.

THE SCOTCH COAL AND IRON TRADES.

Thursday, November 14.

Glasgow and Lanarkshire.

COAL.

The coal trade has been slightly more active in the shipment department than in the preceding week, and it is worthy of note that the volume of business appears to form a good average for this season of the year. The aggregate clearances at the Scotch ports amounted to 318,941 tons, being 3,126 tons more than in the preceding week, and no less than 20,952 tons above the quantity despatched in the corresponding week of last year. At Glasgow 41,300 tons were despatched abroad, and 32,791 tons coastwise, the total of 74,091 tons comparing with 74,255 in the preceding week, and 68,015 in the corresponding week of 1911. The difficulty of transit from the collieries to the ports of shipment have not yet been overcome. A representative committee of coalmasters has the question in hand, and they have ascertained that the delays complained of have chiefly occurred on the Caledonian system, there being very much less reason for complaint as to the working of the coal traffic on the North British and Glasgow and South-Western railways. The matter being thus somewhat narrowed, will be all the more easily dealt with, and it is to be hoped that the representations made by the committee may be speedily effective in bringing about a remedy. At a number of collieries in the Lanarkshire district the miners have had to go on short time owing to a scarcity of wagons, and so far as can be ascertained there did not need to be any lack of employment for the men if the railway service had been satisfactory. There has been a fair demand for steam coal, and also for the better qualities of house coal for shipment. Splint coal continues in excellent demand, and there is also a good outlet for nuts. At Glasgow steam coal is quoted f.o.b. 11s. 6d. to 12s., ell 12s. 3d. to 12s. 9d., splint 13s. 6d. to 14s., treble nuts 13s. to 13s. 6d., doubles 12s. 6d. to 13s., and singles 11s. 6d. to 12s. per ton. A moderate business has been passing in house coal for home use at steady prices, and hard coals and dross for manufacturing purposes are selling extremely well.

IRON.

The amount of business in Glasgow pig iron market has been materially reduced in recent weeks, and prices have also fluctuated considerably in consequence of the war. Since last report Cleveland warrants have sold between 66s. 7d. and 67s. cash, 67s. 2d. and 67s. 4d. one month, and 67s. 9½d. and 67s. 6d. three months. Hæmatite warrants have been done at 82s. one month, f.o.b. Cumberland ports, and Scotch hæmatite is at 85s. for delivery at west of Scotland steelworks. The arrivals at Grangemouth of pig iron from Middlesbrough and district in the past week amounted to 8,232 tons, being 2,056 tons less than in the corresponding week of 1911. Scotch pig iron is in strong demand for home use, and prices are well maintained. Free at ship at Glasgow, Govan and Monkland Nos. 1 are quoted 75s. 6d., Nos. 3, 74s.; Carnbroe, No. 1, 79s., No. 3, 75s.; Clyde, Calder and Summerlee, Nos. 1, 81s., Nos. 3, 76s.; Gartsherrie and Langloan, Nos. 1, 82s. 6d., Nos. 3, 77s. 6d.; Coltness, No. 1, 97s. 6d., No. 3, 79s. 6d.; Eglinton, at Ardrossan or Troon, No. 1, 75s., No. 3, 74s.; Glengarnock, at Ardrossan, No. 1, 82s. 6d., No. 3, 77s. 6d.; Dalmellington, at Ayr, No. 1, 76s., No. 3, 74s.; Shotts, at Leith, and Carron at Grangemouth, Nos. 1, 81s., Nos. 3, 76s. per ton. The shipments of pig iron at Scotch ports in the past week were 1,691 tons foreign and 2,505 coastwise, the total of 4,196 tons being 643 tons less than in the corresponding week of 1911. The makers of malleable iron and steel goods are all very fully employed and, in not a few instances, deliveries of steel are several weeks in arrear. Some five years ago the Clydebridge Steelworks were closed down under an arrangement with the Steelmakers' Association, owing to excessive output, and the company received compensation for keeping their works idle. Now, the steel trade is so busy that it has been determined to re-start these works—which is now in course of being done. They are designed for the manufacture of ship and boiler plates, which are very much wanted at the present time.

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Renfrew, Ayr and Dumbarton.

COAL.

A strike of coal trimmers at Ardrossan, which has now existed several weeks, has materially reduced the coal shipments at that port. But there has been some increase at the other ports, particularly Ayr and Troon, and in consequence the coal traffic has recovered to some extent compared with that of the preceding week. The clearances were at Bowling 145 tons, Greenock 518, Ardrossan 4,624, Irvine 1,608, Troon 9,364, and Ayr 17,006—total 33,265 tons, compared with 28,925 in the preceding week, and 38,404 in the corresponding week of last year. Of the total shipments, 6,604 were sent abroad and the rest went coastwise and to Irish ports. Prices of all kinds of coal have been steady. The inland demand for house coal is moderate, but the requirements of the iron, steel and other works continue on an extensive scale.

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Stirling, the Lothians and Fife.

COAL.

The demand for coal in the Lothians has been quite active, but the shipments at Firth of Forth ports are 7,000 to 8,000 tons less than in the preceding week. At Granton 8,240 tons were shipped, Bo'ness 17,990, Grangemouth 32,893, Leith 40,800—total 99,923 tons, compared with 107,172 in the preceding week, and 82,856 in the corresponding week of last year. Best screened steam coal is quoted at Leith 12s. 9d. to 13s., secondary qualities 11s. 9d. to 12s., treble nuts 13s. 6d. to 14s., doubles 12s. 9d. to 13s., and singles 12s. to 12s. 3d. per ton. The shipments at Fife ports show an increase of 6,000 tons. At Methil, 57,842 tons were cleared, Burntisland 47,560, Alloa 2,201, Dysart 2,060, Wemyss 1,407, Tayport 467, and Charleston 125—total 111,662 tons, against 105,463 in the preceding week, and 108,715 in the corresponding week of last year. First-class screened navigation coal is quoted at Methil and Burntisland 16s. to 16s. 6d., unscreened 13s. 9d. to 14s. 3d.; steam coal, 11s. 6d. to 13s.; treble nuts, 13s. 6d. to 14s. 3d.; doubles, 12s. 6d. to 13s. 3d.; and singles, 12s. to 12s. 6d. per ton. The supplies are being fully carried away, and the outlook for the next few weeks is regarded as satisfactory.

The Causes of Labour Unrest.—Mr. Laurence H. Strain, the prospective Unionist candidate for East Lothian addressing a public meeting at Tranent, recently, made an interesting reference to the labour questions of the day. Referring to what were advanced as the causes of the unrest, he said some were not the real causes at all as affecting the miner. The first of these was the danger and discomfort of the mining industry. There was danger, but when one considered the conditions of the olden times, with bad ventilation, danger always present, and a mere pittance of wages, one realised that that was a diminishing cause of dissatisfaction. Another cause to which a great deal of the unrest was attributed was that cost of living in recent years had gone up, and that wages in the same time had remained stationary. That was no doubt the cause as regards other trades, but he did not think it applied in the same way to the mining industry. Although in recent years the cost of living had gone up by 20 per cent., at the same time in the mining industry wages had increased by some 50 to 100 per cent. There were several real causes for the unrest. There was the fact that mines were not to the same extent worked by a private individual. Mining was to a large extent carried on by companies. It was impossible to have the same interest and sympathy between master and man in these circumstances. Of recent years, too, they had all become better educated. They read and travelled and realised how other people were living, and consequently they demanded, and demanded rightly, a better standard of living than they had had in the past. Most important of all there was with the growing concentration of business the almost intolerable tedium of the work men had to do. There was another cause, and with it he had no sympathy, and that was that in recent years the leaders of the trade unions had acquired through the Trade Disputes Act over the rank and file of the workers a great power which they sometimes did not utilise to the best advantage of the men. Mr. Strain proceeded to deal with Government legislation on behalf of the miners, which he described as short-sighted. It was estimated that these Acts, taken together, would permanently increase the cost of coal by something between 2s. and 2s. 6d. per ton. Besides that, under the 1909 Budget the Government put a 5 per cent. duty on mining royalties. That did not add to the cost of the production of coal at the moment, but it would by-and-by. In addition, the Government had promised to allow the railway companies to increase their rates for the haulage of coal. That would increase the cost of coal to the consumer. There was the ever-growing burden of the general taxes and rates increasing the cost of coal. He proceeded to point out that the East Lothian coal was to a large extent for export. As regarded shipment coal, East Lothian was in competition with Durham coal, with the German Westphalian coal, and since the recent national strike with American coal. Supposing East Lothian coalmining were a very prosperous industry, they might still keep their coal shipment by the master reducing his profits by the 2s. 6d. per ton which legislation was adding to cost of production. But last year the cost of producing a ton of coal all over in East Lothian was 6s. 6½d., while the actual realised value of the coal was 6s. 5d. How were they going to compete, then, with these other coal areas? The home manufacturer was obliged to take the coal at the home price so long as he could live, but could he live when he had to pay the additional price for his coal which his foreign competitors had not to meet? As for the ordinary consumer of coal, he was usually a producer of something else, and he would not pay the extra cost out of his own pocket, but would add it to the cost of the things he sold, and it would in this way react on the coalminer himself. Discussing remedies for the unrest, he said nationalisation of mines as applied to the conditions in East Lothian was an impossible ideal, and the Syndicalist idea would not do at all. There was no one road by which they could cure all the industrial unrest, but there were certain roads along which they could walk with safety. There must be closer co-operation between the master and the workman, for, after all, their interests were identical. They must get rid, so far as they could, of the strike and lock-out. The Trades Disputes Act must be amended, for miners should be allowed to sell their labour as they liked, and there must be something in the way of compulsory arbitration before there was any stoppage of work. Tariff Reform would help the miners enormously. It would give fairplay to manufacturers in our own country, and there would be more work, and more coal would be required. There must also be something done to relieve the tedium of work, and one of the things the Unionists were pledged to was that there should be better housing for the workers and more comfort in the home life.

COLONIAL NOTES.

India

epot.—A project has been placed
Association for a central depot for
tablished in or near the coalfields.
ways concerned should draw their
the wagons were set free to carry
son.

ustralia.

n.—It is stated that the quantity
from Newcastle shows an increase
uantity sent during the first nine
creases, writes our Sydney corres-
rly noticeable in the supplies
ates—Chili, Java, Hawaii, and the
showe a slight falling-off. The
s follow:—

	1911. Tons.		1912. Tons.
......	556.782	...	756,227
......	498,965	..	529,518
.....	104,995	...	158 360
......	102 525	...	113,135
......	258,710	...	355,879
......	499,898	...	701,785
......	30,596	...	63,252
.. ...	126,183	...	225,925
.....	—	...	27,541
......	2,182,654	...	2,941,622

re:—

......	86,806	...	185,125
......	130,266	...	91,717
......	144,488	...	101,585
......	124,167	...	86,652
......	485,667	...	465,079

combined total of 3,306,051 tons
ths of 1912, against 2,668,121 tons
in 1911.
ntroducing the State Coal Mines
Wales Legislative Council, it was
measure to authorise the establish-
on Crown lands or private lands
. It was argued that considering
est consumer of coal within the
t the requirements of the State
s at least one million tons per
nable that the State should not be
private enterprise. The fact of
State affair would be a deterrent
would be no competition against
e coal would simply be used for
ney correspondent adds that it is
her the State Council will accept

Africa.

Output.—Excluding diamonds, the
the Union of South Africa in
23,491,825, made up as follows:—
£176,520; base metals, £57,173;
August 1, says our correspondent,
uction in the railway rates for the
nd a further rebate of 1s. a ton
rates for the carriage of coal for
s anticipated that the goldmines
ter of a million sterling in their
on in the railway rate, but it was
at 1s. per ton reduction only for
e inadequate. To some extent
ow that these anticipations have
eed, because up to the present the
at the goldmines has shown an
l of the anticipated 2d. per ton of
e. There has, moreover, been
in the volume of coal exports,
reduction of 1s. per ton on export
with a more plentiful supply of
ly speaking, the export trade of
d, say, from 12,000 tons to 25,000
August 1, but this increase is a
with what would have taken
duction been made in the railway
xport coal to the different South
sales of the Union of South Africa
718,881 tons from 63 working
contribution being 430,549 tons.
9 collieries, placing in the market
eries in the Orange Free State
,674 tons, and eight mines in
tons. The Transvaal output is
preceding month by 21,893 tons,
crease is probably due to the
railway rate on export coal
e at the pit tops for the whole of
ansvaal was 4s. 4½d., as compared
eding month of July. It does not
of railage on export coal made any
tal coal trade, for, as a matter of
rovince fell from 241,016 tons in
July to 237,449 tons in August, the price at the pit tops remaining at 5s. 7d. per ton. The collieries in the Orange Free State, on the other hand, showed a marked decline in the output, from 47,677 tons to 43,674 tons, and a fall in the average pit top selling price from 5s. 4d. per ton to 5s. 2d. The eight collieries in the Cape province produced 7,209 tons of coal in August, which sold on the average for 11s. 5d. per ton, the results all round being practically the same as those for July. Taken altogether, coal throughout the Union of South Africa in August averaged 1d. per ton less than in July, namely, 4s. 11d. per ton at the collieries instead of 5s., the improvement being confined to the number of tons sold. It would almost seem as though the Transvaal collieries were likely to reap the most benefit from these reduced railway rates, both for local and export sales of coal; in fact, up to the present they seem to be the only collieries to take advantage of the lower railway rates and push the sales of coal in new markets. Perhaps when Natal is freed by the lapse of time from some of their contracts, that province may also benefit. The coal is the best in South Africa, and whilst the railway charges may have benefited the Transvaal most up to the present, the quality of coal must in the long run produce a marked effect. The Orange Free State and Cape collieries may not reap much benefit, but taken on the whole these railway rate reductions must cause a marked expansion in the Transvaal coal trade.

COLLIERY ACCIDENTS.

Barnsley

Mr. P. P. Maitland held an inquest at Barnsley last week on Robert Frewin, 23, a trammer, who was fatally injured at the Old Silkstone Colliery, Dodsworth. The deceased was tramming an empty corf up his gate when he was run into by a full corf which was coming down the gate, with the result that his skull was fractured.

Jos. Newberry, a deputy, was questioned regarding the system by which trammers worked. Asked if he could suggest any better system, he said he could not. If a bell were rung before the trammers started it would be robbing the men of 9s. per week wages.

Mr. Westby, the manager, said that something might be done if means could be possibly devised.

A verdict of "Accidental death" was returned.

Partnership Dissolved.—The *London Gazette* announces the dissolution of the following partnership:—O. Wilkinson and F. Fairbourn, carrying on business as engineers, at Baildon Bridge, Shipley, under the style of Wilkinson and Fairbourn.

Town Planning in South Yorkshire.—The new Labour mayor of Doncaster, Councillor John Thomas Kay, responding for his election to the chair on Saturday last, referred to the development of Doncaster through colliery enterprise, and spoke of the schemes for borough extension, town planning, and housing which will have to be tackled. Doncaster had, he said, outgrown itself; the only difficulty in the way of borough extension appeared to be as to how it was to be accomplished. Before they could do anything of any magnitude they would have to get powers to do it; they could only accomplish what they wanted to do by the extension of Doncaster to such an extent that it could before very long become a county borough. When they and the representatives of the outlying districts seriously took to doing something, he thought it would be accomplished without much difficulty. As to town planning, and the housing of the working classes, this was a question Doncaster had had under consideration for some few years, and was a question that was going to mature before very long in such a way as would show that Doncaster was quite as willing, able and capable of undertaking a matter of this sort as any other part of the country. They were in a unique position as far as this was concerned, as they had plenty of land; the main difficulty seemed to be for them to grasp the best method of accomplishing the resolution so far as the Housing and Town Planning Act was concerned.—"Town Planning in Relation to the Development of the South Yorkshire Coalfield" will be the subject of discussion at the sessional meeting at Doncaster, on November 23, of the Royal Sanitary Institute. The discussion is to be opened by Dr. A. B. Dunne, who, as medical officer to the Doncaster Rural District Council, has the sanitary interests of most of the new colliery villages of that district under his care. The Mayor and Corporation have placed the Mansion House at the disposal of the institute. Those who are expected to take part in the discussion will include the Bishop of Wakefield, Drs Handford and Kaye (medical officers of health under the Notts and West Riding County Councils respectively), Mr. F. Kirkby (chairman of the Bentley Urban District Council), Sir Arthur Markham, M.P., Dr. J. Wright Mason (Hull), Rev. T. F. Rolfe (Doncaster), Mr. R. A. MacBriar, M.I.C.E. (Lincoln), Mr. C. F. Wike, M.I.C.E. (Sheffield), Mr. R. O. Whitley (surveyor to the Bentley Urban District Council), Mr. J. Wilson (surveyor, Bolton-on-Dearne Council), and others. The Corporation of Doncaster are entertaining the members of the institute to luncheon at the Mansion House, and during the afternoon a visit will be paid to the Woodlands model colliery village.

THE FREIGHT MARKET.

North-east coast outward chartering has been fairly active during the week, although operations are now rendered difficult by reason of stormy weather at sea delaying tonnage. Coasting business is based on from 5s. to 5s. 3d., Tyne to London, and 5s. 3d. to 5s. 6d. to Hamburg. North France is being done at about 6s. to Havre, whilst from 7s. 9d. to 8s. is quoted to Bordeaux. The Baltic is dull, at about 5s. 9d. to Swinemunde. The Mediterranean is quoted at about 13s. 6d. to Genoa. At South Wales chartering has been rather quieter. The Mediterranean is steady, and the Islands are very firm. The Bay, coasting, River Plate and Brazils trades are unchanged. At the Clyde, business is quiet at generally firm figures. The Humber market is slow, with firm rates for the Mediterranean and some ease Balticwise. Homewards, Eastern markets are dull and the tone is easy. The Black Sea and district are very quiet, shippers holding off for some concession in rates. The Mediterranean and ore trades are steady. The Baltic is unaltered. The River Plate is firm. The American market has developed a strong tone, and rates for November-December loading have materially advanced.

Tyne to Barletta, 2,700, 15s.; Bitter Lakes, 4,800, 14s. 10½d.; Cette, 2,500, 13s.; Civita Vecchia, 3,300, 14s. 6d., 400; Cherbourg, 800, 8s.; Cronstadt, contract, 20,000 tons, 5s. 9d., voyages over next year; Catania, 3,200, 13s. 10½d. coal, 16s. 4½d. coke, two docks. 600; Caen, 650, 8s. 6d.; Fecamp, 700, 8s.; Genoa, 5,100, 13s. 6d.; 5,800, 13s. 6d. 5,000, 13s. 6d., from Dunston; 3,500, 13s. 9d., from Dunston 3,900, ditto; 13s. 9d., December; 3,200, 13s. 6d.; 6,800, 13s. 6d.; 4,000, 13s. 6d.; Havre, 1,750, 6s.; 700, 7s. 6d. Las Palmas, 3,700, 12s. 3d.; 1,750, 12s. 3d.; London, 4,800, 3s. 10½d., from Dunston; 1,600, 4s. 9d.; 1,600, 5s.; Mazzaron, 2,100, 19s. 6d., coke; Marseilles, 5,300, 12s. 6d., from Dunston; Malta, 3,000, 11s. 3d., from Dunston; Monaco, 1,550, 14s. 6d.; Naples, 4,300, 13s. 1d., 700, 10d.; Oporto, 1,000, 13s.; Palermo, 2,700, 14s., 400; 1,900, 14s.; Pozzuoli, 3,300, 15s. coal, 16s. goods, from Dunston and Elswick; Port Said, 4,500, 13s.; Rotterdam, 3,000, 4s. 3d., 1,000; 3,000, 4s. 9d.; Soller, 1,200, 15s. 6d.; St. Brieux, 500, 9s. 6d. Venice, 4,000, 15s. 6d., 500.

Cardiff to Almeria, 1,500, 13s. 3d., free of tax, ppt.; 2,500, 13s. 3d.; Algiers, 2,700, 14½ fr. coal, 15½ fr. fuel, ppt.; 6,400, 13¾ fr., November 18; Alexandria, 1,500, 13s. 6d., November 18; Buenos Ayres, 24s., fuel; Bermuda, 3,500, 10s., Admiralty; Barcelona, 3,000, 13s. 4½d.; Cadiz, 2,000, 11s. 6d., ppt.; Calais, 1,350, 6s. 6d., spot; Copenhagen, 2,300, 8s. 6d., November 18; 1,850, ditto; Dieppe, 1,100, 6s. 9d., ppt.; Djibouti, about 16s., November; Dakar, 9s. 6d., 500, f.d.; Ferrol, 850, 10s., ppt.; Genoa, 13s. 9d., ppt.; 4,800, 13s. 9d., 500, 6½d., November 22; 1,000, 13s. 4½d., ppt.; 1,900, 13s. 9d.; 3,000-3,500, 11s., voyages over next year; 4,200, 13s. 9d., ppt.; Las Palmas, 2,500, 11s. 6d., November; Lisbon, 3,400, 9s. 3d., 350, November 19; 2,700, 9s. 3d., 300, ppt.; La Pallice, 2,700, 8½ fr.; 1,700, 9 fr., ppt.; 3,000, ditto; Leghorn, 14s., 500, November 16; Malta, 3,000, 10s. 6d., ppt., Admiralty; 2,000, 11s. 9d., ppt.; Marans, 1,200, 12½ fr., ppt.; Marseilles, 6,800, 13 fr.; 2,300, 15½ fr.; Naples, 14s., 500, November 15; Port Said, 5,500, 13s. 3d., November 22; 4,600, 13s. 6d., November 15; Palermo, 4,800, 14s., 500, 10d., November 22; Palma, 1,300, 13s. 3d., free of tax, ppt.; River Plate, 4,500, 23s., November 15; 21s., upper ports, voyages over next year reported; Rosario, 23s., November; St. Vincent, 1,750, 11s. 3d., end December; Savona, 4,800, 13s. 9d., November 22; 1,900, 13s. 4½d., ppt., 1,900, 13s. 9d.; St. Nazaire, 2,800, 8¾ fr., spot; 2,000, 9¼ fr.; 3,300, 9¼ fr.; St. Malo, 1,450, 7s., ppt.; Singapore, 16s. 6d., 500, November.

Partington to Alexandria, 2,000-3,000, 13s. 6d., November.

Garston to Genoa, 2,000, 12s. 6d., early December; Naples, 2,000, 12s. 6d., early December.

Swansea to Pola, 5,500, 16s. 3d. coal, 17s. fuel, ppt.; Leghorn, 3,800, 13s. 9d., 500, ppt.; 1,700, 14s. 1½d.; Charente, 1,400, 11 fr.; St. Nazaire, 2,500, 10¼ fr.; Rouen, 1,650, 7s. 9d.; 1,300, 8s.; Havre, 1,500, 16s., voyages over next year; 1,300, 6s. 9d.; Genoa, 1,700, 4s. 1½d.; 3,200, 13s. 9d., November 18; Caen, 1,200, 7s. 4½d., spot; Tarragona, 1,100, 14s., ppt.; Alexandria, 5,500, 13s. 9d. coal, 14s. 6d. fuel, November 24; Pola, 5,500, 16s. coal, 16s. 9d. fuel, November 16; Savona, 14s. 1½d.; Spezzia, 1,700, 14s. 1½d. Kustendje, 1,600, 17s. 6d.; Nice, 1,700, 14s. 4½d.; Valencia, 1,100, 13s. 3d., free of tax.

Hull to Genoa, 3,700, 13s. 6d.; 2,200, 13s. 3d., spot; Rotterdam, 1,700, 4s. 7d.; Riga, 1,500, 5s. 9d., ppt.; Malmo, 1,900, 7s. 3d.

Newport to Buenos Ayres, 5,000, 23s., ppt.; Malta, 2,000, 11s. 9d., ppt.; Aguilas, 1,200, 14s. 3d., ppt.; Bahia Blanca, 23s., November 20-30; Vigo, 2,900, 9s. 3d.

Wear to Genoa, 4,200, 13s. 9d.; Stettin, 2,100, 6s. 3d. Pillau, 2,500, 6s.; Konigsberg, 2,500, 6s.

Blyth to Cherbourg, 850, 8s.; Stettin, 2,100, 6s. 3d. Pillau, 2,500, 6s.; Konigsberg, 2,500, 6s.; Alexandria, 4,500, 13s. 6d.

Hartlepool to Leghorn, 2,700, 13s. 9d., 500; Carthagena, 1,200, 13s. 6d.

Glasgow to Bordeaux, 2,300, 8¾ fr.; Santos, 27s. 6d. December; Civita Vecchia, 15s.

Grimsby to Helsingborg, 2,200, 7s.

Goole to Boulogne, 750, p.t.

Methil to Genoa, 2,000, 13s. 10½d.; 2,500, 14s.

Seaham Harbour to Bordeaux, 3,200, 8s. 6d., Randers, 2,000, 6s. 6d.

Rotterdam to Chantenay, 2,500, 7s. 3d. coal, 9s. 3d. coke; Rochefort, 3,300, 7s. 3d., ppt.; Bordeaux, 3,800, 7s. 6d. coal, 8s. 3d. fuel, ppt.; 3,000, 7s. 9d. coal, 8s. 6d. fuel, ppt.; Porto Vecchio di Piombino, 3,600, 14s. 3d., ppt.; Porto Ferrajo, 4,100, 13s. 6d., November 20; Nizza, 2,000, 17½ fr., fuel, November 18.

Hamburg to Callao (sail), 31s. coke, stiffening fuel 17s. 6d.

Grangemouth to Monte Video, 4,300, 23s., 250, ppt.

Burntisland to Genoa, 4,700, 14s.

Antwerp to Buenos Ayres, 2,712 net, 31s. 3d., November.

Homeward bound:—Poti, 6,300, Antwerp or Rotterdam, 17s. 9d., November; Kherson, Nicolaieff, Odessa, Novorossisk or Theodosia, 5,300, London or Rotterdam 15s., Antwerp, Emden or Weser 15s. 3d., Hamburg or Liverpool 15s. 6d., ppt.; Japan, 3,267 net, Colombo, 10s. 6d., December; Madras coast, 3,267 net, Marseilles, 37s. 6d., January; 4,366 net, 37s. 6d., with 750 tons unshelled at 32s. 6d., January 5-31; Bombay, 5,700, Garston, 27s., ore, November; 2,412 net, United Kingdom-Continent, 26s., on d.w., November-December; Aden, 3,000 net, Calcutta, Rs. 7·4, salt, November; 6,200, Rs. 6·13, December-January; Gulf, 2,214 net, Liverpool or Bremen, 75s., cotton, December; 162 ft., 73s. 9d. Liverpool

£9,971; net profit from colliery for year to June 30, £20,971; dividends, interest, rents, &c., £452; total, £31,394. To London expenses, £866; income-tax account, £525; royalty paid to Government, £1,287; directors' fees and managing directors' remuneration, £900; directors' bonus under Article 105, £211; reserve account, £2,500; debenture interest, £798; dividends Nos. 11 and 12 on preference shares, £3,245; dividend No. 4 on ordinary shares, £4,722; leaving a balance to be carried forward of £16,340. A dividend of 5 per cent., free of income tax, on account of the profits of the year has already been distributed upon the ordinary shares. In view of the contingencies referred to in the circular dated September 30 last, the directors propose, after adding £2,500 to the reserve fund, which brings that fund up to £7,500, to carry forward to the current year the balance of £16,340.

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Sanderson Brothers and Newbould Limited.—The directors have paid an interim dividend of 1s. 6d. per share, free of income-tax.

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Worcester Coal and Iron Company Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to take over the business carried on at Worcester by John Jackson and Sons (Worcester) Limited, and to carry on the business of coal, iron and steel merchants, &c. First directors: A. Lloyd, E. C. Jackson, W. H. W. Robinson. Registered office, 3, College-street, Worcester.

Mortgages and Charges.—The following have been registered in pursuance of the Companies Acts, 1907:—Apex Steel Company Limited (debentures dated October 16, 1912, to secure all moneys due or to become due from the company to the Sheffield Banking Company Limited, George-street, Sheffield); Gloucester Railway Carriage and Wagon Company Limited (issue on October 14, 1912, of £5,300 debentures, part of a series); Hazel Colliery and Brick Company (Barlborough) Limited (particulars of £4,000 debentures created by resolutions of September 26 and October 10, 1912, whole amount now issued); Jonas and Colver Limited (satisfaction in full on October 15, 1912, of debentures dated February 13, 1908, securing £47,100); North Central Wagon Company Limited (issue on October 9, 1912, of £3,939 debentures, part of a series); South Derwent Coal Company Limited (mortgage dated September 26, 1912, to secure all moneys due from the company to Lloyd's Bank Limited, Collingwood-street, Newcastle-on-Tyne); Tannett, Walker and Co. Limited (issue on October 4 of £2,000, and on October 9, 1912, of £1,150 debentures, parts of a series); Corrwg Vale Colliery Limited (charge dated October 21, 1912, to secure £1,000); Cross, Tetley and Co. Limited (debenture and agreement, defining terms of issue thereof, both dated dated October 10, 1912, to secure £40,000); Jonas and Colver Limited (particulars of £100,000 debentures created October 15, 1912, present issue £47,100); Lincoln Wagon and Engine Company Limited (issue on October 23, 1912, of £10,610 debentures, part of a series); National Explosives Company Limited (satisfaction in full on July 2, 1912, of mortgage or trust deed dated November 19, 1908, securing £101,306, notified; security dated October 22, 1912, to secure £5,000 and further advances not exceeding £10,000, also registered); North Central Wagon Company Limited (issue on October 23, 1912, of £2,049 debentures, part of a series).

COAL AND COKE EXPORTED FROM PORTS IN ENGLAND, SCOTLAND AND WALES

During the month of October 1912, compared with the corresponding month of 1911.*

Port	October 1912.		October 1911.		Coals.		Coke.	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons
Newcastle	930,648	26,426	861,333	33,422	69,315		—	6,996
North Shields	113,354	—	83,303	2,257	30,051	—		2,257
South Shields	137,920	797	97,308	4,827	40,612	—	—	4,030
Sunderland	244,858	6,482	238,463	1,388	6,395	—	5,094	
West Hartlepool	132,029	902	131,547	1,314	482	—		412
Goole	98,264	3,104	105,728	4,124		7,464		1,020
Blyth	355,824	753	298,511	1,037	57,313	—		284
Newport	408,393	1,880	316,112	1,609	92,281		271	
Liverpool	31,982	3,169	27,724	2,034	4,258		1,135	—
Methil	228,084	1,769	221,775	2,942	6,309	—	—	1,173
Glasgow	187,012	954	153,303	3,737	33,709	—	—	2,783
Kirkcaldy	14,276	40	13,439	—	837	—	40	
Burntisland	177,530	1,686	181,378			3,848	1,686	
Cardiff	1,859,673	7,089	1,447,150	6,051	412,523	—	1,038	
Borrowstoness	60,401	1,410	58,687	2,381	1,714	—		971
Llanelly	14,600		14,324	—	276	—	—	
Middlesbrough	889	3,861	2,141	7,002	—	1,252	—	3,141
Seaham	61,944	193	56,801		5,143	—	193	
Swansea	334,571	110	259,227	580	75,344	—		470
Granton	11,509	2,636	10,512	4,647	997			2,011
Port Talbot	172,365	551	110,638	1,414	61,727		—	863
Alloa	15,453	—	19,936	—	—	4,483	—	
Grangemouth	117,717	13,540	117,132	9,205	585	—	4,335	
Neath	8,389	—	11,657			3,268		—
Hull	376,074	7,759	317,269	3,492	58,805	—	4,267	—
Amble	48,230	—	33,353		14,877	—	—	
Troon	5,020	—	5,366	—	—	346	—	
Grimsby	126,939	723	120,990	1,323	5,949			600
Ayr	1,231	—	670	—	561	—	—	—
Greenock	—	—	—		—	—	—	
Leith	180,176	—	143,965	103	36,211	—		103
Ardrossan	2,100	—	2,277	—	123		—	—
Stockton	—	—	—	—	—	—	—	

COAL AND COKE SHIPPED FOR LONDON AND OTHER PORTS IN THE UNITED KINGDOM.*

Port.	October 1911.		October 1912.	
	Coals.	Coke.	Coals.	Coke.
	Tons.	Tons.	Tons.	Tons.
Newcastle	459,997	944	404,726	380
North Shields	—	—	—	—
South Shields	948	—	2,770	—
Blyth	38,188	—	33,548	—
Amble	8,505	—	5,073	—
Sunderland	148,336	—	113,964	—
Seaham	82,205	—	87,781	—
Hartlepool	40,715	—	57,540	—
Stockton	—		—	—
Middlesbro'	470	605	376	100
Hull	89,535	—	86,804	500
Goole	128,821	—	129,920	—
Swansea	31,960	400	32,222	—
Cardiff	274,915	210	251,858	1,220
Llanelly	1,250	—	5,666	—
Newport	71,587	1,110 c 40 pf	67,620	—
Troon	23,766	—	20,283	8
Ardrossan	7,379	—	5,799	—
Ayr	78,729	80	70,953	—
Irvine	6,057	—	3,126	
Alloa	640	—	1,392	—
Whitehaven	20,380	—	19,217	—
Liverpool	171,189	11	181,056	—
Grimsby	5,644	—	6,808	—
Granton	22,938	—	14,980	
Borrowstoness	15,425	—	15,705	25
Burntisland	12,204	—	1,465	
Kirkcaldy	1,528	—	1,047	—
Methil	22,920	—	18,930	—
Port Talbot	22,153	300 pf	14,807	272 c 300 pf
Glasgow	41,376	789	37,194	823
Grangemouth	15,645	600	14,536	600
Greenock	1,418	135	777	—
Neath	11,546	—	8,333	
Leith	2,823	22	6,172	16

* From *Browne's Export List.*

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Abstracts of Contracts Open.

ALEXANDRIA (EGYPT), DECEMBER 5.—Tenders are invited for the supply and delivery of (1) 3,340 tons of Cardiff and 30 tons of Newcastle coal; (2) 19 tons of benzine in 4-gallon tins; and (3) 85 tons of petroleum in 4-gallon tins; required for the service of the Coast Guard Administration. Copies of the conditions and forms of tender for each of the above contracts can be seen by British firms at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C

BEVERLEY, NOVEMBER 23.—For coal, for the Education Committee.

CAIRO, NOVEMBER 25.—For Newcastle, Cardiff, and anthracite coal and coke for the Director of Stores, Central Administration.

HARROGATE, NOVEMBER 25—For (1) supply of house coal, (2) supply of slack coal, (3) supply of slack coal, for the Wells and Baths Department.

HULL, NOVEMBER 22.—For best South Yorkshire double-screened hard steam coal, for the directors of the Steam Cutter Coal and Ice Company Limited. Average monthly consumption 2,000 to 2,500 tons.

LAGOS (SOUTHERN NIGERIA), NOVEMBER 22.—For the supply to the Government of Southern Nigeria of not less than 20,000 tons of best quality double-screened South Wales steam coal (Admiralty standard). Particulars can be obtained by British firms on application to the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

LOWESTOFT, NOVEMBER 27—For about 90 tons of the best seaborne coals, for the trustees of the Kirkley Poors Land Estate.

STOCKPORT, NOVEMBER 18—For best house coal, for the Guardians.

TRICHINOPOLY (INDIA), NOVEMBER 18.—The South Indian Railway Company Limited invite tenders for the supply of 800 tons of Indian smithy coke and 800 tons of foundry coke. Further particulars obtainable from the locomotive and carriage superintendent, South Indian Railway, Negapatam. Tenders must be sent to the agent, South Indian Railway, Trichinopoly.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

ALDERSHOT, NOVEMBER 20—*Boiler.*—For a vertical mild steel-plated boiler, for the Urban District Council. Height of boiler, 6 ft.; diameter, 2 ft. 6 in.; height and diameter of firebox, 3 ft 3 in. and 2 ft 2 in.; cross tubes, 6 in.; uptake 7 in. diameter, with cast iron liner; shell, ⅜ in. thick; firebox, 7-16 in.; tubes and uptake, 7-16 in.; crown, 7-16 in.; safety valve and lever and weight, steam-gauge and siphon, stop-valve, feed-valve, two water-gauges and guards, blow-off cock, fusible plug.

ARDEE (IRELAND), NOVEMBER 19—*Pump.*—For a pump, for the No. 1 Rural District Council.

BELFAST, NOVEMBER 26—*Motor Ambulance.*—For a motor ambulance, for the Guardians.

BIRMINGHAM, NOVEMBER 25.—*Electric Motors.*—For various sizes of electric motors required by the Electric Supply Committee of the Corporation.

CALANAS (SPAIN), NOVEMBER 30.—*Generating Plant.*—The municipal authorities of Calañas invite tenders for a central electric generating station.

CHRISTIANSUND (NORWAY), NOVEMBER 30.—*Cast Iron Water Pipes.*—Tenders are invited by the municipal authorities of Christiansund for the supply and delivery of about 11,300 m. (about 37,000 ft.) of cast iron socket water pipes, or, alternatively, seamless steel socket pipes, of various diameters. Farther particulars may be obtained from the Town Engineer, Christiansund, Norway.

COVENTRY, NOVEMBER 25.—*Cast Iron Manhole Covers, &c*—For cast iron manhole covers, gullies, pavement channels, step irons, &c., for the Corporation (Contract No. 2).

FINCHLEY, NOVEMBER 18.—*Petrol Motor.*—For a petrol motor fire combination, for the Urban District Council.

FOLKTON, NOVEMBER 27—*Oil Engine, &c*—For an oil engine, for the Sherburn Rural District Council.

GOOLE, NOVEMBER 26—*Cast Iron Pipes.*—For about 60 tons 3 in. cast iron pipes, for the Rural District Council.

LONDON, NOVEMBER 19—*Steel and Ironwork*—For about 250 tons of steel and ironwork (British manufacture), for the directors of the Great Western Railway Company

LONDON, NOVEMBER 22—*Fishbolts.*—For fishbolts, for the Secretary of State for India in Council.

MANCHESTER, NOVEMBER 19—*Rotary Converter and Transformer*—For one 650/800 kw. capacity rotary converter and transformer, for the Corporation.

MAESGLAS (NEWPORT), NOVEMBER 19.—*Steel Girders.*—For steel girders and other steel and iron work, for the directors of the Great Western Railway Company.

NEWCASTLE-ON-TYNE, NOVEMBER 19.—*Multitubular Boiler*—For two multitubular boilers, for the No. 5 dredger the Tyne Improvement Commissioners.

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During the month of October 1912, compared with the corresponding month of 1911.*

Port.	October 1912.		October 1911.		Coals.		Coke.	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
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South Shields	137,920	797	97,308	4,827	40,612	—	—	1,030
Sunderland	244,858	6,482	238,463	1,388	6,395	—	2,094	—
West Hartlepool	132,029	902	131,547	1,314	482	—		412
Goole	98,264	3,104	105,728	4,124	—	7,464		1,020
Blyth	355,824	753	298,511	1,037	57,313			284
Newport	408,393	1,880	316,112	1,606	92,281	—	274	—
Liverpool	31,982	3,169	27,724	2,034	1,258		1,135	
Methil	228,084	1,769	221,775	2,942	6,309	—	—	1,173
Glasgow	187,012	954	153,303	3,737	33,709	—	—	2,783
Kirkcaldy	14,276	40	13,403	—	847	—	40	
Burntisland	177,530	1,686	181,378		—	3,848	1,686	—
Cardiff	1,859,673	7,089	1,447,150	6,051	412,523	—	1,038	
Borrowstoness	60,404	1,410	58,657	2,381	1,744	—		971
Llanelly	14,600	—	14,324	—	276	—	—	
Middlesbrough	889	3,861	2,141	7,002	—	1,252		3,141
Seaham	61,944	193	56,801	—	5,143		193	
Swansea	334,571	110	259,227	580	75,344			170
Granton	11,509	2,636	10,502	1,647	1,007		—	2,011
Port Talbot	172,365	551	110,638	1,114	61,727			863
Alloa	15,453	—	19,936	—	—	4,483	—	—
Grangemouth	147,717	13,549	117,132	9,205	585	—	4,331	
Neath	8,389	—	14,657	—		3,268		
Hull	376,074	7,759	317,269	3,492	58,805		4,267	—
Amble	48,230	—	33,353	—	14,877	—	—	—
Troon	5,020	—	5,366	—	—	346	—	—
Grimsby	126,939	723	120,990	1,323	5,949			600
Ayr	1,231	—	670	—	561	—	—	—
Greenock		—	—	—	—	—		
Leith	180,176	—	143,965	103	36,211	—	—	103
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Stockton		—	—	—	—	—	—	

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Troon	23,766	—	20,283	8
Ardrossan	7,379	—	5,799	—
Ayr	78,729	80	70,953	—
Irvine	6,057	—	3,426	
Alloa	640	—	1,392	—
Whitehaven	20,380	—	19,347	—
Liverpool	174,189	11	181,956	—
Grimsby	5,611	—	6,008	—
Granton	22,938	—	14,080	—
Borrowstoness	15,425	—	15,705	25
Burntisland	42,204	—	1,465	—
Kirkcaldy	4,528	—	1,047	—
Methil	22,920	—	18,930	—
Port Talbot	22,153	300 pf	14,807	272 c 300 pf
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Sanderson Brothers and Newbould Limited.—The directors have paid an interim dividend of 1s. 6d. per share, free of income-tax.

Wilsons and Clyde Coal Company Limited.—The directors have decided to split the ordinary shares, which are at present of the denomination of £3 each, into shares of £1 each, three new shares being exchanged for every old share. The authorised capital of the company is £230,000, of which £180,000 is in ordinary shares, and £50,000 in 7 per cent. cumulative preference shares. The whole of the ordinary shares have been issued and called up.

Worcester Coal and Iron Company Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to take over the business carried on at Worcester by John Jackson and Sons (Worcester) Limited, and to carry on the business of coal, iron and steel merchants, &c. First directors: A. Lloyd, E. C. Jackson, W. H. W. Robinson. Registered office, 3, College-street, Worcester.

Mortgages and Charges.—The following have been registered in pursuance of the Companies Acts, 1907:—Apex Steel Company Limited (debentures dated October 16, 1912, to secure all moneys due or to become due from the company to the Sheffield Banking Company Limited, George-street, Sheffield); Gloucester Railway Carriage and Wagon Company Limited (issue on October 14, 1912, of £5,300 debentures, part of a series); Hazel Colliery and Brick Company (Barlborough) Limited (particulars of £4,000 debentures created by resolutions of September 26 and October 10, 1912, whole amount now issued); Jonas and Colver Limited (satisfaction in full on October 15, 1912, of debentures dated February 13, 1908, securing £47,100); North Central Wagon Company Limited (issue on October 9, 1912, of £3,939 debentures, part of a series); South Derwent Coal Company Limited (mortgage dated September 26, 1912, to secure all moneys due from the company to Lloyd's Bank Limited, Collingwood-street, Newcastle-on-Tyne); Tannett, Walker and Co. Limited (issue on October 4 of £2,000, and on October 9, 1912, of £1,150 debentures, parts of a series); Corrwg Vale Colliery Limited (charge dated October 21, 1912, to secure £1,000); Cross, Tetley and Co. Limited (debenture and agreement, defining terms of issue thereof, both dated dated October 10, 1912, to secure £40,000); Jonas and Colver Limited (particulars of £100,000 debentures created October 15, 1912, present issue £47,100); Lincoln Wagon and Engine Company Limited (issue on October 23, 1912, of £10,610 debentures, part of a series); National Explosives Company Limited (satisfaction in full on July 2, 1912, of mortgage or trust deed dated November 19, 1908, securing £101,306, notified; security dated October 22, 1912, to secure £5,000 and further advances not exceding £10,000, also registered); North Central Wagon Company Limited (issue on October 23, 1912, of £2,049 debentures, part of a series).

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Abstracts of Contracts Open.

Alexandria (Egypt), December 5.—Tenders are invited for the supply and delivery of (1) 3,340 tons of Cardiff and 30 tons of Newcastle coal; (2) 19 tons of benzine in 4-gallon tins; and (3) 85 tons of petroleum in 4-gallon tins; required for the service of the Coast Guard Administration. Copies of the conditions and forms of tender for each of the above contracts can be seen by British firms at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Beverley, November 23.—For coal, for the Education Committee.

Cairo, November 25.—For Newcastle, Cardiff, and anthracite coal and coke for the Director of Stores, Central Administration.

Harrogate, November 25—For (1) supply of house coal, (2) supply of slack coal, (3) supply of slack coal, for the Wells and Baths Department.

Hull, November 22.—For best South Yorkshire double-screened hard steam coal, for the directors of the Steam Cutter Coal and Ice Company Limited. Average monthly consumption 2,000 to 2,500 tons.

Lagos (Southern Nigeria), November 22.—For the supply to the Government of Southern Nigeria of not less than 20,000 tons of best quality double-screened South Wales steam coal (Admiralty standard). Particulars can be obtained by British firms on application to the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Lowestoft, November 27—For about 90 tons of the best seaborne coals, for the trustees of the Kirkley Poors Land Estate.

Stockport, November 18—For best house coal, for the Guardians.

Trichinopoly (India), November 18.—The South Indian Railway Company Limited invite tenders for the supply of 800 tons of Indian smithy coke and 800 tons of foundry coke. Further particulars obtainable from the locomotive and carriage superintendent, South Indian Railway, Negapatam. Tenders must be sent to the agent, South Indian Railway, Trichinopoly.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Aldershot, November 20—*Boiler.*—For a vertical mild steel-plated boiler, for the Urban District Council. Height of boiler, 6 ft.; diameter, 2 ft. 6 in.; height and diameter of firebox, 3 ft 3 in. and 2 ft 2 in.; cross tubes, 6 in; uptake 7 in. diameter, with cast iron liner; shell, ⅜ in. thick; firebox, 7-16 in.; tubes and uptake, 7-16 in.; crown, 7-16 in.; safety valve and lever and weight, steam-gauge and siphon, stop-valve, feed-valve, two water-gauges and guards, blow-off cock, fusible plug.

Ardee (Ireland), November 19—*Pump.*—For a pump, for the No. 1 Rural District Council.

Belfast, November 26—*Motor Ambulance.*—For a motor ambulance, for the Guardians.

Birmingham, November 25.—*Electric Motors.*—For various sizes of electric motors required by the Electric Supply Committee of the Corporation.

Calanas (Spain), November 30.—*Generating Plant.*—The municipal authorities of Calañas invite tenders for a central electric generating station.

Christiansund (Norway), November 30.—*Cast Iron Water Pipes.*—Tenders are invited by the municipal authorities of Christiansund for the supply and delivery of about 11,300 m. (about 37,000 ft.) of cast iron socket water pipes, or, alternatively, seamless steel socket pipes, of various diameters. Further particulars may be obtained from the Town Engineer, Christiansund, Norway.

Coventry, November 25.—*Cast Iron Manhole Covers, &c.*—For cast iron manhole covers, gullies, pavement channels, step irons, &c., for the Corporation (Contract No. 2).

Finchley, November 18.—*Petrol Motor.*—For a petrol motor fire combination, for the Urban District Council.

Folkton, November 27—*Oil Engine, &c.*—For an oil engine, for the Sherborn Rural District Council.

Goole, November 26—*Cast Iron Pipes.*—For about 60 tons 3 in. cast iron pipes, for the Rural District Council.

London, November 19—*Steel and Ironwork.*—For about 250 tons of steel and ironwork (British manufacture), for the directors of the Great Western Railway Company.

London, November 22—*Fishbolts.*—For fishbolts, for the Secretary of State for India in Council.

Manchester, November 19—*Rotary Converter and Transformer.*—For one 650/800 kw. capacity rotary converter and transformer, for the Corporation.

Maesglas (Newport), November 19.—*Steel Girders.*—For steel girders and other steel and iron work, for the directors of the Great Western Railway Company.

Newcastle-on-Tyne, November 19.—*Multitubular Boiler.*—For two multitubular boilers, for the No. 5 dredger the Tyne Improvement Commissioners.

BRUSSELS EXHIBITION: "GRAND PRIX." ALLAHABAD, 1910.
ROUBAIX EXHIBITION, 1911: "GRAND PRIX."

HOPKINSON'S "RDS" Steam Trap

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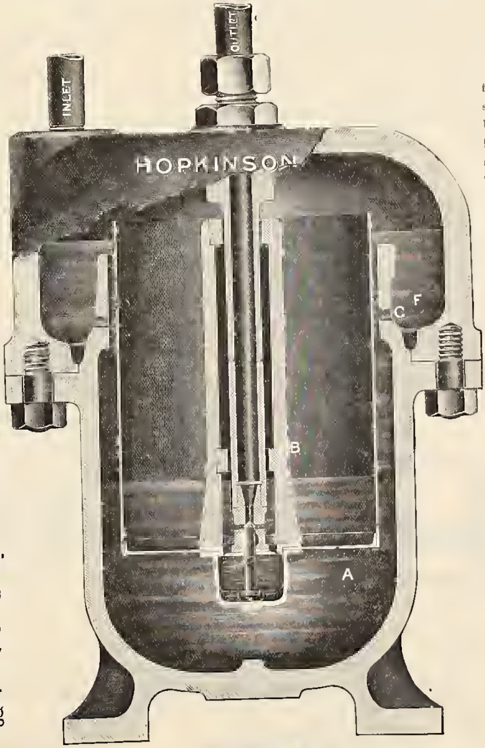
SUITABLE FOR ANY PRESSURE.

A large number of these traps have been in use for several years, and our experience has been so satisfactory that we have every confidence in recommending them to steam users. The workmanship and material are of the highest quality, and is altogether a far superior article to the many cheap bucket traps now on the market.

SPECIAL FEATURES.

- SIMPLICITY.
- RELIABLE.
- QUICK IN ACTION.
- NO DRIBBLING.
- STRONG INTERMITTENT WATER DISCHARGE.
- QUICK CUT-OFF.
- WILL LIFT ITS WATER 2 ft. FOR EVERY 1 lb. STEAM PRESSURE.
- FITTED WITH VALVE AND SEAT OF . . HOPKINSON'S 'PLATNAM' METAL, which is five times harder than . bronze and admirably suitable for withstanding the cutting action of the water.



CAST IRON BODY AND LID,
HOPKINSON'S "PLATNAM" METAL VALVE AND SEAT.

DESCRIPTION.

This steam trap is of the open float type, and consists in its simplest form of a Water Chamber **A**, Float with central guide **B**, Valve **C**, Water Inlet Pipe, and Water Discharge Pipe. The discharge pipe forms the guide for the float.

The valve remains on its seat until the float has sunk low enough to touch the collar on valve; it then immediately begins to discharge.

The Gallery or Water Pocket **F** is an important feature, as it fills with water when the Float is at rest; when the Float begins to rise from its lowest position, the water thus collected flows through the hole **C** into the body **A**, thus ensuring a rapid elevation of the Float independent of a small amount of water passing into the trap. The valve is not rigidly connected with the bucket, and it is therefore held on to its seat until the Float acts on the Valve. This device is, therefore, most valuable under all conditions of working, but more especially when the volume of water entering the trap is small. Its lifting effect on the Float is indicated by the sharpness with which the water discharge is cut off.

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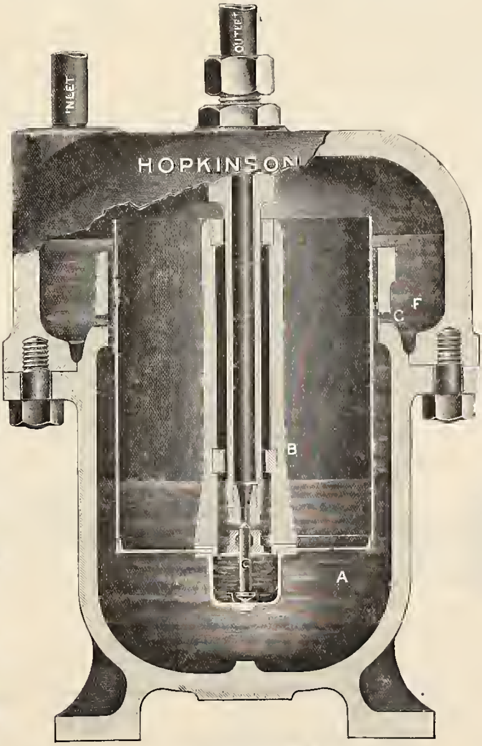

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The Gallery or Water Pocket **F** is an important feature, as it fills with water when the Float is at rest; when the Float begins to rise from its lowest position, the water thus collected flows through the hole **G** into the body **A**, thus ensuring a rapid elevation of the Float independent of a small amount of water passing into the trap. The valve is not rigidly connected with the bucket, and it is therefore held on to its seat until the Float acts on the Valve. This device is, therefore, most valuable under all conditions of working, but more especially when the volume of water entering the trap is small. Its lifting effect on the Float is indicated by the sharpness with which the water discharge is cut off.

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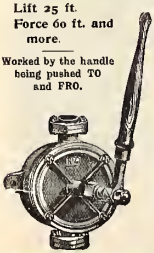

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½ in. to 4 in.
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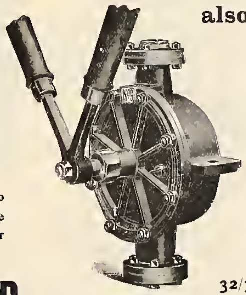
Large Sizes 2½ in. to 4 in. bore have double handles for two or more men.



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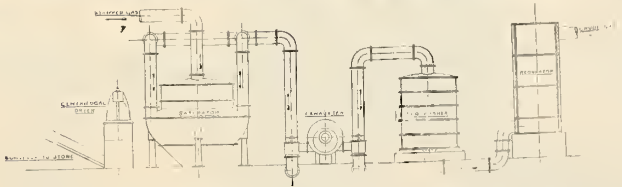

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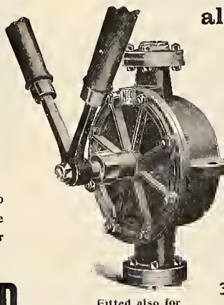

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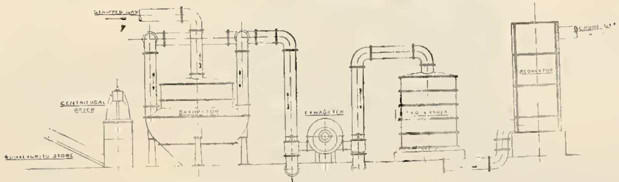

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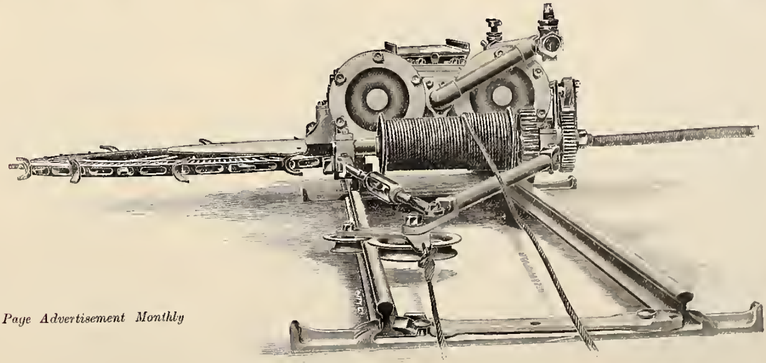

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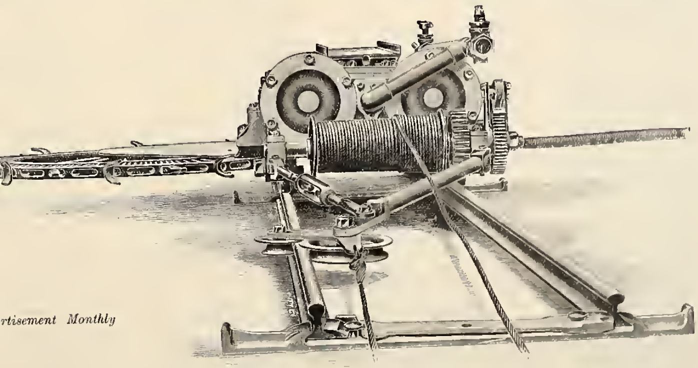

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Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
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Hardy Patent Pick Co. Ld., Sheffield
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Wood, John, & Sons Ld., Brook Foundry, Wigan
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Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Robey and Co. Ld., Lincoln
Theedam, E. C., Ld., Dudley
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Chorley Railway Wagon Co. Ld., Chorley, Lancs.
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Coke Oven Charging Machinery
Coke Oven Construction Co. Ld., Sheffield
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

Coke Oven Recovery Plant
Coke Oven Construction Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Coke Oven Stamping Machinery
Coke Oven Construction Co. Ld., Sheffield
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

Coke Ovens
Coke Oven Construction Co. Ld., Sheffield
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Lührig Coal and Ore-Dressing Appliances Ld., 32, Victoria-street, S.W.
Simon-Carves Ld., 20, Mount-street, Manchester

Coke Rams or Pushers
Coke Oven Construction Co. Ld., Sheffield
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport, Mon.

Coke Screens
Coke Oven Construction Co. Ld., Sheffield
Cousland, Alex., and Son, 3, Mitchell-st., Glasgow
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Colliery Plant
Allan, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Son, Bilston, Staffs
Bever, Dorling and Co. Ld., Bradford
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, E., 2, Aire-street, Leeds
Davis, John and Son (Derby) Ld., Derby
Fraser & Chalmers Ld., 3, London Wall Bldgs, E.C.
Hardy Patent Pick Co. Ld. Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Haslam and Schontheil Ld., Cardiff
Hathorn, Davey and Co. Ld., Leeds
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Hurd Coal-Cutter and Engineering Co. Ld., 188 St. Vincent-street, Glasgow
Improved Coal Mining Co., Sacriston, nr. Durham
Isca Foundry Co., Newport
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, H. H., and Co. Ld., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld. 47, Broad-street, Glasgow
Mining Engineering Co. Ld., (The), Sheffield
Norton's (Tividale) Ld., Tipton
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Phillips, C. D., Newport, Mon.
Pillatt & Co. Ld., Stapleford, Nottingham
Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
Railway and General Engineering Co. Ld., Notts
Reavell and Co. Ld., Ipswich.
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Waddle Patent Fan & Engineering Co., Llanelly
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton
Yeadon, Son and Co., Albion-place, Leeds
Yorkshire Engine Co. Ld., Sheffield

Condensers & Condensing Plant
Bolliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Constructional Steel and Iron Work
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Cantrell, W. E., and Co. Ld., Beeston, Notts
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Newton Heath, Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Norton's (Tividale) Ld., Tipton
Longbotham, H. H., and Co. Ld., Wakefield
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Wood, John & Sons Ld. Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Conveyor Belts
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, R., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Conveyors and Elevators
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Cantrell, W. E., and Co. Ld., Beeston, Notts
Chain Belt Engineering Co., Derby, England
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Diamond Coal-Cutter Co. Stennard Wks. Wakefield
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Improved Coal Mining Co., Sacriston, nr. Durham
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Mather and Platt Ld., Manchester
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Primus Patents Co., Falcon-street, Oldham
Reddaway, F., & Co. Ld., Pendleton, Manchester
Sheppard and Sons Ld., Bridgend, South Wales
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts.
Sutcliffe, R., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Yorkshire Engine Co. Ld., Sheffield
Wright, Joseph, and Co., Tipton

Corner Plates
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

Cotton Waste, Twine, and Spun-yarn
Mudford, B. H., & Sons, 55, Exchange-st., Sheffield

Couplings
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Crab Winches
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

Crane Makers
Middleton, Robert, Sheepscar Foundry, Leeds
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Cranes
Appleby, E. G., and Co., 10, Victoria-street, Westminster
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Ryland-street Works, Birmingham

Creepers
Tickle Bros., Vulcan Ironworks, Wigan

Cut-off Gear
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Thornewill and Warham Ld., Burton-on-Trent
Wood, John, and Sons Ld., Wigan

Detonators
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Dies, Embossing Presses, and Seals
Pryor, Edward, and Son, 68, West-st., Sheffield

Disintegrators
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Middleton, Robert, Sheepscar Foundry, Leeds
Simon-Carves Ld., 20, Mount-street, Manchester
Yeadon, Son and Co., Albion-place, Leeds

Diving Apparatus
Pulsometer Engineering Co. Ld., Reading
Siebe, Gorman and Co. Ld., Westminster S.W.

Dog Spikes
Frost, Albert, and Co., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Renton, B. M., & Co., Midland Works, Sheffield

Double Helical Gear (Machine Cut)
Brown, David, and Sons (H'f'd) Ld., Huddersfield
Citroen, Andre, and Co., 27. Queen Victoria-street, London

Drain Goods
Appleton and Howard, St. Helens, Lancs.
Hopkinson, J., and Co. Ld., Huddersfield

Drawing Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drawing Office Stationery
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drills (Electric)
United States Metallic Packing Co. Ld., Soho Works, Bradford

Driving Pulleys
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Duplex Pumping Engines
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Evans, Joseph, and Sons Ld., Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Pearn, F., and Co. Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works. Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Dustbins (Sanitary)
Baker, John, and Son, Bilston, Staffs
Harvey, G. A., and Co., Lewisham, London, S.E.
Lewis, Wm., and Son, Bilston
Theedam, E. C., Ld., Dudley

Dynamite, &c.
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Nobel's Explosives Co. Ld., Glasgow

Dynamos
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Sutcliffe, Richard, Horbury, near Wakefield

Ebonite and Vulcanite
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Electric Detonators and Fuses
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Electrical Earthing Clips
Ingle, Albert E., 13, Albert-place, Bridge street, Manchester

Electrical Engineers
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Hurd Coal-Cutter and Engineering Co. Ld., 188, St. Vincent-street, Glasgow
Jardine, John. Deering-street, Nottingham
Mather and Platt Ld., Manchester
Theedam, E. C., Ld., Dudley

Electrical Fault Indicators
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield

Electric Haulages
Avonside Engine Co. Ld., Bristol
Bridge, David, & Co. Ld., Castleton, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davis John, and Son (Derby) Ld., Derby
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, H. H., and Co. Ld., Wakefield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Electric Meters
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Electrical Plant
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Ward, Thos. W., Limited, Albion Works, Sheffield

Electrical Pumps
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Electrical Stores
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C., Ld. Dudley

Emery Wheels

Enamelled Plates for Notices for Mines
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Theedam, E.C., Ld., Dudley

Enamel Manufacturers (for all Metals)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalbitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Engineers (Consulting)
Entreprise Générale de Fonçage de Puits, 5, Rue de Surêne, Paris
Fell, C. A., Dronfield, near Sheffield
Radford, B. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

Engines (Blowing)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Gas-Compressing)
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Hauling and Winding)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam
Longbotham, H. H., and Co. Ld., Wakefield
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Notts

Engines (Hauling and Winding)—continued.
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, R., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

Engines (Locomotive)
Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements lane, London, E.C.
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)
Mather and Platt Ld., Manchester

Engine Merchants
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

Engines (Oil)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping) (See **Pumps**)

Engines (Rolling Mill)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.

Engines (Steam)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Boyles Ld., Irlam, Manchester

Exhaust Turbine Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Boyles Ld., Irlam, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Ferro-Concrete Constructions
Yorkshire Hennebique Contracting Co. Ld., Leeds

Files
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & H., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Boyles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Boyles Ld., Irlam, Manchester
Wright, Joseph, and Co., Tipton

Fire Appliances
Fell, C. A., Dronfield, near Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Purchasers' Guide to Advertisers' Specialities.—(continued).

Firelighter Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Fishplates
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

Fittings (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

Forced Draught
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

Forges
Hardy Patent Pick Co. Ld., Sheffield

Forgings
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Benton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld., Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Friction Surfaces
Frood, Herbert, Co. Ld., Chapel-en-le-Frith

Fuel Economisers
Fell, C. A., Dronfield, near Sheffield
Pillatt and Co., Stapleford, Nottingham
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld., Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Pillatt and Co. Ld., Stapleford, Nottingham
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters

Fuses (Safety)
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Srions

Gas Engines
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Gas Exhausters
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Gas Plant
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Tipton

Gas Valves
Haslam and Schontheil Ld., Bristol

Gauge Glasses
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Royles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Hopkinson, J., and Co. Ld., Huddersfield
Royles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gear (Special for Motor Lorries Cars &c.)
Brown, David, & Sons (Hudd.) Ld., Huddersfield

Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroën, Andre, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Room Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon st. House, E.C.

Gutta Percha
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, H., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hoists
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

Hooks or Links (Safety)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Loampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Northern Rubber Co., The Wicker, Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Hose (Coal-Cutter)
Northern Rubber Co., The Wicker, Sheffield

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Hydraulic Jacks
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Byland-street Works, Birmingham

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Hyland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hygrometers
Davis, John, and Son (Derby) Ld., Derby

Incline Rollers
Bagnall, W. G., Ld., Stafford
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Northern Rubber Co., The Wicker, Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Royles Ld., Irlam, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Byland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Hardy Patent Pick Co. Ld., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Byland-street Works, Birmingham

Jointing Cement
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

Jointing (Sheet)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Joists (Rolled Steel)
Heenan and Froude Ld., Worcester
Benton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Keps (for Winding Cages)
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Lamp Cleaning Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Gauze Brushes
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Glasses
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Oil Filling Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Re-Lighting Apparatus (Underground)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Arc)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Lamps (Electric)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

Lamps (Electric Safety)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent
Photos Milner's Electric Lamp Ld., Queen's-road, Battersea
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Miners' Safety)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Outdoor)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

Lathes
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

Leather Appliances

Lessons by Post
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

Lifting and Hoisting Tackle
Benton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Hyland-street Works, Birmingham

Lightning Conductors
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Shaw, John, Ld., Sheffield
Theedam, E. C., Ld., Dudley

Locknut Washers
Benton, B. M., and Co., Sheffield

Loose Collars
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster S.W.

Lubricators
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Royles Ld., Irlam, Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Machinery (Second-hand)
Bute Works Supply Co. Ld., Cardiff
Foot, R. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Benton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

Machine Tools
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

Mathematical Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mechanical Stokers
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Proctor, James, Ld., Hammerton-st., Burnley

Metal Perforators
Barns, W., & Son, Queensland-road, Holloway, N.
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

Metallic Packing
United States Metallic Packing Co. Ld., Soho Works, Bradford

Meteorological Instruments
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King st. West, Manchester

Mills (Grinding)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

Mining Dials
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mining Machinery
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Hurd Coal-Cutter and Engineering Co. Ld., 168 St. Vincent-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Mining Tools
Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

Motors
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

Motor Starters
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Motor Vans and Wagons
Avonside Engine Co. Ld., Bristol
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.

Nails Spikes, &c.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Frost, Albert, and Co., Howard-street, Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Benton, B. M., and Co., Midland Works, Sheffield

Office Furniture and Appliances
Thornton, A. G., Ld., King-st. West, Manchester

Oil Bottles
Baker, John, and Son, Bilston, Staffs
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Cabinets
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Switches
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Oils and Lubricants
Ackroyd and Best Ld., Morley, nr. Leeds
Asbestos and General Paint Co. Ld., Birmingham
Gaunt and Hickman, Oil Works, Wolverhampton
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., & Co. Ld., 23, Southwark-st., E.C.

Overhead Travellers
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Spencer and Co. Ld., Melksham, Wilts
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

Overwinding Gear
Barclay, Andrew, Sons and Co. Ld., Kilmarnock,
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Oxygen Manufacturers
British Oxygen Co. Ld., Elverton-st., Westminster
Knowles Oxygen Co. Ld., Wolverhampton

Packing (Engine)
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Green and Boulding Ld., London, E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Mudford, E. H., & Sons, 55, Exchange-st., Sheffield
Northern Rubber Co., The Wicker, Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Paint
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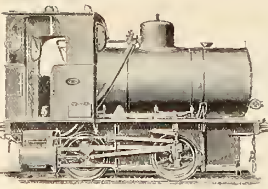

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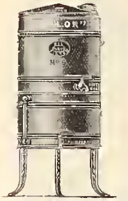

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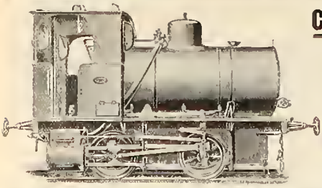

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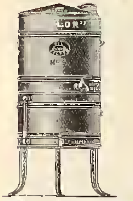

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Robey and Co. Ld., Lincoln

Structural Steel Work
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Wright, Joseph, and Co., Tipton

Sulphate of Ammonia Plant
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Sulphur Recovery Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Superheaters
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
Pulsometer Engineering Co. Ld., Reading
Stringer, John, and Son, Dept. 11, Blackburn

Surgical Appliances
White & Wright, 93, Renshaw Street, Liverpool

Susplug Steam Valves (Full Bore)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Hopkinson, J., and Co. Ld., Huddersfield
Royles Ld., Irlam, Manchester

Surveying (Books on)
Thomas, Wm., Cambrian Mining School, Porth

Surveying (Instruction)
Thomas, Wm., Cambrian Mining School, Porth

Surveying Instrument Makers
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavement, London
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Switch Boards
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Switch Gear
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Swivels (Ball-Bearing)
Bridge, David & Co., Ld., Castleton, Manchester
Youngs, Hyland-street Works, Birmingham

Tamping Plugs

Tanks
Bagnall, W. G., Ld., Stafford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Harvey, G. A., and Co. Loampit Vale, Lewisham
Isca Foundry & Engineering Co., Newport, Mon.
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Valor Co. Ld., Aston Cross, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan
Yorkshire Hennebique Contracting Co. Ld., Leeds

Tanks (Ferro Concrete)

Tar Distilling Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Technical Education
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Telephones
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Timber (Colliery)
Baird, J. W., and Co., West Hartlepool
Osbeck and Co., Newcastle-on-Tyne

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Bagnall, W. G., Ld., Stafford
Cantrell, W. E., and Co. Ld., Beeston, Notts
Heenan and Froude Ld., Worcester
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Spencer and Co. Ld., Melksham, Wilts
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

Tools
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Holland Drilling Co., 56, Moorgate-street, E.C.
Tangyes Ld., Cornwall Works, Birmingham
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Tram and Wagon Corner Plates
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Theedam, E. C., Ld., Dudley

Transformers (Electrical)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

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Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Trommels
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Heenan & Froude Ld., Worcester and Manchester
Robey and Co. Ld., Lincoln
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Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Tubbing and Well Cylinders
Head, Wrightson and Co. Ld., Stockton-on-Tees
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Tub Drawbars
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Ormerod, Edward, Atherton, near Manchester
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

Tube Expanders
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Hyland-street Works, Birmingham

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Lewis, Edwin, and Sons Ld., Wolverhampton
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Wednesbury
Stewarts & Lloyds Ld., Birmingham and Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tubes (Iron and Steel)
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Lewis, William, and Son, Bilston
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tub Greasers and Controllers
Theedam, E. C., Ld., Dudley

Tubs (Colliery)
Allen, A., and Son Ld., Lower Gornal, Staffs
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Humble, Stephen, 9, Victoria-st., London, S.W.
Longbotham, H. H., and Co. Ld., Wakefield
Theedam, E. C., Ld., Dudley
Wigan Wagon Co. Ld., Springs Branch, Wigan
Wright, Joseph, and Co., Tipton

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British Westinghouse Electric and Manufacturing Co. Ld., Manchester
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Wright, Joseph, and Co., Tipton

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Baker, John, and Son, Bilston, Staffs
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Radford, H. H., Son, and Squire, Sheffield
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Auld, D., and Sons, Whitevale Foundry, Glasgow
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Green and Boulding Ld., 28, New Bridge-st., E.C.
Haslam and Schontheil Ld., Cardiff
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Royles Ld., Irlam, Manchester
Russell, John, & Co. Ld., Alma Tube Works, Walsall

Vices
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
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Chorley Railway Wagon Co. Ld., Chorley, Lancs.
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Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Jardine, John, Deering-street, Nottingham
Benton, B. M., and Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
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Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

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Koppers' Coke Oven

has been proved to be the most successful on the market, as is evidenced by the fact that in the comparatively short period of nine years orders for over **9,000** Ovens have been placed with us, of which number over **4,250** are repeat orders. These orders represent a capital cost of over

£7,500,000.

SIMILAR SUCCESS ATTENDS THE INTRODUCTION OF

KOPPERS' NEW SYSTEM OF BYE-PRODUCT RECOVERY.

In the New System the Scrubbing process is entirely dispensed with, and the Ammonia is recovered direct from the Gas in the form of Sulphate.

ADVANTAGES OF NEW SYSTEM

- Effluent Liquor reduced by 50 per cent. and upwards.
- Great Saving in Steam Consumption.
- Greater Yield of Sulphate and Benzol.
- Consumption of Water is considerably Reduced.
- Less Labour Cost.
- Plant is Simpler to Operate, and requires less Supervision.

Plants already at work and under construction to deal with the Gases evolved from upwards of **20,000,000** tons of coal per annum.

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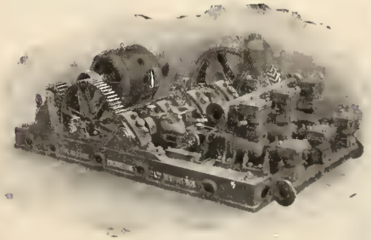

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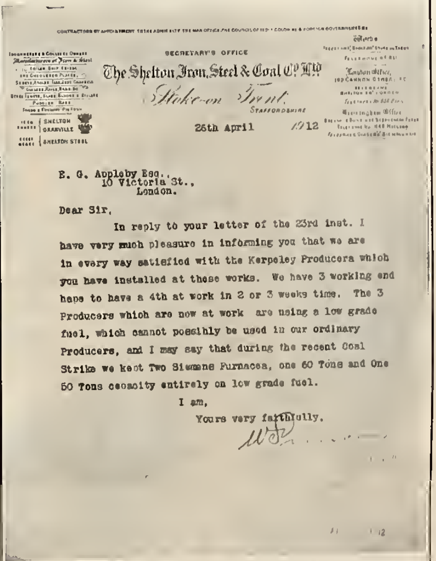

SECRETARY'S OFFICE

The Shelton Iron, Steel & Coal Co. Ltd.

Stoke-on-Trent.

Staffordshire

25th April 1912

E. G. Appleby Esq.,
10 Victoria St.,
London.

Dear Sir,

In reply to your letter of the 23rd inst. I have very much pleasure in informing you that we are in every way satisfied with the Kerpeley Producers which you have installed at these works. We have 3 working and hope to have a 4th at work in 2 or 3 weeks time. The 3 Producers which are now at work are using a low grade fuel, which cannot possibly be used in our ordinary Producers, and I may say that during the recent Coal Strike we kept Two Siemens Furnaces, one 60 Tons and One 50 Tons capacity entirely on low grade fuel.

I am,
Yours very faithfully.

LOW GRADE FUEL.

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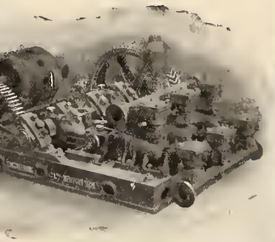
301, *Glossop Road, SHEFFIELD.*

Telegraphic Address—"KOCHS, SHEFFIELD."



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TO DRIVE BY
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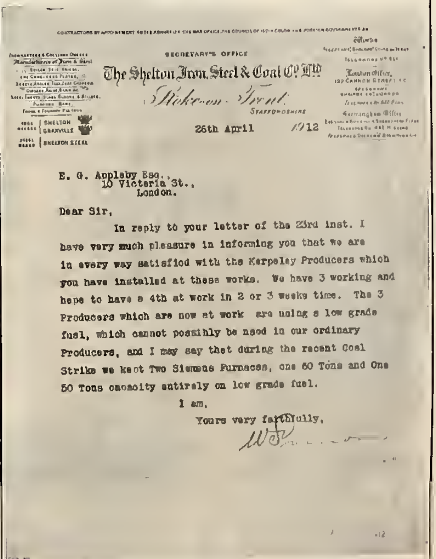

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SHELTON STEEL

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I am,
Yours very faithfully,

LOW GRADE FUEL.

FERODO *A fabric of great mechanical strength and long pedigree for*

FIBRE. LINING

Any kind of BRAKE or CLUTCH.

DURABILITY. Many times greater than wood. Ferodo Lining is cheaper than wood or metal.

NO SPARKING. Doubles your power at once. Gives confidence—your men wind faster and you get more coal every hour of the day. Ferodo fabrics engage sweetly and save jerk on ropes—gives instant power. Keeps the drum path smooth and unworn. No need to use reverse steam.

THINK! London Motor Busses and Tube Railways for several years entirely depend on Ferodo lined brakes, and they carry 800 million persons safely per annum.

READ THIS:

[*COPY*]. From THE STAVELEY COAL & IRON CO. LTD.

Yorkshire Main Colliery, Edlington, nr. Doncaster.
September 4th, 1911.

Gentlemen,

The "Ferodo" Brake Lining in use here on our Winding Engine Drums gives every satisfaction.

The pits are over 900 yards deep, hoppit loaded weighs nearly 4 tons, winding rope 5 tons; this load is entirely unbalanced.

The brake is our four post type, with 9 ft. of bearing surface on each post, and is a foot brake.

Previous to using "Ferodo" we used poplar brake blocks 8 in. by 5 in., the life of a set being about 5 weeks.

"Ferodo" brake lining 8 in. by ¾ in. has on four of the posts been in wear six months and looks like lasting six more. The other four posts were changed after five months' service, having worn down in one place to ¼ in thickness with the holding power unimpaired.

The winding engine drivers speak most highly of its holding qualities, and there is no charring as with wood blocks.

Yours faithfully, (*Signed*) **S. CLARKE, Enginewright.**

ASK FOR SAMPLE AND LIST.

THE HERBERT FROOD CO. LTD.,

39, Upper Rathbone Place, London.
Wires—"Frodobrake." *Tel.*—7650 City.

Sovereign Mills, Chapel-en-le-Frith.
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TELEPHONE: 4366 CENTRAL — TELEGRAMS: "ALFRO, SHEFFIELD"

ALBERT FROST & Co.,

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GAUGE GLASS PROTECTORS,

The surrounding list, comprising only a small portion of our specialities, are articles of which we know the value from practical experience.

For twelve years we had PRACTICAL COLLIERY EXPERIENCE and are therefore fully qualified to know what you—in a similar position—require.

This knowledge enables us to ECONOMISE in all directions, but never to sacrifice either material or workmanship for the sake of an attractive price list.

This SCIENTIFIC ECONOMY makes all the difference in your expenses at the end of the year, and is only to be gained by dealing with a firm who have studied at the school of PRACTICAL EXPERIENCE.

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HAMMERS, PULLEYS,
PICKS, RIVETS,
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VALVES, WINCHES, &c.

GRINDSTONES,
GUN METAL VALVES,
LATHE CHUCKS,
LIFTING BLOCKS,
SIGNAL WIRE,
STEEL WHEEL-BARROWS,
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South Yorks Representative:—
Mr. A. N. Mallinson,
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WE HAVE ALL THESE GOODS IN STOCK, AND CAN SUPPLY YOU IMMEDIATELY.

ERODO

A fabric of great mechanical strength and long pedigree for

FIBRE. LINING

nd BRAKE or CLUTCH.

DURABILITY. Many times greater than wood. Ferodo Lining is cheaper than wood or metal.

NO SPARKING. Doubles your power at once. Gives confidence—your men wind faster and you get more coal every hour of the day. Ferodo fabrics engage sweetly and save jerk on ropes—gives instant power. Keeps the drum path smooth and unworn. No need to use reverse steam.

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TELEPHONE: 4366, CENTRAL TELEGRAMS: "ALFRO, SHEFFIELD"

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South Wales Representative:—
Mr. W. Pegler,
7, Australia Road, Cardiff.

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This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c., as issued.

Registered No. Please quote when ordering.	NEW FORMS, &c., RECENTLY ISSUED.	
	Statutory Rules and Orders, &c.	
H.O., 511	Explosives in Coal Mines Order of 21st May, 1912 (revoking all previous "Explosives" Orders). Pamphlet Form ...	4d. each. By post 5d.
C.G., 69	The same (without Schedules). Pamphlet Form	4d. each. By post 5d.
H.O., 34	The same (without Schedules). In Sheet Form for posting ...	1d. each. By post 1½d.
H.O., 1540	Explosives in Coal Mines Order dated October 15, 1912 ...	Price 1d. By post 1½d.
C.G., E.	Special Rules for the Installation and Use of Electricity in Mines. Sheet Form (H.O., 12)	3d. each. By post 3½d.
C.G., K.	Pamphlet Form (H.O., 11)	2d. each. By post 3d.
	Orders of Secretary of State—	
	Dated October 24, 1912, under Coal Mines Act. Section 35 (i) The Relighting Electrically of Safety Lamps	
H.O., 1537	Dated October 12, 1912, under Section 9 (5) of Coal Mines Act, 1911. Fees to be Paid by Applicants for Certificates of Competency	1d. By post 1½d.
H.O., 1538	Dated October 12, 1912, under Section 13 of Coal Mines Act, 1911. Fees to be Paid for Copies of Lost Certificates of Competency	1d. By post 1½d.
H.O., 1539	Dated October 17, 1912, under Section 116 of Coal Mines Act, 1911. Time and Manner of Serving Notices under that Section	1d. By post 1½d.
C.G., L.	Coal Mines Act, 1911. Pamphlet Form	9d. By post 11d.
C.G., L. (Abs)	Coal Mines Act, 1911, Abstract. Sheet (26 in. by 34 in.) (H.O., 2)...	3d. each. By post 4d.
C.G., M.	Coal Mines (Minimum Wage) Act, 1912. Pamphlet Form ...	1½d. By post 2d.
Cd. 6460	Mines and Quarries: General Reports, &c., for 1910. Part 4. Foreign and Colonial Statistics	1s. 6d. By post 1s. 10d.
Cd. 6340	Mines and Quarries: General Reports, &c., for 1911. Part I. District Statistics	6½d. By post 8d.
	List of Mines in the United Kingdom for 1911	4s. each. By post 4s. 4d.
	List of Quarries in the United Kingdom for 1911	5s. each. By post 5s. 6d.
C.G., F.	Directions as to the Restoration of Persons suffering from Electric Shock (Silvester or Schäfer). Sheets (20 in. by 30 in., and 10 in. by 15 in.)	4d. each. 3s. per doz.
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	On Enamelled Iron Plates (10 in. by 15 in.)	3s. 2d. each do. Reduction on a quantity.

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H.O., 11A	Electricity Rules: Daily Log Sheet	1s. 6d. per 100
H.O., 11B	Do. Do. Book	4s. each. By post 4s. 8d.
H.O., 11C	Do. Notice to Inspector of the District under Rule 2 (ii.) ..	1d. each. By post 1½d.
H.O., 11D	Do. Notice to Inspector of the District under Rule 2 (iii.) ..	1d. each. By post 1½d.
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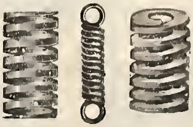

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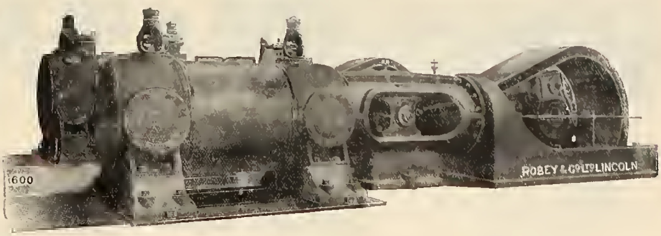

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NOTICE is hereby given, that in an action for Infringement of Blackett's Patent No. 14,953, of 1904, raised in the Court of Session, Edinburgh, at the instance of the Patentee, William Cuthbert Blackett, Mining Engineer, of Acorn Close, Sacriston, in the County of Durham, Complainer, against Dickson & Mann Limited, Engineers and Steel Founders, incorporated under the Companies' Acts, and having their registered office at Bathville Steel Works, Armadale, in the County of Linlithgow, Respondents, the Lord Ordinary (Lord Guthrie) by his Interlocutor or Order dated 17th November, 1908 (*inter alia*) certified the validity of the said Patent, in terms of section 35 of the Patents and Designs Act, 1907.

The Patentee hereby WARNS the trade and the public generally against making, selling, buying, dealing in or using Conveyors made in infringement of the said patent, which it is his intention to support and vindicate by all necessary means including legal proceedings. And further CAUTIONS infringers that they render themselves liable to an injunction or interdict with costs or expenses as well as to damages and delivery up of all infringing apparatus.

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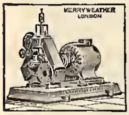

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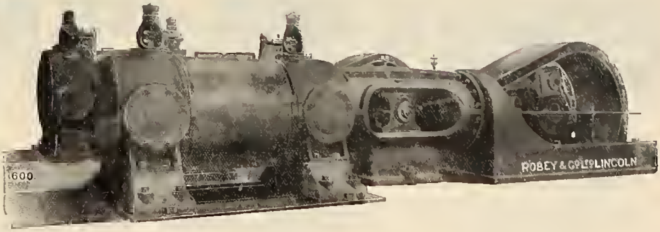

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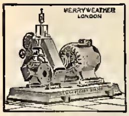

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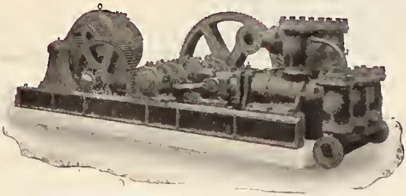

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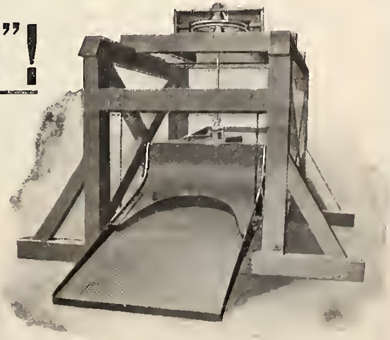

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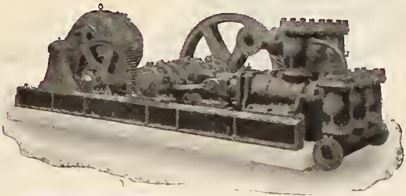

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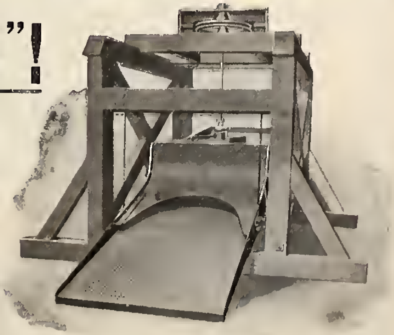

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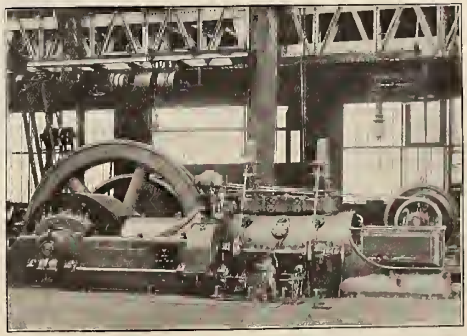

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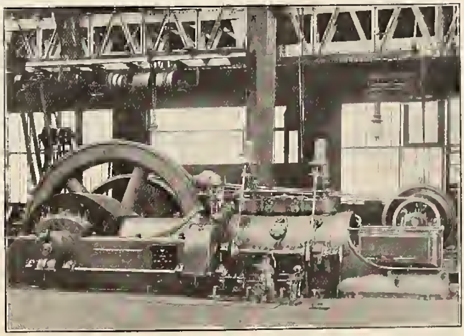

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No. 236.

THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

Vol. CIV. FRIDAY, NOVEMBER 22, 1912 No. 2708.

THE ADAIR FACE-CONVEYOR.

The design of coal face conveyors admits of many variations, whether based upon the prevailing methods of surface transport or upon the peculiar conditions present in the mine. Examples of various types of such conveyors have been described, in which are embodied well-known principles of conveying, such as the endless belt or chain, the trough, the swinging conveyor, and the bogie.

The conveyor, invented and developed by Mr. John Adair, inventor, late of Waterford, Ireland, now residing at Blalowan, Withycombe, Taunton, has certain features of its own which are of special interest. It was in 1908 that this inventor sealed his original patents, and these have since been amplified by others, all referring directly to the conveyance of minerals in narrow seams, the first specification having been put into operation in a seam of 14 in. with 5 in. underholing.

The characteristic of the Adair conveyor is the employment of a body or carrying portion, pivoted to a frame running on wheels, which can be tipped or canted sideways, the coal being discharged at a hatchway or bridge, whilst the specifications provide also for an arrangement by which the body may be so pivoted that no part of it descends below the level of the rails during discharge. The object, of course, has been to occupy as little space as possible in a vertical direction when discharging.

The drawings that follow show various applications of the invention :—

Fig. 1 shows a construction under Specifications No. 8, 1911, and No. 19642, 1909. The carriage frame is constructed of angle iron sides S, braced by cross pieces S^1. Broad-faced wheels T are located between the angle irons revolving on the bar. If desirable, the wheels may extend the full width of the space, but a 4 in. face has proved sufficient. The several conveyors are connected by wire ropes, the eyes formed on same being located on the pin P^3. These wire ropes are eased off from the pit props by a special form of roller located in the roadway.

To the angle iron sides S standards F are riveted, and in these the carrying parts G are pivoted at P, rollers R being attached to the carrying parts, placed alternately on either side of the conveyor, and strikers as indicated by the dotted lines N, coming in contact with these rollers, the carrying parts are canted, as illustrated by the dotted lines G^3.

These conveyors when discharging rise 18 in. above and descend 3 in. below the floor line, or say to the level of the bottom face of the bridge, giving a discharge space of 16 in.; full height of conveyor, 1 ft. above the floor line. The full length of the carrying parts G in their united length are close on 6 ft.

In the construction shown in fig. 2 the two canting parts face each other, the difference being that these are now pivoted to the ends of the carriage frame instead of to the sides. The carriage frame, in this case, is constructed of two lengths of hard wood. Angle irons F being bolted to these secure them in position. The carrying parts G are formed of bent channel iron, to which a strong bent steel plate G^1 is attached, an arm extending from the channel iron and riveted to the plate G^1, with a roller R on its terminal acting in this construction as the roller R in fig. 1. Through the frame and at each end a flat bar B^1 passes to receive on its terminals the wire rope connection as in fig. 1. The wire rope here is attached to an eye in B^1 by a shackle, a pin passing through the shackle and the eye of B^1.

Fig. 3 further illustrates fig. 2, G^1 being the sheet of bent steel, measuring in length close on 6 ft. In this view the conveyor is located on the bridge over the hatchway, this being formed by strong angle irons A^3, on which cross flat bars A^2 rest and are thereto riveted. Upright bars attached to A^3 sustain the strikers N in position, and the rollers R travelling on these accomplish the discharge of the load.

This conveyor rises 14 in. above floor line when discharging, and does not descend, giving a discharge space of 16 in. As this conveyor exceeds the usual length, and may be of further length, it is impossible to discharge its contents directly into the hopper over the hatchway; and therefore a device, termed by the inventor the "elongated discharge," is employed, which is here illustrated by the timber elevation placed on the bridge indicated by W. At each side are placed angle irons A^4 to guide the runners S into position previous to the discharging, these angle irons being bent slightly inwards at their terminals to allow of the runners S entering. The rollers R, having come in contact with the strikers N, travel upward, and the carrying parts open at their centre—that is to say, where the two carrying parts meet—and the load falls part into the hopper and part on the timber floor W. The conveyor travelling forward by the action of the angle iron F and the flat bar B^1, the coal travels forward from the timber floor into the hopper. A similar timber floor is located at the other side of the hatchway, as these conveyors may be operated at both sides of the hatchway. If desirable the discharge space may be increased to 20 inches by slanting the carrying parts more when discharging.

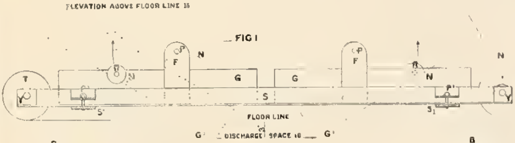

FIG 1

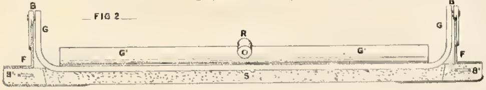

FIG 2

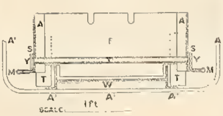

FIG 4

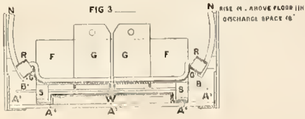

FIG 3

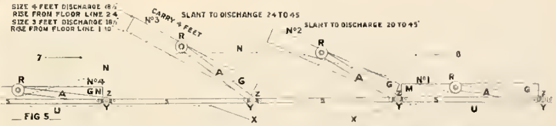
SIZE 4 FEET DISCHARGE 18½
RISE FROM FLOOR LINE 2 4
SIZE 3 FEET DISCHARGE 16½
RISE FROM FLOOR LINE 1 10"
CARRY 4 FEET
No 3
SLANT TO DISCHANGE 24 TO 45
No 2
SLANT TO DISCHARGE 20 TO 45°
No 4
No 1
7
R
N
A
G
Z
M
S
U
Y
X

FIG 5

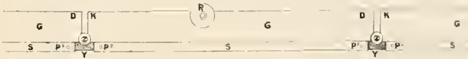

FIG 6

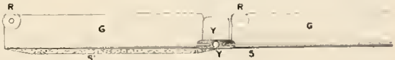

FIG 7

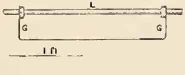

FIG 8

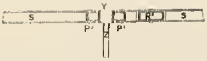

FIG 9

Fig. 4 shows the conveyor travelling on wide-faced wheels T. The strong angle irons A^3 which sustain the bridge over the hatchway are now located at each side of the timber elevation W, and the under flat iron A^1 is extended and curved upward to sustain the strikers N, as in fig. 3. For the angle iron F in fig. 3 a sheet steel is here substituted, held in position by upright angle irons A riveted to the angle iron sides S of the carriage frame. The strong angle irons A^3 are tapered at their terminals and bent slightly inwards, to permit of the wheels T conveniently entering on the bridge, whilst the steel plate F is cut to allow of its travelling clear of the angle irons A^1. The wire ropes are attached to the angle irons by claws M, tightening bolts closing the claws on the ropes.

Fig. 5 indicates a conveyor as expressed in Specification No. 26773, 1908, viz., with its carrying part in the form of a tray lying low to the level or floor line, and further improved by Specification No. 3375, 1912. These conveyors are represented as crossing the hatchway to discharge—the bridge line being indicated by the dotted lines U, and the hopper by the lines X. The action is the same as in the previous figures. Presuming the travel is in the direction of arrow 6—conveyor No. 4 having discharged and conveyor No. 3 discharging, and No. 2

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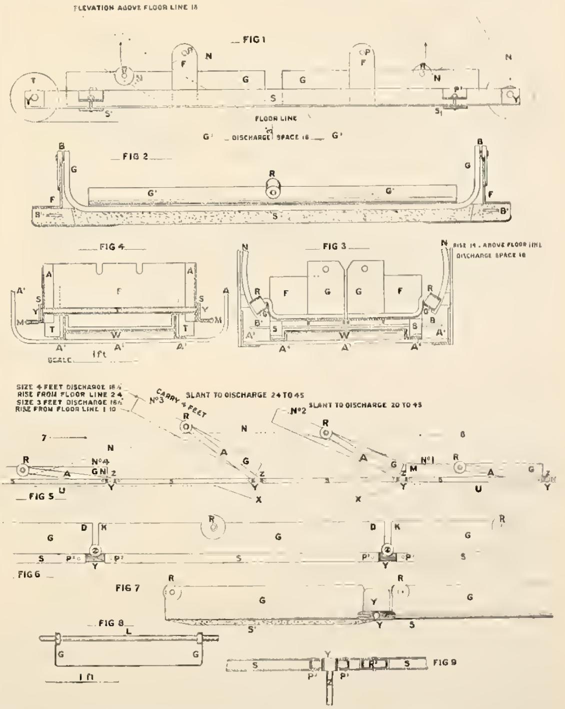

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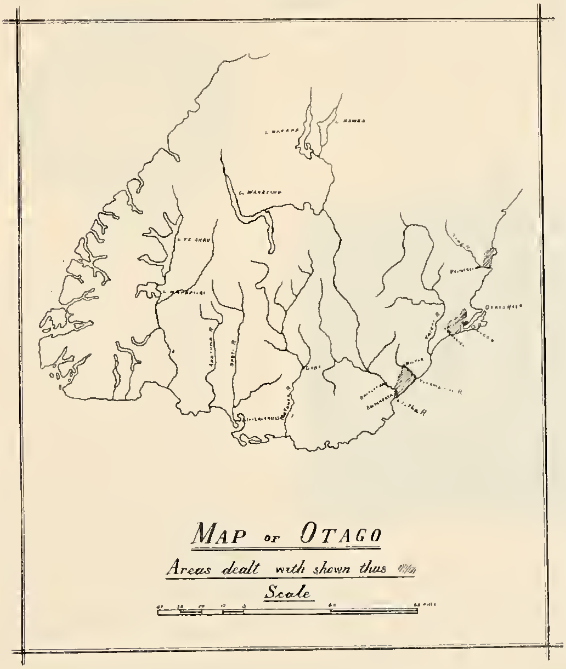

Map of Otago

Areas dealt with shown thus

Scale

series, then there is the probability of the Shag Point seams being found south of the Shag River, or even in the valley of the river itself, if prospecting were carried deep enough; this is the view that Cox and McKay contended in 1887. If, on the other hand, this section represents a true unconformity between older and younger formations, there is practically no likelihood of the Shag Point coal being found even under the valley, for only at one point does the coal horizon disappear beneath the surface; the only coal, if any, that would be found would be the much inferior seams of the Oamaru series.

There is, however, no room for doubt as to the unconformity of the beds when a continuous section is run from the basement rock at Palmerston to the upper beds of the younger series on the coast.

Recognising the unconformity, the only possibility of the Shag Point coals being found under the Shag River is that they were faulted down prior to the deposition of the Oamaru beds and that they escaped denudation by the large early tertiary Shag River. After examining the thickness of the conglomerates underlying the coal and the distance between the Horse Range and the schists to the west, it is evident that prospecting for coal south of Shag Point would be an extremely speculative undertaking, and one necessitating heavy expenditure without much chance of success.

The Waipara series is the principal coal-bearing series of the district, and therefore of far the greatest importance from an economic point of view. In the district under review this series can be dividedly broadly into three distinct members, given in descending order:

Upper: *a.* Clays, sands more or less consolidated, with spherical and elliptical concretions or septaria (fossiliferous).

Middle: *b.* Sandstones and quartzose grits with brown coal.

Lower: *c.* Quartzose and schistose conglomerates.

The sandstones and grits with coal lie immediately above the conglomerates in a perfectly conformable sequence.

The coals of this series lie near the base.

The number of seams of coal varies in different parts of the area. At Puke-iwi-tahi there are two of moderate thickness, 3 ft. to 3 ft. 6 in., and one or two much thinner, while at the Shag Point mine near the Boat Harbour as many as 11 seams of 1 ft. and over are noted in the records of boreholes and shaft-sinking. The chief seams in this locality are:—

1. The Main seam at this point consists of two seams with 7 ft. of parting, as follows:

	Ft.	In.
Coal	5	0
Dark shale	1	0
Sandstone	5	6
Shale	0	6
Coal	3	6

making a total depth of about 140 ft. below the surface. This seam, where worked at the Boat Harbour, showed no parting, while north of the Main shaft again the parting increased to 14 ft.

2. The Blackie seam, 4 ft. thick at 230 ft. below the surface; and

3. The Lower seam, which contained several partings, as represented by the following:

	Ft.	In.
Coal	0	2
Fireclay	1	9
Coal	6	1
Fireclay	0	11
Coal	1	8
Fireclay	1	0
Coal	2	9
Fireclay	1	3

making a total depth of about 400 ft.

A bore put down a depth of 170 ft. from what was called No. 6 seam, which was 445 ft. below the surface, failed to reveal any more coalseams. No. 6 seam is probably the same as the last-mentioned above with the three fireclay partings, and recorded as 400 ft. below the surface at that point. In the workings these seams varied, sometimes making and sometimes thinning out considerably, the variations being generally between 4 ft. and 10 ft.

In the Allendale Mine, situated on the western side of Mount Vulcan, there are three seams worked, which vary from 4 ft. to 7 ft. in thickness. The workings are approached by an engine plane haulage way 350 yards long dipping at an angle of 1 in 6 in an easterly direction, and cutting the different strata, which dip approximately west at about an angle of 20 degs., or 1 in 3. This dip-drive taps the middle seam, the coal from which is brought direct to the foot of the incline. The upper seam, 7 ft. thick, with a clay parting, is cut 50 ft. above the middle seam by a drive from the latter and opened out by a 300-yard incline. In 1908, when the workings of this section had reached their boundary and everything was ready for pillar drawing, these workings had to be closed on account of heating. The lowest seam is worked by a drive from the middle seam put in towards the south-east, cutting the coal 35 ft. below the middle seam.

The method of winning the coal in these seams is a system of bord-and-pillar working. Early in 1907 a 100-horse power steam-driven electric plant was installed at the mine for pumping, underground haulage and lighting. At the foot of the main dip road there is a 25- to 30-horse power electric motor-turbine pump, capable of lifting 15,000 gallons per hour to a height of 300 ft., which is a somewhat greater lift than is required of the pump in its present position. The 300-yard incline in the upper seam was also drained by an electric turbine pump having a capacity of 5,000 gallons per hour. This pump delivered into the sump of the main pump. The coal was hauled up the incline by means of an electric winch and then delivered at the foot of the main haulage way. The lowest seam is worked in a similar manner, having a 5,000-gallon turbine pump, and an electric winch for hauling the coal to the middle seam, from whence it is sent up the main haulage-way. Steam is the power used for hauling on this incline.

Since the above was written this mine has been closed down, and operations transferred to the site of the original workings in a creek further east. At this point operations have been confined to tapping some old workings, but it is expected to open out on solid coal almost immediately.

New workings were opened out in 1909 at Shag Point by Gilmour and party, a short distance west of the old Shag Point shaft. A dip-drive some 500 ft. in length was put in at an inclination of 1 in 5 (about 12 degs.). The bearing of the drive is 10 degs. west of south. The measures at this point dip north-east at about 1 in 6 or 10 degs. The section exposed by this dip is as follows:—

	Ft.	in.
Fine blue grey sandstone	12	0
Shale	0	8
Coal	0	4
Sandstone, coarse and fine	15	0
Shales	1	6
Coal	1	0
Fireclay	0	6
Hard gritty sandstone	20	0
Coal "sulphur seam"	2	4
Sandstone and shales	25	0
Coal	0	10
Fireclay	1	0
Sandstone and grit	14	0
Coal	1	6
Fireclay	1	6
Hard sandstone	1	6
Coal	3	0

This last seam, which is the one worked, varies between 18 in. and 4 ft. From this point, 200 ft. down the dip, the workings proceed along the 3 ft. seam, leaving the 18 in. seam of coal as a roof. Several small seams were intersected in the next 100 ft. of dip, but none of these were opened out except the one 300 ft. down. A small oil-engine and pump have been installed to drain the workings.

The Three-feet seam is worked by the method of longwall advancing, sufficient material for packing being obtained when removing the 18 in. of sandstone and 18 in. of fireclay. These are removed to expose the 18 in. seam of coal, which makes an excellent roof for the travelling ways, needing practically no timber. The coal is hauled up the incline by means of a horse at the surface. Seven men are engaged winning coal, and their average output per day is 10 tons of coal and 5 tons of slack. The output of this mine and also that of the others of this district have to be carted to the railway at Bushey, a distance varying between 2 and 4 miles, for the different mines.

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Dealing first with that portion of the field lying between the present Allendale mine and Puke-iwi-tahi, it is estimated that there is here an area of at least 200 acres of coal-bearing land. Putting the thickness of coal at 10 ft.—which is low according to the Allendale workings, but rather high according to the Puke-iwi-tahi section—the amount of available coal would be 2,000,000 tons. This does not take into account the possibility of extending the workings beyond the limits of the shore. A difficulty in connection with this area e probability of the Shag Point ıth of the Shag River, or even in itself, if prospecting were carried . the view that Cox and McKay f, on the other hand, this section nconformity between older and here is practically no likelihood of eing found even under the valley. does the coal horizon disappear the only coal, if any, that would the much inferior seams of the

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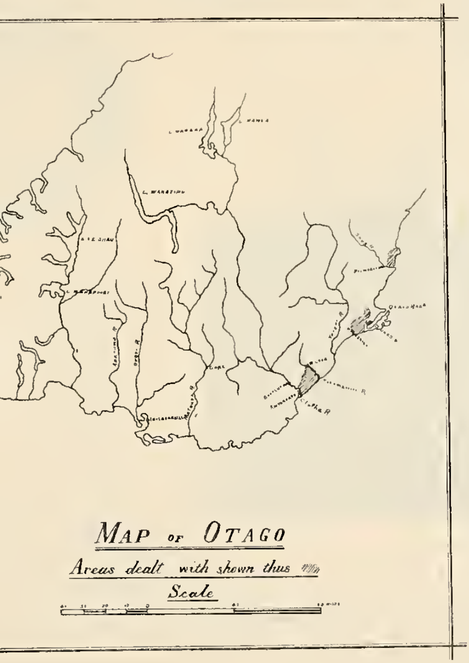

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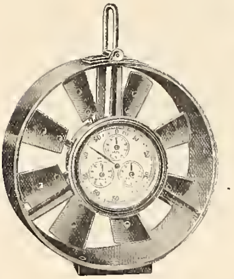

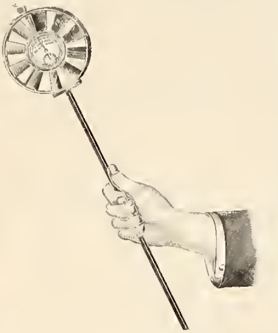

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THE DUTCH STATE COLLIERIES.

In the Netherlands Parliament recently it was decided to add the Meuse coal basin, near Sittard, to the State mining concession. An interesting account of the enterprise undertaken by the Government of the Netherlands is given by M. H. van Grœnenduel in a recent issue of *La Revue Noire* (July 21, 1912).

In 1901, when the State reserved a concession of over 37,000 acres in the Limburg province, the area in question was regarded as having no value. By means of borings, however, it was proved that the Worm coalfield, to the north of Aachen, continued into the Dutch Limburg, and, passing under the Meuse, reappeared in the Belgian Campine. Half-a-dozen demands for concessions were made by the owners of the land. After some delay negotiations were entered into, with the result that the private interests have conveyed their rights to the State for a sum of £160,000, the equivalent of the cost of boring, plus a third of the value of the concessions.

This addition raises the area of the State concession from 47,000 acres to 64,000 acres. The main argument employed by the Ministry in securing acquiescence in this purchase was that it is in the national interest to prevent the Meuse concessions from falling into the hands of foreigners—the Rhenish-Westphalian Syndicate being indicated as eventual proprietors of the lands in question, with the object of controlling the Dutch market. This argument received considerable weight through the efforts of the Syndicate last year to boycott the Limburg collieries by refusing to supply customers in the Netherlands who purchased even small quantities of Limburg coal.

Another argument used by the Minister was that Holland stood in especial need of bituminous coal, and that this grade of coal was to be obtained in large quantities from the Meuse coalfield, the volatile matter being as high as 40 per cent. in some seams. On the other hand, those adverse to this extension of the State enterprise pointed out that although half of the bituminous coalfield in the south of the Limburg lay within the State concession, no effort had been made to develop this reserve. The Government, however, promised to begin operations in the new basin at an early date.

It is of interest to note that there is another coalfield in the Dutch Limburg, in regard to which no steps have as yet been taken. The State mines investigation department, which holds a monopoly, has demonstrated the existence of a coalfield in the "Peel," a marshy and uncultivated district, and proved that this basin, passing under the Meuse between Venlo and Ruremonde, is allied to the contiguous Rhenish-Westphalian coalfield. The State director of the boring service, indeed, believes that he will be able to correlate the seams with those in Westphalia. It appears that the Peel basin comprises the lower portion of the bituminous coal in the Rhenish-Westphalian zone and the upper part of the Hard coal section in the same field. The following seams have been found in a boring at Kessel near the Meuse:—

Depth. Ft.		Thickness of seam. Ft.		Per cent. Ash.		Per cent. Volatile matter.
2,320	...	4·17	...	4·83	...	26·41
2,393	...	3·83	...	6·25	...	26·95
2,482	...	3·28	...	5·52	...	26·40
2,509	..	1·96	...	8·57	...	25·93
2,628	...	2·72	...	6·18	...	24·78
2,659	...	1·80	...	6·07	...	26·70
2,683	...	2·62	...	8·17	...	25·32
2,739	...	5·20*	...	10·38	...	25·04
2,910	...	3·70	...	2·75	...	20·48

* Including 1 ft. parting.

Several smaller seams were passed through of less than 1¼ ft. in thickness, notably one 1·7 ft. thick, including a 6 in. band of stone, at a depth of 2,877 ft. Although the depth is considerable, the strata present no difficulties, and shaft-sinking will be easy, the come of water being in all probability very small.

The depth increases towards the south-east and north-west. At Vlodrop, on the German frontier, the first workable seam lies at a depth of 1,949 ft., whilst at America, at the north-western limit of the basin, coal was found at 3,232 ft. At Vlodrop also the seams are less bituminous; the four seams which have been passed through (with respective thicknesses of 1·64 ft., 11·4 ft., 2 ft., and 1·64 ft.—the last at a depth of 2,095 ft.) have percentages of 19·98 per cent., 18·70 per cent., 14·24 per cent., and 15·38 per cent. of volatile matter respectively.

The entire basin has a superficies of about 42,000 acres. It is traversed by the Meuse and the Nord Canal, connecting with the canal from Maestricht to Bois-le-duc and Antwerp, as well as by three railway lines. The country is absolutely flat, so that further railway and canal construction can be carried out cheaply.

The Government has declared its intention to provide facilities for the working of the Sittard basin by private enterprise.

The Joint Committee of Lords and Commons appointed to report on the position of gas authorities with regard to the manufacture of the residual products arising from the manufacture of gas held its first sitting on the 12th inst., and elected Mr. J. W. Hills, M.P. for Durham, as chairman. It is contended, on behalf of alkali manufacturers, that gas authorities, in dealing in chemical residuals beyond those produced in their own process of gas manufacture, and in purchasing residuals from other gas authorities for the purpose of manufacturing residuals in bulk, were exceeding their statutory powers. Gas authorities, on the other hand, contend that by so doing they are enabled to cheapen the price of gas and bring its purchase within reach of the poorest. It was arranged that the first sitting of the Committee for the purpose of taking evidence should be held on the 26th inst. The chairman intimated that the committee would hear counsel on behalf of the Association of Municipal Corporations, the Alkali Manufacturers' Association, and the Gas Companies' Protection Association.

THE COKING OF COAL AT LOW TEMPERATURES.*

(With a Preliminary Study of the By-products.)

By S. W. Parr and H. L. Olin.

The investigations discussed in this bulletin had two general purposes in view: (1) To discover some fundamental facts pertaining to the properties and characteristics of bituminous coals; (2) to determine the feasibility of modifying the composition of raw coal in order that a different type of fuel might be produced, or possibly an alteration accomplished of the entire fuel content into forms better suited to present-day requirements.

In earlier experiments† (1907-1908), the information developed was mainly of the type indicated under the first division; for example, the experiments early indicated the important *rôle* played by small amounts of oxygen in the gases surrounding the heated masses of coal. The ease with which carbonaceous matter absorbed or united with oxygen was so striking that it seemed desirable to follow the matter into detail regarding the temperatures at which oxidation takes place and its effect upon the material in hand. As a result, the whole matter of coal oxidation at low temperatures was opened up as one of extreme importance. One fundamental fact brought out in the study‡ was the absorbent power of freshly-mined coal for oxygen and the part oxygen played in producing certain changes in the coal and promoting the initial form of deterioration in storage. Again§, the prime element in all the phenomena was seen to be that of oxidation.

In the second phase of the earlier study—i.e., its industrial side as related to the development of a special type of fuel—it seemed to be established that below a certain temperature—say, 700 degs. Fahr.—the heavy hydrocarbons, those chiefly responsible for the formation of smoke, could be driven off, yielding a gas of high illuminating power, a tar with high percentage of volatile oil, and a solid which, while it could be burned without smoke, was friable and not well adapted to ordinary use as a fuel.

In the present studies, the friable or non-coking tendency of the earlier product has been found to depend directly upon the amount of oxidation that has occurred both in the preliminary exposure at ordinary temperature and in the process of heating to moderately high temperatures.

In addition, important facts have developed in connection with the study of the various by-products. These by-products have also been more or less modified in their characteristics by the exclusion of oxygen.

Briefly outlined, the present studies have developed three lines of industrial interest.

First.—The possibility of developing a smokeless fuel of good texture and admirably suited to domestic as well as to general industrial use where absence of smoke is essential. The accompanying by-products promise to be of special value. These consist of (*a*) ammonia, though smaller in quantity than the yield obtained at higher temperatures; (*b*) illuminating gas of high candle power and high heat value; and (*c*) tar, which is composed almost entirely of oils, with a minimum amount of pitch and free carbon. Some of the oils produced are of peculiar structure and may have more than passing interest, two of the fractions, for example, being readily oxidisable. The iodine absorption numbers of the lighter fraction are found to be as high as 165.

Second.—They suggest a possible method for the manufacture of producer gas which would be free from present difficulties attending the use of bituminous coal, and would convert a much higher per cent. of the fuel into the gaseous form. In view of recent developments in the matter of combustion, efficiencies are possible‖ where gaseous fuel is available which are almost revolutionary in character.

Third.—There are opened up interesting possibilities in the production of coke, briquettes or other forms of fuel in a dense and stable form to meet certain requirements of shipping, storing, foundry, and other industrial

---

* Abstracted from *Bulletin* No. 60, University of Illinois Engineering Experiment Station.

† The present investigations are a continuation of the work carried on in 1907-8 and presented as a preliminary report under the title of "The Modification of Illinois Coal by Low Temperature Distillation," *Bulletin* No. 24, University of Illinois, Engineering Experiment Station, by S. W. Parr and C. K. Francis. 1908.

‡ "The Occluded Gases in Coal," *Bulletin* No. 32, University of Illinois, Engineering Experiment Station, by S. W. Parr and Perry Barker.

§ "The Weathering of Coal," *Bulletin* No. 38, University of Illinois, Engineering Experiment Station, by S. W. Parr and W. F. Wheeler; also "The Spontaneous Combustion of Coal," *Bulletin* No. 46, University of Illinois, Engineering Experiment Station, by S. W. Parr and F. W. Kressmann.

‖ "Surface Combustion," *Proc.* Am. Gas Inst. 1911. By Prof. W. A. Bone.

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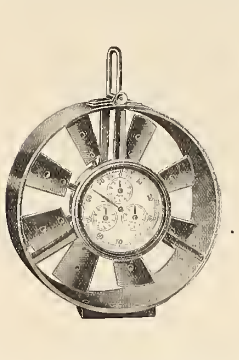

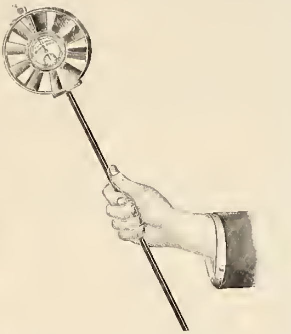

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THE DUTCH STATE COLLIERIES.

In the Netherlands Parliament recently it was decided to add the Meuse coal basin, near Sittard, to the State mining concession. An interesting account of the enterprise undertaken by the Government of the Netherlands is given by M. H. van Grœneudael in a recent issue of *La Revue Noire* (July 21, 1912).

In 1901, when the State reserved a concession of over 37,000 acres in the Limburg province, the area in question was regarded as having no value. By means of borings, however, it was proved that the Worm coalfield, to the north of Aachen, continued into the Dutch Limburg, and, passing under the Meuse, reappeared in the Belgian Campine. Half a-dozen demands for concessions were made by the owners of the land. After some delay negotiations were entered into, with the result that the private interests have conveyed their rights to the State for a sum of £160,000, the equivalent of the cost of boring, plus a third of the value of the concessions.

This addition raises the area of the State concession from 47,000 acres to 64,000 acres. The main argument employed by the Ministry in securing acquiescence in this purchase was that it is in the national interest to prevent the Meuse concessions from falling into the hands of foreigners—the Rhenish-Westphalian Syndicate being indicated as eventual proprietors of the lands in question, with the object of controlling the Dutch market. This argument received considerable weight through the efforts of the Syndicate last year to boycott the Limburg collieries by refusing to supply customers in the Netherlands who purchased even small quantities of Limburg coal.

Another argument used by the Minister was that Holland stood in especial need of bituminous coal, and that this grade of coal was to be obtained in large quantities from the Meuse coalfield, the volatile matter being as high as 40 per cent. in some seams. On the other hand, those adverse to this extension of the State enterprise pointed out that although half of the bituminous coalfield in the south of the Limburg lay within the State concession, no effort had been made to develop this reserve. The Government, however, promised to begin operations in the new basin at an early date.

It is of interest to note that there is another coalfield in the Dutch Limburg, in regard to which no steps have as yet been taken. The State mines investigation department, which holds a monopoly, has demonstrated the existence of a coalfield in the "Peel," a marshy and uncultivated district, and proved that this basin, passing under the Meuse between Veulo and Ruremonde, is allied to the contiguous Rhenish-Westphalian coalfield. The State director of the boring service, indeed, believes that he will be able to correlate the seams with those in Westphalia. It appears that the Peel basin comprises the lower portion of the bituminous coal in the Rhenish-Westphalian zone and the upper part of the Hard coal section in the same field. The following seams have been found in a boring at Kessel near the Meuse:—

Depth. Ft.	Thickness of seam. Ft.	Per cent. Ash.	Per cent. Volatile matter.
2,320	4·17	4·83	26·41
2,393	3·83	6·25	26·95
2,482	3·28	5·52	26·40
2,509	1·96	8·57	25·94
2,628	2·72	6·18	24·78
2,659	1·80	6·07	26·70
2,683	2·62	8·17	25·32
2,739	5·20*	10·38	25·04
2,940	3·70	2·75	20·48

* Including 1 ft. parting.

Several smaller seams were passed through of less than 1¼ ft. in thickness, notably one 1·7 ft. thick, including a 6 in. band of stone, at a depth of 2,877 ft. Although the depth is considerable, the strata present no difficulties, and shaft-sinking will be easy, the come of water being in all probability very small.

The depth increases towards the south-east and north-west. At Vlodrop, on the German frontier, the first workable seam lies at a depth of 1,949 ft., whilst at America, at the north-western limit of the basin, coal was found at 3,232 ft. At Vlodrop also the seams are less bituminous; the four seams which have been passed through (with respective thicknesses of 1·64 ft., 11·4 ft., 2 ft., and 1·64 ft.—the last at a depth of 2,095 ft.) have percentages of 19·98 per cent., 18·70 per cent., 14·24 per cent., and 15·38 per cent. of volatile matter respectively.

The entire basin has a superficies of about 42,000 acres. It is traversed by the Meuse and the Nord Canal, connecting with the canal from Maestricht to Bois-le-duc and Antwerp, as well as by three railway lines. The country is absolutely flat, so that further railway and canal construction can be carried out cheaply.

The Government has declared its intention to provide facilities for the working of the Sittard basin by private enterprise.

The Joint Committee of Lords and Commons appointed to report on the position of gas authorities with regard to the manufacture of the residual products arising from the manufacture of gas held its first sitting on the 12th inst., and elected Mr. J. W. Hills, M.P. for Durham, as chairman. It is contended, on behalf of alkali manufacturers, that gas authorities, in dealing in chemical residuals beyond those produced in their own process of gas manufacture, and in purchasing residuals from other gas authorities for the purpose of manufacturing residuals in bulk, were exceeding their statutory powers. Gas authorities, on the other hand, contend that by so doing they are enabled to cheapen the price of gas and bring its purchase within reach of the poorest. It was arranged that the first sitting of the Committee for the purpose of taking evidence should be held on the 26th inst. The chairman intimated that the committee would hear counsel on behalf of the Association of Municipal Corporations, the Alkali Manufacturers' Association, and the Gas Companies' Protection Association.

THE COKING OF COAL AT LOW TEMPERATURES.[*]

(With a Preliminary Study of the By-products.)

By S. W. Parr and H. L. Olin

The investigations discussed in this bulletin had two general purposes in view: (1) To discover some fundamental facts pertaining to the properties and characteristics of bituminous coals; (2) to determine the feasibility of modifying the composition of raw coal in order that a different type of fuel might be produced, or possibly an alteration accomplished of the entire fuel content into forms better suited to present-day requirements.

In earlier experiments[†] (1907-1908), the information developed was mainly of the type indicated under the first division; for example, the experiments early indicated the important *rôle* played by small amounts of oxygen in the gases surrounding the heated masses of coal. The ease with which carbonaceous matter absorbed or united with oxygen was so striking that it seemed desirable to follow the matter into detail regarding the temperatures at which oxidation takes place and its effect upon the material in hand. As a result, the whole matter of coal oxidation at low temperatures was opened up as one of extreme importance. One fundamental fact brought out in the study[‡] was the absorbent power of freshly-mined coal for oxygen and the part oxygen played in producing certain changes in the coal and promoting the initial form of deterioration in storage. Again[§], the prime element in all the phenomena was seen to be that of oxidation.

In the second phase of the earlier study—*i.e.*, its industrial side as related to the development of a special type of fuel—it seemed to be established that below a certain temperature—say, 700 degs. Fahr.—the heavy hydrocarbons, those chiefly responsible for the formation of smoke, could be driven off, yielding a gas of high illuminating power, a tar with high percentage of volatile oil, and a solid which, while it could be burned without smoke, was friable and not well adapted to ordinary use as a fuel.

In the present studies, the friable or non-coking tendency of the earlier product has been found to depend directly upon the amount of oxidation that has occurred both in the preliminary exposure at ordinary temperature and in the process of heating to moderately high temperatures.

In addition, important facts have developed in connection with the study of the various by-products. These by-products have also been more or less modified in their characteristics by the exclusion of oxygen.

Briefly outlined, the present studies have developed three lines of industrial interest.

First.—The possibility of developing a smokeless fuel of good texture and admirably suited to domestic as well as to general industrial use where absence of smoke is essential. The accompanying by-products promise to be of special value. These consist of (*a*) ammonia, though smaller in quantity than the yield obtained at higher temperatures; (*b*) illuminating gas of high candle power and high heat value; and (*c*) tar, which is composed almost entirely of oils, with a minimum amount of pitch and free carbon. Some of the oils produced are of peculiar structure and may have more than passing interest, two of the fractions, for example, being readily oxidisable. The iodine absorption numbers of the lighter fraction are found to be as high as 165.

Second.—They suggest a possible method for the manufacture of producer gas which would be free from present difficulties attending the use of bituminous coal, and would convert a much higher per cent. of the fuel into the gaseous form. In view of recent developments in the matter of combustion, efficiencies are possible[‖] where gaseous fuel is available which are almost revolutionary in character.

Third.—There are opened up interesting possibilities in the production of coke, briquettes or other forms of fuel in a dense and stable form to meet certain requirements of shipping, storing, foundry, and other industrial formation of "oxygenated" or "hydroxylated" molecules. In any event, or whatever the theory finally developed by Prof. Bone in his most important researches on combustion, the fact remains that these heavier hydrocarbons are the most difficult of all with which to effect complete combustion, and that even under favourable circumstances the tendency in their combustion is to form condensation products in which free carbon largely predominates. The faulty reaction is thereby made visible to the eye as smoke. A good illustration of this fact is found in acetylene gas, which requires a special burner, with special provision for an extra oxygen supply, in order to produce a smokeless flame.

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[*] Abstracted from *Bulletin* No. 60, University of Illinois Engineering Experiment Station.

[†] The present investigations are a continuation of the work carried on in 1907-8 and presented as a preliminary report under the title of "The Modification of Illinois Coal by Low Temperature Distillation," *Bulletin* No. 24, University of Illinois, Engineering Experiment Station, by S. W. Parr and C. K. Francis. 1908.

[‡] "The Occluded Gases in Coal," *Bulletin* No. 32, University of Illinois, Engineering Experiment Station, by S. W. Parr and Perry Barker.

[§] "The Weathering of Coal," *Bulletin* No. 38, University of Illinois, Engineering Experiment Station, by S. W. Parr and W. F. Wheeler; also "The Spontaneous Combustion of Coal," *Bulletin* No. 46, University of Illinois, Engineering Experiment Station, by S. W. Parr and F. W. Kressmann.

[‖] "Surface Combustion," *Proc.* Am. Gas Inst. 1911. By Prof. W. A. Bone.

Smokeless combustion of raw coal is secured, therefore, by observing the principles indicated above—*i.e.*, there must be uniform and gradual accession of fresh coal and a combustion chamber maintained at a sufficiently high temperature, and the same extending over a sufficient space to permit of ultimate mixing and contact of the oxygen with the combustible gases. Other conditions, such as accelerating the reaction by introducing the principle of surface combustion, as developed by Prof. Bone, may at some time be added to the mechanical and physical conditions now in vogue. But while these provisions are readily adapted to large steam-generating units, they are impossible of application to the larger members of combustion processes such as are common to the small plant, house heaters, and possibly to locomotives. It is these latter cases especially that demand a modified fuel which can be burned without the formation of smoke.

It will thus be seen that in the low temperature distillation of coal, processes have been put into operation which have taken out the heavy smoke-producing ingredients, and have also removed the moisture, both free and combined, which are chiefly responsible for the depression of temperatures under ordinary conditions. There is left, moreover, as volatile matter, practically these volatile substances only; methane CH_4 and hydrogen, which most easily of all the gaseous products from coal, maintain a smokeless combustion.

The Formation of Coke.

The experiments as thus far conducted seem to throw some light upon the matter of coke formation. In this discussion of the theories involved, it may be helpful to formulate certain hypothetical conditions which have had more or less confirmation in these studies, as follow:—

First.—For the formation of coke there must be present certain bodies which have a rather definite melting point.

Second.—The temperature at which decomposition takes place must be above the melting point.

Third.—Where the compounds that satisfy the first and second conditions are unsaturated, it is possible, by subjecting them to oxidation, to so lower the temperature of decomposition as to alter the second condition prescribed, in which case coking will not occur.

The first condition prescribed above may be well illustrated by the behaviour of sucrose, or cane sugar. This substance has a rather low melting point—say, 160 degs. Cent. This melting point, however, is just below the temperature of decomposition. Where this point is reached, gaseous products in the form of steam, &c., are delivered, leaving behind, if the high temperature is continued, a mass of coke. On the other hand, if starch is heated in a similar manner, it does not melt, but its first action is that of decomposition. When this is carried to completion, there remains not a strongly coherent mass, but easily disintegrated particles of carbon. Pure cellulose behaves in a still more striking manner, showing no fusion properties whatever, as may be demonstrated by distilling in a closed tube some cotton fibre, or other form of cellulose such as filter paper beaten to a pulp and dried. Wood, however, if not disintegrated, as in the form of sawdust, has enough resinous material closely associated with the fibrous structure to bind the carbon filaments resulting from the decomposition of the cellulose by reason of the fact that these gums, or resins, have a melting point below that of their decomposition temperatures, and thus form a binding film of carbon throughout the mass, producing a sort of coking effect which we find in charcoal. In the case of Illinois coals, we find the first prerequisite formulated above, as present in a marked degree.

As illustrating the conditions which exist where oxidation had been allowed to take place, an example is given. This was made from a weathered sample of coal from Niantic. It had little if any tendency to fuse; the individual particles of coal still retain their form, and the mass may be easily crumbled between the fingers. It should be noted that this result is not due to any inherent quality possessed by the original coal; a Danville mine sample, for instance, weathered to a like degree, gives the same results. Another verification of this point, though in a more marked manner, was the result of Test No. 9. The coal used was the fine material which had collected from the preparation of the previous tests, all of which had given excellent samples of coke in their freshly prepared condition. A quantity of coal passing through a 10-mesh sieve had accumulated through a period of about six weeks, and had been stored in an ordinary coal hod in the grinding room. After being heated for 11 hours under conditions identical with those of the preceding runs, it showed no signs of fusion, and was entirely without coking properties.

It is evident from these tests that the very great avidity of fresh coal for oxygen is evidence of the presence of those compounds which satisfy the first of the hypothetical conditions, and the subjection of the coal to oxidation destroys the fusion property of the fresh coal and produces a condition corresponding to that described under the third proposition, in which the coking property is lost.

Other studies on the nature of the coking process were carried out as follow:—The apparent plasticity exhibited by the coal during certain stages of the treatment suggested the idea of compressing it into a briquette at the time when it would most easily yield to pressure, and when it would presumably cohere without requiring an artificial binder. Accordingly, a cupel press with a pressure of 500 lb. was provided, and the retort was charged with Danville mine coal. At the time of maximum evolution of gas, the heat was suddenly shut off and the retort quickly opened. It was found at this point that the outer and hotter portion of the mass was hard and unyielding. A soft inner core was discovered, however, and portions of this were put into the press. In the resulting briquette it is seen that the escaping gases have swollen it considerably. Determinations of the amount of volatile matter possessed by the coal when in the plastic condition showed that this constituent had been reduced very little—from 38 to 30 per cent. In short, the state of fusion seems to exist in early stages of distillation, but disappears before the process has proceeded far.

One of the essential factors in this scheme for briquetting loose infusible material with bituminous coal is the use of the press for keeping the two substances in close contact. On account of the difficulty of applying such a contrivance in industrial work, attempts were made to attain the desired end by using temporary binders—*i.e.*, substances which might hold the particles together closely until the permanent coalbinder could relieve them. Mixtures of Danville mine coal and Danville mine coke residue No. 17 in the proportion of 3 : 1 were thoroughly moistened with water and pressed (1) in the cupel machine and (2) in a testing machine up to 1,000 lb. per square inch. Neither of the briquettes survived the subsequent heating, being disintegrated, seemingly, by the escaping steam. The same effect, though to a much less degree, was noted when coal tar was employed. The resulting briquette retained its shape, but was rather soft and friable. Crude molasses, of all the binding materials tried, proved to be the best for this purpose. Different percentages of the molasses, ranging from 5 to 15, were tested out at different times. Below 10 per cent. the strength of the briquette was much diminished.

These tests seem to show that the fusible substance of Illinois coals is the true binding material in the coking process; that it is present in such abundance as to produce a coke of too open and spongy a character as a result of the evolution of the large amount of gaseous products which result from its decomposition. In this respect, it is paralleled by the behaviour of sugar in the process of coking, which yields, as a result of the large volume of escaping gases, a very porous mass of sugar, coke or carbon. However, if the raw coal is mixed with a considerable amount of material which has already gone through the coking process, or which has at least given off the larger part of its gases, and then has been reduced to a fine division like breeze, the cementing material of the fresh coal is able to disseminate throughout the mass, and the gases may also escape without blowing it into a spongy mass, with the result that a coke of good texture is formed. Exactly in a similar way, if molasses or other sucrose or glucose material be substituted for the fresh coal, we shall have again the formation of a dense coke capable of retaining its shape under conditions of firing much better than where a plastic binder is used. In both cases a strongly cohering mass is produced which meets the requirements of handling, storage and combustion with the greatest efficiency and the least formation of smoke. A small admixture of raw coal may thus be made to serve the purpose of a binder for material otherwise wasted as coke breeze at a cost which would enable it to compete with the pitch binders now in use. It also suggests a process of fractional coking, or coking in two stages. The first result at the lower temperature furnishes a product which, when ground to a moderate degree of fineness and mixed with a small portion of fresh raw coal, would furnish the essential conditions for producing a coke of dense nature with a binder so distributed as to give the material a strength quite comparable with that produced by coals of the regular coking variety. Moreover, an advantage would be evident in such material, especially for use in household appliances, in that it would be more lively in combustion and less difficult of manipulation in the matter of maintaining a fire than coke made by the usual methods.

One point further is to be noted in this connection. It was said at the beginning of the discussion that superheated steam was employed for the purpose of conveying heat into the material, so that it would not be necessary to revolve the apparatus in order to secure an even distribution of heat. It is seen from the above detail of the essential conditions to be observed in the coking of coals, at least of this class, that an atmosphere free from oxygen is of prime importance. Indeed, following the indicated requirement, the coal should be fresh, or as recently mined as possible, and in any event retained in larger sizes than in a broken down or a fine state of division, in order that the least possible opportunity be given for the absorption of oxygen. Furthermore, by first admitting steam or bringing the coal into an atmosphere of superheated steam, the effect is to drive out such oxygen as has been occluded or absorbed by the coal and as yet not chemically combined. This is also brought about at temperatures and other conditions least conducive to a reaction between oxygen and the coal substance. Moreover, from former experiments,* it has been shown that no reaction at these temperatures takes place between the steam itself and the coal. These principles have an important bearing on certain recent tendencies to concentrate gas production and coke manufacture in large units and distribute the gaseous products at high pressure. From the above, it would seem that the nearer such units were located to the mine or pit mouth, the better. If it is found, as seems probable, that the coke residue is a suitable material for further continuation of the gas-making process for the manufacture of producer gas, then the above advantages and essential conditions would be magnified.

A discussion† by Prof. Lewes, relating to English coals, bears a striking resemblance to the facts developed in our own works on Illinois coals.

A continuation of studies along this line is being made. Mention has been made concerning the adaptability of the coke thus produced to use in suction gas producers for furnishing fuel to gas engines. Its freedom from tar, oils, and the heavier products of distillation, which clog and render impossible the use of raw bituminous coals of this type, would seem to offer a solution of these fundamental difficulties. Further studies along this line are also being made.

Summary and Conclusions.

1. Coals of the Illinois type can be coked at a temperature approximately 400 degs. or 450 degs. Cent.

2. The gaseous products consist chiefly of illuminants of high candle-power, and represent, together with the condensable material under (3) following, the chief elements involved in formation of smoke in the ordinary combustion of raw coal. The nitrogen of the coal is liberated as NH_3, at these temperatures, in amounts representing approximately 20 per cent. of the total nitrogen present.

3. The condensable distillate consists largely of oils with the minimum amount of tar and free carbon. The oils represent positive values for fuel, for carburetting water gas, or for other specific uses on account of their chemical characteristics as unsaturated compounds.

4. The coke residue has special characteristics which seem to make it of value as a concentrated fuel, capable of combustion without the formation of smoke, suitable for storing without the possibility of spontaneous combustion, and presumably adapted to the manufacture of gas for use in the suction gas producer.

5. Certain facts seem to have been developed concerning the principles involved in the formation of coke, which may open the way to the production of a kind of coke of such texture and strength as to make it acceptable for uses that are not now possible with coke made from similar coal, but formed under ordinary

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* Parr and Francis, p. 45, *Bulletin* No. 24, Engineering Experiment Station.

† A recent contribution to the theories of coke formation is made in a lecture by Vivian B. Lewes, Professor of Chemistry, Royal Naval College, Greenwich, England, published in *Progressive Age*, December 15, 1911, p. 1030.

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3. The condensable distillate consists largely of oils with the minimum amount of tar and free carbon. The oils represent positive values for fuel, for carburetting water gas, or for other specific uses on account of their chemical characteristics as unsaturated compounds.

4. The coke residue has special characteristics which seem to make it of value as a concentrated fuel, capable of combustion without the formation of smoke, suitable for storing without the possibility of spontaneous combustion, and presumably adapted to the manufacture of gas for use in the suction gas producer.

5. Certain facts seem to have been developed concerning the principles involved in the formation of coke, which may open the way to the production of a kind of coke of such texture and strength as to make it acceptable for uses that are not now possible with coke made from similar coal, but formed under ordinary

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* Parr and Francis, p. 45, *Bulletin* No. 24, Engineering Experiment Station.

† A recent contribution to the theories of coke formation is made in a lecture by Vivian B. Lewes, Professor of Chemistry, Royal Naval College, Greenwich, England, published in *Progressive Age*, December 15, 1911, p. 1030.

he thought he would give the company the benefit of the doubt. The result of the analysis which had been given was an impossible one. He asked the Bench to say the prosecution had not discharged the onus of proving their case. The management of Bentley Colliery had, by their personal and local enterprise, done a great deal more to solve the question of gob fires in coalmines than had the Government itself, for it was a notorious fact that the question of gob fires was never considered by the Royal Commission, on whose report the Bill was founded. The proper course was to dismiss the summons, as he said, upon a point of law, that no case had been made out.

The Bench ruled there was a *primâ facie* case to answer, and Mr. Craig at once called Dr. Haldane. He said he was fairly familiar with the Bentley Colliery, and knew that the Bentley, Brodsworth and Cadeby companies appointed, in the early part of this year, skilled chemists to go into the whole question which they were discussing that day. They were men independent of the colliery staff, and well known in the world of science. The results of their investigations were placed before him for further investigation at Bentley and Brodsworth. In the course of this investigation he had from time to time visited Bentley pit. He had never seen the return airway there used as a travelling or a haulage road. It would be imprudent to make an over-crossing while there was heating from gob fires. Two and a-half per cent. of gas was about two-fifths of the proportion which would be explosive; 6 per cent. was the minimum for an explosion. A place where there was 2½ per cent. of firedamp could not be regarded as a dangerous place in itself, but where there was 2½ per cent. there might be 6 per cent. or more somewhere near. Work had to be done in every gassy mine; men had often to work in air containing more than 2½ per cent. of gas, and constantly did so.

Mr. Craig: If you withdrew men when you had 2½ per cent. of gas and could not send them back until it was withdrawn or reduced, what effect would that have on colliery mining?—You would have to abandon all the fiery mines.

In answer to further questions, witness said he saw nothing improper in the three men being allowed to work in ripping and improving the ventilation in the airway when there was 2½ per cent. of gas present, as by increasing the size of the airway they were helping to remove the gas.

Suppose you find 2½ per cent. at the face, as you frequently meet it, what is the effect of leaving the face standing?—Well, if it stands long, it is very awkward from the point of view of gob fires. A face which has stood some time is apt to begin to come down; cracks develop in the roof, and falls, which are a most fertile source of gob fires, occur, you get oxidising, which means heat, and danger of fire.

Prof. McMillan's calculation of the analysis of the Bentley air was, said the witness, impossible as a chemical proposition. He did not think the instrument used was wrong, as it was graduated at the National Physical Laboratory. There was something wrong about the analysis. He did not know what it was, and he did not want to blame the professor, who was given this sample quite bluntly in the dark, without knowing how it might have been concocted, and there was nothing to draw his attention to the impossibility.

By Mr. Gichard: The analysis might be correct if there was more oxygen in it, but he was absolutely certain there was not more oxygen. He did not suggest that the professor was not capable of making a correct analysis; he was perfectly certain he was, also that in this case he was at a great disadvantage. He did not suggest the sample had been tampered with after it left the colliery.

Do you suggest that it would be proper to work in any part of a mine where there was 2½ per cent. of gas?—It might be, and in this case I think it was.

Can you tell me any circumstances you can conceive to be more dangerous in relation to the presence of inflammable gas than the prevalence of gob fires in these mines?—No, I cannot, if these gob fires are not properly dealt with and properly watched. Gob fires were always dangerous, and might break out at any time. He thought a manager who called these men out would be a lunatic. He would be a lunatic not to allow them to increase the ventilation and continue their work if he had no other way of withdrawing the gas and increasing the airways. There were other means which might have been employed for reducing the gas, but whether they would not have been much more dangerous was another thing. He agreed ripping was slow work.

Mr. Gichard: Rather than a manager should be a lunatic and take these men out, has he to keep them in for months working in air which is dangerous until the whole of that road is ripped out?—It may be the best course.

Then it is your suggestion he should keep them there in spite of what is said in the Act?—That would be in accordance with the Act, and the intention of the Mines Commission.

Mr. Thos. Hy. Bailey, of S. and J. Bailey, mining and civil engineers, Birmingham, stated he had had a lot of experience in dealing with colliery troubles and gob fires, especially in South Wales. In February he was called in on behalf of the Bentley, Denaby and Cadeby, and Brodsworth collieries to make investigations in regard to their difficulties, and from that time onwards he had been visiting this colliery and advising. Three gob fires, he found, had occurred along the line where there had been a stoppage. During the coal-strike stoppage there had been five gob fires on the line of stoppage. The over-crossing at Bentley was started in the beginning of the year. An over-crossing should be at least 150 or 200 yards from the face.

If you called out men where there was only 2½ per cent. of gas, what would be the effect?—That you could not run the mine. You would have to shut it up altogether. Three men were sent specially to do this work—sent for a specific purpose—knowing the condition of the airway. To withdraw them would be playing the fool with the clause of the Act.

Mr. John William Fryar, mining engineer, agent and general manager for Messrs. Barber Walker and Co.'s collieries for the past seven or eight years, and who stated, that in addition to Bentley and Eastwood, he had managed collieries in Northumberland, Durham, Wales and Nottingham, said the ventilating plant at Bentley was capable of producing much larger quantities of air than they required. He agreed that it was a moot question as to how far, by increasing pressure, the safety of the mine was promoted; it was a matter of opinion. They had had trouble at Bentley from time to time with gob fires, and had always found when the workings had stood any length of time the line of stoppage was more prolific of gob fires than the ordinary gob or goaf which was left. The late Mr. Pickering made several inspections of the Bentley pit, the owners of which had not merely been content with the experience and advice of their staff, but had taken outside opinions and advice from the best men they could find on this particular subject. There had been a local gob fire, and they deemed it inadvisable to go on with the over-crossing until the face had been further advanced and the ground had become more settled. The management instructed three men to continue ripping in the return airway, until they made one whole length of even dimensions. The coal face was 70 or 80 yards away. He quite agreed they ought to get as far away from the face as possible when they built an air crossing. It was the universal experience that the greater ventilating pressure put down the greater leakages they got, and the more liable they were to gob fires. It was stated that inspections were made on July 20, 25 and 30 by Mr. Hudspeth, but it was not until August 31 that he received any communication about these inspections. Then he had a letter from Mr. Redmayne, the Chief Inspector of Mines, about violations of the Coal Mines Act, and alleging two offences on July 22 and 30 under section 34. These had been dropped, and no summonses issued.

In cross-examination by Mr. Gichard, the witness said there would have been absolutely no difficulty in withdrawing the men, but they did not think it necessary. The men were legally employed, notwithstanding what the gas was in that area. At that time some of the working places were fenced off for higher percentages than 2½. The men could have been withdrawn if the company were going to abandon that portion of the pit, but not if they were going to continue working it. The whole of the men at work in that place were necessary to get better ventilation at that part of the workings.

If you took out the soft coal, that would render you less liable to gas?—Yes, if that was taken out there would be less danger, but the pit would not be worth working. Witness said there was a permanent staff to deal with the question of gob fires. On September 9 he wrote to the Chief Inspector of Mines asking him to make any suggestions, and promising careful consideration, but he never received any suggestion from Mr. Redmayne. Dr. Harger had said that Bentley Colliery would be dangerous if excessively ventilated, as the danger of combustion would be increased. He received a letter citing five complaints by Mr. Mottram, none of which had been the subject of a summons. It was not till October 24 that the summonses were issued. There was a threat in September to apply for an injunction. He replied to that asking what contraventions were alleged upon which an injunction could be applied for, but his application was ignored, and eventually the summons came along.

Mr. Craig, in defence, said there was no evidence that the withdrawal of these men was required in this case. Workmen meant those up at the face or in the stall, unless they were going to make a fool of the Act; it could not mean men doing necessary and beneficial work in a part of the mine which was not strictly being worked. Then, again, there was only one sample of air; the Bench wanted a fair test if they were going to convict the company. A sample taken in a place like that might be as unreal as a snap division. Messrs. Barber Walker and Co. Limited had been conducting coalmines in this district for 150 years, and had never been proceeded against before. The company had voluntarily undertaken work which the Home Office would be better occupied in undertaking for themselves than in indulging in prosecutions of this sort against people upon whom these responsibilities rested, and who were trying to meet them. A record like that company had, and the earnest efforts they were making to do the right thing, meant that they should not have their character and their credit assailed on a matter of this sort, and, with great respect, he said the Bench should not convict on evidence like this. He pointed out that a parallel airway was voluntarily undertaken and carried out at Bentley Colliery. This was a summons which ought never to have been taken out. He could not help thinking that the long delay in the time the summonses were coming out must have been due to alarmist anxiety created in the minds of somebody at the Home Office, that, owing to the unfortunate disaster in another pit, unless they did something, whether it was right or wrong, legitimate or illegitimate, decent or not decent, public opinion would be saying, What has the Home Office been doing?" The Department should have more back than to give way to a weakness in issuing summonses like this, simply to protect themselves against public opinion and contingencies which had not yet arisen. If the Bench felt there had been an offence, he hoped they would see their way to deal with it under the Summary Jurisdiction Act.

Mr. Hudspeth was recalled, and the chairman asked him what men would be affected by this 2½ per cent. of gas in the pit. There were the three men in the airway, what other men ought to have been withdrawn, if any?

Witness: All the men and boys that crossed the main return to get to 31's working-place, and the two adjoining ones; in all probability, about 20 men.

Mr. Craig: That would be in all about 400ft. of the face?—Probably.

Don't you think withdrawing the men would constitute a great danger?—It is not a question of danger, it is a question of the law.

Do I understand you to say, Sir, you prefer people to comply with the law in coalmines rather than to avoid danger?—They should not get themselves into danger.

The Bench retired, and the chairman announced upon their return that the question they had to try was not whether the mine was adequately or inadequately supplied with atmospheric air, but whether the defendants were guilty of an offence under this particular section—67. They had come to the conclusion a technical offence had been committed, and therefore there must be a conviction. They did not think, although the offence might have been one of great gravity and had serious consequences, they could take that view of it in the present circumstances, and they thought the case would be met by putting on the nominal penalty of 20s., to be paid between the three defendants, and also the costs. In default, imprisonment would be according to scale.

The Bench fixed the hearing of the summons for the alleged improper ventilation of the pit to be taken on Saturday, November 30, at 11 o'clock.

LAW INTELLIGENCE.

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Trade Unions and the Law of Libel.

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The House dismissed the appeal.

The Lord Chancellor said this appeal raised the question of the true construction to be put on section 4 of the Trade Disputes Act, 1906. In the case of the Taff Vale Railway Company v. the Amalgamated Society of Railway Servants, it had been decided that a trade union, registered under the Trades Union Acts, could be sued in its registered name, and also that a trade union, whether registered or not, could, since the Judicature Acts, be sued in a common law action if the persons selected as defendants were persons who from their position might fairly be taken to represent the union. It was pointed out by Lord Lindley that if a judgment so obtained was for the payment of damages it could be enforced only against the property of the union, and that to reach such property it might be necessary to make the trustees parties to any proceedings. It was common knowledge that this decision gave rise to keen controversy as to whether the law required amendment. On the one hand it was contended that the principle laid down ought to remain undisturbed, because it simply imposed on the trade unions the legal liability for their actions which ought to accompany the immense powers which the Trade Union Acts had set them free to exercise. On the other side it was maintained that to impose such liability was to subject their funds, which were held for benevolent purposes as well as those of industrial battles, to undue risk. It was said that by reason of the nature of their organisation and their responsibility in law for the action of a multitude of individuals who would be held in law to be their agents, but over whom it was not possible for them to exercise adequate control, they were, by the decision of that House, exposed to perils which must cripple their usefulness. Their lordships had heard, in the course of this case, suggestions as to the merits of the conflicting points of view, and as to the reasonableness in interpreting

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THE COAL AND IRON TRADES.

THURSDAY, NOVEMBER 21.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 138,958 tons of coal and 1,068 tons of coke were despatched from Tyne Dock, a decrease of 23,970 tons of coal and 749 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 55,329 tons of coal and 2,321 tons of coke, a decrease of 9,138 tons of coal and 516 tons of coke. The Blyth shipments totalled 88,538 tons of coal and coke, a decrease of 8,572 tons. The decreases all round are mainly attributable to the spell of stormy weather, which delayed tonnage and threw loading turns out of gear. The Swedish State Railways have placed their orders for 124,500 tons of steam coals, for delivery over the winter, at the lower ports. Of the total quantity, Northumberland and Durham have received contracts for 109,500 tons, Scotland for only 5,000 tons, and Silesia for 10,000 tons. Details are as follow:—For Stockholm delivery, 30,000 tons Lambton, Randolph Hetton or South Hetton, at 21s. per ton, c.i.f., option D.C.B. at 20s. 9d., option Hastings-West Hartley at 19s. 9d., and 5,000 tons Gemmells Longrigg Navigation (Scottish coal) at 20s.; Gothenburg discharge, 30,000 tons Lambton at 19s. 10½d. and 10,000 tons Bothal at 19s. 10d.; Uddevalla, 1,500 tons Hastings-West Hartley at 19s. 3d.; Halmstad, 6,000 tons Hetton at 20s. 9d., option D.C.B. at 20s. 6d.; Helsingborg, 12,000 tons Lambton or Hetton, at 19s. 9d., option D.C.B. 19s. 6d.; Malmo, 10,000 tons D.C.B. at 19s. 6d., 10,000 tons Silesian at 23·20 marks free on truck at Malmo, and 2,000 tons Hetton at 19s. 9d.; and Norrkoping, 8,000 tons Lambton or Hetton at 20s. 9d., option D.C.B. at 20s. 6d. The Lambton coal is estimated to work out at about 13s. 9d. per ton f.o.b. The figures show an advance of from 4s. to 4s. 3d. per ton on the prices paid for similar business a year ago. The Norwegian State Railways' contract for steam coals is stated to have gone almost entirely to Yorkshire and Derbyshire, only 9,000 tons of Durham steams, Hettons, having been ordered at about 13s. 3d. per ton f.o.b. The contract to supply the Paris, Lyons and Marseilles Railways with 20,000 tons of coking coals is stated to have been placed in Durham at about 14s. f.o.b. Other important coal sales are as follow:—"Parcels" of Tyne gas primes on passage have been sold at 28s. 6d. per ton c.i.f. Genoa, and, for current loading, a cargo has been disposed of at those figures; for shipment over the first three months of next year, three cargoes of Tyne gas primes (4,000-7,000 tons each) have been sold at 26s. 10½d. c.i.f. Genoa; whilst 28s. for shipment over the whole year is asked; 10,000 tons best Blyth steams have been sold for delivery over the rest of the year at 13s. 6d. f.o.b.; 10,000 tons Wear gas specials have been ordered by the Helsingfors Gasworks, delivery over next year, at 14s. 6d. f.o.b.; 50,000 tons first-class Durham coking coals have been sold for similar delivery at 14s. 6d. f.o.b.; 20,000 tons Durham gas seconds for January-June shipment have been sold at 14s. 3d. f.o.b.; and 10,000 tons Durham gas seconds for delivery over next year have been sold to the Helsingborg Gasworks at 13s. 6d. f.o.b. The enquiry which is causing most interest in the market is that from the Russian State Railways for from 250,000 to 300,000 tons of steams for December-February delivery, tenders immediately. The allotment is expected to be made known this week. This enquiry has caused considerable surprise, coming at a time when coal shipments from this district to Russia are at a very low point, and when, owing to ice, there is already difficulty in getting cargoes delivered at Cronstadt. Negotiations are not likely to be carried through excepting at some considerable advance on current prices. It would seem that the railways' supplies have been seriously limited by the failure of the Donetz basin resources. Other enquiries are as follow:—6,000 to 7,000 tons gas bests for prompt delivery to the Padua Gasworks; 15,000 tons best steams for December-January shipment to the Chilian Government for railways use; 12,000 tons steam smalls for prompt shipment to Christiania works; and 20,000 tons Wear gas specials, shipment next year to the Malmo Gasworks. The latest report as to the French State Railways' contract is that 250,000 tons of steam smalls have been ordered from South Wales and 150,000 tons from Germany. No portion of the order has been allotted locally. The local market is rallying after last week's relapse. The chief factors in the renewed firmness are the Swedish State Railways' order and the Russian enquiry. F.o.b. quotations for prompt shipment are as follow (unaltered, save where otherwise mentioned):—Best steams, Blyths (D.C.B.), 13s. 9d. per ton; Tynes (Bowers, &c.), 13s. 9d., a decline of 3d.; seconds, Blyths, 12s. 6d., 3d. lower; Tynes (Hastings or West Hartleys), 12s. 9d. to 13s.; unscreened, 12s.; smalls, Blyths, 10s. 6d.; Tynes, 9s. 6d.; specials, 11s. 6d., stronger; smithies, 14s. 6d. to 15s., an increase of 6d.; gas bests (New Pelton or Holmside), 15s. to 15s. 3d., an advance of 3d.; seconds (Pelaw Main or similar), 14s. 6d., firmer; specials, 15s. 3d., 3d. dearer; unscreened bunkers, Durhams, 13s. 9d. to 14s. 3d., from 3d. to 9d. higher; Northumbrians, 12s. 6d.; coking coal, 14s. 6d. to 15s., 6d. up; smalls, 14s. to 14s. 6d., 6d. more; households, 14s. 6d. to 15s.; coke, foundry, 27s. to 28s., 1s. increased; blastfurnace, 25s. to 26s., similarly advanced; and gas coke, 22s. 6d.]

Later.—The North-Eastern Railway Company has opened negotiations with local collieries for the supply of 600,000 tons of best steam coals for the use of the northern division over next year. Further details as to the Russian Railways' requirements show that 80,000 tons of coals are required for delivery to Windau and 200,000 tons for Riga and Libau. An enquiry is in circulation for 275,000 tons of Durham coking smalls for delivery over next year to a near port on the Continent.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 81,790 tons of coal and 820 tons of coke, as compared with 108,240 tons of coal and 380 tons of coke for the corresponding period of 1911, being a decrease of 26,450 tons of coal and an increase of 440 tons of coke. The coal market is very steady in all sections, and prices for all descriptions tend upward, with a continued strong undertone also for forward delivery. There is a good demand for best gas sorts; coking unscreened is also stronger; and smalls are in firm request. There is also a fuller enquiry for bunker coals, and prices have advanced. The demand for coke is brisk; the current quotation for foundry coke is 27s. 6d. f.o.b. Furnace coke is quoted 26s. to 26s. 3d. per ton at Teesside furnaces. Contracts for next year are being negotiated at above figures. Gas coke is steady, notwithstanding the heavy production; price is about 23s. 6d. per ton free on board. Of the tenders invited by the Swedish State Railways, 40,000 tons of Lambton, so far, have been accepted at 21s. c.i.f. Stockholm. The Norwegian State Railways have paid 13s. 3d. for 9,000 tons Hetton for delivery during the winter. The Paris, Lyons and Marseilles Railway Company have contracted for 24,000 tons of Durham coking unscreened at 14s. f.o.b., shipment this year; and the Venice Gasworks are inviting tenders for 7,000 tons of Durham gas coals. The Helsingfors Gasworks are reported to have contracted for 10,000 tons of special Wear gas at 14s. 6d. f.o.b., delivery over next year; and for delivery between January and June, 20,000 tons of second Durham. Gas descriptions have been sold at 14s. 3d. per ton free on board. The Malmo Gasworks are inviting offers of 20,000 tons of special Wear gas for delivery over next year. Current quotations:—Special Wear gas, 16s.; seconds, 14s. to 14s. 6d.; household ordinaries, 15s.; bests, 16s.; coking unscreened, 14s. 6d. to 14s. 9d.; smalls, 14s. to 14s. 6d.; smithies, 15s.; peas and nuts, 16s.; ordinary bunkers, 14s.; best, 14s. 6d. to 15s.—all free on board. Outward freights are steady. Coasting has paid: London 5s., Hamburg 5s., Havre 6s. 3d. To the Bay, Bilbao 9s., Bayonne 8s., St. Nazaire 7s. 9d., and Bordeaux 8s. 6d. are the current rates. Baltic is about done for the season. There is a good demand for suitable boats for the Mediterranean ports, Genoa paying 13s. 9d., Algiers 11s. 6d., Porto Vecchia 15s. 6d., Naples 13s. 3d., Venice 16s., and Port Said 13s. 3d; whilst the Islands is represented by 12s. 1½d. to Las Palmas.

Middlesbrough-on-Tees.

COAL.

The fuel market is steady in all sections. Demand is good, and northern markets are strengthened by somewhat unexpected enquiry for coal for the Russian State Railways. There is a good and increasing demand for Durham gas coal, and best kinds stand at 15s. 3d., with second qualities at 14s. 3d. Bunker coal is in heavy request, and ordinary Durhams range from 13s. 6d. to 14s. 6d., whilst for special kinds 14s. 6d. up to 15s. 6d. is quoted. Household coal is in improving demand, and is very strong in price. Coking coal is well taken up, and smalls are 14s. 9d. to 15s. Durham coke is in very good demand, and supplies are insufficient to fully meet requirements of users. Local consumption is heavy, and Barrow and West Cumberland are taking large supplies. Nothing below 26s. is now named for average blastfurnace coke delivered at Teesside works, and some sellers now ask up to 27s. Foundry coke is in the neighbourhood of 27s. 6d. f.o.b. Gas coke is put at 23s. 6d. f.o.b., and production is now nearing its highest point.

IRON.

Quite a good business has been done in pig iron this week, and values of Cleveland have touched higher rates than since the great boom year of 1900. As much as 68s. 6d. has been rather freely paid for early f.o.b. delivery of No. 3 g.m.b., which is a higher figure than for just 12 years. The price, however, has eased, and the market rate for No. 3 is now 68s., with a steady business passing. Foundry 4 and forge 4 continue scarce, and are the same price as No. 3. Mottled and white iron each stand at 67s. 6d., and No. 1, the supply of which is plentiful, is offered rather freely at 71s. Though the recognised market quotation for either early or forward delivery of Nos. 1, 2 and 3 east coast hæmatite pig is in the neighbourhood of 82s., very substantial sales over the whole of 1913 have been made at a lower figure. One heavy sale to a Sheffield firm of heavy consumers, for delivery over the whole of next year, is reported to have been arranged at 89s. at Sheffield, which, with 2½ per cent. off and 6s. carriage, makes the price about 80s. 9d. at Middlesbrough. Under existing conditions, such a figure must be regarded as favourable to the buyer. Business in foreign ore is at a standstill, but market rates are still based on 23s. ex ship Tees for best rubio. Excellent accounts continue to be given of the manufactured iron and steel trades. Producers are full of work. Steel joists, ship plates and ship angles have all gone up 5s. per ton, and advances of other descriptions are expected to follow. Principal market rates are now as follow:—Common iron bars, £8 10s.; iron ship plates, £8; iron ship angles, £8 10s.; iron ship rivets, £9 15s.; steel bars (basic), £7 15s.; steel bars (Siemens), £8 5s.; steel ship plates, £8 5s.; steel ship angles, £7 17s. 6d.; steel joists, £7 7s. 6d. to £7 10s.; heavy steel rails, £6 12s. 6d. to £6 15s.; and steel railway sleepers, £7 to £7 2s. 6d.—railway material net and all other descriptions less 2½ per cent.

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South-West Lancashire.

COAL.

The inland household coal trade is waiting for suitable weather to rescue it from its quietude. Prices keep unaltered, and are about as follow:—Best coal 16s. 3d., good medium qualities 14s. 6d. to 14s. 9d., and kitchen coals 12s. 3d., all into wagons at the pit. The consumption of screened coal for forge and manufacturing purposes continues satisfactory, with the price about 12s. per ton into wagons at the pit. Shipping shows little or no change from the somewhat easier state of affairs reported last week. Bunkering requirements under contract are fully maintained, and there is fair open sale enquiry, but supplies are coming forward more freely than they were two or three weeks ago. Quotations for screened Lancashire steam coals range from 12s. 6d. to 13s. 3d. f.o.b., according to quality, but for prompt shipment concessions may be obtained. Shipments of household coal for the coastwise and cross-Channel trade is scarcely up to the average November. Best coal at the moment rules at about 16s., with good medium grades at about 14s. 9d., both f.o.b. Garston and net. The slack trade has a very firm tone, and buyers are anxious to cover themselves already for contracts which only expire at the year end. Open sale prices for best qualities rule at 9s. 9d. to 10s., good seconds grades 9s. to 9s. 3d., with the finer and commoner qualities about 8s. 6d., all into wagons at the pit.

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South Lancashire and Cheshire.

COAL.

There was a full attendance of members on the Manchester Coal Exchange on Tuesday. House coal is on the quiet side, prices remaining unchanged at 16s. 6d. to 17s. for the best house grades, with good medium qualities at 15s. 3d. to 16s., and the commoner sorts from 12s. 6d. to 14s., all into wagons at the pit. Furnace coal continues to meet with steady enquiry, and the price is firm at about 12s. 6d. per ton at the pit. Shipping coal is steady, and the price is about 14s. f.o.b. Partington. The price is perhaps not quite so firm as during the last few weeks. Slack is still brisk and prices are very firm at 9s. to 9s. 9d. for the best qualities, with the commoner grades at from 8s. to 8s. 6d., all into wagons at the pit.

IRON.

Prices for all classes of iron are firm. In pig iron the makers are now getting delivered in this district for good foundry iron 73s. 6d. per ton, and forge iron 72s. per ton. Hæmatite No. 3 has been sold at over 92s. The forges are full and prices well maintained. Bars £8 10s., second quality 8s., hoops £8 12s. 6d., sheets £9. Steelworks are also full, with bars £8 5s. and billets £6 5s. Heavy engineers fairly well off. Boilermakers slack and prices unremunerative. Textile machinery makers full of work. Wagon builders very busy; deliveries are very hard to get hold of.

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Yorkshire and Derbyshire.

Leeds.

COAL.

The West Yorkshire pits have averaged about five days' work this week, the continued scarcity of trucks and the dulness of the house coal trade having prevented full time work. The output of house coal, limited though it has been, has not all been sold, and stocks in colliery sidings have been increased to a considerable extent. The distant markets have been exceptionally quiet, London merchants taking scarcely anything beyond contract tonnages. Pit prices have suffered to some extent, although no official reduction has been made. Collieries with big stocks have offered concessions equal to wagon hire, but this has had little effect on sales. Reports from London indicate a very quiet state of things in the retail trade. For London and the southern and eastern counties official pit prices average about as follow:—Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. to 14s.; Silkstone best, 13s. to 14s.; Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. 6d. to 12s. The coastwise trade is duller and prices for prompt shipment are all lower. Quotations given in Hull during the past few days range round the following.—Haigh Moor best 16s. to 16s. 6d.; Silkstone best, 16s. to 16s. 9d.; Silkstone house, 14s. to 14s. 9d.; other qualities, 13s. to 13s. 6d. In the West Riding markets the return of mild weather has checked the improvement noted last week, and merchants are very far from being fully employed. Pit prices are officially unchanged, but spot lots at special rates are frequently met with. Current quotations:—Haigh Moor

THE COAL AND IRON TRADES.

Thursday, November 21.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 138,958 tons of coal and 1,068 tons of coke were despatched from Tyne Dock, a decrease of 23,970 tons of coal and 749 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 55,329 tons of coal and 2,321 tons of coke, a decrease of 9,138 tons of coal and 516 tons of coke. The Blyth shipments totalled 88,538 tons of coal and coke, a decrease of 8,572 tons. The decreases all round are mainly attributable to the spell of stormy weather, which delayed tonnage and threw loading turns out of gear. The Swedish State Railways have placed their orders for 124,500 tons of steam coals, for delivery over the winter, at the lower ports. Of the total quantity, Northumberland and Durham have received contracts for 109,500 tons, Scotland for only 5,000 tons, and Silesia for 10,000 tons. Details are as follow:—For Stockholm delivery, 30,000 tons Lambton, Randolph Hetton or South Hetton, at 21s. per ton, c.i.f., option D.C.B. at 20s. 9d., option Hastings-West Hartley at 19s. 9d., and 5,000 tons Gammells Longrigg Navigation (Scottish coal) at 20s.; Gothenburg discharge, 30,000 tons Lambton at 19s. 10½d. and 10,000 tons Bothal at 19s. 10d.; Uddevalla, 1,500 tons Hastings-West Hartley at 19s 3d.; Halmstad, 6,000 tons Hetton at 20s. 9d., option D.C.B. at 20s. 6d.; Helsingborg, 12,000 tons Lambton or Hetton, at 19s. 9d., option D.C.B. 19s. 6d.; Malmo, 10,000 tons D.C.B. at 19s. 6d., 10,000 tons Silesian at 23 20 marks free on truck at Malmo, and 2,000 tons Hetton at 19s. 9d.; and Norrkoping, 8,000 tons Lambton or Hetton at 20s. 9d., option D.C B. at 20s. 6d. The Lambton coal is estimated to work out at about 13s. 9d. per ton f.o.b. The figures show an advance of from 4s. to 4s. 3d. per ton on the prices paid for similar business a year ago. The Norwegian State Railways' contract for steam coals is stated to have gone almost entirely to Yorkshire and Derbyshire, only 9,000 tons of Durham steams, Hettons, having been ordered at about 13s. 3d. per ton f.o.b. The contract to supply the Paris, Lyons and Marseilles Railways with 20,000 tons of coking coals is stated to have been placed in Durham at about 14s. f.o.b. Other important coal sales are as follow:—"Parcels" of Tyne gas primes on passage have been sold at 28s. 6d. per ton c.i.f. Genoa, and, for current loading, a cargo has been disposed of at those figures; for shipment over the first three months of next year, three cargoes of Tyne gas primes (4,000-7,000 tons each) have been sold at 26s. 10½d. c.i.f. Genoa; whilst 26s. for shipment over the whole year is asked; 10,000 tons best Blyth steams have been sold for delivery over the rest of the year at 13s. 6d. f.o.b.; 10,000 tons Wear gas specials have been ordered by the Helsingfors Gasworks, delivery over next year, at 14s. 6d. f.o.b.; 50,000 tons first-class Durham coking coals have been sold for similar delivery at 14s. 6d. f.o.b.; 20,000 tons Durham gas seconds for January-June shipment have been sold at 14s. 3d. f.o.b.; and 10,000 tons Durham gas seconds for delivery over next year have been sold to the Helsingborg Gasworks at 13s. 6d. f.o.b. The enquiry which is causing most interest in the market is that from the Russian State Railways for from 250,000 to 300,000 tons of steams for December-February delivery, tenders immediately. The allotment is expected to be made known this week. This enquiry has caused considerable surprise, coming at a time when coal shipments from this district to Russia are at a very low point, and when, owing to ice, there is already difficulty in getting cargoes delivered at Cronstadt. Negotiations are not likely to be carried through excepting at some considerable advance on current prices. It would seem that the railways' supplies have been seriously limited by the failure of the Donetz basin resources. Other enquiries are as follow:—6,000 to 7,000 tons gas bests for prompt delivery to the Padua Gasworks; 15,000 tons best steams for December-January shipment to the Chilian Government for railways use; 12,000 tons steam smalls for prompt shipment to Christiania works; and 20,000 tons Wear gas specials, shipment next year to the Malmo Gasworks. The latest report as to the French State Railways' contract is that 250,000 tons of steam smalls have been ordered from South Wales and 150,000 tons from Germany. No portion of the order has been allotted locally. The local market is rallying after last week's relapse. The chief factors in the renewed firmness are the Swedish State Railways' order and the Russian enquiry. F.o.b. quotations for prompt shipment are as follow (unaltered, save where otherwise mentioned):—Best steams, Blyths (D.C.B.), 13s. 9d. per ton; Tynes (Bowers, &c.), 13s. 9d., a decline of 3d.; seconds, Blyths, 12s. 9d., 3d. lower; Tynes (Hastings or West Hartleys), 12s. 9d. to 13s.; unscreened, 12s.; smalls, Blyths, 10s. 6d.; Tynes, 9s. 6d.; specials, 11s. 6d., stronger; smithies, 14s. 9d. to 15s., an increase of 6d.; gas bests (New Pelton or Holmside), 15s. to 15s. 3d., an advance of 3d.; seconds (Pelaw Main or similar), 14s. 6d., firmer; specials, 15s. 6d., 3d. dearer; unscreened bunkers, Durhams, 13s. 9d. to 14s. 3d., from 3d. to 9d. higher; Northumbrians, 12s. 6d.; coking coal, 14s. 6d. to 15s., 6d. up; smalls, 14s. to 14s. 6d., 6d. more; households, 14s. 6d. to 15s.; coke, foundry, 27s. to 28s., 1s. increased; blastfurnace, 25s. to 26s., similarly advanced; and gas coke, 22s. 6d.

Later.—The North-Eastern Railway Company has opened negotiations with local collieries for the supply of 600,000 tons of best steam coals for the use of the northern division over next year. Further details as to the Russian Railways' requirements show that 80,000 tons of coals are required for delivery to Windau and 200,000 tons for Riga and Libau. An enquiry is in circulation for 275,000 tons of Durham coking smalls for delivery over next year to a near port on the Continent.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 81,790 tons of coal and 820 tons of coke, as compared with 108,240 tons of coal and 380 tons of coke for the corresponding period of 1911, being a decrease of 26,450 tons of coal and an increase of 440 tons of coke. The coal market is very steady in all sections, and prices for all descriptions tend upward, with a continued strong undertone also for forward delivery. There is a good demand for best gas sorts; coking unscreened is also stronger; and smalls are in firm request. There is also a fuller enquiry for bunker coals, and prices have advanced. The demand for coke is brisk; the current quotation for foundry coke is 27s. 6d. f.o.b. Furnace coke is quoted 26s. to 26s. 3d. per ton at Teesside furnaces Contracts for next year are being negotiated at above figures. Gas coke is steady, notwithstanding the heavy production; price is about 23s. 6d. per ton free on board. Of the tenders invited by the Swedish State Railways, 40,000 tons of Lambton, so far, have been accepted at 21s. c.i.f. Stockholm. The Norwegian State Railways have paid 13s. 3d. for 9,000 tons Hetton for delivery during the winter. The Paris, Lyons and Marseilles Railway Company have contracted for 24,000 tons of Durham coking unscreened at 14s. f.o.b., shipment this year; and the Venice Gasworks are inviting tenders for 7,000 tons of Durham gas coals. The Helsingfors Gasworks are reported to have contracted for 10,000 tons of special Wear gas at 14s. 6d. f.o.b., delivery over next year; and for delivery between January and June, 20,000 tons of second Durham. Gas descriptions have been sold at 14s. 3d. per ton free on board. The Malmo Gasworks are inviting offers of 20,000 tons of special Wear gas for delivery over next year. Current quotations:—Special Wear gas, 16s.; seconds, 14s. to 14s. 6d.; household ordinaries, 15s.; bests, 16s.; coking unscreened, 14s. 6d. to 14s. 9d.; smalls, 14s. to 14s. 6d.; smithies, 15s.; peas and nuts, 16s.; ordinary bunkers, 14s.; best, 14s. 6d. to 15s.—all free on board. Outward freights are steady. Coasting has paid: London 5s., Hamburg 5s., Havre 6s. 3d. To the Bay, Bilbao 9s., Bayonne 8s., St. Nazaire 7s. 9d., and Bordeaux 8s. 6d. are the current rates. Baltic is about done for the season. There is a good demand for suitable boats for the Mediterranean ports, Genoa paying 13s. 9d., Algiers 11s. 6d., Porto Vecchio 15s. 6d., Naples 13s. 3d., Venice 16s., and Port Said 13s. 3d; whilst the Islands is represented by 12s. 1½d. to Las Palmas.

Middlesbrough-on-Tees.

COAL.

The fuel market is steady in all sections. Demand is good, and northern markets are strengthened by somewhat unexpected enquiry for coal for the Russian State Railways. There is a good and increasing demand for Durham gas coal, and best kinds stand at 15s. 3d., with second qualities at 14s. 3d. Bunker coal is in heavy request, and ordinary Durhams range from 13s. 6d. to 14s. 6d., whilst for special kinds 14s. 6d. up to 15s. 6d. is quoted. Household coal is in improving demand, and is very strong in price. Coking coal is well taken up, and smalls are 14s. 9d. to 15s. Durham coke is in very good demand, and supplies are insufficient to fully meet requirements of users. Local consumption is heavy, and Barrow and West Cumberland are taking large supplies. Nothing below 26s. is now named for average blastfurnace coke delivered at Teesside works, and some sellers now ask up to 27s. Foundry coke is in the neighbourhood of 27s. 6d. f.o.b. Gas coke is put at 23s. 6d. f.o.b., and production is now nearing its highest point.

IRON.

Quite a good business has been done in pig iron this week, and values of Cleveland have touched higher rates than since the great boom year of 1900. As much as 68s. 6d. has been rather freely paid for early f.o.b. delivery of No. 3 g.m.b., which is a higher figure than for just 12 years. The price, however, has eased, and the market rate for No. 3 is now 68s., with a steady business passing. Foundry 4 and forge 4 continue scarce, and are the same price as No. 3. Mottled and white iron each stand at 67s. 6d., and No. 1, the supply of which is plentiful, is offered rather freely at 71s. Though the recognised market quotation for either early or forward delivery of Nos. 1, 2 and 3 east coast hæmatite pig is in the neighbourhood of 62s., very substantial sales over the whole of 1913 have been made at a lower figure. One heavy sale to a Sheffield firm of heavy consumers, for delivery over the whole of next year, is reported to have been arranged at 69s. at Sheffield, which, with 2½ per cent. off and 6s. carriage, makes the price about 60s. 9d. at Middlesbrough. Under existing conditions, such a figure must be regarded as favourable to the buyer. Business in foreign ore is at a standstill, but market rates are still based on 23s. ex ship Tees for best rubio. Excellent accounts continue to be given of the manufactured iron and steel trades. Producers are full of work. Steel joists, ship plates and ship angles have all gone up 5s. per ton, and advances of other descriptions are expected to follow. Principal market rates are now as follow:—Common iron bars, £8 10s.; iron ship plates, £8; iron ship angles, £8 10s.; iron ship rivets, £9 15s.; steel bars (basic), £7 15s.; steel bars (Siemens), £8 5s.; steel ship plates, £8 5s.; steel ship angles, £7 17s. 6d.; steel joists, £7 7s. 6d. to £7 10s.; heavy steel rails, £6 12s. 6d. to £6 15s.; and steel railway sleepers, £7 to £7 2s. 6d.—railway material net and all other descriptions less 2½ per cent.

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South-West Lancashire.

COAL.

The inland household coal trade is waiting for suitable weather to rescue it from its quietude. Prices keep unaltered, and are about as follow:—Best coal 16s. 3d., good medium qualities 14s. 6d. to 14s. 9d., and kitchen coals 12s. 3d., all into wagons at the pit. The consumption of screened coal for forge and manufacturing purposes continues satisfactory, with the price about 12s. per ton into wagons at the pit. Shipping shows little or no change from the somewhat easier state of affairs reported last week. Bunkering requirements under contract are fully maintained, and there is fair open sale enquiry, but supplies are coming forward more freely than they were two or three weeks ago. Quotations for screened Lancashire steam coals range from 12s. 9d. to 13s. 3d. f.o.b., according to quality, but for prompt shipment concessions may be obtained. Shipments of household coal for the coastwise and cross-Channel trade is scarcely up to the average November. Best coal at the moment rules at about 19s., with good medium grades at about 14s. 9d., both f.o.b. Garston and net. The slack trade has a very firm tone, and buyers are anxious to cover themselves already for contracts which only expire at the year end. Open sale prices for best qualities rule at 9s. 9d. to 10s., good seconds grades 9s. to 9s. 3d., with the finer and commoner qualities about 8s. 0d., all into wagons at the pit.

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IRON.

Prices for all classes of iron are firm. In pig iron the makers are now getting delivered in this district for good foundry iron 73s. 6d. per ton, and forge iron 72s. per ton. Hæmatite No. 3 has been sold at over 92s. The forges are full and prices well maintained. Bars £8 10s., second quality 8s., hoops £8 12s. 6d., sheets £9. Steelworks are also full, with bars £8 5s. and billets £9 5s. Heavy engineers fairly well off. Boilermakers slack and prices unremunerative. Textile machinery makers full of work. Wagon builders very busy; deliveries are very hard to get hold of.

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Yorkshire and Derbyshire.

Leeds.

COAL.

The West Yorkshire pits have averaged about five days' work this week, the continued scarcity of trucks and the dulness of the house coal trade having prevented full time work. The output of house coal, limited though it has been, has not all been sold, and stocks in colliery sidings have been increased to a considerable extent. The distant markets have been exceptionally quiet, London merchants taking scarcely anything beyond contract tonnages. Pit prices have suffered to some extent, although no official reduction has been made. Collieries with big stocks have offered concessions equal to wagon hire, but this has had little effect on sales. Reports from London indicate a very quiet state of things in the retail trade. For London and the southern and eastern counties official pit prices average about as follow:—Haigh Moor selected, 14s. to 15s.; Wallsend and London best, 13s. to 14s.; Silkstone best, 13s. to 14s.; Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. 6d. to 12s. The coastwise trade is duller and prices for prompt shipment are all lower. Quotations given in Hull during the past few days range round the following:—Haigh Moor best 19s. to 19s. 6d.; Silkstone best, 16s. to 16s. 9d.; Silkstone house, 14s. to 14s. 9d.; other qualities, 13s. to 13s. 6d. In the West Riding markets the return of mild weather has checked the improvement noted last week, and merchants are very far from being fully employed. Pit prices are officially unchanged, but spot lots at special rates are frequently met with. Current quotations:—Haigh Moor

THE WELSH COAL AND IRON TRADES.

Thursday, November 21.

North Wales.

Ruabon.

COAL.

The state of the coal trade of North Wales still continues to be all that is desirable, excepting that in some instances tonnage is hard to secure, and this with the collieries which have not a large rolling stock sometimes hampers them, and causes them to have to play for a day. There is no lack of orders for the best household coal. People are getting in their winter supplies, and merchants who have no contracts with the colliery companies for this class of fuel are willing to pay 16s. and 17s. per ton at the pit for the best quality, with every prospect of immediate advance, and the colliery companies are not eager to book any orders for forward delivery, or to make contracts in this class of trade. The seconds quality large coal, together with the best quality in cobbles size, finds a ready market at 15s. and 16s. per ton at pit. Steam coal has a ready sale, owing doubtless to the continued good state of trade generally in manufacturing districts, and the average selling price for this fuel is about 14s. per ton at pit, while steam coal for bunkers is obtainable at about 13s. per ton. Large quantities of locomotive coal are being taken by the railway companies on account of their contracts, and the same remarks apply to gas coal. Slack is very scarce at the present time, owing to the abnormal demand for manufacturing purposes and for coking, but what slack is available is being sold at prices varying from 6s. 6d. to 9s. 6d. per ton f.o.r., and nuts, which also are scarce for the ordinary trade outside of contracts, are being sold at about 12s. 6d. per ton at pit. The demand for gas coke is satisfactory, and the ruling prices are from 16s. to 18s. per ton, according to locality of gas works and quality of the coke.

Monmouthshire, South Wales, &c.

Newport.

COAL

After marking time for practically the whole of last week, a stronger tone developed in the steam coal market, which this week has been daily growing firmer. At the docks there is tonnage in abundance, supplies having come along with a rush, while chartering has been quite brisk enough to secure a reasonable continuance of shipping for some time. Shipments this week will be exceptionally heavy, although there is no probability of pulling down stocks to the point of scarcity. Collieries now are pretty well secured for the disposal of their output over the next few weeks, and for forward business sellers are very firm at fully 6d. higher than quoted figures. Smalls and large alike are priced at higher rates, other qualities sharing in the general improvement. On short supplies pitwood also is firmer. In the freight market matters are now quieter. A fair amount of tonnage is on offer, while the downward tendency of freights is not so perceptible. Latest approximate ruling quotations may be taken as follow, coal quotations cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 6d. to 16s.; western-valleys, ordinaries, 14s. 9d. to 15s. 3d.; eastern-valleys, best, 14s. 6d. to 14s. 9d.; other sorts, 14s. to 14s. 6d.; colliery smalls, best, 9s. 6d. to 9s. 9d.; seconds, 8s. 9d. to 9s.; inferiors, 8s. 3d. to 8s. 6d.; screenings, 9s. 6d. to 10s.; through coals, 12s. to 12s. 6d.; nuts, best washed, 12s. 6d. to 12s. 9d.; house coals, best, 18s. to 18s. 6d.; seconds, 17s. to 17s. 6d.; patent fuel, 17s. 9d. to 18s. Coke: Furnace, 22s. to 23s.; foundry, 23s. to 28s. Pitwood: Best French fir, 23s. 6d. to 24s. ex-ship.

IRON.

Continued steadiness characterises the iron and steel trades of the district, but as last reported, there is not a large volume of fresh business passing, owing to most producers being fully committed over the next couple of months, and showing no inclination to negotiate for still further ahead except upon their own terms. There is little fresh to report at the bar mills, where quotations are strong at £5 17s. 6d. for Bessemer, and £5 17s. 6d. to £6 for Siemens Welsh bars. Arrivals of foreign steel are again heavy, and values also are still further inclined upward. There is rather more activity in the rail department, with enquiry more plentiful. Quotations remain unchanged at £6 10s. to £6 15s. for heavy sections. Work continues in every way satisfactory at blast furnaces, where there are still heavy deliveries of arrears to work off. Another furnace will shortly be blown in, and in full working order soon after Christmas. Quotations of Welsh hæmatite are harder, and are by some sellers 1s. to 1s. 6d. more than the official figures of 86s. 6d. to 87s. 6d. delivered in the district. Iron ore remains unaltered at 22s. to 22s. 6d., best rubio c.i.f. Newport. Tinplate works continue uniformly well placed for orders, although only small forward business is passing. Quotations remain steady on last week's basis of 15s. 9d. Bessemer and 15s. 9d. to 15s. 10½d., Siemens for I C 20 × 14 × 112; and 31s. 6d. Bessemer and 31s. 6d. to 31s. 9d. Siemens for 28 × 20. Other sizes and grades *pro rata*. Finished blackplate is again quoted £11 12s. 6d. to £11 15s. per ton.

Cardiff.

COAL.

This market is decidedly firmer than it was last week. Arrivals of tonnage over the week end were exceptionally heavy, and quite sufficient to meet all requirements. In the Bute docks alone there were no less than 137 vessels, whilst at Barry dock there were 71, and at Penarth 29 vessels, making a total of 237. Freights are on the easy side, and coalowners, in consequence of this and the increased demand for coal, have been able to get better prices for their minerals. As much as from 17s. to 17s. 3d. has been paid for some of the best steam descriptions for prompt shipment, and even at the higher figure collieries are not disposed to sell any large quantity, as they are more than ever convinced that their turn for participation in the boom in trade prevalent in other districts is fast approaching. As has before been pointed out, the controlling factor is the supply of tonnage, and should this come forward in anything like adequate quantities, prices of coal are bound to rise. Optimists put the rise at 1s. per ton at the least, whilst later they prognosticate an advance of 1s. 6d. per ton. Superior second class Admiralties command from 16s. 6d. to 16s. 9d., whilst lower grades are held for 16s. to 16s. 3d. As usual there is a good deal of mystery with reference to the prices paid by the Admiralty for their supplies for next year, but the writer of this report has every reason for stating that they range from 16s. 6d. to 17s. net, whilst for some of the premier descriptions even a slightly higher figure has been obtained. As for the coal required for the naval manœuvres, it is very generally understood that an extra 6d. per ton would be paid. Of course, there is always a great deal of uncertainty as to when these manœuvres will take place, and for this reason collieries have to safeguard themselves by charging an additional price, especially as the movements of the fleet are usually at a time when there is considerable pressure for coal. In addition to this the Admiralty have the right to call for extra quantities whenever they may think fit. It is not known what quantity of coal has been purchased, as the orders have been spread over a great number of collieries, but the Admiralty usually take between 1,250,000 and 1,500,000 tons over the year. There is a very widespread belief that the prices obtained for these contracts will have a stiffening influence on the market, and sellers in particular carry their optimism so far as to predict a boom in South Wales. The prices paid by the Austrian-Lloyd Steamship Company for the supply of about 250,000 tons of Admiralty coals for delivery over next year, are reported to be about the same, quality considered, as was paid by our own naval administrators, being 16s. 9d. to 17s. less 2½ per cent. discount. The bulk of this contract is said to have been divided between the Lewis-Merthyr and North's Navigation colliery companies. A large quantity of coal continues to be despatched to the war vessels assembled in Turkish waters, and the shipments last week from Cardiff alone reached a total of over 382,000 tons. The Chilian Government are in the market for 15,000 tons of best steams for delivery over December and January, and there are also enquiries from other consumers. Chartering is very active, the number of vessels taken up last week representing a gross carrying capacity of nearly 376,000 tons. There is every indication that tonnage will become more plentiful in the near future, as several markets in which a large number of vessels are at present employed will soon resume their normal state. It is feared, however, that so far as South Wales is concerned, there will not be much easiness in freights for some time to come, for it is stated on good authority that vessels have been engaged over the year for the River Plate at 21s. per ton. It is for short voyages that shippers are looking for diminished rates. The small coal market continues very firm. This is due in great measure to the pressure that exists for small coal for industrial purposes, particularly for iron and steel works, the manufactures of coke, &c. For cargo qualities from 9s. 3d. to 9s. 6d. is being paid, whilst bunkerings command from 10s. 9d. to 11s. per ton. Washed nuts are 15s. 6d., and washed peas 13s. 6d. Further particulars have come to hand regarding the contracts for the French State Railways. Of the 380,000 tons of small which they require, it is stated that Messrs. E. W. Cook and Co. have secured about 100,000 tons, while smaller quantities have been allotted to Messrs. Pyman, Watson and Co., Messrs. Moxey, Savon and Co., and Mr. Chas. Le Borgue, of Paris. The price is said to be about 25 05 fr. inclusive of the French tax, and delivered into trucks at a French port. Monmouthshire coals are firm, and fully 15s. 9d. is paid for Black Veins, 15s. to 15s. 3d. for western valleys, and 14s. 6d. for eastern valleys, all f.o.b. Cardiff The exports of coal to foreign countries from the Bristol Channel during the month of October amounted to 2,793,364 tons, as against 2,186,051 tons in the corresponding month of last year, or an increase of 607,313 tons. From Cardiff alone the shipments amounted to 1,855,548 tons, an increase of 416,463 tons, whilst Newport showed an increase of 80,912, Port Talbot an increase of 57,095, and Swansea an increase of 47,607 tons. The following table shows the exports to the chief countries of the world in October last, and also for the same month last year:—

	October 1911. Tons.	October 1912. Tons.
Russia	58,390	67,394
Sweden	18,504	20,877
Norway	8,105	12,141
Denmark	6,922	3,470
Germany	24,350	20,286
Netherlands	15,166	15,560
Java	12,290	—
Dutch possessions in Indian Seas	5,755	—
Belgium	36,211	40,500
France	496,803	575,216
Algeria	36,495	68,030
French Somaliland	4,998	—
Portugal	33,995	67,251
Azores	3,868	6,838
Madeira	3,851	20,498
Spain	73,947	113,227
Canary Islands	53,999	86,096
Italy	386,327	674,832
Austria-Hungary	15,202	9,198
Greece	21,750	21,724
Bulgaria	12,453	3,494
Roumania	30,820	21,192
Turkey (European)	2,872	13,827
„ (Asiatic)	3,455	1,284
Egypt	128,103	146,126
Tunis	7,136	1,929
China (exclusive of Hong Kong)	—	5,622
Mexico	3,875	1,152
Chili	45,145	11,844
Brazil	123,660	138,002
Uruguay	59,250	82,031
Argentine Republic	282,971	364,299
Channel Islands	6,670	8,927
Gibraltar	37,414	15,868
Malta	28,508	48,659
Cyprus	—	4,579
Aden	14,087	15,714
British India	6,424	11,544
Ceylon	23,481	10,881
Hong Kong	5,207	—
West Africa (French)	12,714	4,942
„ (Portuguese)	26,333	32,358
„ (British)	7,483	15,693

The largest increases were to Italy 288,505 tons, France 78,413, Argentine Republic 61,328, Chile 66,699, Spain 39,280, Portugal 33 256, Canary Islands 32,097, and Algeria 31,535 tons. There is practically no change in house coals. Best qualities are still quoted at 18s. to 18s. 6d. No. 3 Rhondda large 16s. 6d to 17s., through-and-through 14s. 3d., and small 11s. 6d. to 12s. No. 2 large is 13s. to 13s. 3d., through-and-through 11s. to 11s. 3d., and small 9s. 6d. to 9s. 9d. per ton. There is a good enquiry for patent fuel, and the Austrian naval authorities are reported to have bought seven cargoes of Swansea fuel. The Argentine railways are in the market for 200,000 tons for delivery over the year. Shipment of fuel from the Bristol Channel for the week amounted to about 22,000 tons, the Crown Company shipping 8,094, Swansea makers 10,755 and Newport 3,050 tons. Best brands are from 18s. 6d. to 19s., seconds 17s. 6d. to 18s. per ton. Special foundry coke is 30s., ordinary qualities 28s. per ton. Furnace coke is 20s. to 22s. Pitwood has gone up to 24s., an increase of 1s. per ton.

IRON

Though the volume of trade doing in tin-plates is fairly satisfactory, manufacturers are meeting with considerable difficulties. Tin continues high, and supplies of bars are very scarce, causing temporary stoppages at the mills. Last week receipts from works only amounted to 85,461 boxes, whilst shipments reached a total of 104,303 boxes. Stocks have been decreased by 18,842 boxes, and now stand at 152,683 boxes. As compared with the corresponding period of last year, there are 16 more mills at work, the number operating being 586, of which 513 are tin-plate, and 73 sheet mills. Prices all round are still in excess of the normal 14 × 20 cokes, being 15s. 1½d. to 15s. 4½d., and oil sizes 14 × 18¾ 15s. 4½d. to 15s. 7½d. per box. Blackplate is offering at £11 10s. to £11 15s. Owing to the continuance of the war in the Balkans, only six mills out of 16 are operating at the works of Mr. W. H. Edwards at Morriston. There is no little distress, and in order to provide work for the unemployed the Swansea Corporation have decided to spend about £600 on improvements in the parks. Foundations are being laid down for four new mills at the Aber works, Llansamlet. Siemens steel bars are £5 17s. 6d. to £6. Bessemer 2s. 6d. less. These figures are adhered to for delivery from January to June. Business in galvanised sheets is very quiet, and makers are offering 24 gauge corrugateds at £12 15s. There is no change in rates. Welsh pig iron is firm at 87s. 6d. f.o.t. Best rubio iron ore is 22s. 6d. to 23s. The strike of ironmoulders at Cardiff still continues, but prospects of a speedy settlement are now more reassuring.

Swansea.

COAL

The trade of the port last week was on the whole fairly satisfactory, although the returns were adversely affected owing to the very limited supply of tonnage. The shipments of coal and patent fuel amounted to 92,421 tons. There was an excellent attendance on 'Change this morning, and there was no material alteration in the general condition of the anthracite coal market. There was a brisk demand for Swansea Valley large, and values were steadily advancing. Red Vein large was also firm at last quotations. Machine-made nuts and cobbles were steady, but beans were weak, and were freely offered at reduced prices for prompt delivery. For rubbly culm there was a better enquiry, with prices slightly harder. Duff was steady. In the steam coal market there was a better demand, and prices for bunkers were slightly advanced. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. 6d. to 25s. 6d. net; second quality ditto, 20s. 6d. to 22s. 6d. net; Big Vein large, 18s. 6d. to 19s. 6d., less 2½ per cent.; Red Vein large, 15s. to 15s. 6d., less 2½ per cent.; machine-made cobbles, 21s. 6d. to 23s. 6d.; Paris nuts, 23s. 6d. to 26s. 9d.; French nuts, 23s. 6d. to 27s.; German nuts, 23s. 6d. to 26s. 6d.; beans, 21s. to 23s. 3d.; machine-made large peas, 12s. 6d. to 14s.; ditto fine peas, 11s. to 12s. 6d., all net; rubbly culm, 5s. 3d. to 5s. 9d., less 2½ per cent.; duff, 4s. 6d. to 5s., net. Steam: Best large, 17s. to 18s.; seconds, 13s. to 14s.; bunkers, 10s. 6d. to 11s. 6d.; small, 9s. 6d. to 10s. 6d., less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. to 18s.; through-and-through, 14s. to 15s.; small, 11s. 6d. to 13s., all less 2½ per cent. Patent fuel, 16s. to 17s., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

During the past week the condition of the iron and steel trades in this district continued good. The blastfurnaces and steelworks were actively engaged. Most of the tin-plate and sheet-rolling mills were busy, but the trouble in the Balkans is causing serious interruption at some of the works, and there are now several mills idle. The tube works and foundries had a steady run of work. The shipments of tin-plates last week were 104,303 boxes, receipts from works 85,451 boxes, and stocks in the dock warehouses and vans 152,083 boxes.

Llanelly.

COAL.

The coal market of the district has become distinctly firmer during the past week, and on all sides there appears to be increased activity, with a very hopeful outlook for the future. This is possibly due to the arrival of more tonnage, and the big enquiries received from foreign markets. Enquiries from the manufacturing works are numerous, and most buyers are anxious to book contracts to the end of June next, and in many instances to December 31. Prices have advanced beyond all expectation, and collieries have had but very little difficulty in securing quite 9d. to 1s. per ton advance on present figures for the whole of next year. Almost all people anticipate that coals will become scarce. The scarcity of small steams has been accentuated by the stoppage of several local collieries owing to water difficulties. It is very doubtful if some of the pits will be opened. Almost all kinds of anthracite have a big enquiry. The only coals showing any slackness are peas and culm, the enquiry for horticultural and stove coals being great. Prices are firm, and approximately are:—Best malting large, 23s. to 25s.; second malting large, 21s. to 22s. 6d.; Big Vein large, 17s. 6d. to 19s.; Red Vein large, 15s. to 15s. 6d.; machine-made cobbles, 21s. to 22s.; German nuts, 25s. to 26s.; French nuts, 25s. to 26s.; Paris nuts, 25s. to 25s. 6d.; machine-made beans, 23s. to 23s. 6d.; ditto, second quality, 21s. to 22s.; machine-made peas, 12s. 6d to 13s.; rubbly culm, 6s. to 6s. 6d.; duff, 4s. 6d. to 5s. 6d.; large steam, 16s. to 16s. 6d.; through-and-through, 10s. 9d. to 11s. 3d.; small steam, 9s. 6d. to 10s. 6d.; bituminous small. 11s. to 11s. 6d.—all f.o.b.

COAL AND IRON TRADES.

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Greece	21,750	21,724
Bulgaria	12,453	3,494
Roumania	30,820	21,192
Turkey (European)	2,872	13,827
" (Asiatic)	3,455	1,284
Egypt	128,103	146,126
Tunis	7,136	1,929
China (exclusive of Hong Kong)	—	5,622
Mexico	3,875	1,152
Chili	45,145	11,844
Brazil	123,660	138,002
Uruguay	59,250	82,031
Argentine Republic	282,971	364,299
Channel Islands	6,670	8,927
Gibralter	37,414	15,868
Malta	28,508	48,659
Cyprus	—	4,579
Aden	14,087	15,714
British India	6,424	11,544
Ceylon	23,481	10,881
Hong Kong	5,207	—
West Africa (French)	12,714	4,942
" (Portuguese)	26,333	32,358
" (British)	7,483	15,693

The largest increases were to Italy 288,505 tons, France 78,413, Argentine Republic 81,328, Chile 66,699, Spain 39,280, Portugal 33 256, Canary Islands 32,097, and Algeria 31,535 tons. There is practically no change in house coals. Best qualities are still quoted at 18s. to 18s. 6d. No. 3 Rhondda large 16s. 6d. to 17s., through-and-through 14s. 3d., and small 11s. 6d. to 12s. No. 2 large is 13s. to 13s. 3d., through-and-through 11s. to 11s. 3d., and small 9s. 6d. to 9s. 9d. per ton. There is a good enquiry for patent fuel, and the Austrian naval authorities are reported to have bought seven cargoes of Swansea fuel. The Argentine railways are in the market for 200,000 tons for delivery over the year. Shipment of fuel from the Bristol Channel for the week amounted to about 22,000 tons, the Crown Company shipping 8,094, Swansea makers 10,755 and Newport 3,050 tons. Best brands are from 18s. 6d. to 19s., seconds 17s. 6d. to 18s. per ton. Special foundry coke is 30s., ordinary qualities 28s. per ton. Furnace coke is 20s. to 22s. Pitwood has gone up to 24s., an increase of 1s. per ton.

IRON

Though the volume of trade doing in tin-plates is fairly satisfactory, manufacturers are meeting with considerable difficulties. Tin continues high, and supplies of bars are very scarce, causing temporary stoppages at the mills. Last week receipts from works only amounted to 85,461 boxes, whilst shipments reached a total of 104,303 boxes. Stocks have been decreased by 18,842 boxes, and now stand at 152,683 boxes. As compared with the corresponding period of last year, there are 16 more mills at work, the number operating being 586, of which 513 are tin-plate, and 73 sheet mills. Prices all round are still in excess of the normal 14 × 20 cokes, being 15s. 1½d. to 15s. 4½d., and oil sizes 14 × 18¾ 15s. 4½d. to 15s. 7½d. per box. Blackplate is offering at £11 10s. to £11 15s. Owing to the continuance of the war in the Balkans, only six mills out of 16 are operating at the works of Mr. W. H. Edwards at Morriston. There is no little distress, and in order to provide work for the unemployed the Swansea Corporation have decided to spend about £600 on improvements in the parks. Foundations are being laid down for four new mills at the Aber works, Llansamlet. Siemens steel bars are £5 17s. 6d. to £6. Bessemer 2s. 6d. less. These figures are adhered to for delivery from January to June. Business in galvanised sheets is very quiet, and makers are offering 24 gauge corrugateds at £12 15s. There is no change in rates. Welsh pig iron is firm at 87s. 6d. f.o.t. Best rubio iron ore is 22s. 6d. to 23s. The strike of ironmoulders at Cardiff still continues, but prospects of a speedy settlement are now more reassuring.

Swansea.

COAL

The trade of the port last week was on the whole fairly satisfactory, although the returns were adversely affected owing to the very limited supply of tonnage. The shipments of coal and patent fuel amounted to 92,421 tons. There was an excellent attendance on 'Change this morning, and there was no material alteration in the general condition of the anthracite coal market. There was a brisk demand for Swansea Valley large, and values were steadily advancing. Red Vein large was also firm at last quotations. Machine-made nuts and cobbles were steady, but beans were weak, and were freely offered at reduced prices for prompt delivery. For rubbly culm there was a better enquiry, with prices slightly harder. Duff was steady. In the steam coal market there was a better demand, and prices for bunkers were slightly advanced. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. 6d. to 25s. 6d. net; second quality ditto, 20s. 6d. to 22s. 6d. net; Big Vein large, 18s. 6d. to 19s. 6d., less 2½ per cent.; Red Vein large, 15s. to 15s. 6d., less 2½ per cent.; machine-made cobbles, 21s. 6d. to 23s. 6d.; Paris nuts, 23s. 6d. to 26s. 9d.; French nuts, 23s. 6d. to 27s.; German nuts, 23s. 6d. to 26s. 6d.; beans, 21s. to 23s. 3d.; machine-made large peas, 12s. 6d. to 14s.; ditto fine peas, 11s. to 12s. 6d., all net; rubbly culm, 5s. 3d. to 5s. 9d., less 2½ per cent.; duff, 4s. 6d. to 5s., net. Steam: Best large, 17s. to 18s.; seconds, 13s. to 14s.; bunkers, 10s. 6d. to 11s. 6d.; small, 9s. 6d. to 10s. 6d., less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. to 18s.; through-and-through, 14s. to 15s.; small, 11s. 6d. to 13s., all less 2½ per cent. Patent fuel, 16s. to 17s., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

During the past week the condition of the iron and steel trades in this district continued good. The blastfurnaces and steelworks were actively engaged. Most of the tin-plate and sheet-rolling mills were busy, but the trouble in the Balkans is causing serious interruption at some of the works, and there are now several mills idle. The tube works and foundries had a steady run of work. The shipments of tin-plates last week were 104,303 boxes, receipts from works 85,451 boxes, and stocks in the dock warehouses and vans 152,683 boxes.

Llanelly.

COAL.

The coal market of the district has become distinctly firmer during the past week, and on all sides there appears to be increased activity, with a very hopeful outlook for the future. This is possibly due to the arrival of more tonnage, and the big enquiries received from foreign markets. Enquiries from the manufacturing works are numerous, and most buyers are anxious to book contracts to the end of June next, and in many instances to December 31. Prices have advanced beyond all expectation, and collieries have had but very little difficulty in securing quite 9d. to 1s. per ton advance on present figures for the whole of next year. Almost all people anticipate that coals will become scarce. The scarcity of small steams has been accentuated by the stoppage of several local collieries owing to water difficulties. It is very doubtful if some of the pits will be opened. Almost all kinds of anthracite have a big enquiry. The only coals showing any slackness are peas and culm, the enquiry for horticultural and stove coals being great. Prices are firm, and approximately are:—Best malting large, 23s. to 25s.; second malting large, 21s. to 22s. 6d.; Big Vein large, 17s. 6d. to 19s.; Red Vein large, 15s. to 15s. 6d.; machine-made cobbles, 21s. to 22s.; German nuts, 25s. to 26s.; French nuts, 25s. to 26s.; Paris nuts, 25s. to 25s. 6d.; machine-made beans, 23s. to 23s. 6d.; ditto, second quality, 21s. to 22s.; machine-made peas, 12s. 6d to 13s.; rubbly culm, 6s. to 6s. 6d.; duff, 4s. 6d. to 5s. 6d.; large steam, 16s. to 16s. 6d.; through-and-through, 10s. 9d. to 11s. 3d.; small steam, 9s. 6d. to 10s. 6d.; bituminous small, 11s. to 11s. 6d.—all f.o.b.

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The prosecution was under section 67 of the Act, which refers to the withdrawal of workmen in case of danger, and reads as follows:—

"Section 67.—(1) If at any time it is found by the person for the time being in charge of the mine, or any part thereof, that, by reason of the prevalence of inflammable or noxious gases, or of any cause whatever, the mine or any place in the mine is dangerous, every workman shall be withdrawn from the mine or place found dangerous, and a fireman, examiner, or deputy, or other competent person authorised by the manager or under-manager for the purpose shall inspect the mine or place found dangerous, and, if the danger arises from inflammable gas, shall inspect the mine or place with a locked safety lamp, and in every case shall make a full and accurate report of the condition of the mine or place; and a workman shall not, except in so far as is necessary for enquiry into the cause of danger or for the removal thereof, or for exploration, be readmitted into the mine or place found dangerous until the same is reported by the fireman, examiner, or deputy not to be dangerous.

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The prosecution alleged that on July 30, when an inspector visited Bentley Colliery, he smelt gas, and his safety lamp revealed more than 2½ per cent. of gas in the main airway, and that men were doing ripping there; and although the under-manager's attention was drawn to the state of the air, the men were not withdrawn. The defence was that the men employed in the return airway were there for repair work and not for getting coal, that they were ripping to improve ventilation, and that section 67, above quoted, permitted their presence. The Bench determined that a technical offence had been committed, and imposed a nominal penalty of 20s., with costs.

The decision is, without doubt, a serious one, and would appear to place on the Mines Act an interpretation directly opposed to the recommendation of the Royal Commission on Mines, upon whose reports the new legislation was based.

The Home Office maintained that certain men, engaged in enlarging a return airway so as to improve the ventilation, were illegally working in air containing over 2½ per cent. of firedamp, and that they were not entitled, under any similar circumstances, to work or pass in such air. There was one analysis only, and as this was arithmetically impossible, the actual percentage was doubtful.

The serious thing, however, is that the Home Office should maintain that work in air containing more than the standard maximum of impurity for ordinary work is illegal, even when there are important reasons for permitting such work; and, moreover, that they should prosecute a colliery which is unexceptionably well staffed and carefully managed, and which is spending large sums in investigating every source of danger from gob-fires and gas, and trying to minimise the dangers from them.

This work has been organised, and is being carried out, under the supervision of Dr. Haldane, a member of the Royal Commission on Mines, and the leading authority on mine air, and it seems a pity that this invaluable work should be hindered by the loss of time occasioned by continual visits from inspectors, whose endeavour seems apparently to be to find out some breach of what they believe to be the letter of the Mines Act. The recommendation of the Commission on Mines appears in the Second Report. The Commissioners say:—

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It is understood that the Mines Commission was unanimously against any provision making important work impossible in air containing more than the ordinary working limits of air impurity.

Unfortunately, this recommendation was not literally embodied in the Act, although it would appear to be implied in the words, "except in so far as is necessary for inquiry into the cause of danger or for the removal thereof" (section 67 (1)). This has given rise to an ambiguity, section 67 being read in conjunction with section 29, which specifically refers to the employment of persons for the purpose of restoring the ventilation "interrupted in consequence of an accident."

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— PROGRESS. —

Pollution of Streams by Coal-washing Water.

A paper on this subject was read before the recent Health Congress at York by H. Maclean Wilson, M.D., B.Sc., chief inspector, West Riding Rivers Board. Dr. Wilson observes that coal as it comes from the pits often contains a considerable admixture of impurities, such as shale, clay, and pyrites, which greatly reduce its value, and especially so in the case of coal which is to be converted into coke for use in the iron and steel industries. The larger pieces of stone and shale can be picked out of the coal by hand, but when the coal and its impurities are broken up into small pieces this method of separation is impracticable, and it becomes necessary to wash the coal. The impurities are almost invariably of greater specific gravity than the coal, and when a mixture of small pieces of the two is agitated in water they gradually separate into two layers, the coal at the top, and the "dirt" at the bottom. All washing machines are constructed to take advantage of this difference of specific gravity, and are so arranged that the dirt is discharged from one part of the washer while the coal issues with the water from another part. The coal is separated from the water either by straining or settlement, but the water which finally escapes usually carries with it large amounts of fine coal in suspension.

In order to safeguard the streams and to recover as much water as possible, it is advisable, at every colliery, to have final settling tanks or ponds situated as low as circumstances will permit, so as to be available for the interception not only of the surplus water from the washers, but also of the surface drainage from the whole of the colliery premises. These ponds can readily be constructed by forming banks across a small valley or around a flat area with the spoil from the pit. The waste waters when turned into such a pond will percolate through the banks, and, thus filtered, may be made fit to discharge to a stream or to be reused at the colliery. When the pond becomes full of settled solids its banks can easily be raised by further tipping. In some cases, ponds of this kind have been made ½ acre in area, and with banks 25 ft. high.

It is gratifying to find that the measures of purification adopted by colliery proprietors have resulted in a great saving to them. When the dirty water from the washers was discharged untreated to the streams a much larger quantity of water was needed for washing the coal, and it carried with it a large amount of good coal in suspension, amounting in some cases to 200 tons per week. This coal is now almost always recovered and mixed with the washed coal. Where this is not done it can be used for burning in the colliery furnaces.

The Study of Earthquakes in Germany.

In a recent issue of *Engineering* there is an interesting description of the appliances used in the magnetic observatory and earthquake station connected with the Berggewerkschaft at Bochum. The object of the station is to observe and to record the phenomena of natural and "artificial" earthquakes, and to study them in their bearing upon mining. The Berggewerkschaftkasse, it may be mentioned, is a common fund to which all the mine proprietors of the district have to contribute. Prof. Heise is the director of the schools, and Dr. Mintrop is the chief of the observatory and the originator of several of the instruments used in it. The equipment consists of three astatic Wiechert pendulums, two suspended so as to record the horizontal components, and one for registering the vertical component. There are also two portable horizontal pendulums, each for two components, of the Rebeur type, for recording gradual level changes and inclinations and depressions caused by excavations in mines. The third set of instruments comprises two highly sensitive portable seismometers for photographic records, the one a horizontal pendulum of the Wiechert-Mintrop type, the other a universal pendulum of Dr. Mintrop. The records are produced in kinematograph fashion. With these instruments, the movements of the ground are continuously being observed at Bochum.

Explosibility of Gaseous Mixtures.

Mixtures of an explosive gas, like methane, with air or with oxygen will not necessarily explode on ignition; the oxygen contents must not be too small or too large. The limits of explosibility depend also upon the method of ignition. In recent experiments E. P. Perman, of University College, Cardiff, ignited the mixtures by means of incandescent platinum wires, and observed wider limits of explosibility than are usually assumed. He found that mixtures of the following percentages were explosive, the figures in brackets indicating the limits given by Clowes:—Methane, 2·5 to 24 per cent. (5 to 13); coal gas, 4 to 28 per cent. (6 to 29); hydrogen, 3 to 75 per cent. (5 to 72). The interest lies chiefly in the observed explosibility of very dilute mixtures. Perman also confirmed the explosibility of mixtures of coaldust and air, free from other gases, which Garforth (British Coaldust Commission) and others have established.

LABOUR AND WAGES.

North of England.

The Northumberland Miners' Wages Committee met on Friday, Mr. Jos. English presiding, when it was decided to ask the coalowners for an interview to consider the question of a further advance of wages.

The half-yearly council meeting of the Northumberland Miners' Association commenced on Saturday, at the Burt Hall, Newcastle, under the presidency of Mr. Joseph English.

It was resolved that the representatives on the committee of the Miners' Federation of Great Britain be elected by a vote of the branches. A basis wage of 5s. 8d. per shift for coal-cutters was agreed to, and it was decided to seek to establish this. A resolution was passed urging the Wages Committee to press the demand for an eight hours day and a minimum wage for all classes of surface workers. It was decided to ask Lord Mersey whether or not it was his intention that, under the district rules, workmen should pool their wages for minimum-wage purposes when they are working in separate places or at two different classes of work.

On Monday, when the meeting resumed, it was resolved that the men who were in receipt of part compensation during the strike, and were in consequence paid only part strike allowance, should now be paid up to full strike allowance.

On Tuesday, the following deputation was elected to put forward the requests embodied in the resolutions after confirmation by the lodges, before the coalowners:—Messrs. J. Chapman, G. W. Shield, G. H. Warne, A. Kinghorn, F. Burton and M. Davy.

This concluded the agenda for the half-yearly meeting.

At a special meeting of the council it was decided to hold the annual picnic in 1913 at Morpeth on Saturday, July 19. Mr. Thomas Burt has represented Morpeth in Parliament since 1874, and therefore Morpeth was regarded as an appropriate place for holding the gala in the jubilee year of the association.

Drastic action has been recommended by the executive committee of the Cleveland Miners and Quarrymen's Association for dealing with the non-union question. It was reported at a meeting on Monday, by Mr. W. Stephens, J.P., the organiser and general treasurer, that a number of men who during the recent railway and coal strikes had received benefits from the association's funds now declined to pay their contributions and had seceded from membership. The executive committee decided to recommend to the district that, unless a more favourable report could be presented at the next meeting, the advisability of tendering notices as a body should be considered.

A special council meeting of the Northumberland miners was held on Wednesday to consider the abolition of the three-shift system. Mr. Joseph English presided. The following resolution was unanimously agreed to: "That our agents and the executive committee commence a vigorous campaign throughout the country for the purpose of explaining to our members the evils arising out of the three-shift system, after which a ballot vote by our members be taken upon the following question: Are you in favour of tendering 14 days' notice, and, if necessary, striking, to secure the abolition of the three-shift system?"

The executive committee of the Miners' Federation of Great Britain met in London on Tuesday, Mr. W. E. Harvey, M.P., presiding. Among the compensation cases considered was an appeal from the decision of a Derbyshire county court judge, where an employee of the Alma Colliery Company (now in liquidation) had sustained an injury while at work. The colliery company had been in full benefit with an insurance company of the mutual type until after the time the accident occurred, but the judge dismissed the action brought against the insurance company for compensation. This decision the Court of Appeal upheld, and the miners' executive decided to carry the case to the House of Lords, with a view of either obtaining a reversal of the judgment of the Courts below or of being in a position to present a case to the Government for the amendment of the Workmen's Compensation Act in case the lower courts were found to be right.

The meeting resumed on Wednesday, when it was resolved to seek an interview with Mr. McKenna, Secretary of State for Home Affairs, with reference to the proposed regulation for carrying out the Mines Regulation Act. Mr. McKenna has already interviewed the coalowners on the subject, and a further meeting with them has been arranged. It is expected that the interview with the miners' representatives will take place about the beginning of next month.

Federated Area.

At a meeting at Wigan, on Saturday, between the coalowners' representatives and representatives of the Lancashire, Cheshire, and North Wales Enginemen and Boilermen's Federation, an agreement was arrived at whereby a minimum wage is to be established for engine-winders, fan, and other engine men, and boiler men. This means that 3d. will be paid for each 5 per cent. to engine-winders, 2d. to all fan and other enginemen and stokers on the surface, with an eight-hours day for week-end work. The agreement is to last three years.

Trouble has arisen in the South Derbyshire coalfield over the minimum wage, and in some cases matters are at an absolute deadlock. The chairman of the district board ruled that stallmen should pay the minimum wage to contract loaders under them when the wage is required to be made up. The Miners' Association do not consider the decision in accordance with the Government's intention in framing the Act, and it has been decided to attempt to secure a reversal of the chairman's interpretation. Many stallmen absolutely refuse to make up their workers' wages to the minimum, and the latter do not know whether to sue the stallmen or the owners.

Mr. Samuel Finney, of Burslem, has been elected agent and general secretary to the North Staffordshire Miners' Federation to fill the vacancy caused by the death of Mr. Enoch Edwards.

Scotland.

A movement is on foot for the purpose of arranging a new basis of prices for the regulation of the miners' wages throughout Scotland in accordance with selling prices of coal. A meeting of the Scottish Coal Trade Conciliation Board is accordingly to be summoned shortly to discuss the subject with a view to an equitable arrangement. The old wages agreement expired at the end of July. It is hoped that the coalmasters and miners' delegates will be able mutually to arrange matters and adjust scales in regard to prices. About 100,000 miners are concerned in the arrangements.

A prolonged conference took place on Friday last between representatives of the Fife and Clackmannan Coalowners' Association and of the Fife and Kinross Miners' Association in regard to weekly pays. No report was supplied at the close of the conference, but a circular was issued to the delegates of the miners' union showing that the decision of the employers in the matter was that the men's proposals would not be for the good of the trade, and that the masters would adhere to their own suggested basis of settlement. It was, however, left for the members to say whether the proposals of the coalowners would be accepted.

Proposals for a national union of the Scottish miners are in the course of consideration in the various districts of Scotland, and a special conference will be held by the Scottish Miners' Federation early in 1913 to consider the details.

At a meeting of the executive of the Scottish Miners Federation in Glasgow on Monday, Mr. Jas. Gould, Douglas Water, was appointed general secretary of the Miners' Federation Approved Society.

Out of sympathy with the men who are on strike in Parkhead Colliery against a reduction of their tonnage rate, and at the same time to impress trade unionism on the non-union miners of Parkneuk Colliery, which is also owned by the Glasgow Iron and Steel Company, the latter pit has been thrown idle by pickets.

THE TIN-PLATE TRADE.

Liverpool.

Several makers seem to be short of specifications, and are prepared to take low prices for quick delivery in order to keep their mills going. For forward shipment, however, most works are standing to their quotations, which they state they are unable to reduce in face of the high costs ruling for raw materials. A certain amount of "bearing" is still going on, and this of course does not improve the tone of the market at all. Quotations are very "wide" just now, and range as follow:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 15s. 1½d. to 15s. 6d. per box; I C 28 × 20 (112 sh. 216 lb.), 30s. to 30s. 6d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. 3d. to 15s. 9d. per box; I C 14 × 19¾ (120 sh. 110 lb.), 15s. 3d. to 15s. 9d. per box; I C 20 × 10 (225 sh. 156 lb.), 22s. 3d. to 22s. 9d. per box; I C squares and odd sizes, 15s. 4½d. to 16s. basis. Ternes are easy at 26s. to 26s. 3d. for I C 28 × 20. Charcoal tins rule quietly steady at 18s. basis and upwards according to finish. Blackplate in finished quality is easy at round £10 15s. basis. Coke wasters meet with a moderate enquiry. Quotations:—C W 14 × 20, 14s. 3d. per box; C W 28 × 20, 28s. 6d. per box; C W 14 × 18¾, 14s. 3d. per box; C W 20 × 10, 19s. 6d. to 19s. 9d. per box—all f.o.b. Wales, less 4 per cent.

THE SCOTCH COAL AND IRON TRADES.

Thursday, November 21.

Glasgow and Lanarkshire.

COAL.

There has been a considerable increase in the coal shipments in the past week, and this has occurred altogether on the east coast, the clearances on the Clyde, indeed, showing a reduction. The aggregate shipments at Scotch ports reached 329,794 tons, being 10,853 tons more than in the preceding week, but 3,803 tons less than the quantity shipped in the corresponding week of last year. The clearances at Glasgow were 66,433 tons, compared with 74,091 in the preceding week and 68,525 in the corresponding week of 1911. About 40,000 tons of the Glasgow shipments were sent abroad, the falling away being thus chiefly in the coastwise department of the trade. There has been a moderate demand for steam coal, which is unchanged in price. House coal for shipment has had a slightly easier tendency, the demand not being quite so good as hitherto—even for the better qualities of ell coal. Splint is in very active request both for home use and shipment. Steam coal is quoted f.o.b. at Glasgow 11s. 6d. to 12s., ell 12s. 3d. to 12s. 6d., splint 14s. to 14s. 6d., treble nuts 12s. 6d. to 13s., doubles 12s. to 12s. 6d., and singles 12s. to 12s. 6d. per ton. Owing to the remarkable mildness of the weather, business in house coal for home use has been quiet, but prices are well maintained. There is no slackening in the demand for coal for consumption in iron and steel works and other factories, which is probably the greatest that has ever been experienced in the history of the coal trade. Contracts do not, however, as a rule extend beyond a month, but prices have not varied much for some time. Of 124,500 tons of coal fixed for the Swedish State Railways, only some 5,000 tons have been taken from Scotland.

IRON.

The prospect of an early termination of the war has had a strengthening effect on the iron trade, and a large business has been done in the last few days at higher prices. Since last report Cleveland warrants have sold from 67s. 2d. to 68s. 4d. cash, 67s. 9½d. to 68s. 9d. one month, and 68s. 3d. to 69s. 4½d. three months. Transactions have also been noted in the same class of iron, 67s. 11d. for delivery in 14 days, 68s. 10 days, and 68s. 2d. and 68s. 7d. for February 7. There has been more enquiry for Cumberland hæmatite, which has risen further in price, sales having been effected at 82s. and 82s. 3d. for cash. Scotch hæmatite is steady at 85s. for west of Scotland delivery. The business in ordinary and special brands of Scotch pig iron has been active, and prices have had an upward tendency. Free at ship at Glasgow, Govan and Monkland Nos. 1 are quoted 76s., Nos. 3, 74s. 6d.; Carnbroe, No. 1, 80s., No. 3, 76s.; Clyde, No. 1, 81s., No. 3, 76s.; Calder, No. 1, 81s. 6d., No. 3, 76s. 6d.; Summerlee, No. 1, 82s., No. 3, 77s.; Gartsherrie and Langloan, Nos. 1, 82s. 6d., Nos. 3, 77s. 6d.; Coltness, No. 1, 97s. 6d., No. 3, 79s. 6d.; Eglinton, at Ardrossan or Troon, No. 1, 75s. 6d., No. 3, 74s. 6d.; Glengarnock, at Ardrossan, No. 1, 82s. 6d., No. 3, 77s. 6d.; Dalmellington, at Ayr, No. 1, 77s., No. 3, 75s.; Shotts, at Leith, No. 1, 81s., No. 3, 76s.; Carron at Grangemouth, No. 1, 82s., Nos. 3, 77s. per ton. There are 88 furnaces in blast in Scotland, compared with 84 at this time last year. Shipments of pig iron continue moderate, those from Scotland amounting to 2,976 foreign and 1,039 coastwise, the total of 4,015 tons comparing with 4,053 in the corresponding week of last year. The finished iron and steel works are very busy, especially the former, makers of shipbuilding material being much behind with deliveries. The prices of steel have this week been raised 5s. per ton all round, and the quotations now are for angles £8, ship plates £8 7s. 6d., bars £9, and boiler plates £9 2s. 6d.—all less 5 per cent. discount for Clyde delivery. Foundries and engineering works are also fully employed.

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Renfrew, Ayr and Dumbarton.

COAL.

Business at Ardrossan has been hampered by the strike of coal trimmers, which has now lasted for several weeks. In the last few days, however, a good deal of non-union labour has been available, and it is thought the dispute will soon be at an end. The coal shipments have been at Bowling 107 tons, Irvine 1,125, Troon 5,938, Greenock 2,523, Ardrossan 3,639, Ayr 15,248—total 31,580 tons, compared with 33,265 in the preceding week, and 35,266 in the corresponding week of 1911. Of the total of 31,580 tons shipped, only about 6,000 tons went abroad, so that the coastwise and Irish traffic was probably about an average. Inland business is quiet as regards house coal, but the business in manufacturing qualities is on an extensive scale, and good prices are obtained.

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Stirling, the Lothians and Fife.

COAL.

The volume of business at Firth of Forth ports has shown a considerable improvement on that of the preceding week. Exports reached 96,573 tons, and the coastwise shipments were upwards of 22,000 tons. At Bo'ness 6,838 tons were shipped, Granton 12,422, Leith 51,931, and Grangemouth 47,703—total 118,894 tons, against 99,923 in the preceding week, and 116,551 in the corresponding week of 1911. There has been a good demand for steam coal, and also for treble and double nuts. Best screened steam coal is quoted at Leith 12s. 9d. to 13s., secondary qualities 11s. 9d. to 12s., treble nuts 13s. 6d. to 14s., doubles 12s. 9d. to 13s., and singles 12s. to 12s. 3d. per ton. The shipments at Fife ports were also satisfactory. From Methil, 59,567 tons were despatched, Burntisland 51,120, Alloa 1,669, Dysart 1,564, Wemyss 1,170, Tayport 660, and Charleston 137—total 115,887 tons, compared with 111,662 in the preceding week, and 113,255 in the corresponding week of last year. A larger business might have been done but for reduced hours at the docks on Saturdays and insufficient supplies of railway wagons. First-class screened navigation coal is quoted at Methil and Burntisland 16s. to 16s. 6d., unscreened 13s. 3d. to 14s. 3d.; first-class steam coal, 13s.; third class, 11s. 6d.; treble nuts, 13s. 6d. to 14s.; doubles, 12s. 6d. to 13s.; and singles, 11s. 6d. to 12s. per ton.

THE LONDON COAL TRADE.

Thursday, November 21.

The London coal trade for the past week has been very erratic; very little buying has been done, and stocks both at the colliery end, as well as at all London depots, have rapidly increased. Merchants complain of a great scarcity of public orders, and in many cases the coal in transit has been unavoidably detained, and charges for siding rent incurred. At the beginning of the week the market was in a state almost bordering on panic, owing to the reckless manner in which many of the merchants and factors were disposing of the coal in trucks, and it is feared in many cases they were sold at a distinct loss. On Monday, however, the colder weather created a better tone, and the market somewhat recovered, but the demand all through for all household qualities has been exceedingly weak; considerable friction was caused by some of the collieries, especially those with heavy stocks in the sidings, clearing out at 6d. to 1s. per ton below the winter contract prices, and the various marshalling junctions with "wait" order trucks on hand soon became fearfully congested. Stocks at the depots, too, are now at their zenith, and the plethora of trucks awaiting unloading is becoming a serious question. Happily, the weather continues good for general household consumption, and in view of the near approach of so many Christmas club orders, and the usual strong demand just before the holidays, there are no indications of any general reduction in prices. Manufacturing coals continue steady and the best qualities of hard steam coal are firm. Bakers' nuts are also in good demand. Second quality of steam coal and kitchen cobbles have been somewhat weak, but the absence of any keen frost will account for this. Slacks and small nuts for electric stations have experienced a very strong demand, and the difficulty of obtaining any extra supplies in anticipation of the longer evenings and possible foggy weather has kept the prices unusually high; contracts for slacks in many cases have been extended far beyond the usual time, and in some cases renewed at present rates for a further six or 12 months from July next. This rather points to a general expectancy that the present high prices for small coal is likely to last. In the house coal market the anomaly has frequently been commented upon that with the north wind blowing lately the weather has been so open and mild. The great fear has been that many of the large Yorkshire collieries whose outlet for the daily output has been crippled by the closing of the Baltic ports and the uncertainty of the Mediterranean opening, would pour their tonnage upon the London and southern trade, and so compel a lower price. So far, however, this has been averted, although very low quotations have been announced here and there. Reports from Newcastle show that a strong demand still exists and large enquiries for fuel are in evidence. The Russian State Railways are reported to be enquiring for 280,000 tons of steam coal, the North-Eastern Railway Company for 600,000 tons, and the Swedish Railway Company for 110,000 tons, beside the ordinary Continental demand. On Monday's market, 50 vessels were entered as having arrived in the Thames, and on Wednesday eight, but notwithstanding the increase in the number of vessels, none of the cargoes were on offer; the official quotations continue as before—viz., 21s. 6d. for best, 20s. 6d. for seconds. The paucity of seaborne coal offering for sale was more than counterbalanced by the free offering of all grades of inland qualities, but, owing to the merchants having huge accumulation of stock, few buyers were to be found who were ready to avail themselves of the lower terms. The attendance on the market lately has not been up to the usual average, and whilst business is so quiet the ordinary merchant refrains from attending. Some West Yorkshire qualities were offered as low as 14s. 6d. in the river, but only a limited quantity changed hands. The comparison of prices with last year shows a distinct advance this month as compared with the corresponding period last year. The advertised selling prices to the public last year were 26s. for best Wallsend and this year 29s., whilst the market quotations for 1911 were 19s. 6d. for best and 18s. 6d. for seconds, and this month they are 21s. 6d. for best and 20s. 6d. seconds; but in the inland market pit prices are only 6d. to 9d. per ton above last year, the recent depression pulling all quotations down.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, November 15.—The seaborne house coal market was quiet to-day, with no cargoes offering. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston (W.E. Yorks) 21s. 6d. Cargoes 19.

Monday, November 18.—The enquiry for seaborne house coal was very limited to-day, with no cargoes reported sold. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston (W.E. Yorks) 21s. 6d. Cargoes 49.

Wednesday, November 20.—The seaborne house coal market was inactive to-day, with no transactions in either Durham or Yorkshire reported. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston (W.E. Yorks) 21s. 6d. Cargoes 8.

THE IRISH COAL TRADE.

Thursday, November 21.

Dublin.

There is no change whatever in the local trade either with regard to prices or the amount of business current. Upon the whole, there is a fairly good demand, but the briskness which usually manifests itself in the household branch at this season is lacking, and under existing conditions there is no immediate prospect of any advance being made in prices. Quotations stand as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; steam coals from 20s. per ton upwards; best coke 23s. per ton, or 18s. per chaldron; Irish coals, at Wolfhill, from 5s. to 20s. per ton at the pit mouth. Very heavy gales have prevailed in the Channel during the past week, which have caused much delay in the arrival of coaling vessels at this and other ports. The number arriving here amounted to 57 as compared with 69 the week previously, chiefly from Garston, Workington, Girvan, Cardiff, Newport, Preston, Manchester, West Bank, Campbeltown, Swansea, Troon, Saundersfoot, Liverpool and Partington. The total quantity of coal discharged upon the quays was 26,652 tons.

Belfast.

There is some improvement in the demand for house coals, and business generally is fairly active in other branches of the trade, prices of all qualities remaining unchanged. House coals in the city are:—Best Arley coal, 26s. 6d. per ton; Hartley, 25s. 6d.; Wigan, 24s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 22s. 6d.; Orrell slack, 22s. 6d. Current prices ex-quay:—Arley house coal, 22s 8d. per ton; Scotch house coal, 19s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; navigation steam, 16s. 6d. to 17s. 6d.; Welsh steam coal, 17s. to 18s. per ton. More coal has been coming in from Scottish ports this week, and at present merchants have rather heavy stocks, as there has not yet been any great rush for household supplies owing to the absence of severe cold. Freights keep steady at recent high rates. Coal cargoes arriving during the week were chiefly from Whitehaven, Ayr, Liverpool, Troon, Garston, Manchester, Preston, Lydney, Girvan, Partington, Swansea, Maryport, Cardiff, Ellesmere Port, Irvine, Newport and Glasgow.

THE BY-PRODUCTS TRADE.

Tar products:—Though quiet, the market is steady and prices for the most part are well maintained. Pitch steady. Benzols are inclined to be easier. Carbolics are much about the same as last week. Creosote and napthas firm, and in good request. Closing prices are:—

Benzols, 90's, 10¼d. to 11d.; ditto 50's, 10d. to 10¼d.; toluol, 11½d.; carbolic acid, crude (60 per cent.), 1s. 10½d. to 2s.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 1s. 1d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 3½d. for ordinary qualities; pitch, 43s. 6d. to 44s. 6d. f.o.b. east coast; ditto, 43s. to 43s. 6d. f.a.s. west coast; ditto, 47s. 6d. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—Reports anent the state of the market are very variable and so are quotations, but considered collectively the market is firm, much firmer than would-be buyers care to see it, the American depression notwithstanding. Some low figures for forward parcels are in circulation, but they in no way represent the general tone of the market. Nearest prompt prices are:—

London (ordinary makes), £13 5s.; Beckton £13 15s.; Liverpool, £14; Hull, £13 17s. 6d.; Scotch ports, £14 to £14 2s. 6d.; nitrate of soda (ordinary), 11s. 9d. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

Sale of Colliery Plant: A Question of Delivery.—An interesting action was heard at the Liverpool Assizes by Mr. Justice Rowlatt recently, in which Jane Craven, of Blackpool, daughter of the late Mr. William Latham, and other executors of the late Mr. William Latham, of Wigan, and executors of Mr. Thomas Latham, sued James Ratcliffe, engineer, of Hawarden, Flintshire, for the purchase price of a pair of colliery winding engines, which it was alleged had been sold to the defendant, and had not been paid for. The action was brought, it was explained by counsel, to recover the purchase price of a pair of 20 in. colliery winding engines, which were sold to the defendant on October 26, 1911. According to the evidence it appeared that the defendant first of all bought two engines for £75, and for these he paid, but with regard to the two winding engines in question, it was agreed in October 1911 that the defendant should purchase them for the price of £140. The defendant neither took delivery of, nor paid for, the engines, as it was alleged by the plaintiffs the contract bound him to do. The defendant, in his evidence, mentioned that for a number of years it had been his practice to leave goods which he bought in the possession of the sellers until he had resold them, and counsel urged that it was a term of the contract in the present case that the property should remain on the premises of the seller until the defendant could find a purchaser, a reasonable time to be allowed for that purpose. The words "free on rail," he contended, made all the difference. The risk of the defendant only began when the goods were put on the rail. His lordship, in giving judgment, said it was perfectly obvious that the defendant could not afford to take what he bought into store, and provide premises for housing, and remove it twice. It was also perfectly obvious that the plaintiff should be entitled to his money, and probably the property could pass at once, although, for the convenience of the purchaser, it might be arranged that the engines should remain where they were until the defendant found a purchaser. Under the circumstances, it seemed quite out of the question to attribute to the words "free on rail" in regard to the contract any effect as to the time when the property should pass. Having regard to the position of both parties, it seemed to him, from the business point of view, that the contract simply meant that the seller must send the engines to the station, and consign them to the consignee named by the buyer. It seemed quite clear to his lordship that the seller in this case should, under the circumstances, be entitled to recover the purchase money—he would not say immediately, but in the ordinary course of payment—being entitled to send in the account for payment, and at the same time storing the engines for a reasonable time. That being so, he gave judgment for the plaintiffs in the case with costs.

CONTINENTAL MINING NOTES.

Belgium.

Coal Prices.—Industrial coals: *Menus greneux maigres*, 14·50-15 fr.; *braisettes maigres*, 10/20 mm., 17-18 fr.; *braisettes* ¼-gras, 10/20 mm., 19-20 fr.; *menus greneux* ½-gras, 16·50-17·50 fr.; *braisettes* ½-gras, 10/20 mm., 23 fr.; washed briquettes, 24-26 fr.; lean slack, 11-14 fr.; coking coal, 30/40, 16 fr.; blastfurnace coke, 25 fr.; coke, 28·50-33 fr.; *flénu* slack, 15 fr.; *fines*, 16·50 fr.; through-and-through, 18·50 fr. House coals: *Gailleterie, maigre*, 23-26 fr.; *¼-gras*, 26-29 fr.; *½-gras*, 31-33 fr. *Gaillettins*: Anthracite, 28-29 fr.; *maigre*, 24-27 fr.; *¼-gras*, 29-31 fr.; *½-gras*, 33-35 fr. *Têtes de moineaux*: Anthracite, 30-32 fr.; *maigres*, 30-32 fr.; *¼-gras*, 32-35 fr.; *½-gras*, 36-38 fr. *Braisettes lavées*, 20/30 mm.: Anthracite, 28-29 fr.; *maigre*, 28-29 fr.; *¼-gras*, 27-29 fr.; *½-gras*, 28-30 fr. *Ovoid* briquettes: Anthracite, 20-21 fr.; *maigre*, 20-21 fr.; *¼-gras*, 20-21 fr. Screened bituminous and through-and-through improved, 25-28·50 fr.

France.

Coal Prices in Paris.—Industrial coals: Through-and-through, 20/25, 33 fr. per ton d/d, octroi dues not included; through-and-through, 30/35, 34 fr.; through-and-through, 50 per cent., 36 fr.; *grains*, 10/25, 38 fr.; *fines*, 30 mm., 31 fr.; Charleroi *fines*, 25 fr.; smithy coals, 40 fr.; washed briquettes, 40 fr.; producer coal, 10/15, 48 fr.; producer coal, 15/25, 58 fr.; English anthracite *fines*, 27 fr.; washed coke, large, 45 fr., 70/100, 50 fr.; 40/70, 55 fr.

Germany.

Coal Prices at Düsseldorf.—Gas and flaming coal: Gas coal, 12 to 13 marks summer, 13 to 14 marks winter; producer coal, 12·50 to 13·50 marks; flaming coal (through-and-through), 11·50 to 12·50 marks. Bituminous coals: through-and-through, 11·25 to 12 marks; best mixed, 12·50 to 13 marks; coking coal, 12·25 to 13 marks. Lean coals: through-and-through, 10·50 to 12 marks; best mixed, 12·75 to 14·25 marks; anthracite nuts II., 21·50 to 25·50 marks. Coke: blastfurnace coke, 15·50 to 17·50 marks; foundry coke, 18·20 marks; broken coke I/II., 20 to 23 marks. Briquettes, 11 to 11·25 marks.

Coal Market in Upper Silesia.—The scarcity of railway wagons is again becoming seriously felt, the deficiency having, of late, been as high as 20 per cent., which is sufficient explanation of the delay experienced in complying promptly with the extensive requirements of consumers. Whereas the actual demand is sufficient to take over the entire output in most kinds, as a matter of fact the pits have been obliged to stock part of their production on several days. This is very disagreeable to the consumers, because their stocks are generally low, and they are therefore depending on current supplies. Business is particularly active in industrial coals. The iron industry and other manufactures are very busy, but are greatly inconvenienced by the irregular delivery. The demand for house coals is growing, and though large supplies were laid in beforehand, there is a considerable margin left uncovered. Gas coals are in improved request, and as the gasworks have very small reserves the delay in delivery is highly inconvenient. Coking coal cannot be raised fast enough, and other grades have to be substituted. The foreign trade is well maintained, increased consignments being sent to Northern Germany and Berlin; and Austria-Hungary continues to take large quantities.

Ruhr Coal Market.—Although the situation is extremely good so far as the demand for fuel is concerned, it is prejudicially affected by an almost unprecedented shortage of railway wagons, in consequence of which short time has had to be introduced and some of the output stocked. With regard to the dispute between the fiscal authorities and the Syndicate on the question of the new price list, it has been extensively rumoured that the former "outsiders" intended to sever their connection with the latter body, but this has now been authoritatively denied. Of the various classes of fuel, house coal is in very active request, but deliveries are hampered by lack of sufficient means of transport, and complaints on the same score are rife in respect of industrial coals and coke. The export trade continues to expand, and the demand from South Germany is still growing.

New Shafts in Lower Rhineland.—The Rheinisch-Westfälische Schachtbau-Gesellschaft, Essen, has been commissioned to put down several double shafts in the Moers district to work the mining properties acquired by the Niederrheinische Bergwerksgesellschaft m.b.H.

Coal Market in South Germany.—Notwithstanding the considerable increase in the price of Saar coals, business is very active, consumers recognising that they cannot calculate on a superfluity of coal next year, and that if they delay too long they may be unable to secure the kinds they require. There does not seem to be any keen competition for orders, the Saar collieries being certain of a market for their entire output, and therefore adopting a firm attitude. English competition seems to be crippled for a long time ahead, owing to difficulties at home and in respect of freights; and stocks of Ruhr coal in this district are dwindling. In fact, the scarcity of spot goods is becoming acutely felt, and will be still further intensified by the scarcity of railway wagons, which has prevailed for some time in the Ruhr district, and to a smaller extent in the Saar coalfield.

Russia.

The Coal Trade of South Russia.—Mr. Consul-General C. S. Smith (Odessa) says, in his last annual report, the ever-growing consumption of fuel in the various industries in Russia becomes matter for serious thought. It seems that at present the oilfields give no increased supply of petroleum; but that unless rich sources can be found in new places, the yield is likely to decrease. There are indications in places near Kertch, which from time to time have raised great hopes, but so far with no good results. The forests have been made to give supplies of firewood far beyond the annual production of wood. Wood is therefore rapidly becoming dearer, and, at least in the Odessa district, wood merchants foretell further increase in price, possibly by as much as 50 per cent., within a year or two. Of peat there is plenty in many places, but so far it is used only in certain industries and localities where firewood has become too dear. Therefore the demand falls more and more upon coal, of which a great deal more will have to be mined. The following shows the amounts and kinds of fuel consumed in Russia by factories:—

Kinds of fuel.	1909.	1910.	1911.
Mineral coal and anthracite (long tons)	4,149,545	5,592,374	5,771,318
Coke (long tons)	1,612,100	1,947,417	2,342,381
Naphtha (long tons)	770,584	896,327	923,733
Charcoal (long tons)	538,441	581,968	648,064
Firewood (1,000,000 cubic yards)	11	15	13
Peat (1,000,000 cubic yards)	1	2	1

To show the total consumption of fuel in Russia (whether European only or Asiatic as well is not stated), the following estimate is added. The quantities of wood and naphtha are not shown in their natural weight, but in the weight of coal needed to yield the same amount of heat:—

	In 1,000 tons.			
	Wood.	Coal.	Naphtha.	Peat.
Domestic use	51,783	2,700	3,556	2,670
Manufactories	7,364	12,375		1,235
Railroads	1,758	6,134	2,038	5
River navigation	306	451	1,499	—
Total	61,211	21,600	7,095	3,910

In 1911 the coal trade had to contend with no adverse conditions such as cholera, &c., but on the contrary there was a boom in the iron and steel industries, and a consequent enormous demand for fuel, which kept the collieries fully employed, and in many instances it was found difficult to cope with the demands. According to statistics just published, the output of the mines in the Donetz coal basin during the years 1909-11 was as follows:—

	1909. Tons.	1910. Tons.	1911. Tons.
Bituminous	14,952,745	14,013,390	16,607,600
Anthracite	2,546,300	2,398,000	2,903,870
Total	17,499,045	16,411,390	19,511,470

Thus the output for 1911 shows an increase of over 3,000,000 tons as compared with 1910, and establishes a record for the Donetz basin. The principal consumers of the coal were as follow:—

	1910. Tons.	1911. Tons.
Railways	3,516,000	4,211,450
Iron and steel works	2,420,000	3,271,000
Sugar factories	800,000	1,065,000

which shows a substantial increase under all categories. The quantity of coal shipped through Mariupol also constitutes a record and amounted to 1,240,000 tons, of which about 1,065,000 tons were shipped to Odessa, Sevastopol, Nicolaieff, and other Black Sea and Azof ports; 150,000 tons to Russian Baltic ports and 25,000 tons to foreign countries. The production of coke was also greatly increased, the figures being 2,705,000 tons in 1910 and 3,292,000 tons in 1911. The metallurgical works made such large demands for coke that the ovens, notwithstanding that they were all working at high pressure, could not satisfy them, and some foreign coke was imported to meet the urgent needs of some of the works. A large number of additional coke ovens are now building, but as they have already sold the whole of their estimated production in advance, they will make no perceptible impression upon the coke market. Coal briquettes, on the other hand, show very unsatisfactory returns. Owing to the Russian Admiralty having curtailed its orders, and several of the railway companies having abandoned the use of briquettes on account of their high price, the patent fuel factories did very badly, and their output dropped from 150,000 tons in 1910 to 55,000 tons in 1911, while the quantity in stock at the end of the year rose from 84,000 tons in 1910 to 49,750 tons in 1911. One of the greatest drawbacks with which this industry has to contend is that it must employ foreign pitch, which has, during the past two years, greatly increased in price, with the result that the cost of the briquettes has attained a prohibitive figure. With a view to surmounting this difficulty experiments are being made in the manufacture of briquettes with naphtha pitch, and great hopes are also being placed on the increased output of pitch to be expected from the various coke ovens, which are now all being adapted for the recovery of by-products. The various by-products received from the coke ovens during 1911 were as follows:—Sulphate of ammonia, 500 tons; spirits of ammonia, 214; benzol, 62; heavy oils, 2,600; pitch, 3,300 tons. The production of all these articles will be greatly increased in 1912, and it is intended to export benzol and sulphate of ammonia to Italy, France, and North Africa. The prospects for the coal trade for 1912 are very bright, prices are well maintained and the demand for mineral fuel continues to expand. Many of the collieries have already disposed of their whole production for 1912, and owing to the firm tone of the market sellers are not at all keen on accepting new orders, the general idea being that prices must still rise, especially as, owing to the rapid rise in the price of liquid fuel, several railways and other consumers, which have hitherto exclusively used liquid fuel, are now buying coal.

The export of coal to the Mediterranean, a subject which is always cropping up in the Russian Press, and always being raised at every session of the Mining Congress at Kharkov, so far makes little progress and cannot yet be said to have passed the preliminary trial stage. The coal strike in the United Kingdom could have served as an opportunity for entering the markets of Turkey, the Balkan peninsula, Greece, Italy and other countries bordering on the Mediterranean; but stocks at the mines are practically non-existant, and navigation at Mariupol, the only outlet for Donetz coal, was still closed on March 20. Another factor which may benefit the Russian exporters is that if prices of British coal rise perceptibly, this may counteract the difference of sea freight, which has always been to the disadvantage of Russia, and thus give the Donetz coal a chance of competing on equal terms. The proof of this must, of course, be left to the future; but there is no doubt that strenuous efforts will be made by the Donetz collieries to capture a larger share than they now enjoy of the Russian Baltic trade. The great impediment hitherto has been the heavy cost of transport of Donetz coal to the north, which has precluded the possibility of Russian coal competing with British as regards price; but once the cost of the British coal is raised, then Russia, having the advantage of the Customs duty of about 2s. per ton, may equalise chances, and as doubtless preference will, to a certain extent, be given to the native product, the United Kingdom will stand to lose a sensible portion of this trade. With this object in view the representatives of the Russian mining interests have petitioned the Imperial Government to introduce special reduced tariffs for coal destined to the north, and for the conveyance of which the Northern Donetz Railway has been specially built. During 1912 the Russian Black Sea fleet will also take a larger quantity of Donetz coal, and instead of taking final delivery at Sevastopol as hitherto it is proposed to have a testing station at Mariupol, where the various qualities of coal will be tried and only after approval will they be shipped to destination.

The market for anthracite coal is also strong, and this grade of coal is gradually finding more favour, although there are still many parts of Russia where the use of anthracite is still practically unknown. Moscow and district are increasing their consumption yearly, and 1912, owing to the increased cost of liquid fuel, mentioned earlier, promises to surpass all previous years. Some of the Russian railways are also making trials with anthracite on their locomotives, and the Southern Railway Company lately ordered 32,000 tons for this purpose. Should these tests give satisfaction an extensive new field will be opened for this fuel. Then again, there is always the question of export, especially to Italy, which market has been most carefully studied by several commissions and private individuals. Great attention was also given to this matter at the Turin Exhibition, where Russian anthracite was widely advertised and extensive trials made. A company, financed by Russian banks, has also been formed at Kharkov for the express purpose of furthering the export trade in this article. The war prevented anything being done during 1911, but great hopes are entertained for a large business as soon as peace is concluded. Welsh anthracite holds, of course, a strong position in the Italian market; but the Russians intend to organise the business on a firm basis, have their own distributing agents, &c., and as they maintain that the Donetz anthracite is quite equal in quality to the British product, they foresee no difficulty in capturing a portion of this market. The one great drawback is the fact that Mariupol, which must act as the shipping port, is always closed by ice from December to March, just the best time for disposing of the coal, and this will entail large depots at the Italian ports, which will have to be replenished from Mariupol during the autumn months.

The 1912-13 session of practical mining classes in connection with the Somerset County Council Mining Instruction Committee commenced on Monday last and will be continued weekly at the following centres:—Peasedown St. John Schools on Monday at 5.30; Radstock Council Schools on Tuesday, advanced at 5 p.m., elementary at 6.15; High Littleton Schools on Wednesday at 6 p.m.; Midsomer Norton Higher Elementary School on Thursday at 6 p.m.; and Coleford Church of England Schools on Friday at 6 p.m. Mr. J. W. Simpkin, M.I.M.E., will be the instructor.

to the Editor.

sponsible either for the statements
ns expressed by correspondents.

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ondents, and not by letter, stamped
es are not required to be sent.

NDER-MANAGERS' MUTUAL ASSOCIATION.

n has been drawn to a statement st week's *Colliery Guardian*, to the ent meeting held in Newcastle, on s members is alleged to have made hrough the recent legislation, his ced £1 per week.

at once repudiating that any such , and is entirely unfounded. My this is that if such an action was doubtedly bring discredit upon our e same time lessen our dignity as

J. E. Riddle,
Secretary *pro tem.* Colliery Under-Managers' Mutual Aid Association.
rnopfield,
1912.

OF THE FIREMEN.—IV.

end for your personal inspection a y the Home Office for the use of structions as to "How to Test for bits excellent photographs of the he lamp when the wick-flame is lard height. The four caps shown nd with those shown on the lamp ges of "firedamp" in the air are pectively. The issue of this neat , perhaps, the most practical and yet performed by the Home Office nection. As a miner of extended in fiery mines, I have little hesita- ny other man of mining experience, ests the teaching set forth on the to pass the gas test at any firemen's any further instruction whatever, e is physically capable of seeing the hat he is "cute" enough to appre- of a clean and properly-trimmed he examination is conducted on the nmonsense.

that the four gas-caps shown on ly in height, but in quality also. lf calls attention to this important igger caps is more easily seen than in magnitude, not only by reason but also by reason of its clearer sed luminosity.

at practical men in the pit, when lamp in the air, have long judged by two distinct criteria—one, the ne other, its degree of definition or the practised fireman of to-day is lead of his predecessors, and his the tradition that the gas cap is ght of these two criteria.

e density of the cap is the *better* Some men hold that it is *always* reover, there are cases in which it is st. Firedamps differ very much ine. Generally, it is quite possible vith small percentages of gas. In ot command such a cap—the gas, as acular of the North, is too "wick" bly a corruption of "quick" as "—"the *quick* and the dead"). known pits where, owing to this cally impossible (except with the our light altogether) to detect gas ith any lamp of the Marsaut type. eputies had to be provided with a pe of lamp—*i.e.*, a lamp having a n the top to the bottom of the lamp in fact.

ver, it remains necessary that the e the cap with reference to both the ibed. In this connection, it is of e dictum of Mr. G. H. Winstenley, ointed H.M. inspector of mining n is stated by him in a set proposi-

> "That the density of the cap (its visibility) is a more reliable indication of the percentage than the mere height of the cap; and that, in order to estimate correctly the percentage of gas from the appearance of the cap, one must be familiar with all the variations in height and degree of visibility possible with different percentages of gas and different sizes of testing flames." (*Trans.* Inst.M.E., vol. xl., p. 345.)

This quotation, Sir, from a competent and well-known authority and one, moreover, who has made a speciality of this particular branch of study, aptly voices the expostulation which the practised fireman is to-day addressing to the Home Office, and to the approved authorities, with regard to the sciolistic methods adopted at many of the firemen's examinations. It luminously explains why, when coal gas is substituted for firedamp, it is not the crammed dummy of the class-room, but the practised fireman of the pit, who fails to pass the so-called "gas test." At the examination, he is shown a cap which, by the first of his criteria (height) ought to be a 2 per cent. cap, but which, by the second and most reliable of his criteria (definition and luminosity) evidences 3 per cent. or 4 per cent. of firedamp in the air. So he naturally pronounces it to be a 3 per cent. or a 4 per cent. cap, and fails to pass the grotesque "test." Kindly note that he goes down simply because he, of all men, is the most fully entitled to go up. He fails *because* he knows what firedamp really is, and because he is too "cute" to be led astray by the same fallacy as that which has landed his examiners into their present sorry predicament.

The above argument constitutes no special pleading. All practical men who, like myself, have an extended experience in fiery mines know it to be sound. Other men who, like Dr. Cadman and Prof. Louis, combine indubitably high scientific attainments with an even wider practical experience, preach the same doctrine. The only persons who remain oblivious of this fact are those whose actual mining experience is either infinitesimal or *nil*. The entire argument, so far as I have unfolded it in these letters, will find no opponents amongst men who are really practical; because all of them know perfectly well that the personal equation referred to in my last letter—an equation which forms the very *raison d'être* of the firemen's examination—is altogether evaded and left completely unsolved by the substitution of coal gas for firedamp at these "tests." And on the other hand, the really efficient fireman who has had practically unlimited experience with actual firedamp is unable to pass this "test," unless he consents to pay fees, and waste valuable time, in attending certain classes, in which classes he is set the task of unlearning all he has learned in the mine itself, and is prepared by specially wrong methods to learn something which will never be of any use either to himself or to anyone else, except that it enables him for the time being to conform with the utterly false standard of the "test," and so pass his examination and gain his fireman's certificate. This is the standpoint from which the practised fireman of to-day complains that he is being "exploited," and one is bound to admit that his complaint is not a groundless one.

The lesson that firedamp is one thing and coal gas quite another has been read to the mining community over and over again. The essential difference of these two mechanical mixtures is not only evident from theory, but has frequently been demonstrated in practice. Nevertheless, one person after another goes stumbling into the old error that experiments with coal gas can prove something in connection with firedamp. It is only a few months since we had the dismal fiasco of the Holmes-Ralph lamp (*Trans.* Inst.M.E., vol. xlii., pages 201 and 435). In this case the inventor spent years of patient and earnest investigation, which would have reaped a better reward except for the fact that he stumbled into the old error of supposing that firedamp would act in the same way as did the coal gas with which he conducted his ingenious—although, as it turned out, fruitless—experiments. In this case the error lay in overlooking the fact that almost half of the mechanical mixture we call "coal gas" is contributed by free hydrogen, whereas that elementary gas is scarcely ever found free in firedamp at all; or, if found, in very small proportions.

Table II.—Composition of Firedamp and Coal Gas.

	Firedamp. Per cent.		Coal gas. Per cent
Hydrogen	Trace	...	47 9
Methane	87·25	..	33 3
Methane series	0·00	..	7 9
Carbon monoxide	0 00	..	6 0
Olefines	0·00	..	3·5
Benzene series	0·00	...	0 9
Oxygen	0 00	...	0 5
Air	2 75	...	0 0
Extinctive gases	10 00	...	0·0
	100 00	...	100·0

In Table II. the composition there shown of firedamp is the average of the nine samples of British firedamp given by Prof. Redmayne and previously referred to. Coal gas, like firedamp, varies very much in its composition; but the composition set forth in Table II. is that which is given in the *Harmsworth Encyclopædia*, on the authority of Prof. Vivian B. Lewes, as representative of modern purified coal gas. The fiasco of the Holmes-Ralph lamp was due to the fact that the inventor overlooked the vital importance of the free hydrogen constituent. For the detection of coal gas in any atmosphere his lamp was a brilliant success, simply because coal gas contains about 48 per cent. of free hydrogen. When subjected, however, to the test by firedamp in the pit, the lamp failed entirely, simply because the catalytic action, upon which the success of the lamp depended, is only one-fifth as powerful in the case of methane as it is in the case of coal gas.

The fallacy above described is not exactly the same as that which has misled many of the authorities having control of the firemen's examination. These authorities have not erred on precisely the same lines, but they have erred on precisely parallel lines. It will be seen from Table II. that the average firedamp contains 87 25 per cent. of methane with a trace of hydrogen. These are the only combustible gases in the mixture, the remainder being a small quantity of air and 10 per cent. of extinctive gases. The essential feature, to which I may again call attention, is that the combustible gases in this mixture burn with a non-luminous flame. Now, looking at the sample of coal gas shown in the same table, we have hydrogen, methane, gases which stand higher in the same series, and carbon monoxide, and we may suppose that all of these gases will burn with flames which are practically non-luminous. Besides these, we have a small quantity of oxygen which may be left out of account. The remainder of the mixture consists of 3·5 per cent. of the olefine series and 0·9 per cent. of the benzene series. These are gases which burn with brilliantly luminous flames, and it is these alone which give the coal gas its illuminating power. The 0·9 per cent. of the benzine series, considered with reference to its illuminating power, is practically equal to about 7½ per cent. of olefiant gas. For the purposes of the gas test, the comparison between coal gas and firedamp may be stated thus: so far as their non-luminous constituents are concerned they are pretty much alike, but the essential difference is that whereas the balance in firedamp is made up by 10 per cent. of extinctive gases, this extinctive factor is replaced in coal gas by what is practically the equivalent of 10 per cent. of olefiant gas. Therefore, one may presume, *à priori*, that the gas-cap shown by the coal gas will be a very different affair from the gas cap shown by firedamp.

With regard to the electric lamp previously referred to, the fiasco was comparatively excusable. You cannot expect mere mining men to be experts in all the mysteries of catalysis. Before the lamp had been tried in actual firedamp, even so great an authority as Prof. W. M. Thornton, of the Armstrong College, Newcastle, "had come to the conclusion that it was about the most reliable appliance that one could possibly have from the point of view of accuracy and reliability." Prof. H. Louis was the only man who suggested, *beforehand*, that it was important that the instrument should be calibrated in pure marsh gas, and not in coal gas. (*See Trans.* Inst.M.E., vol. xlii., page 207.)

But the great fiasco of the firemen's examination is utterly without excuse. The principles involved are the most ordinary of rudimentary chemistry, such as every educated mining man is reasonably expected to be familiar with. To replace firedamp by coal gas is, *ipso facto*, simply to replace the extinctive gases contained in firedamp by combustible gases which are still more highly inflammable than the combustible portion of the firedamp mixture. You not only remove the quenching element, but you add other constituents which are notoriously sensitive to ignition. The heavier hydrocarbons have a less specific heat than methane, therefore they heat more *rapidly*. Their temperatures of ignition are lower, therefore a less *amount* of heat excites them into flame; whilst the very fact of their being "heavier" hydrocarbons is responsible for their combustion being attended by *great light* as well as by heat. But why labour the point? If a mixture is deprived of its *extinctive* constituents, and if highly inflammable gases of *great illuminating power* are substituted in place thereof, what does any man in possession of a head expect?

Testing for coal-gas, therefore, solves no physical personal equation, because there is no man, not actually blind, who is unable, even in broad daylight, to see the cap produced by coal gas. This luminosity, as already stated, is entirely due to the presence of the heavier hydrocarbons. To quote Sir Henry Roscoe:

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rs to the card, in colours, issued by
1½d., doubtless well known to readers
an.—Ed., *C.G.*

"The difference between the non-luminous flame of marsh-gas and the luminous flame of olefiant gas is due to the fact that in the latter carbon is separated out in the solid form, whereas in the former all the carbon is at once burnt to carbonic acid."

It will probably be replied that, by effecting complete combustion of the coal gas, the flame can be rendered non-luminous. No doubt, as an abstract proposition, that is true. Whether it is true in any practical sense, considered from the standpoint of these firemen's examinations, is another question; and this, I hope, Sir, you will allow me to discuss in a final communication.

Cardiff, November 6, 1912. H. W. Halbaum.

THE STATUS OF COLLIERY SURVEYORS.

Sir,—I have closely followed the correspondence in your columns *re* the above, and must say that, until the appearance of Mr. Galletly's letter in your issue of the 8th inst. and that of Mr. O'Donahue in last week's issue, I have always failed to see how the status of colliery surveyors would in any way be improved by forming an institute, having as its members surveyors who simply hold the Home Office certificate.

As pointed out by Mr. Galletly, surveyors who have had two years' experience at the passing of the Act (December 16, 1911), are granted certificates without examination up to December 31, 1912.

As a matter of fact, I have never agreed with the Home Office regulations respecting the two years' experience, having always thought that five years should have been the minimum, the same as for managers and under-managers at the passing of the 1872 and 1887 Acts respectively. However, it is law now, and we must stand by it.

Much more is required of colliery surveyors than practical surveying, and I therefore think that if the suggestions of Messrs. Galletly and O'Donahue were acted upon it would certainly be the only means whereby the status of colliery surveyors would be raised. I should further suggest that no candidate be admitted to the examination for "associate members" under the age of 21 years. Mr. O'Donahue's suggestion as to the age of 30 years or over for fellowship I quite agree with.

I am pleased to see that Messrs. Galletly and O'Donahue have gone so far as to approach the Surveyors' Institute, London, on the question of forming a subdivision No. 4 for colliery surveyors, and also to note that Mr. O'Donahue has received a somewhat favourable reply.

Readers of the *Colliery Guardian* who are interested in this matter now know what the Surveyors' Institute require, viz., "a wide demand," and I think the only means of obtaining this is by calling an early general meeting at some convenient centre, or have local centres and local secretaries, who could forward the proposals of those who attend the meetings, to the secretary of the Surveyors' Institute, London, to place before the council for their further consideration.

Leabrooks, near Alfreton, Geo. B. Morris.
Derbyshire.
November 19, 1912.

NOTES FROM SOUTH WALES.

[From our own Correspondent.]

Oil Fuel from Coal: Local Installations—Wage Reduction Not Approved—Colliery Profits in South Wales Average 5 per Cent.—Statutory Board Meeting—Great Progress in Rhymney Valley—Cost of Feeding School Children during the Strike—Fresh Developments at Port Talbot—Coal Shipping by a High-speed Belt—Period of Notice Required: A Contrary Decision—Federation Disagreements.

The extraction of oil fuel from coal is under consideration in this district, leading firms installing apparatus for the production of benzol, and it is evident that a new departure of great moment may soon be witnessed. Details are, at present, not obtainable, but in more than one instance the profits secured from sulphate of ammonia and other by-products of the coke ovens have been so large that an extension of the dealings with residuals is assured. Importance attaches to the project because of the rapidly-rising price of motor spirit and the growing demand for supplies.

The Conciliation Board met on Monday, chiefly to deal with the question of the wage-rate, though a number of other matters were brought under review. Lord St. Aldwyn attended, presiding as independent chairman in order to decide the coalowners' proposal for a reduction of 2½ per cent. Mr. F. L. Davis presented the employers' case and Mr. Brace the workmen's; and in the result his lordship decided in favour of the men, so that the rate stands unaltered, at 57½ above the standard. The owners showed that there had been a fall in prices both of large and small coal as compared with the preceding quarter, and also that prices had been declining since the national strike. On the other hand, the men's representative argued that the September quarter of this year had had sales vastly in excess of the corresponding quarter of last year, that there was clear prospect of continued heavy shipments, and that in 1907, when wages were 57½ per cent. above the standard, the price of coal was only 14s. 6d. per ton whereas now it was 15s. 10d.—so that the owners benefited by the much higher price at the present wage-rate. Lord St. Aldwyn, on the termination of the arguments, gave his casting vote in favour of the men.

From the executive council of the Federation a scheme was submitted for dealing with local disputes at the collieries by the pit committees, the miners' agents, and, if requisite, the calling in of umpires from the panel of chairmen. This scheme was remitted to the joint sub-committee.

In the course of a discussion at the University Settlement, Cardiff, where Mr. Mardy Jones (registration agent of the Federation) advocated the nationalisation of mines, Mr. D. A. Thomas, head of the Cambrian Combine, answered an allegation that certain collieries which had been referred to would yield 10 per cent. profit. He pointed out that out of the total sum represented as profit £7,000 would have to go in royalties, leaving only £11,000; but they must again deduct the loss in working collieries, which had not been taken into consideration by the previous speaker. Some of his own collieries had been most unprofitable. Of some of them, the last 10 years had worked out at only about 4 per cent.; and that was far below the 10 per cent. spoken of by Mr. Mardy Jones. Personally, he would not place the average of profits higher than 5 per cent. He held strongly that nationalisation would be a huge mistake.

Under the statutory District Board, the Minimum Wage Sub-committee met at Cardiff on Saturday, Mr. W. Stewart presiding over the owners' representatives and Mr. Watts Morgan over the workmen's. It was decided that the extra turn given to timbermen at the Elled Colliery, in the Eastern Valley, prior to Lord St. Aldwyn's award, should be continued. The committee decided that the award does not alter the practice of paying the extra turn. Another dispute had reference to the new Bryncethin Colliery, the question being whether the minimum wage award applied to a portion of the seam in which a fixed allowance had been agreed to. The committee decided that the award was to be operative in that portion in the same manner as in any other part of the mine. It was found impracticable to agree as to the case of pitmen not entirely engaged underground; and as to matters affecting the minimum rate of pieceworkers at North's Collieries.

During a conference of colliery banksmen, held in Cardiff, it was stated that some of these men had to work 12 or 14 hours per shift, and on Sunday to Monday morning (at the change of shifts) as much as 24 hours continuously. The object of the conference was to bring about an eight-hours day, with a wage-rate of 5s. per day plus percentages; and Mr. A. Onions, treasurer of the Federation, who was one of the speakers, said there could be no compromise on the question of hours, for there were some collieries which already gave the eight-hour day, and the safety of the men required that it should be general.

Industrial progress is more noticeable in the Rhymney Valley than in any other part of South Wales, although, on account of the River Rhymney forming the boundary between Monmouth and Glamorgan, the growth of contiguous areas in the two counties does not receive that general observation which would otherwise be the case. Chiefly, it is the sinkings of the Powell Duffryn Company that have transformed Bargoed and Bedwellty, with the neighbourhood, into urban districts of 20,000 inhabitants; but the Rhymney Iron Company, by their collieries at Pengam, have also brought about material changes further south in what was, until very recently, a purely agricultural area; while still lower down the valley the Llanbradach Company, and now more recently the Bedwas Company, have occasioned the change. It cannot be long before the rival interests of the two counties will be adjusted, and the Rhymney Valley become, like the Rhondda, one continuous town. Additional sinkings by the Powell Duffryn Company, now well advanced, will add to the force of the claim that the valley be made one local area for administrative purposes. Their new Britannia pits, about a mile below the Bargoed collieries, are now at a depth of approximately 500 yards; and when these are in full work, giving employment to between 2,000 and 3,000 men, the output is estimated at 3,000 tons per day. A new population of 8,000 to 10,000 is expected. These Britannia collieries will be of the very finest equipment, electrically worked in every department. One of the difficulties encountered in the sinking has been the quantity of water, as much as 100,000 gallons per hour having to be lifted. The total depth of 730 yards will, it is expected, be reached by the middle of next summer.

During the coal strike, the county of Monmouth incurred an expense of £1,600 in feeding school children, as many as 12,000 meals being provided at an average cost of 1½d. each. The parents were called upon to repay only 1d. per meal; but much difficulty is experienced in collecting money. Attendance officers, who have been endeavouring to get payment, had to accept the money by instalments, in some cases as low as 1d. per week; although the bills, except in a few instances, do not exceed 3s. 6d. To the local committee of managers, on Monday last, it was reported that the amount spent in the Rhymney Valley had been £162 17s. 9d., but only £30 18s. had been recovered.

The paragraph which has been already published in this column concerning industrial developments at Port Talbot is confirmed, later intelligence showing that, besides the iron and steel works, the tin-plate and other undertakings, the railway and dock company will add materially to their resources for dealing with the extra traffic that is anticipated. New collieries, as was previously stated, will be sunk at Brynddu, sinking operations having now commenced; and at the docks several miles of new sidings are to be provided, whilst dredging work will ensure better access to the wharves of the steel company. One very interesting change we have already noted is that the dock company will instal an appliance which is novel to South Wales—namely, a high-speed belt for the shipping of coal in place of the hydraulic hoist ordinarily in use.

A case of considerable importance came before the Bridgend magistrates on Saturday, involving the question as to the proper period of notice which has to be given for the termination of contracts. The International Coal Company were sued by 49 of their workmen for sums which totalled £490, in lieu of notice. They had been given only 24 hours' notice and they claimed a month, consonantly with the recent decision of the Pontypridd magistrate. Mr Kirkhouse Jenkins, who appeared for the men, said that on the termination of the national strike, notices were put up at all the collieries stating that "pending the fixing of the minimum wage award under the Act," the men would be engaged from day to day, subject to 24 hours' notice. The Pontypridd stipendiary had given a judgment that the old agreement under the Conciliation Board was dead; and that the interpretation to be placed on the words "pending the publication of the award," was that the day-to-day contracts existed only till the date of publication of the award and no further. The stipendiary had also found that no agreement at all existed as to notice, and that therefore he must decide what was reasonable notice, and he decided on four weeks. Mr. Kenshole, who appeared for the colliery company, stated that the present case was not on all fours with that which was heard at Pontypridd. In that instance there was no evidence of a contract, direct or implied; whereas this case was different. The day-to-day contract existed until the date of the award, July 5; but after that date—as recently as October 17—the men at the International Colliery had themselves given 24 hours' notice signed by the checkweighers. Mr. W. J. Morgan, the manager, produced about 50 notices, all for 24 hours, which had from time to time been put in by the workmen, and upon this evidence the magistrates gave judgment for the colliery company.

For over a week about 600 men were on strike at the Duffryn Rhondda colliery, differences having arisen between the management and the men; but as a result of personal interview with Mr. D. A. Thomas and Mr. Leonard Llewellyn, certain concessions were made, and the men have now resumed work.

The Ogmore Valley miners passed a resolution on Saturday that unless all workmen in the district became members of the Federation before December 31, notices should be tendered at all the collieries.

As evidencing the feeling which exists between sections of the Federationists in South Wales, it is worth while to quote the declaration of Mr. Hartshorn that the proposed centralisation scheme in its form as settled by the conference last week, and now to be

lot of the whole body of men, is
iary mixed medley of proposals
telligent body of workmen." He
tion of the scheme in its original
ight the affairs of the Federation
glement, and that by adopting it
Federation will be shaken to its
his expression of opinion is mild
criticism of the results of the
give scope to "the arrogant and
inexperienced reformers on the
eme, he says, has been "forced
a caucus of young enthusiasts;"
to the fact that those who had
attending the recent conference
ade clear to them how unfitted a
o deal with matters of complicated
that, "The whole scheme is un-
untold harm to the Federation.
adaptable, the offspring of in-
. . . The notion of these imprac-
recoiled on their own heads, and
st their old infatuation for their
s."

al to reduce agents' salaries from
s Morgan, miners' agent in the
hat his earnings under present
at 8¾d. per hour; that his net
6d. a day, whilst the average of
ield has been 8s. 1d. per day; and
e a change he is willing to work
a shilling an hour, but should
-third for working extra hours.
ese and other sources might be
w the widespread and fundamental
evails; but the foregoing is typical

in connection with the proposals
miners are proceeding with their
The special committee which is
tution for a separate organisation
olution which has direct relation
allot of the other sections; and
act on the express understanding
r own last ballot constituting the
separate organisation be loyally
gard to any further action that
e South Wales Federation."

the Coalowners' Association, held
. S. Tallis (Tredegar) and Mr. B.
were elected to the vacancies on
ne Conciliation Board occasioned
Maclaren and the retirement of
With reference to the intended
scoyne Dalziel (secretary), it was
mittee appointed to confer with
made arrangements to relieve him
tine work, and thus retain his
Gibson, who has been for many
would be appointed assistant

ERY ACCIDENTS.

Coalville.

t Coalville last week, conducted an
e death of William Marshall, an
Ellistown Colliery, who died from
ing struck by a piece of coal which
aft.
ter, said that the deceased helped
ccident, taking the place of another
e-shift cage, one up and one down,
decks, the cages covered with a
The sides were enclosed and the
a handle, and the puller-off had to
eased stood at the end of the cage,
ards away, heard something falling
shouted to the deceased to "Keep
oal fell down the shaft, but those at
ly hear the material falling.
verdict that the deceased died from
ain, due to being struck by a fall of
alteration of the space between the
pening at the base, urging that it

tton-in-Ashfield.

Saturday conducted an inquest on
Bonser, a miner, who was killed by a
ing his employment at the Summit

Page told the story of the accident.
ed, asked for a wedge to place under
g coal, but before he could use it the coal, weighing about 2 tons, fell and partially buried him. He was extricated, but died about two hours later. The stall, it was stated, was properly timbered, and the fall occurred between a prop and the coal face.

Frank Bradley, a deputy, spoke to examining the stall on the morning of the accident, and finding everything satisfactory. He thought sprags should have been set, and confirmed a previous witness's statement that according to rules, sprags should have been placed so as to reduce any danger to a minimum.

A verdict of "Accidental death" was returned.

OBITUARY.

We regret to announce the death of Mr. Frederick Ewart Robertson, C.I.E., partner of Rendel and Robertson, consulting engineers, Westminster, who died on Saturday morning at the age of 65.

The death has taken place at his seat, Woodlands Vale, Ryde, Isle of Wight, in his 82nd year, of Lord Calthorpe. Deceased was a J.P. for the Isle of Wight, Staffordshire and Warwickshire.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Abstracts of Contracts Open.

Alexandria (Egypt), December 5.—Tenders are invited for the supply and delivery of (1) 3,340 tons of Cardiff and 30 tons of Newcastle coal; (2) 19 tons of benzine in 4-gallon tins; and (3) 85 tons of petroleum in 4-gallon tins; required for the service of the Coast Guard Administration. Copies of the conditions and forms of tender for each of the above contracts can be seen by British firms at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Cairo, November 25.—For Newcastle, Cardiff, and anthracite coal and coke for the Director of Stores, Central Administration.

Balderton, November 27.—For good quality coal (about 60 tons), for the Balderton Charities Trustees.

Bourne (Lincs.), November 25.—For 150 to 200 tons of good coal, for the Bourne Charity Trustees.

Bromley (Kent), November 25.—For coal and coke, for the Rural District Council.

Carndonagh (Ireland), November 25.—For 25 tons of best English coal, for the Inishowen Guardians.

Harrogate, November 25.—For (1) supply of house coal, (2) supply of slack coal, (3) supply of slack coal, for the Wells and Baths Department.

Hull, November 25.—For steam coal, for the Sculcoates Guardians.

Lowestoft, November 27.—For about 90 tons of the best seaborne coals, for the trustees of the Kirkley Poors Land Estate.

Tredegar, December 2.—For about 2,000 tons of small and about 750 tons of large gas coal, for the Urban District Council.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Adelaide (Australia), January 17.—*Boiler Plates, &c.*—Tenders will be received by the Chairman of the Supply and Tender Board Office, Adelaide, South Australia, for the supply of the following:—510 best mild steel boiler plates; 102 best mild steel smoke-box tube plates; 5 best mild steel firebox back casing plates; 11 copper wrapping plates; 18 copper tube plates; 8 copper back plates; 720 solid-drawn copper tubes; 35 bars of best mild steel angles; 724 engine and tender tires; 54 best steel crank pin forgings; 9 best steel crank axles; 6 best steel straight axle forgings; 1,069 bars of channel steel; 1,697 bars of angle steel; 2,407 steel plates and bars; 20 best Yorkshire iron boiler plates; 2 best steel straight axles; and 200 cast steel brackets. Forms, &c., can be obtained from the Supply and Tender Board Office, Adelaide, and can be seen at the office of the South Australian Inspecting Engineer in London, Mr. S. A. Strickland, 85, Gracechurch-street, E.C.

Auckland (New Zealand), January 6.—*Switchboards.*—For switchboards, for the Harbour Board. W. and A. McArthur Limited, 18-19, Silk-street, Cripplegate, London, E.C.

Ayr (Scotland), November 27.—*Tram Rails.*—For about 220 tons of steel grooved tramway rails and fish plates, for the Corporation.

Balderton (Notts), December 14.—*Electrical Installation.*—For an electrical installation for street lighting, for the Parish Council.

Clacton-on-Sea, December 4.—*Cast Iron Pipes.*—For about 50 tons of British cast iron pipes and connections, for the Urban District Council.

Cradock (South Africa), December 2.—*Electric Power Plant.*—The Municipal Corporation of Cradock, Cape Province, is prepared to receive tenders for the following works in connection with the municipal electric supply undertaking:—(Section A) two 50-kilowatt Diesel engines and dynamos complete with pipework and accessories, battery of accumulators, balancer, booster, switchboard, accessories, and foundations for same; (Section B) underground feeder cables, aerial distributing lines, street lamps, fittings and accessories, feeder pillars, service cut-outs, meters, &c.; and (Section C) buildings.

Dartford, November 27.—*Cable.*—For 500 yards of concentric lead-covered and armoured cable and accessories, for the Urban District Council.

Dublin, November 29.—*Motors.*—For one three-phase 25 kw. motor, about 800 revolutions per minute, 50 periods and 346 volts; one three-phase 20 kw. motor, about 800 revolutions per minute, 50 periods and 346 volts, for the Corporation (Technical Education Committee). Both to be suitable for driving direct through raw high pinion. One starter and switch to be included for each motor. One 35 kw. dynamo, to give both direct and three-phase current, to couple direct to engine, making 250 revolutions per minute.

Edinburgh, December 7.—*Police Motor Ambulance.*—For a motor ambulance, about 20-horse power, for the Corporation.

Hastings, December 9.—*Cast Iron Socket Pipes.*—For about 237 yards of 22 in. and 700 yards 4 in. cast iron socket pipes, for the Corporation.

Leeds, December 2.—*Centrifugal Pumps.*—For six No. inter-dependent units of combined centrifugal sewage pumps, direct coupled to three-phase alternating-current motors, for the Sewerage Committee of the Corporation (Contract No. 42).

Leigh-on-Sea, November 25.—*Weighbridge.*—For No. 1 6-ton weighbridge, for the Urban District Council.

London, November 26-December 3.—*Rails, &c.*—For (1) rails, (2) fishplates, (3) sleepers, (4) bridgework, for H.M. Government (the Secretary of State for India in Council). Conditions of contract can be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W.

London, S.W., December 3.—*Girder Bridges.*—For girder bridges (12, 15, 20, 30, and 100 feet clear span), for the directors of the Madras and Southern Mahratta Railway Company Limited. Mr. H. Bonham-Carter, secretary, 91, York-street, Westminster, S.W.

Manchester, November 27.—*Castings.*—For 12 months' supplies of malleable iron castings, iron castings, gunmetal and phosphor bronze castings and iron and steel, for the Cleansing Committee of the Manchester Corporation.

Mansourah (Egypt), December 12.—*Petrol Motor.*—Tenders are invited by the Municipality of Mansourah for the supply and erection of (1) a 20-horse power petrol motor and all accessories, and (2) a centrifugal pump of 8 in. diameter. Forms, &c., obtainable from Mr. A. L. Webb, C.M.O., Queen Anne's-chambers, Broadway, Westminster, London, S.W.

Mexborough (Yorks), December 2.—*Cornish Boiler.*—For a Cornish steam boiler, 18 ft. by 6 ft., for the Swinton and Mexborough Gas Board.

Newport (I.W.), November 27.—*Pumping.*—For pumping, &c., at the Bembridge Waterworks for the ensuing year, for the Rural District Council.

Romford (Essex), November 27.—*Oil Engine.*—For a H.C. type 45-b.h.p. continuous working load Blackstone crude oil engine, for the Urban District Council.

Sandbach (Ches.), December 2.—*Fire Engine.*—For (1) a second-hand (Shand-Mason) steam fire engine of the London Fire Brigade single vertical description, capable of delivering from 200 to 250 gallons of water per minute, with all necessary working tools and accessories, including 300 ft. of hose, two 100 ft. and two 50 ft. lengths; (2) 450 ft. of the best quality woven canvas hose, highest grade, treated to resist dry-rot and mildew, as supplied for use with similar engine to above, in three lengths each of 100 ft. and three lengths each of 50 ft., including six pairs of couplings, for the Urban District Council.

Watford, December 17.—*Pumping Plant.*—For two triple expansion pumping plants required for the raising of water from four 36 in. boreholes, each set of engines and pumps to be capable of dealing with 2,500 gallons per minute, for the Urban District Council (Contract No. 7).

Lord St. Aldwyn on Labour Unrest.—The sixth annual dinner of the Institute of Directors was held on Friday last at the Hôtel Métropole. Sir Felix Schuster, the president, occupied the chair.—Lord St. Aldwyn said that the interests of capital and labour could not be divided in the way that some people recommended. It was often said that the spread of limited liability nowadays had the effect of getting rid of some measure of the personal nexus which used to exist between employer and employed. That was true, and it had been one of the many causes of industrial unrest. But there had been other causes as well. One cause was the changed idea as to the proper function of Government with regard to disputes between employer and employed. He was afraid that the frequency of the interference of Government in industrial disputes and the endeavours to conciliate the parties on both sides might sometimes have encouraged disputes, or have led to mere temporary patching up of quarrels. Something more could be done in getting rid of industrial unrest than was possible under that system if employers and employed could be brought to a better knowledge of each other. In that connection he referred to the example of industrial co-partnership set by the late Sir George Livesey and Lord Furness, and expressed the hope that something would be done to bring about that co-partnership which meant common interest, and which would be infinitely better in the result for the workers than a mere increase of wages.

Ambulance Work in Yorkshire.—The annual meeting of the Yorkshire Collieries Ambulance League was held at Sheffield, on Saturday. Mr. H. Peake, of Doncaster, who presided, expressed regret for the loss sustained by the death of Mr. Pickering, chairman of the general committee. Mr. Edward Wood was re-elected president, and the other officers were re-elected, with the addition of Messrs. T. H. Mottram and Robinson (the two new mines inspectors) as vice-presidents. The secretary, Mr. A. H. Barnard, reported that owing to the coal strike, only 75 teams took part in the Wood Shield Competition, and the shield was won by the Silverwood team. Three life-saving certificates had been granted. The year was commenced with £56 3s. 5d. in hand, and closed with a bank balance of £89 12s. 6d. Subscriptions from the companies amounted to £238 11s.; from royalty owners £10 7s.; and from the miners' union £10 10s. had been received. It was decided that the League grant life-saving certificates to members in first-aid cases not in the mines, when fully authenticated. In a discussion as to the interest in ambulance work in Yorkshire, Col. Walker said he was afraid there had been some slackening in interest in ambulance work. He only looked upon the competitions as a secondary matter, but the task of encouraging ambulance work in all collieries was of utmost importance. Mr. F. H. Mellor (H.M. mines inspector) said when the Wood Shield Competition began only 3 per cent. of the miners of Yorkshire were qualified to render first aid; but now over 10 per cent. were trained, and in some collieries the numbers were nearer 20 per cent. Other speakers gave correspondingly favourable statistics.

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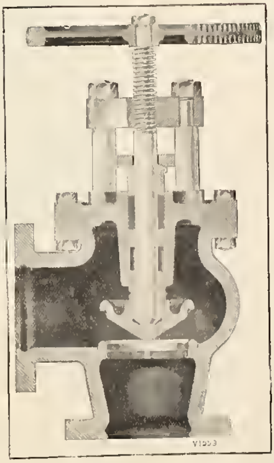

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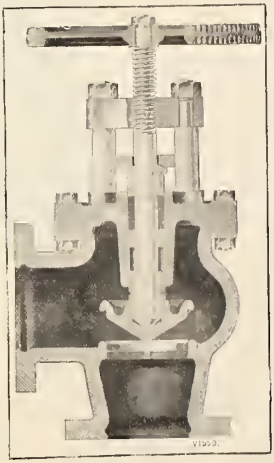

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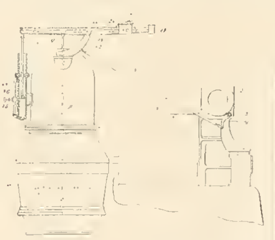
November; Honfleur, 1,700, 7s. 10½d., end November; Bordeaux, 3,500, 7s. 4½d. coal, 8s. 1½d. fuel, November 25; Barcelona, 3,000, 13s.

Homeward bound.—Poti, 4,700, Rotterdam, 14s. 3d., ppt.; 5,400, 14s., ppt.; 2,018 net, Rotterdam, Antwerp, Middlesbrough or Garston, 15s., ppt.; Nicolaieff, 2,900, Algiers or Tunis coast, 18 fr., ppt.; Sulina, 4,000, Naples, 17½ fr., ppt.; Bombay, 3,000 u.1. Antwerp or Rotterdam, 24s., ore, December; 6,600, Mostyn Deeps, 24s., ore, December; Calcutta, 2,760 net, Hamburg or Bremen, lump sum, about 32s. 6d., jute basis, December; 3,794 net, Bombay or Kurrachee, Rs. 7, December; Madras coast, 2,370 net, Marseilles, 37s. 6d., December; 2,731 net, 37s., January-February; Boston, 25,000 qrs., Avonmouth or Rotterdam, 4s., Copenhagen, 4s. 3¾d., December; Baltimore, 30,000 qrs., 10 per cent., 3s. 9d. heavy grain, 3s. oats, Rotterdam, December; 2,265 net, Sharpness, 4s. 1½d. heavy grain, 3s. 1½d. oats, December; Gulf, 1,350 stds., Buenos Ayres or La Plata, 192s. 6d., December; 1,200 stds., 10 per cent., Bordeaux, 152s. 6d., December; Galveston, 3,075 net, Liverpool or Bremen, 67s. 6d., ppt.; Rosario, 4,200, 10 per cent., Bristol, 24s., no reduction, November-December; San Lorenzo, 1,809 net, United Kingdom-Continent, 24s. 3d. o.c., less 6d., November; 4,000, 10 per cent., 24s. o.c., less 6d., January 25-February 25; 4,700, 10 per cent., 24s. o.c., less 6d., February 15-March 15; 5,300, 10 per cent., 24s. 3d. o.c., less 6d., half seed as wheat, balance 1s. extra, February 15-March 15; 6,000 10 ten per cent., 23s. 9d. o.c., less 6d., December-January; 4,500, 10 per cent., 23s. 9d. o.c., less 6d., January 1-31; Bahia Blanca, 4,000, 10 per cent., United Kingdom-Continent, 24s. 6d. o.c., less 6d., January 25-February 25; New York or Philadelphia, 3,546 net, two ports Japan, 38c., January; Charleston, 2,300 net, 163 ft., Liverpool or Bremen, 60s., cotton, December 5-20; Mobile, 160s. one port, 162s. two ports West Italy, December. January; Alexandria, 3,000 10 per cent., United Kingdom f.o. 16s., direct port 15s., Bristol Channel 14s. 6d., ppt.; Port Said, 2,278 net, Calcutta, 12s., salt, ppt.; Algiers, 7,200, Rotterdam, 6s. 3d., with 1,200-1,500, ppt.; Bilbao, 3,500, Cardiff, 6s., ppt.; 3,200, 6s. 6d. ppt.; Fremantle, sail, 35s., United Kingdom-Continent, end February; Adelaide, sail, 26s. 3d., United Kingdom-Continent, with options, January-February; South Australia, sail, 38s. 9d. United Kingdom-Continent, 31s. Cape; New York, sail, 25¼ c. case oil, Monte Video; time charter, States and West Indies, £950, three years, delivery May; £850, three years, delivery May: Kurrachee, 2,899 net, p.p. United Kingdom-Continent, 20s. 6d., 6d. less Liverpool, net terms, December; 22s. 3d., Hull, Tyne or Leith, with 9d. extra if two ports discharge; Burmah, 6,000, United Kingdom-Continent, 35s., March; Novorossisk or Theodosia, 6,000 max., Marseilles or Genoa, 16 fr., ppt.; Portland, Or., 33,000 qrs., 10 per cent., Hull, Tyne, Antwerp or Rotterdam, 4s., November-December; Gulf timber port, 1,100 stds., 10 per cent., Holland and Tyne, 142s. 6d., December 25-January 25; 900 stds., 10 per cent., Rosario, 190s., December 10-January 10; 2,097 net, 192s. 6d., December; Hornillo Bay, 5,000, Rotterdam 6s. 9d., November-December; Santander, 2,200, Rotterdam, 7s. 3d., ppt.; 1,700, 7s. 3d., December; 1,700, Oslebshausen, 7s. 1½d., ppt.; Nantes, 1,750, Rotterdam, 5s. 3d., November; Newcastle, N.S.W., sail, 30s. 6d., Peru; 52s. 9d., West Coast South America and home to Mediterranean; Fremantle or Albany, sail, 27s. 6d., South Africa, January-February; nitrate ports, sail, about 30s., Mediterranean, August-September; guano deposits, sail, basis 32s. 6d. one deposit, United Kingdom-Continent; time charter, 7,200, 7s. 3d., one round trip United Kingdom-Continent or Brazil and River Plate and home; time charter, 8s., four months, delivery and re-delivery Gulf; time charter, 12s. 6d., one trip, New York to United Kingdom-Continent; time charter, 7s., delivery and re-delivery United Kingdom-Continent, via States, New York or Philadelphia, 38 c., Japan, Korea 39 c., December; Philadelphia, 4s., heavy grain, 4s. 6d. flax seed, Avonmouth, Hull or Rotterdam, 1½d. extra Hamburg; Port Pirie, 7,000, Antwerp, 40s. 6d., December-January; Villa Constitucion, 4,000, 10 per cent., United Kingdom-Continent, 23s. 6d., o.c., no reduction ppt.; Carthagena, 5,000 Rotterdam, 8s. 9d., f.t., end November; Torrevieja, 5,000, Calcutta, 12s.; salt, December-January; time charter, Brazil and River Plate trade, 4,750, 7s. 6d., one round trip, delivery Mersey; Nicolaieff, Novorossisk or Theodosia, 3,400, Denmark, 17s. 6d. one port, 17s. 9d. two ports, 18s. three ports, December 15-31; Nicolaieff, Odessa, Novorossisk, Theodosia, Skadowsk, 5,000, Rotterdam, 12s., December; Philadelphia, 40,000 qrs., 10 per cent., United Kingdom-Continent., p.p., 3s. 9d., heavy grain, December; Pensacola, 700 stds., 10 per cent., Brest and London or Liverpool, 150s., December; Bona, 4,200, West Hartlepool, 10s., f.t., end November; La Goulette, 3,300, Tyne, Middlesbrough or West Hartlepool, 10s. 3d., end November; Sagunto or Agua Amarga, 4,700, Philadelphia, 9s. 6d., f.t., December 5-25; Nantes, 2,200, Rotterdam, 5s. 3d., ppt.; New York, 130,000 cases, Brazil, basis 35c. one port, February; Melbourne, sail, 30s., South Africa, January; West Australia, sail, 29s., South Africa, option South Australia loading 31s. 3d., January-February; Gulf timber port, sail, 16 dols., Rio de Janeiro; Puget Sound, sail, 65s., Valparaiso; 73s. 9d., Melbourne or Adelaide; time charter, American trade, 1,950, £787 10s., 12 months, delivery May; time charter, £3,750, one trip, Wilmington to United Kingdom-Continent, *via* Savannah and Fernandina.

Mr. Guy D. Bengough, lecturer in metallurgy at Liverpool University, delivered a public lecture on "Metallurgy and Civilisation" in the Arts Theatre of the University last week. The metallurgical industry, he pointed out, was the third most important in the country, being surpassed only by coalmining and the cotton industries. It employed nearly half a-million people, and the value of its production was £242,000,000, which was greater than that of any other industry. The United Kingdom's old-time lead in the production of steel was never likely to be recovered, as our unattacked ore reserves were relatively small, and British iron ore was inferior in quality to that of the United States and Germany. In reference to the metallurgical research which is now being conducted at the Liverpool University, Mr. Bengough remarked that the most important subject that was engaging their attention was the elucidation of the causes which gave rise to the corrosion of metals.

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

1497 (1912). *Improvements in and relating to Centrifugal Compressors.* The British Thomson-Houston Company Limited, 83, Cannon-street, London, E.C. (A communication from the General Electric Company, of Schenectady, Schenectady County, New York, U.S.A.).—The problem solved by this invention is to provide a governing mechanism for a compressor and its driving motor, which is capable of being so adjusted or modified in its action that the compressor, instead of delivering its normal output, may deliver any fraction thereof at a predetermined pressure. The drawing shows a centrifugal compressor and a turbine for driving it, the compressor and turbine being shown side by side to simplify the illustration. When the weight 19 is in the zero-flow position, and the weight 18 is in the proper position, the parts are balanced. Air flowing upward through the intake exerts a force on the lever 9 through the rod 8, tending to move it upward. As the weight 19 is moved along the scale beam from the position shown, toward the left, the opposition to the upward movement of the float is changed, and the rate of flow of air through the compressor is therefore increased. This is due to the fact that the changed position of the weight causes a depression of the left-hand end of the beam, and with it the float 7 to a new and lower position. This action moves the regulator of the motor in a direction to cause the speed of the motor to increase. The amount of air flowing through the intake will, for any given condition, ultimately reach such a value as to balance the effective action of the weight 19 on the beam, and when this occurs, the speed of the driving motor will become substantially constant, as will also the output of the compressor. This output is greater for each successive position of the weight 19 toward the left from the initial position. The parts are so proportioned and related that a movement to the left of the weight 19 steadily increases the rate of flow per unit of time until the maximum is reached, when the pointer 21 will enter or coincide with the notch in the scale beams indicating 40,000 cubic feet of free air. To decrease the rate of flow, assuming the weight 19 to be set for maximum delivery, the weight is moved to the right, which permits the float and co-operating beam to close one or more valves in the turbine and decrease its speed. (Two claims.)



3393 (1912). *Device for Stopping Runaway Hutches or Trucks in Coalmines and the like.* J. Taylor, of 42, Overton-road, Kirkcaldy, Scotland, and C. Wood, of 242, High-street, Kirkcaldy, Scotland.—This invention relates to an arrangement to be fitted up on inclined planes in coalmines laid with rails, on which are run coal tubs or hutches, by means of which a person standing at any part of the inclined plane can by a simple process bring a hutch or tub which has broken away or got out of hand to a stop within a few yards, and so prevent accidents which are of very frequent occurrence through this cause. Fig. 1 is a perspective view showing a section of an incline or "brae" with the device in readiness for use; fig. 2 is a front view of one pair of legs with crossbar or crown and support; and fig. 3 is a detail plan view showing the hinge connection of one of the props with the crossbar or crown. The free ends of the props *a* are normally supported out of reach of the hutches *e* by means of the supports *d* but on the supports being moved or swung towards the upper end of the incline or "brae," the props *a* are released and are allowed to fall by gravity into the position indicated by dotted lines at fig. 1 of the drawings, so that they are in position to arrest the motion of a runaway hutch or the like on either track. The means whereby the supports *d* are so moved or swung consists of a wire rope or chain or the like *g* secured to the part d^3 at one side of each support, being carried from the support *d* nearest the foot of the incline or "brae" to that nearest the top (being secured to each in turn) and is passed from thence round a crown or crossbar *b* higher up the track (or round a pulley or sheaf) and then down to the foot of the track passing downwards, over the tops of the crowns or crossbars, and at the foot of the incline or "brae" the rope or the like may be secured to a hand lever *h* fulcrumed at h^1 on the side of one of the legs *f*, so that the rope *g* may be readily pulled in such manner as to swing the supports clear of the prop *a* and allow the latter to fall in position to stop the hutches or the like. The device when in use would most frequently be operated by means of the lever *h* by the man who is always stationed at the foot of the "brae," but it could also be readily operated, or put in use, by anyone on the "brae" by simply pulling down the rope *g* above the crowns or crossbars *b*. (Three claims.)

Fig 1.

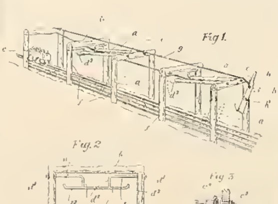


Fig. 2

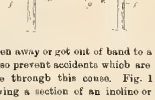
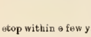


Fig 3



12063 (1912). *Improvements in Sheet Metal Piling.* E. Le Bas and H. T. Garvie, both of Dock House, Billiter-street, London.—This invention has reference to sheet-metal piling of the kind in which the piling consists of homogeneous non-riveted metal bars of similar section rolled with flanges having interlocking members integral therewith, the member on one bar engaging with the corresponding member on the other. An example of such a piling is to be found, for instance, in Specification No. 8011 of 1907. The present invention consists in constructing the bars as shown in the accompanying drawings, which show horizontal sections of the piling bars. In fig. 1 the web *a* of the bar is rolled at each of its ends with flanges *b* b^1, the flanges b^1 being rolled of hooked section to receive and guide the straight flanges *b* of the adjacent bar in driving. The figure shows the hooked flanges b^1 as being both on the same side of the web *a*, but they may be on opposite sides if desired. In the bar, fig. 2, the construction is as last mentioned, but the hooked flange b^2 is somewhat more rounded to receive the flange b^3 of the next bar, which latter flange is of bulbous shape and the hooked flange b^1 on the other side of the web *a* receives the straight flange *b* of the next bar; if desired, flange b^1 may also be more or less rounded to receive a bulb on flange *b*, as indicated in dotted lines on the figure. In fig. 3 the bar is of channel section, the flange at one end being rolled of rounded hook section b^2 and that at the other end having a bulbous edge b^3 to engage in the hooked flange b^2 of the adjacent bar. In any of the constructions the web *a* may be rolled in the known way with lateral stiffening ribs as indicated in dotted lines in fig. 1, or of trough section as indicated in dotted lines in fig. 2, or it may be rolled of corrugated section. (One claim.)

Fig 1

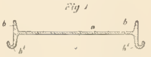


Fig 2

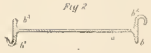
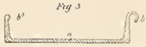


Fig 3



12064 (1912). *Improvements in Sheet-metal Piling.* E. Le Bas and H. T. Garvie, both of Dock House, Billiter-street, London.—This invention has reference to that class of sheet-metal piling which consists of bars of similar section rolled or provided with interlocking members, the member at one end of the section being forked and bent inwards, and that at the other end of the section having lateral flanges to engage in the inwardly bent limbs of the forked member of the adjacent piling bar. Such bars are described for instance in the Specifications of Patents Nos. 3846 of 1906, 11281 of 1909, and 17917 of 1911. According to the present invention an integral piling bar of this kind is rolled at one end of its section, with an interlocking member of Y section, having the ends of the straight limbs of the Y deflected outwards at right angles to the web of the piling bar, to engage with the inwardly-bent portions of the forked member of the adjacent piling bar, the contact of the Y piece with the adjacent section being at two points only instead of at three, in the somewhat similar joint shown in Specification No. 17917 of 1911. The accompanying drawings show in section two forms of piling bar made according to the invention. In the form shown in fig. 1, the bar is rolled at one end with oblique flanges *a a* at each side of the web *b*, these flanges being curved inwardly at their ends a^1. At the other end of the web, the bar is rolled of forked or approximately Y section, the ends of the flanges *c c* thus formed being bent outwards at

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MARK.

Steam Pump

A STRONG SIMPLE PUMP

That needs no oil or packing, has nothing to get out of order, and can be left at work for weeks without attention.

FOR PIT SINKING &

The absence of exhaust steam, the facilities for slinging, and its capacity for pumping dirty water render it unsurpassed for this work.

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Having no frictional parts, it will pass large quantities of coal dust, grit, &c. To withstand the wear, special patterns are made for this work.

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15, King Street, Leeds.	Pulsometer, Leeds.	1925 Central.
60, St. Vincent St., Glasgow.	Pulsometer, Glasgow.	8526 City; 1426 Central.
2, Strand St., Liverpool.	Pulsometer, Liverpool.	4184 Bank.
206, Corn Exchange Buildings, Cathedral St., Manchester.	Pulsometer, Manchester	45 City.
50, Central House, New Street, Birmingham.	Pulsometer, Birmingham.	0774 Central.

Pulsometer Engineering Co. Ltd

Offices—11, Tothill Street,
LONDON, S.W

Telegrams—"Pulsometer, London."
"Egyptian, London."
Telephone—165 Westminster.

Nine Elms Iron Works,
READING.

Telegrams—"Pulsometer, Reading."
Telephone—583 Reading.

approximately right angles to the line of the web as shown at c^1 c^1, to engage and be guided by the incurved portions a^1 of the adjacent piling bar. In fig. 2 the construction is similar, but the flanges *a a* are curved instead of being

Fig 1

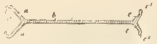
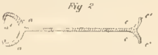
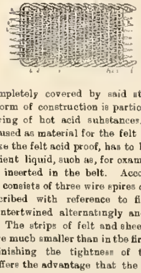


Fig 2



straight, as in fig. 1. The web in any case may be rolled with lateral stiffening ribs such as indicated in dotted lines in fig. 1, or it may be rolled of trough section as indicated in fig. 2, or be otherwise shaped in any other known way to give increased strength. (One claim.)

19045 (1912). *Conveyor Belt for Pulverised Materials* F. Garelly, of Searbrücken, Germany.—This invention relates to a conveyor belt which is absolutely tight and acid-proof, and consequently particularly adapted for conveying pulverised superphosphate, which can be either hot or cold. In the accompanying drawings the invention is shown by way of example, and in several forms of construction. The conveyor belt is composed in the well-known manner of flat wire spires *a*, the length of which is equal to the width of the belt. These wire spires *a* are interwoven and connected the one with the other by means of cross rods *b*. The cross rods are connected at the ends by means of links b^1, which further serve for preventing the stretching of the belt. The arrows in figs. 1, 2 and 4 indicate the direction of movement of the belt. For making the belt tight a strip *c* of sheet metal is obliquely inserted in each link in such a manner that its front edge bears upon the corresponding cross rod, its rear edge laying under the corresponding cross rod *b*. Owing to this oblique position of the strips of sheet metal, an absolute tightness of the belt is obtained without considerable increase of the cost of manufacture compared with the conveyor belts with horizontal blades of sheet metal. Conveyor belts which are designed for the transport of acid substances are painted with an acid-proof varnish or tar. According to the second form of construction, strips *d* of felt are inserted in the links so that their edges bear against the cross rods *b*, whereby the belt is made absolutely tight. According to figs. 2 and 3, strips of sheet metal *e* are placed upon the felt strips *d*, according to one form of construction, only upon the upper surface of said felt strips, or, according to another form of construction, upon both surfaces, as shown in fig. 2 at the right of the line B—B, so that the felt strips are almost completely covered by said strips *e* of sheet metal. This form of construction is particularly designed for the conveying of hot acid substances. In this case woollen felt is used as material for the felt stripe *d*, which, in order to make the felt acid proof, has to be impregnated with a convenient liquid, such as, for example, tar, before the strips are inserted in the belt. According to figs. 4 and 5, the belt consists of three wire spires *a*, instead of two as above described with reference to figs. 1 to 3, the spires being intertwined alternatingly and connected by cross rods *b*. The strips of felt and sheet metal *d* and *e* respectively are much smaller than in the first case, without, however, diminishing the tightness of the belt. This construction offers the advantage that the conveying belts are much more solid and flexible than those according to figs. 1 to 3, so that they better adhere to the conveyor cylinders. The surface of contact between the belt and the cylinder is larger, whereby the wear of the belts is considerably reduced. (Six claims.)



Staffordshire Iron and Steel Institute.—A meeting of the above will be held on the 23rd inst. at Dudley, when Mr. Herbert Pilkington, M.I.C.E., will read a paper on "The Manufacture of Wrought Iron and its Future."

GOVERNMENT PUBLICATIONS.

⁂ Any of the following publications may be obtained on application to this office at the price named post free.

Rural Cottages Bill, 3½d.

Housing and Town Planning: Further Memorandum, 2½d.

Report on the Changes in Rates of Wages and Hours of Labour, 1911, 10½d.

York Corporation Light Railway, 1½d.

Entomological Research Committee. Correspondence, 3d.

COAL MINES ORDER. October 24. 1½d.; Ditto, Storage of Explosives. 1½d.

Consular Reports: Turkey, Damascus, 1911, 3½d.; Siam, Senggora, 3½d.

Foreign Trade, Returns for October, 6d.

Labour Gazette, November, 2d.

PUBLICATIONS RECEIVED.

DICTIONARY OF APPLIED CHEMISTRY, VOL. III., GR-OILS. By Edward Thorpe. 1912. London: Longmans, Green and Co. Price 45s. net.

LEAD POISONING AND LEAD ABSORPTION. By T. M. Legge and K. W. Goadby. 1912 London: Edward Arnold. Price 12s. 6d. net.

"University of Illinois (Bul. No. 60), 'The Coking of Coal at Low Temperatures, with a Preliminary Study of the By-products,'" by W. S. Parr and H. L. Olin; "The Journal of the West of Scotland Iron and Steel Institute" (Vol. 20, No. 1), October; "Proceedings of the South Wales Institute of Engineers" (Vol. 28, Part 4); "Bul. de la Société d'Encouragement pour l'Industrie Nationale" (tome 118, No. 2), Août-Octobre; Canada, Department of Mines "Report on the Utilisation of Peat Fuel for the Production of Power," by B. F. Haanel, B.Sc.

NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

25811. Manufacture of coke. A. Rollason.
25819. Apparatus for taking the profiles of rails. A. E. Shorter.
25821. Apparatus for dealing with slimes from coal washing and the like. S. Hunter and Simon-Carves Bye-product Coke Oven Construction and Working Company Limited.
25832. Process of and apparatus for distilling petroleum and other hydrocarbon oil. C. W. Turner.
25835. Apparatus for boring holes in mines. E. Meyer.
25858. Making high-grade pig iron. P. L. T. Héroult.
25879. Means for automatically regulating or controlling pumps and compressors. Knorr Bremse Akt.-Ges.
25888. Grabs for coals and the like. K. Hauberg, Marstrand and Hellweg, Aktieselskabet Titan.
25936. Apparatus for separating light or smaller material from heavier or larger material by means of water currents, applicable to cereals and their products and for cleaning fruit and seeds and for the separation of large and small particles of minerals in a granular state. J. Higginbottom.
25970. Apparatus for working on the upper or wearing portions of rails. J. Noll.
25974. Making dephosphorised high-grade pig iron. P. L. T. Héroult.
25976. Manufacture of objects from molybdenum. Chemische Fabrik von Heyden Akt.-Ges.
25979. Annealing metels. F. W. Le Tall.
25980. Annealing metals. F. W. Le Tall.
25987. Method of uniting sheets of brass, aluminium, and other metels of high conductivity for heat. N. Próstler and Ges. für Electrotechnische Industrie m.b.H.
26034. Construction of wrought-iron wheels for road vehicles. C. Challiner.
26045. Centrifugal separators. H. de Raasloff and T. E. Brown.
26051. Safety couplings for colliery tubs, quarry wagons, and other purposes. H. Weetman.
26116. Means for stopping and automatically controlling the supply of steam to winches, engines and the like. E. L. Wishlade.
26127. Open-hearth suction gas producers. Sir K. I. Crossley and F. Fielden.
26128. Gas producers. Sir K. I. Crossley and F. Fieldon.
26129. Automatic weighing apparatus. W. and T. Avery Limited, and S. H. Johnson.
26130. Mechanical device or arrangement to prevent accidents in shafts or inclines of mines, and such like, by the breakage of hoisting and other ropes, and particularly to prevent hoisting cages and such like appliances from dropping from that cause. J. Houston and G. Symon.
26158. Apparatus for coating iron and steel plates with other metels. S. O. Cowper-Coles.
26166 Tilting arrangement for metallurgical furnaces. Jossingfjord Manufacturing Company A/s.
26197. Steam generators. C. Lemale.
26203. Process of converting iron into steel. F. F. Palli.
26204. Centrifugal air-compressors. British Thomson-Houston Company Limited.
26221. Miners' safety lamps. W. Best, J. C. Best, A. E. Best, R. O. Best and M. Best.
26222. Gauzes for miners' safety lamps. W. Best, J. C. Best, A. E. Best, R. O. Best and M. Best.
26248. Construction of haulage clips and the like. F. G. Seeley and G. Wood.
26267. Channelling machines. S. Lucking.
26275. Furnaces. R. Haddan.
26279. Cranes and other hoisting apparatus. Variable Speed Gear Limited and J. Robson.
26281. Steam generators. C. Lemale.
26287. Manufacture of ductile and malleable bodies of tungsten or molybdenum or their alloys, especially wires or filaments for electric incandescent lamps Westinghouse Metallfaden Glühlampenfabrik G.m.b.H.
26294. Centrifugal compressors. British Thomson-Houston Company Limited.
26301. Apparatus for making gas and coke. H. Nelsen.
26302. Apparatus for making gas and coke. H. Nelsen.
26314. Mining and suchlike picks. J. B. Catterall.
26341. Apparatus for operating the brake mechanism of colliery winding engines. J. Shrigley.
26350. Treatment of ores. S. L. Bensusan.
26364. Extraction of tin and other metals from tin ores and slags. W. E. Gibbs.

Complete Specifications Accepted.

To be published on December 5.

1911.

25359. Apparatus for mixing and pressing smokeless explosive. Fortuna-Werke Albert Hirth.
25410. Apparatus for controlling the supply of liquid or gaseous fuel and air or the like to furnaces and the like. Crosbie
25877. Centrifugal pumps. Kerr and McEwan.
28145. Process for producing peat fuel or coke, and apparatus therefor. Prioleau and Prioleau.
28738 Pumps. British Thomson-Houston Co.
29200. Operating producer gas power installations. Hutchins.

1912.

25. Carding engines Travis and Fitton.
1496. Governors for centrifugal air compressors. British Thomson-Houston Co.
3740 Automatic couplers for railway carriages and wagons. Willison.
7095. Manufacture of silicon sheet steel. Connell.
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23561. Hydraulic drilling apparatus. Von Vangel.
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25207. Alternating-current generators. Ateliers de Constructions Electriques du Nord et de l'Est.
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CATALOGUES AND PRICE LISTS RECEIVED.

Mr. H. M. Budgett, of the Crown Works, Chelmsford, sends us a copy of his latest catalogue of magnetic chucks, demagnetisers, generators, &c. The list is well illustrated, and contains full particulars as to prices, sizes, &c.

We have received from Messrs. **Herbert Tuchman Manufacturing Company,** 2, Dyers-buildings, Holborn, E.C., a new list recently issued by them, which deals with the subject of illumination of engineering works by gas.

Messrs. **W. H. Bailey and Co. Limited,** Albion Works Salford, Manchester, have placed before us a copy of their new pamphlet which contains fullest particulars of their "tell-tale" recording gauges, for pressure and vacuum.

We have received from **Messrs. Kaymer and Co.,** Gorleston-on-Sea, a leaflet giving particulars of their rock drills, rock drilling appliances, pneumatic hammers, &c., copies of which may be had upon application to the firm at the above address.

Messrs. **the Herbert Frood Company Limited,** of Chapel-en-le-Frith, having sent us particulars relating to their Ferodo specialities for lining brakes and clutches. We are also informed that this firm have now opened a warehouse and offices at 39, Upper Rathbone-place, London.

Messrs. **Davies, Turner and Co. Limited,** 52, Lime-street, E.C., inform us that they are now in a position to accept contracts for the transportation of goods to nearly every part of the world. Copies of their tariff may be had upon application, as above.

We have received from the **National Time Recorder Company,** 5, Blackfriars-road, London, S.E., a copy of a catalogue they have recently issued, which contains some interesting facts as to the employment of their British-made time recorders, time stamps, watchmen's portable clocks, &c., &c.

Mr. J. F. Barker, engineer, Hatfield-road, Ipswich, draws attention, in a leaflet he has just published, to an extract from the Government inspector's report for the Lancashire and North Wales district, which relates to cases of overwinding, and solicits enquiries from colliery managers and engineers for particulars of his safety hooks, as an effective safeguard against a repetition of such fatalities.

A profusely illustrated catalogue (No. 14m), or rather book, has recently been issued by **Messrs. Alley and MacLellan Limited,** of Glasgow, and deals very extensively with their "Sentinel" steam wagons. Some 80-odd pages are filled with excellent illustrations, quite a number being in colours. The end of the book contains some excellent testimonials from the users of these vehicles, in this and foreign countries; and engineering firms, coal factors, &c., &c., who are contemplating the employment of this type of transport would do well to obtain a copy of the work.

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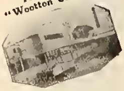

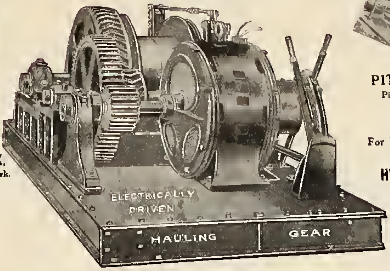

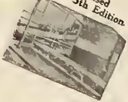

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Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Accumulators

Acid Plant
Daglish, Robert, and Co. Ld., St. Helens, Lancs.

Air Analysis Apparatus
Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

Air Compressors
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Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
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Harvey, G. A., and Co., Lewisham, London, S.E.
International Channelling Machines Ld., Sheffield
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
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Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., F. Department, Ipswich
Robey and Co. Ld., Globe Works, Lincoln
United States Metallic Packing Co. Ld., Bradford
Walker Brothers (Wigan) Ld., Wigan
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Lewis, William, and Son, Bilston
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Youngs, Byland-street Works, Birmingham

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Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
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Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
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Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Isca Foundry Co., Newport, Mon.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway and General Engineering Co. Ld., Notts
Stewarts and Lloyds Ld., Birmingham & Glasgow
Summerson, Thomas, and Sons Ld., Darlington
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

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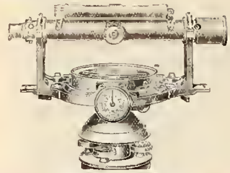

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Couplings
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Crab Winches
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

Crane Makers
Middleton, Robert, Sheepscar Foundry, Leeds
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Cranes
Appleby, E. G., and Co., 10, Victoria-street, Westminster
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Ryland-street Works, Birmingham

Creepers
Tickle Bros., Vulcan Ironworks, Wigan

Cut-off Gear
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Thornewill and Warham Ld., Burton-on-Trent
Wood, John, and Sons Ld., Wigan

Detonators
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Dies, Embossing Presses, and Seals
Pryer, Edward, and Son, 68, West-st., Sheffield

Disintegrators
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Middleton, Robert, Sheepscar Foundry, Leeds
Simon-Carves Ld., 20, Mount-street, Manchester
Yeadon, Son and Co., Albion-place, Leeds

Diving Apparatus
Pulsometer Engineering Co. Ld., Reading
Siebe, Gorman and Co. Ld., Westminster S.W.

Dog Spikes
Frost, Albert, and Co., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Renton, B. M., & Co., Midland Works, Sheffield

Double Helical Gear (Machine Cut)
Brown, David, and Sons (H'fi'd) Ld., Huddersfield
Citroen, Andre, and Co., 27. Queen Victoria-street, London

Drain Cocks
Appleton and Howard, St. Helens, Lancs.
Hopkinson, J., and Co. Ld., Huddersfield

Drawing Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drawing Office Stationery
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drills (Electric)
United States Metallic Packing Co. Ld., Soho Works, Bradford

Driving Pulleys
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Duplex Pumping Engines
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Evans, Joseph, and Sons Ld., Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Pearn, F., and Co. Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Dustbins (Sanitary)
Baker, John, and Son, Bilston, Staffs
Harvey, G. A., and Co., Lewisham, London, S.E.
Lewis, Wm., and Son, Bilston
Theedam, E. C., Ld., Dudley

Dynamite, &c.
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Nobel's Explosives Co. Ld., Glasgow

Dynamos
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Sutcliffe, Richard, Horbury, near Wakefield

Ebonite and Vulcanite
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Electric Detonators and Fuses
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Electrical Earthing Clips
Ingle, Albert E., 13, Albert-place, Bridge street, Manchester

Electrical Engineers
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Hurd Coal-Cutter and Engineering Co. Ld., 188, St. Vincent-street, Glasgow
Jardine, John, Deering-street, Nottingham
Mather and Platt Ld., Manchester
Theedam, E. C., Ld., Dudley

Electrical Fault Indicators
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield

Electric Haulages
Avonside Engine Co. Ld., Bristol
Bridge, David, & Co. Ld., Castleton, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davis John, and Son (Derby) Ld., Derby
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, R. H., and Co. Ld., Wakefield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Electric Meters
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Electrical Plant
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Ward, Thos. W., Limited, Albion Works, Sheffield

Electrical Pumps
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Electrical Stores
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C., Ld., Dudley

Emery Wheels

Enamelled Plates for Notices for Mines
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Theedam, E.C., Ld., Dudley

Enamel Manufacturers (for all Metals)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalbitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Engineers (Consulting)
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Fell, C. A., Dronfield, near Sheffield
Sodlerd, R. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

Engines (Blowing)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Gas-Compressing)
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Hauling and Winding)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, R. H., and Co. Ld., Wakefield
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Notts

Engines (Hauling and Winding)—*continued.*
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, R., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

Engines (Locomotive)
Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements lane, London, E.C.
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)
Mather and Platt Ld., Manchester

Engine Merchants
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

Engines (Oil)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping) (See Pumps)

Engines (Rolling Mill)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.

Engines (Steam)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Boyles Ld., Irlam, Manchester

Exhaust Turbine Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Royles Ld., Irlam, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Ferro-Concrete Constructions
Yorkshire Hennebique Contracting Co. Ld., Leeds

Files
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Royles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Royles Ld., Irlam, Manchester
Wright, Joseph, and Co., Tipton

Fire Appliances
Fell, C. A., Dronfield, near Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Purchasers' Guide to Advertisers' Specialities.—(continued).

Firelighter Machinery
Glover, M., and Co., Holbeck-lane, Leeds

Fishplates
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

Fittings (Iron and Steel)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

Forced Draught
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

Forges
Hardy Patent Pick Co. Ld., Sheffield

Forgings
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Renton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld. Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Friction Surfaces
Froud, Herbert, Co. Ld., Chapel-en-le-Frith

Fuel Economisers
Fell, C. A., Dronfield, near Sheffield
Pillatt and Co., Stapleford Nottingham
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Pillatt and Co. Ld., Stapleford, Nottingham
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Heenan & Froude Ld., Worcester and Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters

Fuses (Safety)
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Bricks

Gas Engines
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Gas Exhausters
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Gas Plant
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Tipton

Gas Valves
Haslam and Schontheil Ld., Bristol

Gauge Glasses
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Royles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Hopkinson, J., and Co. Ld., Huddersfield
Hoyles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gear (Special for Motor Lorries Cars &c.)
Brown, David, & Sons (Hudd.) Ld., Huddersfield

Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroën, André, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Rods Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, R., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield

Heapsteads
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Heenan and Froude Ld., Worcester
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hoists
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
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Heenan and Froude Ld., Worcester
Mather and Platt Ld., Manchester
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Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Hooks or Links (Safety)
Heenan and Froude Ld., Worcester
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Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
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Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
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Yorkshire Hennebique Contracting Co. Ld., Leeds

Hose
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Reddaway, F., & Co. Ld., Pendleton, Manchester
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Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

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Hardy Patent Pick Co. Ld., Sheffield
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Tangyes Ld., Cornwall Works, Birmingham

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Lancaster and Tonge Ld., Pendleton, Manchester
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Royles Ld., Irlam, Manchester
Tangyes Ld., Cornwall Works, Birmingham
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Ward, Thos. W., Ld., Albion Works, Sheffield

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Harvey, G. A., and Co., Lewisham, S.E.
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Davis, John, and Son (Derby) Ld., Derby
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Thornton, A. G., Ld., King-st. West, Manchester

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Hardy Patent Pick Co. Ld., Sheffield
Hurd Coal-Cutter and Engineering Co. Ld., 188 St. Vincent-street, Glasgow
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Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
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Davis, John, and Son (Derby) Ld., Derby
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Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
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British Westinghouse Electric and Manufacturing Co Ld., Manchester
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Robey and Co. Ld., Lincoln
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Walker Brothers (Wigan) Ld., Wigan
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Wright, Joseph, and Co., Tipton

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Northern Rubber Co., The Wicker, Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
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Hardy Patent Pick Co. Ld., Sheffield
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Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington

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Thompson and Southwick Ld., Tamworth
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

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Spencer and Co. Ld., Melksham, Wilts
Thompson and Co., Wigan
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

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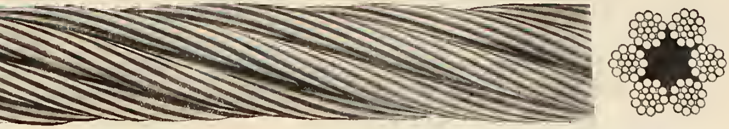

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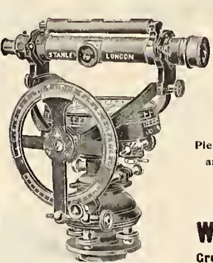

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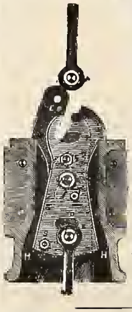

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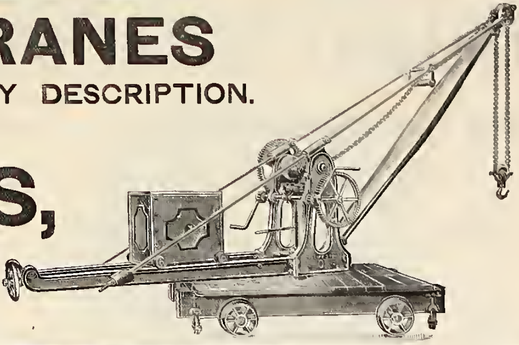

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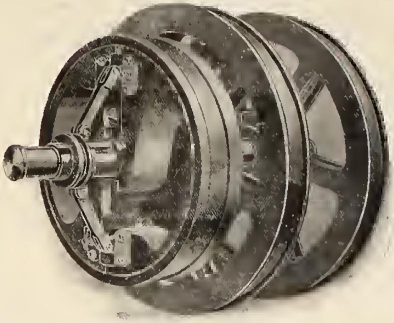

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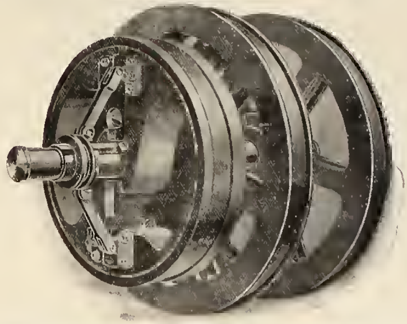

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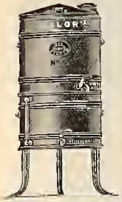

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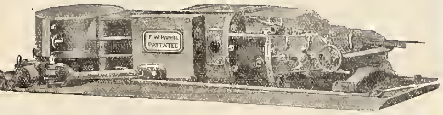

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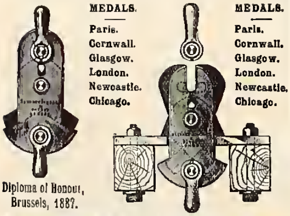

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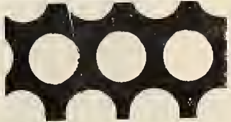

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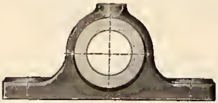

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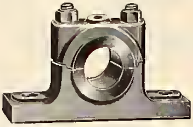

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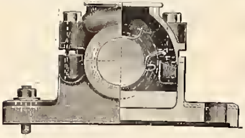

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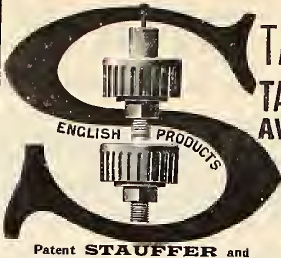

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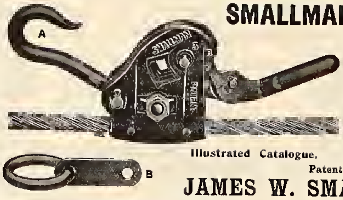

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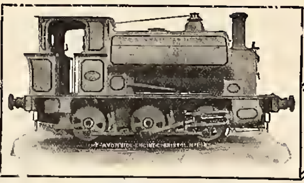

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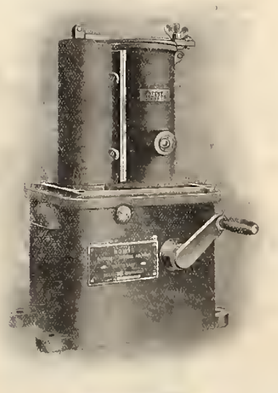

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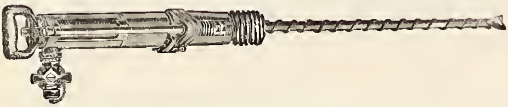

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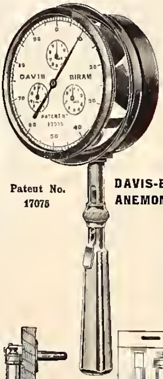

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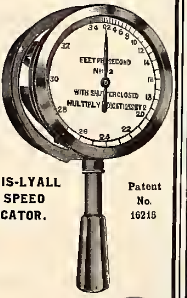

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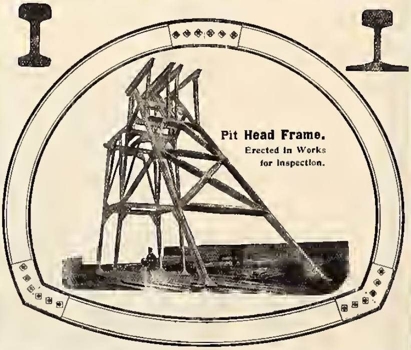

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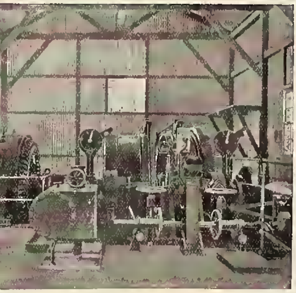

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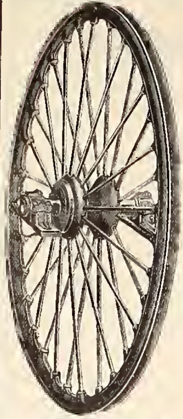

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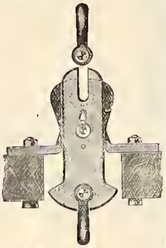

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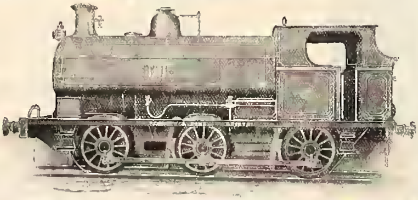

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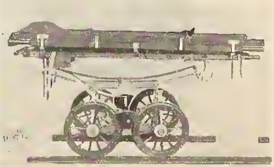

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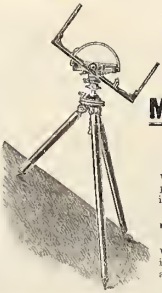

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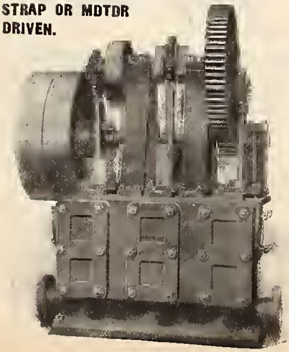

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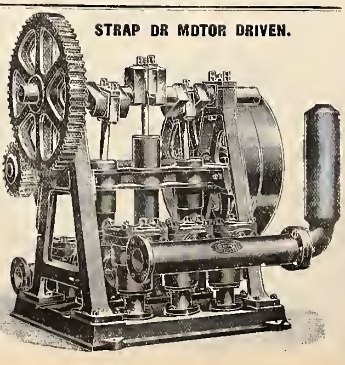

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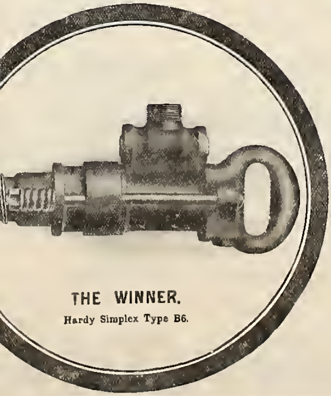

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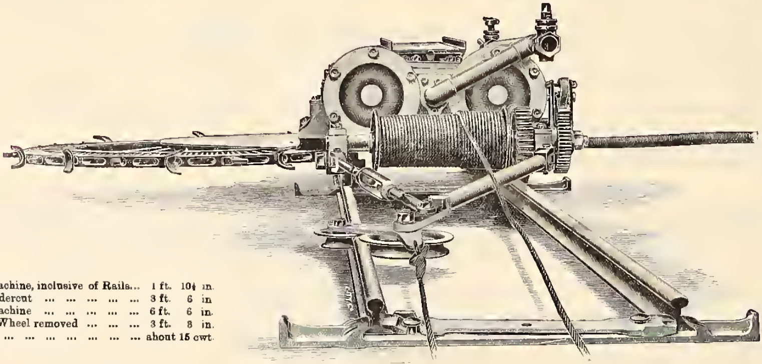

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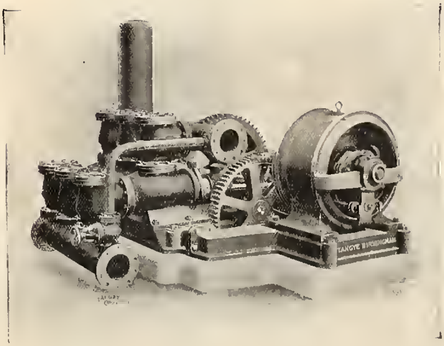

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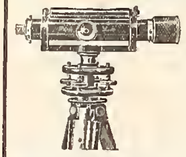

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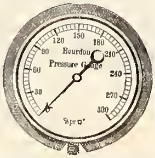

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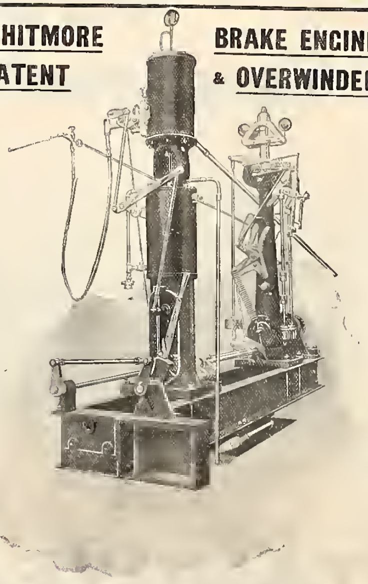

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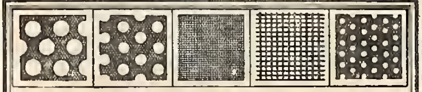

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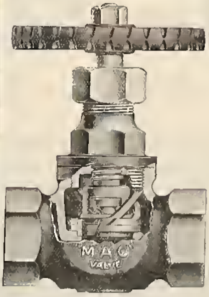

Figure 6200—Inside Screw
Figure 6205—Outside Screw

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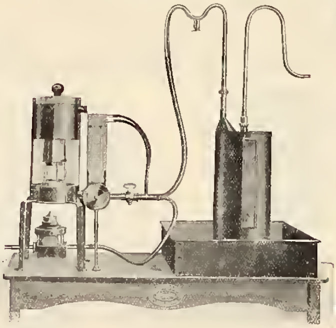

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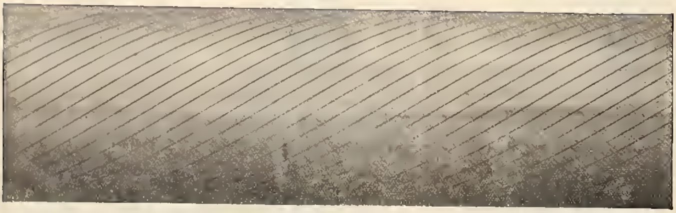
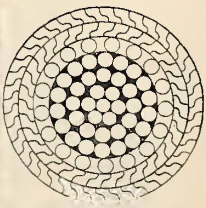

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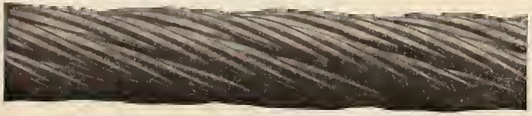
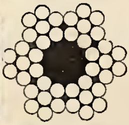

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THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

Vol. CIV. FRIDAY NOVEMBER 29, 1912 No. 2709.

WORKMEN'S COMPENSATION IN 1911.

A return has been issued by the Home Office giving the statistics of compensation and of proceedings under the Workmen's Compensation Act, 1906, and the Employers' Liability Act, 1880, during the year 1911 [Cd. 6493]. The return is prefixed by an introduction written by Mr. Delevingne, the head of the Industrial Department. Returns have again been collected from the seven great groups of industries—mines, quarries, railways, factories, harbours and docks, constructional works, and shipping. These returns furnish materials for a general review of the working of the Compensation Act of 1906 in relation to the main body of the industries of the United Kingdom.

In these seven groups of industries, the number of employers included in the returns was 139,884, and the aggregate number of persons employed coming within the provisions of the Act was over 7 millions, of whom more than 5 millions come under the heading "factories." In these industries in the year 1911, compensation was paid in 4,021 cases of death and in 419,031 cases of disablement. The average payment in case of death was £154, in case of disablement £5 16s. The annual charge for compensation, taking the seven groups of industries together, averaged 8s. 5d. per person employed. It was lowest in the case of persons employed in factories, being only 4s. 6d. per person; in the case of railways, it was 7s. 11d.; it rose to 10s. 9d. in quarries, to 14s. 3d. in shipping, and to 13s. 5d. in constructional work; it was highest in docks, 21s. 9d., and in mines, 23s. 8d. It is noteworthy that in the coalmining industry the charge arising under the Act works out at about 1·1d. only per ton of coal raised. The total amount of compensation paid under the Act in the seven groups of industries during the year was £3,056,404, as compared with £2,700,325 last year. When to this is added the costs of management, commission, legal and medical expenses, &c., the total charge borne by the seven industries probably amounts to more than £4,000,000.

The foregoing figures include, in addition to accidents, cases of the various industrial diseases (now 24 in number) included under the Workmen's Compensation Act. Compensation was paid, in the seven groups of industries, in 33 cases of death from disease and in 5,737 cases of disablement. The bulk of these cases, 87·6 per cent. of the total, occurred in the mining industry, and were due mainly to nystagmus, beat hand, beat knee and beat elbow. Of the remainder, 554 were cases of lead poisoning.

The statistics show that only a very small proportion of claims under the Act become the subject of litigation. The total number of cases under the Workmen's Compensation Act which were taken into court in England and Wales in 1911 was 8,017; many of these, however, were applications for dealing with allowances that had already been granted, and many were settled out of court or otherwise disposed of, so that the total number of original claims for compensation finally settled within the cognisance of the courts was only 4,487. In Scotland the corresponding figures were 1,825 and 563; in Ireland 1,233 and 717 respectively. Of the 5,767 cases settled judicially under the Act in the United Kingdom, the decision was in favour of the applicant—that is, the workman—in 4,504, or 78·1 per cent. The total number of cases under the Employers' Liability Act, 1880, taken into court in the whole of the United Kingdom, was 604 in 1907, 406 in 1908, 298 in 1909, 217 in 1910, and 223 in 1911. These figures show clearly the tendency of the remedy provided by the older Act to fall into disuse since the Act of 1906 came into full operation.

As regards the increase in the number of cases compensated, it must be remembered that the charge for the deaths caused by the Hulton Colliery disaster, which resulted in the loss of 344 lives at the end of 1910, fell during 1911; apart from this the increase in the number of accidents corresponded to increased activity in trade during 1911.

The following table enables a ready comparison to be made between mines and the whole of the seven selected industries:—

	Mines.	Seven selected industries (including mines).
Number of persons employed	1,059,642	7,305,997
Number of fatal cases	1,711	3,988
Payments in respect of same	£281,183	£615,452
Persons wholly dependent	978	2,317
Payments in respect of same	£235,265	£518,318
Persons partially dependent	590	1,291
Payments in respect of same	£44,613	£93,737
No dependants	143	380
Payments (medical, &c., expenses) in respect of same	£1,305	£3,397
Number of disablement cases	178,466	413,294
Payments in respect of same	£905,999	£2,353,290
Continued from previous year	16,507	37,046
Payments in respect of same	£323,942	£851,947
First payment during year	161,959	376,248
Payments in respect of same	£582,057	£1,501,343
Fatal cases of disease	1	33
Payments in respect of same	£24	—
Disablement cases (diseases)	5,026	5,737
Payments in respect of same	£68,017	£82,959
Total compensation (1911)	£1,255,223	£3,056,404
Total compensation (1910)	£1,081,782	£2,700,325
Payments in lump sums:—		
Accidents	3,722	21,923
Payments in respect of same	£138,868	£690,110
Cases of industrial disease	142	340
Payments in respect of same	£7,294	£15,390

Mines.

Returns were received in respect of 2,382 employers, of whom 1,750 were included in the collective returns and 632 made individual returns. The cases in which returns were not received were small mines in which very few, if any, accidents occurred during the year. Compensation was paid in 1,711 fatal accident cases to the amount of £281,183, and in 178,466 accident disablement cases to the amount of £905,999. In 978 fatal cases compensation was paid to persons wholly dependent, the compensation averaging £241, and in 590 to persons partially dependent, the compensation averaging £76. In 1910 the average compensation to persons wholly dependent was £240, and to persons partially dependent £65.

In the disablement cases the compensation paid averaged £5 1s. a case, as compared with £4 18s. in 1910; 16,507 cases were continued from the previous year, and involved an average charge of £19 12s.; the corresponding figures for 1910 were 15,377, and an average charge in the year of £17 5s. Compensation was paid in respect of industrial disease to the amount of £68,041. The total charge, therefore, under the Act on the mining industry was £1,255,223, as compared with £1,081,782 in 1910.

The approximate average number of persons employed to whom the Act applied as given in the returns was 1,059,642. The charge for compensation per head in 1911 works out at £1 3s. 8d., as compared with £1 0s. 2d. in 1910.

The charge for compensation under the Act on coal-producing mines, calculated per ton of mineral raised, is estimated to work out at nearly 1·1d. per ton, as compared with 0·9d. in 1910.

The number of fatal accidents reported under the Mines Act in 1911 was 1,308. The difference between this figure and the number of fatal cases in which compensation was paid is mainly due to the occurrence, in the last days of December 1910, of the Hulton explosion, which resulted in the loss of 344 lives, the compensation in respect of which was not paid till 1911.

Industrial Diseases.

Compensation was paid in 33 fatal cases to the amount of £4,703, and in 5,737 disablement cases to the amount of £82,959. These figures compare as regards fatal cases with 26 in 1910 and 33 in 1909, and as regards disablement cases with 4,438 in 1910 and 3,313 in 1909. Of the disablement cases, 1,407 were continued from the previous year, and involved an average charge of £28 9s. during the year. The corresponding figures for 1910 were 914 continued from the previous year, and an average charge of £28 3s.

As in previous years, the bulk of the disablement cases occurred in the mining industry, and were due mainly to nystagmus, beat hand and beat knee. The figures for nystagmus and beat knee again showed large increases.

The following table shows the statistics relating to those diseases principally associated with mining:—

Disease.	No. of cases (mines)		Certificates of disablement given by certifying and appointed surgeons (mines).
	Continued from previous years.	In which first payment was made during year.	
Ankylostomiasis	—	6	—
Nystagmus	1,144	1,374	1,250
Subcutaneous cellulitis of the hand (beat hand)	37	726	503
Subcutaneous cellulitis of the patella (beat knee)	56	1,402	1,293
Aonta bursitis over the elbow (beat elbow)	6	130	124
Inflammation of the synovial lining of the wrist joint and tendon sheaths	4	137	184

In addition to the cases recorded in the first two columns there were two cases of lead-poisoning and its sequelæ amongst miners, and three of eczematous ulceration of the skin, &c. On the other hand, one case of nystagmus is recorded in the case of a quarryman; the following cases of beat hand, viz., quarries, 1; railways, 1; factories, 6; and one case of inflammation of the synovial lining of the wrist joint and tendon sheaths in the case of a person employed in a factory. Certificates of refusal to certify disablement were made in the following cases:—Ankylostomiasis, *nil;* nystagmus, 29; beat hand, 12; beat knee, 17; beat elbow, 3; and synovitis, 2. No certificates of suspension were made in any cases coming under the foregoing heads, but two supplementary certificates under Regulation 5 were made in cases of nystagmus. There were 554 cases due to lead poisoning, of which 148 were continued from the previous year; 182 of the new cases and 49 of the continued cases were in the engineering and metal groups of industries, and 71 of the new cases and 56 of the continued cases were in the china and earthenware industry.

Duration of Compensation.

The disablement cases are classified in six groups, according to the period for which the compensation lasted. Cases continued from 1910 which were terminated during 1911 are included, but cases which were terminated by payment of a lump sum and not by the recovery of the workman, and in which, therefore the period during which compensation was paid does not represent the period of disablement, are excluded. The Table A, on p. 1088, shows, with regard to the accident cases, the proportion of cases in each group. In the case of mines, the figures for 1910 are also inserted in italics.

It must be borne in mind that cases terminated by payment of a lump sum are not taken into account in the said table. These cases are usually cases in which the disablement is likely to last for a considerable period—as the payments made show—and the proportion of cases of disablement of longer duration would be higher than the figures in the last two columns of the table indicate.

The proportion of cases in the second and third groups—two weeks and less than three, and three weeks and less than four—again show an increase, and the proportion of cases in the fourth, fifth and sixth groups again show a decrease.

According to the returns received, the number of cases not terminated at the end of 1911, which had by that date lasted more than one year, was 9,627, as compared with 7,691 at the end of 1910. Of the 4,215 cases which at the end of 1910 had lasted over one year and less than two, 2,561, or nearly 61 per cent., of the 2,474 cases

TABLE A.

Industry.	Percentage of cases terminated in 1911 in which compensation had lasted					
	Less than two weeks.	Two weeks and less than three.	Three weeks and less than four.	Four weeks and less than 13.	Thirteen weeks and less than 26	Twenty-six weeks and over.
	Per cent.	Per cent	Per cent.	Per cent.	Per cent.	Per cent.
Shipping	6 06	19 90	15·45	45·78	8·65	4 16
Factories	10·44	30 66	21·07	33 74	3·18	0 91
Docks	9 72	23 11	18·14	41 86	4·95	2·22
Mines	6·08	35·11	19 38	34 31	3·55	1·57
Do. 1910	*5 95*	*33·25*	*20 13*	*35 34*	*3·59*	*1 74*
Quarries	7·94	30 24	18 15	38·36	3 96	1·35
Constructional work	15 99	24 12	17 59	37·28	3·66	1·36
Railways	16·01	28 88	17 45	31 78	4·01	1 87
Grand total	8 73	32 06	19·80	34·46	3·57	1·38
Total in 1910	*8·66*	*29 82*	*19·42*	*36·68*	*3 87*	*1·55*

TABLE B.—ARBITRATIONS IN COUNTY COURTS (ENGLAND AND WALES) AND SHERIFF COURTS (SCOTLAND) UNDER THE WORKMEN'S COMPENSATION ACT, 1906.—MINES.

Nature of injury.	Total number of cases.	How dealt with.				Claims for compensation settled.						
							Result.		Amount of compensation awarded.			
									Lump sums.		Weekly payments.	
		Heard by judge or sheriff.	Heard by arbitrator.	Acceptance of money paid into court.	Otherwise disposed of.	No. of claims settled.	For applicant.	For respondent.	No. of cases.	Total amount.	No. of cases.	Total amount.
England and Wales:—												
Death—										£ s. d.		£ s. d.
Leaving dependants	881	861	—	10	10	834	793	41	793	149,207 8 0	—	—
Not leaving dependants	13	13	—	—	—	13	13	—	13	130 0 0	—	—
Total incapacity	730	519	—	69	142	493	414	79	126	2,259 0 0	288	200 0 10
Partial incapacity	209	167	6	1	35	118	95	23	19	1,040 7 0	76	44 13 7
Total	1,833	1,560	6	80	187	1,458	1,315	143	951	153,636 15 0	364	244 14 5
Scotland:—												
Death—												
Leaving dependants	189	189	—	—	—	30	23	7	23	3,361 13 7	—	—
Total incapacity	363	292	—	—	71	151	76	78	5	21 12 4	71	48 1 3
Partial incapacity	160	122	—	—	38	25	17	8	2	9 16 0	15	7 14 6
Total	712	603	—	—	109	209	116	93	30	3,393 1 11	86	55 15 9

TABLE C.—MEMORANDA REGISTERED IN COUNTY COURTS (ENGLAND AND WALES) AND SHERIFF COURTS (SCOTLAND) UNDER THE WORKMEN'S COMPENSATION ACT, 1906.—MINES.

Nature of injury.	Total number of cases.	How settled.			Amount of compensation.			
					Lump sums.		Weekly payments.	
		By agreement.	By committee.	By agreed arbitrator.	Number of cases.	Total amount.	Number of cases.	Total amount.
England and Wales:—								
Death—						£ s. d.		£ s. d.
Leaving dependants	575	435	140	—	575	106,519 8 11	—	—
Not leaving dependants	3	3	—	—	3	28 10 0	—	—
Incapacity	2,825	2,797	28	—	161	12,486 14 10	1,650	1,177 2 11
Total	3,403	3,235	168	—	739	119,034 13 9	1,650	1,177 2 11
Scotland:—								
Death—								
Leaving dependants	145	144	—	1	145	27,410 19 10	—	—
Incapacity	2,859	2,844	—	15	1,033	21,451 7 4	306	224 16 6
Total	3,004	2,988	—	16	1,178	48,862 7 2	306	224 16 6

which at the end of 1910 had lasted over two years and less than three, 1,797 or nearly 73 per cent., and of the 1,002 cases which at the end of 1910 had lasted three years and less than four, 825 or 82 per cent., were still undetermined at the end of 1911. The number of permanent disablement cases, unless commuted, and consequently the annual charge in respect of them, will continue to increase probably for some years.

Lump Sum Payments.

Out of 414,117 accident cases 21,923 were settled by payment of a lump sum, either at once or after a period during which a weekly payment was made. In the 9,800 cases which were settled at once without any previous weekly payments, the average sum paid was £6 14s. In the 7,315 cases which were settled after weekly payments had been made for a period less than 26 weeks, the average sum paid was £21 5s.; in the 4,808 cases settled after weekly payments had continued for more than 26 weeks, the average payment was £97. The total compensation paid amounted to £705,500, or 29 per cent. of the whole amount of compensation paid during the year in respect of disablement cases.

Administration of the Act.

The number of cases under the Workmen's Compensation Act, 1906, actually dealt with by county court judges and county court arbitrators amounted to 5,730. Of these, 5,313 were decided by judges and 136 by special arbitrators, and 281 were settled by acceptance of money paid into court. In 1910 the corresponding figures were 4,848, 4,550, 88 and 210 respectively. In addition to the cases actually dealt with by county court judges and county court arbitrators, there were 2,287 cases which were either withdrawn, settled out of court, or otherwise disposed of in such a way as not to enable the officials of the court to state definitely the results, making the total altogether of cases taken into court, under the Act of 1906, 8,017. Besides the cases under the Act of 1906, a small number of cases outstanding under the earlier Acts were also dealt with, as follow: 73 cases decided by judges, and 30 otherwise disposed of—a total of 103 taken into court.

Of the claims for compensation, the decision in 3,673 cases was in favour of the applicant, and in 814 in favour of the employer. The proportion of cases in which the applicant was successful was 82 per cent., as compared with 82 per cent. in 1910, 79 per cent. in 1909, and 82 per cent. in 1908. In 1,393 cases under the Act of 1906, the compensation was awarded on account of death; and in all except 15 of them the deceased had left dependants. Excluding these 15, the total amount of compensation awarded was £234,276, an average of £170 per case. Out of the 1,378 cases in which compensation was awarded to dependants, there were 545 in which sums less than £150 were awarded—*i.e.*, cases of partial dependency only; the total amount being £39,689 5s., or an average of £72 16s. 6d. a case.

With regard to the grants of compensation for injury under the Act of 1906, there were 793 cases in which the compensation is returned as consisting of a lump sum, and 1,487 in which a weekly sum was assigned. In 190 of the cases in which a lump sum was paid, the plaintiff accepted money paid into court. In the majority of the remainder a lump sum appears to have been awarded by consent of the parties. The average amount of the compensation was £27 4s. 1d. In the cases under the Act of 1906 in which a weekly payment was awarded, the average compensation was, (*a*) for cases of total incapacity, 11s. 11d.; (*b*) for cases of partial incapacity, 9s. 11d. Table B shows the figures so far as they relate to mines.

In 157 of the cases under the Act of 1906, the compensation was claimed for incapacity due to industrial disease.

Of the total number of cases taken into court during 1911—viz., 8,017—1,833 were in connection with mines; in 1910 the corresponding figures were 1,504 out of 6,666; and in 1909, 1,255 out of 6,188.

The number of cases in which memoranda were registered in county courts during the year under the Act of 1906 was 22,940, and, in addition, there were 161 memoranda registered under the earlier Acts. The number registered in 1910 was 20,754 under the Act of 1906, and 347 under the earlier Acts. The number is still only a small proportion of the cases in which compensation is settled by agreement. The totals settled under the Act of 1906, under each head, were: By agreement, 22,767; by committee, 171; by arbitrator, 2; the corresponding figures for 1910 being 20,680, 69, and 5. The average compensation to dependants in cases of death under the Act of 1906 was £175, and the average weekly payment in cases of incapacity was 13s. These figures may be compared with the figures of awards in county courts above. The number of cases of incapacity under the Act of 1906, in which the memorandum registered was for a lump sum, and not a weekly payment, was 4,334, as against 6,519 cases in which a weekly payment was agreed upon. In addition to the 4,334 cases in which the original agreement was for a lump sum, there were 8,222 cases in which memoranda for redemption of weekly payments by a lump sum were registered. In 577 cases the Registrar refused to record the memorandum, and referred it to the judge in pursuance of Schedule II. (9) (*d*) of the Act. In 83 of the cases the memoranda was thereupon withdrawn; in 270 the memoranda was ordered by the judge to be recorded, and 198 other orders were made by him. In four cases the judge, after the memorandum had been recorded, ordered the record to be removed on the ground that the agreement had been obtained by improper means.

The figures in regard to mines are given in Table C.

Under Schedule II. (16) of the Act of 1906 the Secretary of State has power to confer on any committee, representative of an employer and his workmen as respects any matter in which the committee act as arbitrators or which is settled by agreement submitted to and approved by the committee, all or any of the powers conferred by the Act exclusively on county courts or county court judges. Five Orders have been made under this provision in respect of the five committees of the Durham Colliery Owners' Mutual Protection Association on the one side, and on the other of the Durham Miners' Association, the Durham Colliery Mechanics' Association, the Durham County Colliery Enginemen and Boilerminders' Association, the Durham Cokemen's Association, and the Durham Deputies' Mutual Aid Associotion respectively. During 1911 these committees sat, in all, on 20 occasions and dealt with 398 cases, of which 120 were fatal and 278 disablemsnt cases.

In 1911 there were only 170 cases under the Employers' Liability Act.

The number of cases under the Workmen's Compensation Acts carried to the Court of Appeal in England was 141 (as compared with 136 in 1910), or just over 2·6 per cent. of the cases decided in the county courts; 57 were appeals by workmen, and 84 by employers. Of the appeals by workmen 13 and of the appeals by employers 31 were successful; 33 were abandoned, withdrawn or settled out of court before hearing. Four of the appeals were under the Act of 1897. The list of appeal cases which has been given in previous returns has been continued for the year 1911, and, as in previous years, a brief note showing the point in the Act on which the appeal arose has been inserted in all cases in which it could be ascertained. Out of 101 cases in which the point on which the appeal arose is known, 44 turned on the meaning of the words "accident arising out of and in the course of the employment," in section 1 (1) of the Act. There were 12 appeals from the Court of Appeal to the House of Lords (as compared with three in 1907, three in 1908, two in 1900, and nine in 1910), the workman being the appellant in seven cases. There were no appeals in actions under the Employers' Liability Act.

The foregoing figures, except where expressly stated, refer to England and Wales. The number of cases taken in Scotland under the Workmen's Compensation Act of 1906 was 1,825, the cases taken under the Acts of 1897-1900 being 5; 9,510 memoranda were registered under the former Act and 6 under the older Acts; 50 cases were taken under the Employers' Liability Act; there were 44 appeals under the Workmen's Compensation Acts and 4 under the Employers' Liability Act. The average amount of compensation paid during 1911 in Scotland in cases of death where dependants were left was, (*a*) as regards cases decided in the Sheriffs' courts under the Workmen's Compensation Acts, £135 16s. 1d.; (*b*) as regards cases in which memoranda were registered, £175 5s. 5d. In cases of incapacity the corresponding figures were, (i.) where compensation was a lump sum, £12 16s. 3d. and £14 9s. 11d. respectively; (ii.) where it was a weekly payment, 12s. 4d. and 12s. 10d. respectively.

The number of medical referees appointed for the purpose of the Workmen's Compensation Act was, on December 31, 1911—in England 215, in Scotland 86, in Ireland 46. The total number of references under Schedule II. (15) was 387, viz., by judge, 211; by appointed arbitrator, *nil*; by agreed arbitrator, 7; by committees, 169.

The total number of references under Schedule I. (15) was 521; under Schedule 1. (18), 9; and as assessor under Schedule II. (5), 976. There were 312 appeals under section 8 against decision of certifying surgeon, 44 being by the workman and 267 by the employer. The decision was confirmed in 225 cases.

Certified Schemes.

The statistics furnished by the Chief Registrar of Friendly Societies show that on December 31, 1911, 102 certified schemes were in operation in England and Wales, of which 13 were in connection with mines. Of the 70,170 workmen in the employment, 65,001 were under the schemes, the corresponding figures in the case of mines being 16,992 and 16,490. In addition to these, there were two schemes in force in Scotland affecting factories employing 3,848 men, all of whom came under the schemes.

A Curious Weights and Measures Case.—A deferred decision of great importance to the retail coal trade has just been given by his Honour Judge Greenhow at Leeds. The proceedings originally arose out of a case in which a local coal dealer was summoned at the police court as having, in supplying a load of coal to a customer, failed to deliver a weigh ticket properly filled in. The order of the purchaser had been for 30 cwt., and a ticket made out to that quantity had accompanied the load. The coal, however, after delivery, had been weighed by Corporation weights and measures inspectors, and was found to be 2¼ cwt. short. The intention of the authorities at first was to prosecute the dealer for having supplied short weight, but an awkward legal point arose out of the fact that the coal, when examined by the inspectors, had passed out of the hands of the merchant and was in the cellar of the buyer. The dealer, therefore, was summoned under section 22 of the Weights and Measures Act, 1889, for having failed to deliver a properly filled-in ticket, and on that charge was fined by the stipendiary magistrate (Mr. C. M. Atkinson) 20s. and costs, with the alternative of 14 days' imprisonment. The sequel was a demand by the coal merchant upon the customer for payment of the full account for 30 cwt., and upon the purchaser refusing to comply, the dealer issued a county court summons against him for the amount. The claim was heard by Judge Greenhow. The weights and measures authorities, although not appearing in the county court case, watched the proceedings. It was, indeed, the chief inspector of that department, Mr. A. H. Rutherford, who unearthed the ancient cases of Little *v.* Poole (1829) and Cundell and Another *v.* Dawson (1847), which proved to be the most recent cases known to have occurred under this section of the Act, and upon which the defence was based. In the Little *v.* Poole case it was "held that a seller of coals could not recover the value of them where he omitted to deliver a ticket pursuant to the statute," and in the case of Cundell and Another *v.* Dawson it was held that, the statute being passed for the protection of purchasers of coal, as the plaintiff had not conformed with the provisions of the statute, he could not, therefore, recover the debt. The decision of Judge Greenhow was in accordance with the cases quoted, that, "being a seller of a quantity of coal exceeding 2 cwt. conveyed for delivery on sale in vehicle in bulk, he unlawfully did not insert or cause to be inserted on the ticket required by the Weights and Measures Act, 1889, to be given by him a statement of the correct weight of the coal contained in the vehicle contrary to the form of the statute." A verdict for the defendant, therefore, was given. This decision, which means, of course, that the dealer lost all and the customer got his load of coal for nothing, is believed by the Leeds weights and measures authorities to be something in the nature of a revelation to the coal trade and to coal consumers.

THE BROWN COALS OF OTAGO.

By A. Gordon Macdonald, B.E., A.O.S.M.

(*Continued from page* 1038.)

Tokomairiro and Clutha Coalfields.

The Tokomairiro and Clutha coalfields together constitute by far the largest and most important of the three coastal coal areas. Not only is this the largest area of coal-bearing measures, but the coal of the Clutha field is of better quality and in greater quantity than that of the other fields.

The basement rocks appear on the north-east in the Akatore Hills, some 500 to 1,400 feet in height.

The coals of this area occur in two distinct horizons: The upper, consisting of quartz conglomerates, grits and sands, contains the brown coals of Taratu and Waronui. The lower, consisting of heavy greywacke conglomerates with occasional sandstones, contains the bright clean black coal of Kaitangata proper. The anticlinal folding just mentioned has brought these lower beds to the surface at Kaitangata, and made accessible the thick seams of coal contained therein.

The axis of the anticline follows, approximately, the ridge of the hills running north-north-east from the mouth of the Clutha. It dips towards the north-north-east, that is the maximum movement was towards the south-south-west. Towards the north-east and north the anticline flattens out, forming a long shallow syncline as far as Camp Creek, where the beds rise up again, exposing another outcrop of lower conglomerates in Twostone Creek. After passing Twostone Creek, northwards, the upper beds again appear dipping in a north-westerly direction. Following up Twostone Creek a continuous section of the different strata is obtained from the lower conglomerates of the lower horizon to the upper quartzose grits immediately underlying the Measly Beach fossiliferous zone.

The beds exposed along this part of the coast are the higher members of the upper coal horizon. They are highly fossiliferous in places—the Measly Beach fossil locality of Hector.* Continuing towards the north, the lower beds begin to appear again, until in the Tokomairiro Valley the greywacke conglomerates of the lower horizon appear once more close to the schist. They are, however, very much thinner at this end of the area. The beds have a general dip of about 8 degs. to 10 degs. towards the south-south-west.

Thus it is seen that the coal measures lie in a shallow basin, only one-quarter of the edge of which is exposed—that is, the north-eastern portion. The floor of this basin must have been undulating, with occasional small peaks, one of which is represented by the small outcrop of schist in the Rocky Valley Creek.

Against the steep edge of the basin the measures lie with a high degree of overlap. They dip away at low angles quite regularly from this edge and maintain this regularity till reaching Kaitangata, where, as already pointed out, they have been subjected to considerable folding and faulting. At this end of the area, the beds, especially of the lower horizon, thicken very considerably. The coalseams also improve, and it is towards the south that the most valuable extension of this coalfield may be looked for.

From all appearances there is no reason for doubting that the coal measures do not continue under Inch-Clutha. The extent of the movement on the western side of the anticline cannot, however, be accurately calculated, but from available data it is estimated that the main Kaitangata seam should be found at a depth of about 1,200 ft. below sea level anywhere on the flat 2 miles north-west of the mouth of the Clutha. More to the westward the depth should be less.

The *Waipara series* is sub-divided as below:—

A. *Lower Horizon Measures.*

Heavy greywacke conglomerates with intermittent beds of hard calcareous sandstone containing leaf impressions; shales and fireclays with seams of superior brown coal.

B. *Upper Horizon Measures.*

(*a*) Quartzose conglomerates and loose grits with seams of inferior brown coal.

(*b*) Quartzose grit, sands and sandstones (calcareous) with tabular fossiliferous beds.

The thickness of the lower measure conglomerates at Kaitangata, calculated from the various outcrop exposures and mine workings, is estimated to be between 500 and 600 feet; this is down to the main seam in the Kaitangata mine. Below this it is impossible to give any estimate, for the main seam does not outcrop at the surface. It is quite probable, however, that the projected boring operations of the Kaitangata Company will reveal another seam, but the depth will be considerable.

At the northern end of the area, where the conglomerates appear again in the Tokomairiro Valley, there does not appear to be nearly such a thickness of these beds, though there is no actual sectional exposure in which they may be properly measured. With this diminution of thickness disappears the likelihood of the presence of a thick seam of coal. Nevertheless a workable seam may be found by boring in these lower beds. A suitable boring site would be about half a-mile north-west of the present Waronui Mine, keeping low down in the gully to avoid as much of the overburden as possible.

The tendency of these conglomerates to thicken towards the south-western portion of the field, together with the nature of the material composing them, points to the possibility of the source of this material being towards the south and east—that is, to the presence of an extensive cretaceous land area to the east of New Zealand.

The importance of this consideration lies in the possible extension under the sea of the lower horizon and its coalseams. If the material came from the south-east and east the probability is that there is a very extensive coalfield in that direction—lying, however, at a considerable, though not unworkable depth. This would not be altogether a disadvantage, for it would provide an ample cover for submarine workings.

If, however, the main source of the detritus was more towards the south, the economic value of the field, as already pointed out, is impaired by the folding and faulting along the present outcrop boundary near the Clutha. The beds under Inch-Clutha probably come nearer the surface towards the west, but as in that direction they rapidly approach the rim of the basin, considerable thinning-out may be looked for, with simultaneous thinning of the coalseams.

There are at least four thick workable seams in the upper horizon. At this locality there is a seam of 18 to 20 feet outcropping in the gully, while in the shaft seams 20 ft., 14 ft. and 12 ft. thick are cut in a total depth of 205 ft. The 14 ft. seam is the one at present being worked.

The surface seam at Taratu outcrops in several places in the different creeks near Taratu, and also in Washpool Creek. Probably Joseph Smith's seam near Trig. R is also the same seam. Finally it is seen at Coal Point.

This appears to be the uppermost seam of any importance in the sequence. It is followed by grits and sandstones sometimes consolidated into loose sandstones which are devoid of coal.

North of Taratu the coal outcrops at several places in Fraser's Creek west and south-west of Mount Misery. It is then lost under the great pile of morainic *débris* to the east, and is not again seen till the basin of the Tokomairiro is reached.

Here, between 3 and 4 miles from the mouth, a number of outcrops of a seam about 10 ft. thick are exposed. This is the locality of the old Real Mackay and Fortification workings and the present Waronui pit.

In the old Real Mackay basin the coal is associated with beds of shale and fireclay and loose gritty sands. These beds follow almost immediately upon the greywacke conglomerates of the Lower Horizon.

At the northern end of the basin there is either a high degree of overlap or a fault cutting the measures off, though there is no dynamic evidence of faulting.

The present workings are situated south of the river, near Trig. B., where the Bruce Railway and Coal Company have opened a new pit (the Waronui Colliery) in a 14 ft. seam which is apparently an extension across the river from the worked area on the north side of the river. The associated beds at this point are very similar to those already mentioned.

Amount of Available Coal.—After a careful examination of the field, and after due allowance being made for loss and disturbance, the total available coal in the more accessible portions of the field may be summarised thus:—

	Tons.
Upper horizon coals—	
Tokomairiro (Waronui extension)	6,000,000
Kaitangata and Taratu	100,000,000
Total	106,000,000
Lower horizon coals—	
Kaitangata	100,000,000
Area south-east of Kaitangata	100,000,000
Castle Hill and Taratu	60,000,000
Total	260,000,000

This gives a grand total of 366,000,000 tons available within those areas already, to a certain extent, opened up and in their immediate surroundings.

Hutton's* estimate was 768,000,000 tons for the whole area of coal measures—namely, 60 square miles, taking an average of 20 ft. over the whole area. Hector[*] gave a later estimate of 140,000,000 tons for the Kaitangata field.

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* Hector: "Index to Fossiliferous Localities in New Zealand," Appendix, Repts. Geol. Expls. 1890-91, p. 129, No. 280, p. 145, No. 760.

* "Geology of Otago," p. 106.

The quantities contained in other areas less accessible, or in which the coal would be more difficult to win, may be tabulated as follow:—

	Tons.
Upper horizon coals—	
Area to seaward of Waronni extension	10,000,000
Area south of Mount Misery	40,000,000
Total	50,000,000
Lower horizon coals—	
Area south of Mount Misery	20,000,000

This gives an additional 70,000,000 tons, or 436,000,000 tons in all.

Details of these Estimates: Upper Measures:—

Tokomairiro Field.—The coal of the Real Mackay basin appears to have been almost worked out, no active operations being carried on in that locality. There could never be any great extent of coal in that part, however, for the schist is too near, cutting off the seams towards the north.

There is much more likelihood of a larger coal area extending from the site of the present workings of the Waronui mine. The seams here will be found to dip steadily towards the coast though not at high angles, unless disturbed by dislocations not noticeable at the surface.

The presence of a rise in the schist floor, indicated by the Rocky Valley schist outcrop, will have caused the coal to thin out towards the south-west, but the seams should be practically continuous towards the coast—that is, in about a south-easterly direction.

Taking the average thickness of coal, over an area of 1,000 acres, to be 10 ft. (the thickness of the seam at Waronui is 14 ft., but only 7 ft. is worked at present), the total amount of coal within reasonable distance of the present workings should amount to about 10,000,000 tons. From this has to be deducted approximately one-third for disturbed areas and loss, leaving more than 6,000,000 tons of available coal.

With more powerful plant operations could be extended over an additional 1,500 acres seawards, increasing the quantity of available coal by another 10,000,000 tons. This, however, would necessitate shaft workings near the coast. Boring operations in that direction would be of great value in proving the quality, thickness and depth of the coal. At a point in the Rocky Valley creek about 2 miles south-east of Trig. B the coal should be found at a depth of between 550 and 650 feet below the surface.

Kaitangata and Taratu Fields.—The section along the coast line from the Clutha to Coal Point is rather unsatisfactory for determining the number of seams that are contained in the upper measures at this end of the field. Most geologists who have examined the section agree that there are at least three, perhaps four, seams represented there. These give an aggregate thickness of from 30 to 35 feet.

In the Castle Hill mine four seams were cut by the incline, at a distance of about 2,000 ft. from the entrance, giving a total thickness of 39 ft. The incline was extended and passed through a fault which revealed a seam 25 ft. thick. This, however, possibly belongs to the lower horizon.

The section exposed in the Taratu shaft also reveals several seams. At this point there is an outcrop seam 18 to 20 ft. thick (probably the Coal Point seam). In the shaft, after passing through clays, sandstone and grits with stony coal, a coalseam 20 ft. 6 in. was struck at a depth of 143 ft. From there the succession is as follows:—

	Ft.	in.
Coal	20	6
Carbonaceous shale.........	8	6
Coal	14	0
Clay	8	9
Coal	12	9
Clay	unknown.	

This gives a total thickness of 47 ft. 3 in. of coal in the shaft exclusive of the surface seam.

From the workings in the Taratu Mine, however, the country at that point appears to be considerably disturbed by faults and "rolls" which have not only rendered the coal "soft" but have produced a wet, running conglomerate. This has given a great deal of trouble in the mine, causing the loss of a considerable amount of coal. This conglomerate sets like concrete after being left on the surface for a time. It occurs some distance below the bottom seam, and as it consists mainly of greywacke pebbles, evidently belongs to the measures of the lower horizon.

Not only are the measures disturbed at this point but the beds are not uniform, the thickness varying considerably, as is shown by a borehole put down a short distance west of the Taratu shaft. This bore is on the other side of the fault, that disturbs a considerable portion of the coal in the mine. The sequence in the bore as far as the coal is concerned is as follows:—

		Ft.
At 75 ft. below the surface:	Coal	11
After passing through sandstones and grits to a depth of 132 ft.:	Shale	4
	Coal	6
	Coal (soft) ...	7

Soft conglomerate was struck at 170 ft. below the surface.

It will be seen, then, that in estimating the quantity of coal contained in this area, an average thickness of 30 ft. is not excessive.

On this basis, the amount of coal in that strip of country extending from Coal Point through Smith's pit and Trig. M to Twostone Creek, about 5,000 acres in all, is computed to be 150,000,000 tons. Deducting one-third from this for loss by denudation and disturbances, there remains 100,000,000 tons of available coal.

There is a large area between Twostone Creek and Mount Misery that has several coal outcrops at different points showing that it is coal bearing. Taken on a basis of an average thickness of 20 ft. of coal, this area, approximately 3500 acres, would contain 100,000,000 tons, or 70,000,000 tons available after allowing for loss.

Careful prospecting would be necessary on this area to prove the extent of the outcrops and their stratigraphical position. An intimate knowledge of the dip of the beds would also be required to facilitate the selection of a satisfactory site at which to commence operations.

Castle Hill Colliery, Kaitangata.

There should be a considerable extent of coal-bearing country, approximately 3,000 acres, south of Mount Misery, in the drainage area of the Wangaloa Creek. The coal in this area would belong to the measures of the upper horizon, for the summit of Mount Misery is composed of quartzose conglomerate, which is the lowest member of this horizon. The conglomerate dips south, so coal outcrops may be looked for anywhere in the gullies about a mile south of Mount Misery. An average thickness of 20 ft. of coal should be obtainable here, which would give available coal to the extent of 40,000,000 tons. A difficulty in connection with this area would be the selection of a suitable route by which the coal could be brought to the coal market.

The coal measures of the upper horizon extend across Lake Tuakitoto to Benhar, where three seams are worked giving an aggregate thickness of 30 ft.

As already mentioned, the coal measures also crop out in the Tokomairiro Plain, near Lovell's Flat, and a considerable quantity of coal has been raised from this locality.

Lower Measures.

Kaitangata.—In the workings at the Kaitangata Mine a number of seams have been exposed, about 10 in all, more than half of which are not, however, of much value, either because of their small size or poor quality. The works have been carried on in three seams, 6 ft. and 18 ft., with a parting of 12 ft., and, about 100 ft. below this, the main seam 20 to 30 feet thick.

These seams have been followed towards the south-east—that is, under Trig. Q. Up to this point, the seams have been rising, but at about Trig. Q the summit of the anticline is reached and the beds begin to dip away towards the coast. Though they were worked to the rise, the coalseams did not outcrop on account of a number of faults intersecting them, with a downthrow of about 150 ft. to the east.

Developments in this direction have shown that the seam thickens towards the south-east, and at the present time the workings are in a seam 40 ft. thick.

Taking the area of the coal lands at 3,000 acres, with an average thickness of 50 ft. of coal, the total quantity would be 150,000,000 tons, or, in deducting the customary third, 100,000,000 tons of available coal.

Fifty feet is not a high average thickness on which to base the calculations, for that amount was given by the three seams at their thinnest part, while in the present works one seam alone is 40 ft. thick. If the other seams thicken in proportion, it is probable that towards the coast an aggregate thickness of between 70 and 90 ft. will be found.

This amount of 100,000,000 tons represents the quantity of coal available in the whole area. From this has to be deducted the amount of coal already won—namely about 2,000,000 tons. This output, though not large when compared with the total amount available, probably represents the destruction of a much larger area than it should, owing to wasteful methods of mining.

It may be well to note here that though these reserves of coal appear large, they are being rapidly consumed, and the rate of consumption is increasing. Prof. Park[*] considers that at the present rate of increase the choicest and most available half of all the New Zealand coals will have been consumed within the next 60 years. Though the life of the Kaitangata coals may not be so brief as that, it is doubtless true that all the most valuable and accessible coal will have been extracted before that date. Hence careful mining is an urgent necessity, so that the highest percentage of extraction possible consistent with economical working may be maintained.

In working such thick seams as those at Kaitangata the natural tendency must always be towards wastefulness, especially where the miners are paid a contract price per ton. This tendency must always be carefully watched and checked, so that not 40 per cent., but at least 60 per cent. of the coal be brought to the surface.

The area of 3,000 acres on which the quantity of coal was calculated only includes that portion of the field in which the conglomerates of the lower horizon outcrop at the surface, near the mouth of the Clutha. There is no reason why the coal should not continue seaward at a workable depth between the mouth of the Clutha and Coal Point. This would add another 3,000 acres of coal-bearing measures yielding an additional 100,000,000 tons of coal, assuming the average thickness to be 50 ft.

The coal may also be expected to extend north of Castle Hill, though probably thinning out somewhat in that direction. Boring operations in the outcrop of lower measures conglomerates in Twostone Creek would give very valuable information on this point. If workable seams are found at that locality—and there seems to be no reason for doubting their presence—it may be safely assumed that they extend continuously from Kaitangata, giving an area of 4,000 acres. An average thickness of 20 ft. of coal over that area would give, allowing for loss, 60,000,000 tons of coal.

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[*] J. Park, "The Geology of New Zealand," p. 289.

[*] J. Park, "Geology of New Zealand," p. 292.

The area south of Mount Misery, mentioned when discussing the coals of the upper horizon, may possibly contain seams in the measures of the lower horizon, but on account of the thinning out of the beds in that direction it would not be safe to assume an average thickness of more than 10 ft. over an area of 3,000 acres. This would yield about 20,000,000 tons after allowing for loss.

(To be continued.)

SOUTH WALES INSTITUTE OF ENGINEERS.

The ordinary general meeting of the South Wales Institute of Engineers was held at Cardiff on Thursday, November 21, Prof. W. Galloway, the president, in the chair.

The following were elected office-bearers for the session 1913 to fill the vacancies occasioned by the retiring office-bearers:—Vice-presidents: Principal E. H. Griffiths, M.A., F.R.S., Cardiff; Mr. John Roberts, Swansea; and Mr. John Fox Tallis, Llantarnam Grange, Monmouthshire. Members of council: Mr. Edward Dawson, Cardiff; Mr. Wm. Johnson, Bridgend; Mr. W. A. Chamen, Cardiff; Mr. Thomas Sugden, London and Cardiff; Mr. B. Nicholas, Pontypool; Dr. W. N. Atkinson, H.M. inspector of mines, Cardiff; and Mr. Hubert Spence Thomas, Cardiff.

The following candidates for admission to the institute were declared duly elected:—As members: Charles E. Cleeves, Sketty, Glamorgan; Edgar Charles Evans, Ferndale; R. N. Lundie, Cardiff; Herbert Ll. Morgan, Onitsha, Southern Nigeria; W. P. Wrightson, Penarth. As student members: D. T. Morgan, Upper Cwmtwrch, Swansea Valley; D. G. Richards, Porth, Glamorgan.

Analyses of Mine Air.

The papers by Mr. J. W. Hutchinson, M.I.M.E., and Mr. Edgar C. Evans, B.Sc., A.I.C., on the "Analyses of Mine Air conducted at the Lewis-Merthyr Consolidated Collieries Limited, Trehafod," were again considered.

Mr. Edgar Evans, one of the joint authors, said that in their second paper Mr. Hutchinson and he mentioned that under certain conditions a variation in the methane content of a mine preceded a barometric variation. It was thought that a little further work on this point would be of interest. For the purpose of their experiments they chose a time for taking samples that had been preceded by a period of six weeks of continued high barometric pressure. The same place was chosen for sampling as was described in their supplementary papers, and samples were taken hourly from 3 p.m. on October 11 to 2 p.m. on October 15. Two facts were clearly evident from the results obtained. Firstly, taking the chart as a whole, barometric changes, however small, were in general accompanied by corresponding changes in the methane content. Secondly, the variations in the methane percentage preceded barometric changes. This second fact was noticeable in several places, but was especially marked in the period from 12 a.m. on Sunday, October 13, to 12 a.m. on Monday, October 14. From 12 noon on the Sunday until midnight the barometer remained steady at 30·84 in., yet during that period the methane percentage rose steadily from 0·26 per cent. to 0·77 per cent. preceding a barometric depression of 0·06 in. during the next seven hours. During that period the methane percentage further rose to 1·3, and then commenced to fall rapidly, the fall again preceding by several hours a rapid barometric rise. It was clearly evident that the methane in old workings was more sensitive to meteorological changes than the barometer. One other important point was brought out by a comparison of these figures with those obtained in the authors' previous experiments. This was the very great changes that are brought about in the methane percentage by only slight barometric depressions after an extended period of high pressures. Thus, in the example already given, a change of 0·06 in. of mercury in seven hours caused an increase in the methane percentage to 1·30 per cent. In absolute quantities (from a consideration of the volume of air passing) this meant that a rate of fall of only 0·01 in. of mercury per hour caused an ultimate evolution of 325 cubic feet of methane per minute from the old workings. The importance of these facts could scarcely be over-estimated, and helped to account for the many mining disasters that had occurred after extended periods of high barometric pressure. The conclusions arrived at from a consideration of the authors' results had been affirmed by some observers, but denied by others. Discrepancies were probably due to the different conditions under which the experiments were made. In the present case the conditions were peculiarly favourable; they were tapping a very large area of old workings, and the results were not affected by any other factors, such as those due to working the coal, &c.

Mr. T. E. Richards said it would be interesting to know how many of their old firemen were possessed of ideas similar to those promulgated by the authors of the papers without being able to give scientific reasons therefor. The speaker remembered some 25 years ago seeing in a gob wall across a main level in a Rhondda colliery, which had been stowed from the face back for some 150 yards, a hole 15 in. square and about 3 ft. deep, where the fireman kept his walking stick, and where during the day he deposited his lunch. It was his custom before the morning examination to test the conditions of his district by pushing his Davy lamp into this hole each morning, and he invariably found that if the hole was perfectly clear of gas to the furthest extremity he would have no difficulty with gas feeders that morning. If he found a gas cap at the back he would expect to find the heaviest feeders in his district manifesting themselves to a greater degree; whereas if he discovered that the gas could be found within 12 to 15 inches of the mouth of the hole he could calculate upon having considerable trouble with the arrangement of his brattice sheets that day. For many years after an endeavour was made to correlate the movements of blowers with those of the barometer, and the observations made by a large number of officials went to prove that with a fairly steady gas feeder the pressure movements of the atmosphere would be detected before the barometer had commenced to move. As to the effect of the fan upon the issue of gas, experiments carried out by the speaker under the superintendence of the late Mr. William Thomas, Aberdare, conclusively proved that by watching closely the action of a number of constant feeders, almost invariably the level of the igniting line was lowered as the fan speed was reduced; but there were one or two blowers which acted otherwise. At the time this was not explainable; but no doubt further experiments would have shown, as was now shown in the authors' second paper, that it was the result of opposing factors. Further experiments were made at the same time as to the result of placing regulators of different dimensions between the downcast and the return airways, and they invariably went to corroborate the remarks of Mr. W. D. Wight on this point at the last meeting of the institute. One of the most important matters emphasised by the paper was that the greatest percentage of methane in the air was found at the end of the coal shift. This, of course, had a clear bearing upon the question of shot-firing. It had been the practice at some collieries to take advantage of the afternoon shift, when the fewest number of men were below, to perform any shot-firing that might be needed. After what was now established in connection with the presence of methane a new arrangement must be made, and a considerable time must elapse after the coal shift terminated before blasting was permitted. The colliery manager was now between Scylla and Charybdis; he must either, if compelled, take the risk of shot-firing during the night shift with its large body of men underground, or take the latest hour of the afternoon shift, with its risk of a dangerous cap; or, if both were too far in the danger zone, he must postpone his shot-firing until Sunday, and thus keep his rippings in order with one day per week, with its heavier cost and disturbance of Monday's output.

Mr. J. W. Hutchinson said at the last meeting held at Cardiff he stated that Mr. Evans and he intended to submit a supplementary paper showing the effect which the variations in the speed of the fan had on the amount of methane on the return airways. The slowing and stopping of the fan certainly increased the barometric pressure through the mine, and the effect that this had on the quantity of methane exuding from cavities and fissures was clearly shown in the charts and tables attached to the paper. The quantity of the methane was checked, for a time, at any rate, by the increased pressure, and when the fan was again started the methane at once exuded in larger quantities. He agreed with Mr. Hugh Bramwell that the natural changes in atmospheric pressure had no appreciable effect upon the issue of gas from the coal itself, but he thought the experiments clearly proved that slight changes in the barometric pressure did affect the amount of methane issuing from cavities and old workings. With regard to the question of methane issuing from the strata before any change could be observed on the barometer, mining engineers generally had for many years accepted this as an established fact. At a colliery in Durham with which he was well acquainted many years ago, a blower of gas was piped to the pit bottom and allowed to burn. The burner end of the pipe was fitted into a long glass case, and sometimes, before any change could be observed in the barometer, a change could be observed on the flame, a fall in the barometer being indicated by an increase in the length of the flame and a rise by a decrease—sometimes two hours before any change took place on the barometer. He agreed with the president that the quality of oil employed in the lamp had a great deal to do with the size of the gas cap, and that with pure colza oil it was not possible to detect such low percentages of gas as it was with mineral colza oil, such as was used in the lamps with which the firemen in this case made their tests. He was inclined to agree with Dr. Atkinson that what was called the personal equation was not sufficiently appreciated. He had certainly proved by experiments that practical firemen of many years' experience would differ as to the height of a gas cap, although their eyesight in each case was proved by doctors to be equally good. Mr. Wales referred at the previous meeting to the analysis of intake air. Several analyses had been made of the intake air within 100 yards of the face, and no methane could be detected.

Mr. D. E. Thomas referred to the lack of constancy of the differences between the atmospheric pressures as recorded on the surface and those taken underground, as shown in tables furnished by the authors.

Mr. Hutchinson said their chief aim was to see the changes of the barometer underground, because the measurements were underground, and it was quite possible that the man standing at the surface, not having the self-registering barometer, might not have been as accurate as the man at the bottom. They were, however, able to guarantee that the readings at the bottom of the pit were perfectly accurate.

Mr. Noah T. Williams, of the University, Manchester, wrote that he fully endorsed the authors' remarks as to the variable results obtained by the Winstanley apparatus. He had experience of the apparatus extending over a period of six months, morning and evening, in training 1,300 firemen in South Wales. As pointed out by the president, inconsistent results could be produced from insufficient mixing of the gas and air in the tank. He observed, after taking this necessary precaution, that an identical cap could not always be produced even at the same place during the morning and evening, though a similar adjustment of water running into the tank had been made, and the lamps trimmed and warmed to the same extent. Often in the morning the cap would appear bigger than in the evening for the same amount of gas in the tank, and he attributed this divergence of results to the slightly different composition of the gas supplied to the tank. The gas was probably impoverished by introducing air into it at the gasworks, when there would be a big demand for it in the evening. Again, gas supplied from different gasworks gave varying results. In order to obtain uniformity in the caps he found it necessary to adjust the amount of water flowing into the tank according to the locality. In a place where the gas was poor the water would be run into the tank at a higher rate than at a centre where the gas was richer. However, in dealing with 2 per cent. of gas in the tank no appreciable difference could be obtained by this means, and to get a recognised 2 per cent. cap where the gas was poor a little more than 2 per cent. would have to be put into the tank to get the desired result. With 3 per cent. or 3½ per cent. a notable increase in the size and intensity of the cap could be produced by increasing the velocity of the mixture going into the lamp. From the phenomena observed under the artificial conditions, he wished to raise a point—whether the cap would be of different size and intensity at various points in the mine; that is, would a 3 per cent. cap be smaller when observed in a cavity in the roof than in a place where the velocity of the mixture was much greater? In using various types of lamps, he found that a lamp with round wick gave less trouble to set a standard flame than a flat wick, the latter presenting some difficulty in trimming a flame of uniform height over the full width of the flame.

Mr. Henry Davies, mining lecturer, said he believed more tests had been conducted in the South Wales coalfield than in any other coalfield in the country. In the earlier tests the results obtained as to the length of blue cap varied considerably, but later the examiner secured about 1,500 revolutions in the tank, and with this proper diffusion of the gases and the mixture a blue cap was obtained that was not in any way variable.

The discussion was adjourned to a special evening meeting, when Mr. Henry Davies will show the tanks used by the staff of the Glamorgan County Council in conducting the cap tests and explain the methods adopted.

Electric Winding Engines.

Mr. A. E du Pasquier exhibited lantern slides illustrating the systems of electric winders by way of supplement to his paper giving a comparison of systems, and showing the influence of the drum profile on the performance obtained.

Mr. Hugh Bramwell spoke in high terms of the paper, and went on to recall that when he himself read a paper on the electrical winder at the Maritime Colliery—a comparatively small winder—some years ago, some members expressed the opinion that, owing to the small diameter of the drum he might expect trouble with the ropes. He now gave figures showing the "life" of these ropes, and contended that time had justified the plan adopted in going down to a small diameter and getting the balance in the load line. Even if two or three years' lifetime for such a rope did not compare with the best, it was reasonable, and much more than the value of any extra life of rope was saved in the materially decreased current consumption in the winder itself. There was another profile to which Mr. du Pasquier referred in his paper. This was the outline design for the drum it was proposed to put on to a large winder at the new colliery of the speaker's company. In this instance his company had decided to overlay the rope—to wind the coils one on top of another. The decision had not been come to without very serious consideration and procuring a great deal of information from other countries, and particularly South Africa, where winding and winding design had become almost a fine art. Then, of course, he had his own experience. At the Great Western Colliery Company's old pits overlaid ropes had been running for a good many years. In December 1908 the drums were changed, and so far two ropes had been taken off. One had lasted for 36 months one day, and the other 24 months 17 days. They had now running on the drum one rope that had gone for 22 months, and another for 13 months. For round ropes overlapping, drawing two trams from about 400 yards depth, on practically similar loadline, he was apparently going to get a lifetime of from 24 months to 36 months. Of course, with an overlapping system they had to be very careful or they got trouble. Many points had to be considered, but his company were so satisfied with the results that they were prepared to risk it in connection with a still larger proposition.

The discussion was adjourned, Mr. du Pasquier being cordially thanked for his paper and his lantern illustrations, on the proposition of the President.

Reinforced Concrete.

Mr. T. E. Thain, B.Sc., author of a paper on this subject contributed to the *Proceedings* of the institute, made some supplementary observations, in the course of which he criticised the method adopted by public bodies in asking reinforced concrete-making firms to design one against another. This meant, he said, the cutting down of designs to the smallest proportions, and with a lessened factor of safety. In the course of time, however, the engineers to these public authorities would become acquainted with the principles of reinforced concrete construction and be independent of outside designs.

Mr. James McMurtrie said the subject of the paper was highly interesting, and its application to coalmines would probably extend. The author had shown them a good example of its applicability to pit-top structures.

Mr. Robert G. Clark said reinforced concrete had been found a highly useful structure for engine beds specially designed to guard against subsidence, a notable instance of which was a bed of ferro-concrete at Messrs. Powell Duffryn's New Britannia Colliery, which was about 100 feet long, and built to carry large main winding engines and flywheels.

The President, proposing a vote of thanks to Mr. Thain, said the subject of reinforced concrete was of growing importance. It was being very largely used in some mines in the north of France and Belgium, where the "push" of the ground was so great that no kind of timbering and no arches that had hitherto been tried withstood the pressure extending over many kilometres. It was probable that before long reinforced concrete would be tried in some of the mines in this country, and he had confidence it would prove effective in the work it would be required to do.

Before concluding the proceedings the president announced that the next general meeting of the institute would take place at Swansea on December 17.

Big developments in coalmining in the Porteeton district of East Lothian are about to be brought into effect. Something like 970 tons a day is at present the output, but it is anticipated that this will be increased to a turn-out of 3,000 to 4,000 tons per day, and employment will be given to about 1,600 men, as compared with 400 at present.

TOWN PLANNING IN SOUTH YORKSHIRE.

Important Conference at Doncaster.

[By our own Correspondent.]

The Royal Sanitary Institute, which held a sessional meeting in Doncaster, on Saturday last, had the Mansion House placed at its disposal by the Mayor and Corporation of the borough. There was a large and representative attendance, the special subject for discussion being "Town Planning in Relation to the Development of the South Yorkshire Coalfield." Mr B. Percy Boulnois, M.Inst.C.E. (chairman of the council of the institute), presided.

The company were heartily welcomed to the town by the Mayor of Doncaster, who said he hoped, as a result of that meeting, some satisfactory work would be done in the way of dealing with the district around Doncaster, if not actually in the borough, to meet the great commercial demands of the district and the people who were arriving in it. It was entirely a question to be dealt with outside the borough.

The Chairman, on behalf of the Royal Sanitary Institute, returned thanks.

In a letter of apology for absence, Dr. Handford. Notts County medical officer of health, stated that the colliery developments in the portion of Nottingham bordering on Derbyshire and Yorkshire made the question which the institute was going to discuss an important one for the county he represented. The considerations of public health demanded that each cottage should have at least three bedrooms. The third bedroom, usually a small one, should always have a fireplace and chimney. The third small bedroom was usually used to isolate a sick child and was oftentimes quite unsuitable for the purpose. There should be adequate and suitable accommodation for storing food, the water system of excrement removal should be adopted, and more efficient regulations were needed to prevent overcrowding, even in well-built roomy houses, by the unrestricted taking in of lodgers. In colliery districts a bath in every cottage was a great advantage.

Dr. Arthur B. Dunne, B.A., M.B., B.C.Camb., D.P.H.Lond., medical officer of health to the Doncaster Rural and the Bentley Urban District Councils, then read the following upon "Town Planning in relation to the Development of the South Yorkshire Coalfield."

The subject chosen for discussion is one which has been before the public in this locality, more especially since January 16, 1911, when the Mayor of Doncaster presided over a large and representative gathering convened to promote a scheme for the town planning of this district. At that meeting his Grace the Archbishop of York made a weighty contribution in a speech on the subject. The special problems of public welfare which the concentration of the new population involves, are receiving effective consideration by those bodies especially created to deal with them; and in this connection I would refer to the work which is being done to provide opportunities of public worship by the Committee on which the late Mr. Pickering, H.M. inspector of mines, was so active a member.

I propose briefly to refer to the geological aspects of the South Yorkshire coalfield, as they supply the key to the right understanding of the difficulties and special characteristics of its development as affecting town planning. It is common knowledge that the coalfield of South Yorkshire extends at least 15 miles east of Doncaster, and that throughout this area the famous seam of coal known as the Barnsley bed has been reached at depths of from 595 to 1,062 yards. Until seven years ago the easterly boundary of the Yorkshire coalfield which was being worked could be roughly indicated by a line, running north and south, along the range of limestone hills through which the River Don has cut its way at Conisbro.

In the district around Doncaster 13 new collieries are in process of being, or are about to be, sunk. Of these, 10 are within the area covered by the Rural District Council of Doncaster and the Urban District of Bentley. The Barnsley seam, as it extends eastward, dips further and further away from the surface of the earth, so that very large and deep shafts are required to be sunk to work it. Large areas of minerals have also to be leased. For these and other reasons a colliery undertaking has to face from the first a very heavy capital expenditure. The work, therefore, when once begun, of sinking and developing the colliery is carried forward night and day. Only a few hundreds of men are employed at this stage in sinking the shaft, making the sidings, and erecting the permanent buildings and machinery. These men are housed in temporary wooden huts, and they form a community to themselves. It is only when coal has been reached and the pit has been opened up that large numbers of colliers will be employed. For instance, I am informed that in one of the largest of these pits 4,000 underground workers will ultimately be employed. It is estimated that each pit will form the centre of a district of from 10,000 to 12,000 persons, and that in the districts surrounding Doncaster there will be a population of 120,000 in the near future directly dependent upon mining. As the collieries are situated in sparsely populated rural parishes, and are sometimes quite a distance from any existing village, it will be realised what are the problems involved in housing these people.

No review of the subject of town planning would be complete without referring here to the provision which the colliery companies have themselves made, and are making, on a large scale for their workpeople. The pioneers, so far as this district is concerned, were the Brodsworth Main Colliery Company, whose chairman, Sir Arthur Markham, Bart., M.P., has taken a warm interest in providing better homes for the colliers. This company erected on an estate at Woodlands in 1907 a model village, which was honoured with a visit from their Majesties the King and Queen during their Yorkshire tour. This village is situated in the parish of Aldwick-le-Street, one mile south-west of the ancient village. The parish had a population in 1901 of 307, which has increased to 5,731 at the Census of 1911. Woodlands itself had a population of 3,161, and is built on a limestone plateau 150 ft. above sea level. It is reached by the Great North road from Doncaster, 4½ miles away. The situation is healthy and the air bracing, and thus it enjoys a great advantage in this respect. Its roads and avenues have been laid out on a generous scale, while there are spacious open greens at the rear of the houses. For purposes of description I may say the village consists of two portions, the earlier of which was erected in June 1907. Here there are 118 houses, built around a large open green 12 acres in extent; this park, which is surrounded by houses embowered in fine old trees which have been carefully preserved, forms the most striking and beautiful feature of the place. The houses in this part of the village number five to the acre. The mansion house which belongs to the estate has now been adapted to the purpose of a workmen's club. The main portion of the village lies to the north of the park, and consists of 530 houses erected on what was formerly agricultural land. The main feature of the plan of the village is a wide crescent with connecting and radiating streets. The houses are built in short rows, and the cottages themselves have tiled roofs, casement windows, and pebble-dash walls. In this part of the village the houses number eight to the acre. The rents of the houses range from 5s. 3d. to 6s. 6d. per week, clear of rates. There are three types of houses, varying in respect of the accommodation provided:—

1. Three bedrooms, large living room, scullery and larder. Rent 5s. 3d.

2. Three bedrooms, living room, parlour, larder, scullery and bath. Rent 6s. 3d.

3. Three bedrooms, bathroom (hot and cold water), living room, parlour and scullery. Rent 6s. 6d.

The company have laid on water to the houses and have provided a water closet and sanitary ashbin for each. The sewage from the village is treated at the sewage outfall works a mile away. The contour of the land facilitates drainage, and no pumping is necessary. The scavenging of the village is undertaken by the company, who employ a staff of men for this purpose. Spaces have been reserved for the erection of public buildings, and the West Riding Education Committee have erected a large modern school to accommodate 910 children. Various religious denominations have places of worship here, and a large church is in course of erection.

While Woodlands has not escaped criticism for various reasons, against this must be set the fact that Woodlands, as one of the model types of colliery villages, has attracted attention and stimulated public opinion on this important matter of housing the colliery population.

I would also refer to the provision which other colliery companies have made for their workmen in the district. Messrs. Barber, Walker & Co. have a colliery village, covering an area of 75 acres, at Bentley, where 802 houses will eventually be erected. At Edlington, in connection with the Yorkshire Main Colliery Company, a large estate has been laid out to provide 823 houses. At Askern the colliery company have bought an estate, and intend to erect 1,000 houses. At Rossington, where the Sheepbridge Coal and Iron Company are engaged in sinking a new colliery, there is to be erected a colliery village of 849 houses, laid out on the same principle as in their well-known village at Maltby. At Owston the Bnlcroft Colliery Company are erecting a small village. All the above villages, though differing from one another in design, yet have this in common, that they are laid out on a definite plan from the beginning, the houses being erected as they are wanted. A house-to-house water supply is provided, water closets taking the place of the privy midden, and the long, monotonous rows of colliery houses which begin anywhere and end nowhere—of which numerous examples are to be seen in the older parts of the Yorkshire coalfield—have no place amongst them.

These villages owe their existence to the colliery companies, and must form the nucleus around which any town plan may in future be drawn. They will not, however, be capable of housing the new population altogether, and the speculative builder is already in the field providing houses to fill up this deficiency, and it is in connection with the activities of the private builder that the necessities of a town plan for a colliery village arise.

The subject of town planning is now again engaging the attention of the local authorities, and a joint meeting was held last month at Doncaster. As reported in the Press,

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ght to have authority to appoint a
e inspector.

Rolfe (Doncaster Board of Guar-
mbined action between the Borough
Doncaster Rural District Council.
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y, surveyor to the Bentley Urban
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was so urgent that the procedure of
Act would hardly meet the case. It
, if they started to-day, before they
eration—the area was so large and
It was a case for special intervention of the Government. There was need for some simple and expeditious method, which, without making a complete and final town plan, would protect the area by some general allocation of open spaces, limit the number of houses per acre, and settle the main lines of traffic. Twenty thousand more houses would shortly be needed in the immediate neighbourhood of Doncaster. Let them have a maximum of 10 houses per acre, and then they would see something in usefulness and happiness.

Mr. **Wilson**, surveyor to the Bolton-on-Dearne Council, said he held that immediately an area was sent up to the Local Government Board control began. The recommendations sent out from the conference of surveyors, held in Doncaster the previous day, would throw upon the various councils the onus of using their discretion and looking at the matter in a very broad light. The difficulties of one district overlapping another were already being realised.

The Hon. E. **Wood**, M.P., asked what would be happening in the three years they would be getting their scheme in operation? He had often wondered why, if it was a sound investment for the Government to spend £500,000 on the development of Uganda, it could not spend £200,000 upon the development of South Yorkshire. He believed the landlords were anxious to meet the authorities in the matter.

Alderman **Smith** (Huddersfield) moved that a resolution be drawn up, pointing out the difficulties and asking for special Government consideration for Doncaster and its neighbourhood.

The **Chairman** said any resolution would have to go to the council of the Sanitary Institute, and they would act. The chairman said they had the widow of a most distinguished man present in Mrs. Pickering. If she had anything to say on the subject, he was sure they would listen to her with a great deal of attention.

Canon **Sandford** said Mrs. Pickering had asked him to speak on her behalf. She shared with her late husband a very deep interest in the welfare of the district. Mr. Pickering did all he possibly could during his lifetime to urge upon the local authorities the importance of town planning for South Yorkshire, and in the report published after his lamented death he referred to the importance of the subject. Time was rushing on. Very great mischief had been done already, and it would increase with every succeeding month of inactivity on the part of the local authorities. It meant infantile mortality, death from phthisis, and a heightening general death-rate, and all this must put tremendous responsibility on each and all of them. They were bound to throw the whole weight of their influence into the scale, so as to urge on, at the earliest possible date, an adequate town plan for the whole district, stretching from Askern to Tickhill. If there was any approach to the Local Government Board, he believed they would be found extremely sympathetic. The chief responsibility rested upon the Rural District Council of Doncaster. They appeared to be just beginning to realise their responsibilities, but they had not yet grasped the importance or magnitude of town planning.

The **Chairman** thought if there was a will there was a way to reduce the time. Two years would be ample to get any scheme through. A scheme need not be so big, that was a mere bogey. They might take any district more urgent than the other and deal with it at once, leaving other districts to be dealt with as necessary. There was plenty of legislation if local authorities would act. They required no more legislation; they had had quite enough for many years and wanted a little breathing space to carry out that legislation.

The **Chairman** then announced that Ald. Smith had handed up the following resolution: "That with a view to expedite the provisions of the Town Planning Act affecting particularly the area of the Doncaster rural district, this meeting desires to place before the council of the Royal Sanitary Institute an urgent recommendation to apply to the President of the Local Government Board in favour of such measures as may facilitate the putting into operation of the provisions of the Act."

Mr. **Nodes** seconded, and the resolution was carried.

After luncheon members of the Sanitary Institute went by motor to Woodlands model village, which was inspected with great interest.

Sheriff Shairp, at Ayr Sheriff Court, on the 22nd inst imposed a fine of £2 10s. on David Cunningham, bencher, for a contravention of the Coal Mines Act. The offence was that on October 16, in No. 2 coalpit, Highhouse Colliery, Auchinleck, damage—namely, the puncturing of the seal of the outer case—was caused to a safety lamp through his neglect or fault.

CONTINENTAL MINING NOTES.

Belgium.

The following shows the exports and imports of coal during the first ten months of the current year:—

	Imports.		Exports.	
	1911. Tons.	1912. Tons.	1911. Tons	1912. Tons
Coal ..	6,018,600	6,687,000 ...	4,358,800	4,228,100
Coke	547,600	773,600 .	846,200 .	836,500
Briquettes	316,900	370,600	126,100 ...	532,100

Imports during October 1912 were as follow:—Coal, 732,700 tons (598,900 tons); coke, 81,000 tons (58,600 tons); briquettes, 35,900 tons (34,900 tons). And exports: Coal, 486,300 tons (459,600 tons); coke, 97,900 tons (90,400 tons); briquettes, 49,500 tons (49,400 tons).

The market increases in firmness, and all classes of fuel are scarce.

The official statistics relating to the operation of Belgian mines during 1911 have just been issued, and tend to confirm the apprehension as to the effect of recent industrial legislation. The output of coal in 1911 was 23,053,540 tons, or 863,020 tons less than in 1910. Of the 127 mines in operation, 59 have earned a profit, amounting in the aggregate to 17,677,250, but against this has to be set the deficit of 20,804,300 fr. sustained by the remaining 68 undertakings. In only four years since 1885 has there been a net loss to the industry. In 1907 there was a profit of 2·16 fr. per ton; in 1908, 1·44 fr.; 1909, 0·74 fr.; 1910, 0·50 fr.; but in 1911 there was a loss of 0·14 fr. per ton. The average profit per ton during the period 1901-10 was 1·27 fr. This result has not been due to a decline in prices, for the average value per ton in 1911 was 14·76 fr., as compared with 14·59 fr. in 1910, and the loss has been wholly due to the increase in cost of working, &c. The individual output has declined, the average production per worker at the face having been 926 tons in 1911, as against 950 tons in 1910, or, based upon the total number employed below ground, 222 tons, against 231 tons; whilst, if the total employed both above and below ground be taken, the average production per head is 100 tons, as against 166 tons. M. Dejardin also states that the number of accidents has increased, the number of fatalities per 10,000 employed being 11·45 in 1911, as against 9·92, the average of the five years 1906-10. He gives it as his opinion that the predominant cause may be looked for in the "general perturbation of underground labour."

France.

At the beginning of the week a serious explosion took place at the St. Martin de Valgalgues Mine, near Montpelier, in the Gard coalfield, by which upwards of 20 men were killed. No further details are at present to hand.

Germany.

Coal Market in Saxony.—The demand is very brisk, and would have been still greater but for the scarcity of railway wagons and the short supply of several kinds of coal. The result has been great delay in delivery, and no improvement is expected in this connection for some time to come. The favourable condition of the market has also benefited the lignite briquette manufacturers, who have increased their sales by 23,000 tons as compared with the same month of last year, about 17,000 tons more being supplied from Prussia.

Coal Market in Upper Silesia.—The scarcity of railway wagons has attained disagreeable proportions, the daily shortage being 3,000-5,000, to the serious prejudice of the coal industry. The normal demand is high, and is now supplemented by additional orders which are being sent in owing to the fear of transport difficulties. The iron industry is the principal consumer, and other industrial branches are putting forward requirements which it is difficult to satisfy completely. Urgent requests are coming in for the delivery of house coal, and for some time past it has been impossible to fill the orders for coking coal; whilst gas coal is selling in progressively increasing quantities. Meanwhile the pits are forced to stock coals they could easily dispose of, whilst on the other hand, there is a considerable risk of buyers in Northern Germany making up the deficiencies in the supply with English coal; indeed, a commencement in that direction is already announced. In these circumstances, the exportation of fuel to Russian-Poland is perforce neglected. The same difficulties are hampering the coke market, to the great inconvenience of consumers, whose stocks are low.

Ruhr Coal Market.—For the time being the predominant feature in the situation is the scarcity of railway wagons, which has become so acute that, on several days of late, the shortage has been not less than 5,000, or nearly one-third the total number requisitioned. The result is that customers cannot be properly supplied, part of the output has to be stocked, and, where no space for this is available, the men are put on short time. In all other respects business is favourable, though the lack of transport facilities has curtailed the exports to Holland and Belgium. In the home market the favourable situation in the iron industry and other branches creates an extensive demand for fuel; and, indeed, complaints of a scarcity of coal are already making their appearance, owing to the cause mentioned above, the trouble being accentuated by the fact that stored coal depreciates in value. The demand is particularly active in South Germany, where stocks are being rapidly exhausted Apart from industrial grades, coking coals are in great request, whilst gas and flaming coals are meeting with a larger sale owing to the advance of the season. In the coke market, blastfurnace and foundry coke naturally attract the most attention.

Coal Market in South Germany.—Deliveries are being hampered by the shortage of railway wagons, and consumers who obtain their supplies direct from the collieries cannot get their contracted quantities. This circumstance has led to extensive demands being laid on the resources of the local stockyards, especially since the waterborne consignments coming forward are insignificantly small, on account of the delays in loading craft in the shipping harbours. Stocks are consequently becoming quickly exhausted, and will be difficult to replenish, even when normal traffic conditions are restored, the current demand being sufficient to absorb practically the whole of the shipments for some time ahead.

Coal Syndicate Report for October.—The total coal raised during the month amounted to 6,480,265 tons (7,328,604 tons in October 1911), or 314,084 tons (281,869 tons) per working day. Calculated distribution 6,530,054 tons (5,776,859 tons), or 241,854 tons (222,187 tons) per working day, being 92·07 per cent. (84·77 per cent.) of the participation. Total coal distribution of Syndicate pits 8,150,628 tons (7,289,288 tons), or 301,875 tons (280,357 tons) per working day. Deliveries, including local sales, miners' house coal and supplies to pits' own ironworks: Coal, 5,084,179 tons (4,734,802 tons), or 188,303 tons (182,108 tons) per working day; coke, 1,798,843 tons (1,461,833 tons), or 58,027 tons (47,156 tons) per working day; briquettes, 368,986 tons (329,383 tons), or 13,666 tons (12,669 tons) per working day.

A New Institute of Coal Research.—The Emperor William Society for the advancement of Sciences, which was founded two years ago by the Kaiser in commemoration of the centenary of the Berlin University, has decided to establish a special institute for coal research at Mülheim on Ruhr, upon a site that has been presented for the purpose by the local municipality. The anual budget of the institute will amount to £6,000, and as the Rhenish Westphalian Coal Industry Syndicate has agreed to contribute £5,000 per annum, the Emperor William Society will only have to find the comparatively small sum of £1,000 a year. The building of the institute is to be begun next spring, and it is expected that it will be completed by the spring of 1914. Its origin is due to the initiative of the Berlin chemist, Prof. Emil Fischer. The investigations of the Mülheim Institute will be devoted in the first place to increasing the inherent value of coal, and they are to be applied to all kinds of fuel. Among the specific problems that will be pursued will be the study of the production of coke under altered conditions, and the obtaining of tar, water gas and power gas, or the transference of inferior products of tar distillation into more valuable fluid or gaseous fuel substances, so that this country may be made independent of the importation of such substances from abroad.

Russia.

The scarcity of fuel in Russia is more pronounced. An important conference has been held, under the presidency of the Minister of Industry and Commerce, at which representatives were present from the departments of Finance, Ways of Communications, War, Admiralty, together with representatives of the collieries and ironworks. The railway department insisted that it was necessary to obtain authority to import immediately and free from duty coal from abroad, since the Donetz coalfield was unable to guarantee the supply of the 215 million poods necessary for use on the railways during 1913. The colliery representatives, on the contrary, affirmed that the coalfield could without difficulty meet all requirements, but that a rise of 2 to 2½ copecks per pood would have to be paid. Subsequently the Government gave the authority demanded by the Minister of Railways. In the meantime large quantities of coal are being diverted by the railways for their own use, to the great inconvenience of other consumers.

North Staffordshire Institute of Mining and Mechanical Engineers.—A general meeting of the members of this institute will be held on Monday, December 2, 1912, in the North Staffordshire Hotel, Stoke-on-Trent, at 5 p.m., when the following papers will be read: "Electricity: a short paper addressed to Colliery Managers," by Mr. R. Nelson, H.M. electrical inspector of Mines; and "Some Notes on Haulage Clips in Use in North Staffordshire," by Messrs. W. G. Salt and A. L. Lovatt. Mr. W. G. Peasogood will exhibit and explain a model of cage gates.

Grimsby Coal Exports.—The return of the quantity of coal shipped from Grimsby during the week ended November 22 is as follows:—Foreign (tons): Gothenburg, 1,131; Ystad, 1,399; Drammen, 1,050; Trelleborg, 1,960; Hamburg, 1,268; Antwerp, 716; Rotterdam, 803; Savona, 2,607; Dieppe, 923; Ahus, 1,801; Malmo, 1,564; Randers, 232; Ronnaby, 1,970; Halmstadt, 1,722; Bremen, 371; Christiania, 2,699; Stockholm, 292; Gefle, 3,879; Reykjavik, 414; and Helsingborg, 1,289 tons; total, 26,292 tons. Coastwise: London, 111 tons; total, 111 tons.

LAW INTELLIGENCE.

HIGH COURT OF JUSTICE.

KING'S BENCH DIVISION.—November 21.

Before Mr. Justice Bailhache.

Stanley Brothers Limited v. the Mayor and Corporation of Nuneaton.—In this action the claimants were the owners of a colliery and brick and tile and glazing works at Stockingford, and the Corporation were the water authority for the district in which claimants' works were situated. The claimants said that under a certain conveyance of January 17, 1900, they were entitled to a water supply from the Corporation, when their own available sources of supply were not sufficient for their purposes, at 2d. per 1,000 gallons. The Corporation, on the other hand, said the claimants were not entitled to that supply, at any rate in the way the claimants desired to get it, and that if they took it through the ordinary channels they must pay 8d per 1,000 gallons. For nearly 10 years claimants had paid 8d. per 1,000 gallons for all the water they had taken from the Corporation, and they said they did that in ignorance of their rights, and that they were entitled to a return of the difference between 2d. and 8d. of the amount so paid. The dispute went to arbitration, and the arbitrator had in substance found in favour of the Nuneaton Corporation. The main question turned on what was the true construction of a covenant in the conveyance. The covenant was in these terms: "The Council hereby covenants with the company that they (the Council) will, in the event of the company being unable to obtain sufficient water for the purpose of the works of the company from all their available sources, supply the company with water at cost price, not exceeding 2d. per 1,000 gallons. Provided, nevertheless, that the Council will only be liable to supply the company with a proportionate quantity of such water as for the time being is available for manufacturing purposes or supplied by meter or otherwise after the domestic supply has been provided for, so that if the available water supply is deficient, manufacturers and others supplied by water shall share ratably with the company." It was argued that the conveyance really referred to the pumping of water to the claimants' reservoir.

His lordship, in giving judgment, said there had been no action or application to rectify the covenant. If there had been such an application, the fact that the claimants did not seek to enforce the covenant in the way they now sought, but were content for nearly 10 years to pay 8d. per 1,000 gallons instead of 2d. per 1,000, would have been a very cogent factor in the case. His lordship said he must come to the conclusion that he must give effect to the covenant in the way in which it was drawn and put into the deed, and therefore he held that the claimants were right upon their main contention, and that the respondents were wrong. The claimants must take such water as the Corporation were able to give them, and, after doing that, even though the water was not fit for their purpose, they would have no cause of complaint against the Corporation. He made a declaration that the claimants were entitled to require the respondents to supply them with water for their works at a cost price not exceeding 2d. per 1,000 gallons. He made the amount to which the plaintiffs were entitled £1,426.

His lordship, on the application of Mr. Young, granted a stay of execution, with a view to appeal.

SCOTTISH COURT OF SESSION.

JUSTICIARY APPEAL COURT.—November 24.

Before the Lord President, and Lords Kinnear and Mackenzie.

Conviction of Manager under the Eight Hours Act Quashed.

Roger v. Stevenson.—This was an appeal by William Houston Roger, Rigend House, Townfoot, Dreghorn, who, on January 26 last at Kilmarnock Sheriff Court, was charged that he, being the manager of Montgomeryfield Colliery, Dreghorn, Ayrshire, on five separate dates in October and November last failed to cause a register to be kept at the colliery, in the form prescribed by the Secretary of State, contrary to the Coal Mines Regulation Act, 1908. It was found proved at the trial that (1) on October 24, 1911, four miners were below ground for nine hours and twenty minutes; (2) that the register produced was supplied to the colliery in official form, and that the entries were made by the pithead-men; (3) that on November 13, 1911, an inspector of mines visited the colliery and inspected the register, at which time no cause was entered for the men being below ground for the period specified; (4) that on November 3, 1911, two firemen were below ground for 15¼ hours, and that the cause of their detention below ground was not entered in the register at the date of the inspector's visit; and (5) on October 24, 1911, the men worked in a shift, the last man of which left the surface at 6.5 a.m., and the first man recorded as having returned to the surface did so at 8.30 a.m. Sheriff-substitute Mackenzie found the appellant guilty of two out of five of the charges brought against him, and not guilty of the others, and a fine of £1, with the option of ten days' imprisonment, was imposed.

The Court in July last quashed the conviction, with 12 guineas expenses. Their lordships now stated the grounds of their judgment.

Lord Mackenzie, who gave the leading opinion, said in regard to the second charge miners were below ground for nine hours and 20 minutes. The Sheriff-substitute, however, had found that the last man of the shift left the surface at 6.5 a.m., and the first man recorded as having returned to the surface did so at 8.30 a.m. In these circumstances it was impossible to hold, as regarded the second charge, that any of the miners were below ground for more than the time fixed by the Act. The fifth charge dealt with two firemen who left the surface not later than 4.15 a.m. and returned to the surface at 7.30 p.m., and who were below ground for 15¼ hours. A fireman was a "workman" for the purposes of the Act, and the provisions of section 1 (1) and (2) applied to him, with the modification that nine and a-half hours was to be read into these sections when they were to be applied to the case of a fireman, instead of eight hours, which was the period applicable to the ordinary workman. The firemen here were members of a shift in the sense of the Act. It appeared from the register that the number of firemen composing the shift was four, that the last fireman in the shift left the surface at 4.14 a.m., and that the first fireman in the shift to return to the surface did so at 1.5 p.m. The period between those was only eight hours and fifty minutes. The conviction must therefore be quashed. The question whether these firemen were working in a shift or not was a question of fact for the judge who tried the case, and he must be guided by the provisions of section 1 (7). It was obvious that unless a strict view was taken of the words in the subsection, "whose hours for beginning and terminating work in the mine are approximately the same," the Act might be made a dead letter, for, by indefinitely prolonging the time lowering the members of a shift the time when the last workman left the surface and the first workman returned might never exceed eight hours.

The other judges concurred.

Offices have been opened at Atlas-chambers, James-street, Cardiff, by Messrs. W. D. Wight and J. W. Fidoe, A.M.I.E.E., as consulting mining engineers, under the title of Wight and Fidoe. Mr. W. D. Wight was for over 20 years the general manager of Cory Brothers and Co. Limited, Cardiff, and was on two occasions elected president of the South Wales Institute of Engineers. Mr. J. W. Fidoe was assistant general manager of Messrs. Cory Brothers and Co. Limited and previously was in the employ of the Bengal Coal Company Limited; he is an old Birmingham University man, is a late Bowen Research Scholar in Engineering, and holds the first mining diploma awarded at Birmingham University. The new firm are consultants to the Cwmamman Coal Company Limited, the Mynachdy Coal Company Limited, the Torycoed Coal Company Limited and others.

Genoa Contract Notes.—At a meeting of the Arbitration Committee of Newcastle Chamber of Commerce on Tuesday, a letter was read from the Secretary of the British Chamber of Commerce for Italy, stating that by a number of coal import agents resident at Genoa there had been brought before the Chamber the matter of the bewildering diversity of British coal contracts or sale notes, and the paramount desirability for all concerned of the establishment of a standard contract note embodying "Genoa terms," to be good for sales made to Genoa, Savona, Spezzia and any other Italian ports as might be agreed upon. The letter continued: "We are informed that the diversity of classes and wording of the present contract forms are a constant source of dispute and controversy between buyers, agents and shippers; that it would also greatly facilitate business if there were attached to the English contract a facsimile in Italian, as the majority of buyers do not understand English, or at any rate not sufficiently to fully comprehend the meaning of the clauses. I am therefore directed to enquire whether your members in the coal export trade would be willing to fall in with this proposal. We understand that the matter has already been informally discussed between some of the Genoa agents and various British exporters. We consider it is one of the modern advantages of international trade to have standard contracts for goods or special transactions, and to which parties can always refer. In bringing this matter forward we are not only inspired by the desire to facilitate the coal trade between British shippers and the merchants here; we are also moved by the wish to preserve a trade that is being eagerly watched by some of our neighbours; in fact, we find that whereas in 1910 Germany exported only 169,000 tons to Italy, she sent 442,000 tons in 1911, and in this year, January-August, 600,000 tons; whilst the United States, America, in the same latter period sent 50,000 tons, France 105,000 tons and Austria-Hungary 134,000 tons, the principal destination being undoubtedly Northern Italy, where the frontier countries have the benefit of direct railway communication. Great Britain in January-August 1912 has sent Italy only 5,244,600 tons, against 5,986,400 in the same period last year." It was resolved to reply, stating that the committee would be glad to assist the British Chamber of Commerce for Italy; it was further resolved to send a copy of the uniform contract note at present in use at Baltic ports for the Italian Chamber of Commerce to consider and make any suggestions thereon.

THE COAL AND IRON TRADES.

THURSDAY, NOVEMBER 26.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 146,496 tons of coal and 1,323 tons of coke were despatched from Tyne Dock, a decrease of 6,712 tons of coal and an increase of 1,239 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 67,955 tons of coal and 1,099 tons of coke, a decrease of 6,261 tons of coal and 126 tons of coke. The Blyth shipments totalled 96,065 tons of coal and coke, an increase of 4,654 tons. The following coal contracts are reported:—9,000 tons Wear gas specials for early delivery to the Padua Gasworks, an order placed with Genoa merchants, details not to hand; 23,000 tons Londonderry gas coal for the Malmo Gasworks, delivery over next year, at rather over 20s. c.i.f.; 30,000 tons Durham gas bests for delivery over next year to the Palermo Gasworks at about 13s. 7½d. f.o.b.; and a considerable quantity of best Blyth steams for shipment over 1913 at 13s. 8d. f.o.b. With reference to the Russian State Railways requirements of from 250,000 to 300,000 tons of steams for December-February delivery, it is stated that the St. Petersburg merchants have arranged for from 60,000 to 100,000 tons of Yorkshire and Scottish steams at c.i.f. prices estimated to leave 14s. 1d. and 12s. 9d. per ton f.o.b. respectively. The same merchants are offering from 14s. 3d. to 14s. 6d. f.o.b. for Blyth steams and 14s. for Tyne primes for some 60,000-60,000 tons of local coal, but merchants here are stated to be disinclined to accept these figures. It is not known, by the way, whether the Russian merchants have definitely secured the contract, or any portion of it, or whether these purchases and offers are being made speculatively. The North-Eastern Railway Company, which requires about 600,000 tons of steams for use in the northern division, is stated to have closed contracts for a larger supply than usual from South Yorkshire on the basis of 11s. 6d. per ton at the pitmouth for best hards—an increase of 1s. 6d. per ton on the current contract rates—and for about 150,000 tons of South Durham coal at from 13s. 3d. to 13s. 6d., an advance of 2s. 6d. At least one lot of Northumberland coal is said to have been secured at a similar increase. Negotiations for the balance of the contract are in progress. The enquiry for a large quantity of coking coal, noted last week, is now stated to be for 300,000 tons for the Zeebrugge Cokeworks, Belgium. The contract is said to have been secured by the same local firm which held it prior to the Westphalian Syndicate capturing it, apparently regardless of cost, four years ago. Up till now, however, only some 50,000 tons of best Durhams appear to have been arranged for delivery over the next three months at from 14s. 6d. to 14s. 9d. per ton f.o.b. It is reported that the balance of the allotment has been postponed on account of the prevalent high prices. It is stated that several large steamship liners, which usually bunker on the Tyne, have gone to Cardiff for their supplies, owing to local high prices. The same reason is said to be responsible for the diversion of an order for a cargo of furnace coke for Bilbao to Germany. The Hull and Grimsby trawlers are inviting local tenders of bunkers, but not much hope is entertained that the order will come to this district, Yorkshire and Derbyshire coal being relatively cheaper. The market for prompt shipment is firm and advancing, and supplies are on the scarce side. F.o.b. quotations are as follow (steady, where not otherwise stated):—Best steams, Blyths (D.C.B.), 14s. 3d. per ton, an increase of 6d.; Tynes (Bowers, &c.), 14s., 3d. up; seconds, Blyths, 12s. 9d. to 13s., from 3d. to 6d. more; Tynes (Hastings or West Hartleys), 13s. to 13s. 6d., similarly increased; unscreened, 12s. 6d. to 13s., from 6d. to 1s. higher; smalls, Blyths, 10s. 3d., 3d. down; Tynes, 9s. 6d.; specials, 11s. 6d.; smithies, 15s. to 15s. 6d., 6d. up; gas bests (New Pelton or Holmside), 15s. 6d., from 3d. to 6d. up; seconds (Pelaw Main or similar), 14s. 6d. to 15s., 6d. more; specials, 15s. 6d., 3d. up; unscreened bunkers, Durhams, 14s. 3d. to 15s., from 6d. to 9d. increased; Northumbrians, 13s., 6d. more; coking coal, 15s. to 15s. 6d., 6d. up; smalls, 15s., from 6d. to 1s. dearer; households, 15s., firmer; coke, foundry, 28s. to 30s., from 1s. to 2s. more; blastfurnace, 26s., stronger; and gas coke, 22s. 6d.

Later.—The Russian State Railways are definitely stated to have contracted for 35,000 tons of best Blyth steams for December-February delivery at 14s. f.o.b., and to be inviting fresh tenders of 100,000 tons of Blyths for similar shipment. Replies are promised by Friday. The Russian Volunteer Fleet wants tenders of its next year's steam coal supplies, for delivery at various Mediterranean and Eastern coaling stations. Offers are due on December 14.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 108,665 tons of coal and 1,595 tons of coke, as compared with 106,670 tons of coal and 1,025 tons of coke for the corresponding period of 1911, being a decrease of 5 tons of coal and an increase of 570 tons of coke. There is a very steady market for prompt loading, and with big enquiries for forward delivery producers and holders of coal are inclined to stiffen their ideas of values. There is a growing demand for best gas coals for shipment in December, and prices are firmer; both coking unscreened and coking smalls are in strong request locally, and a good enquiry from Italy. Prices are exceedingly firm. There is also a heavy call for bunker coals of all descriptions. Coke is very firm, both for prompt and forward positions. The North-Eastern Railway Company are stated to have renewed several engagements at about 2s. 6d. advance on current contract prices. A Belgian firm is enquiring for 275,000 tons of coking smalls, delivery over next year. The Malmo Gasworks have contracted for 23,000 tons of Londonderry gas coals at 20s. c.i.f. for delivery over next year. The Palermo Gasworks have contracted for 30,000 tons of unscreened at 13s. 7½d. free on board next year, and the Zeebrugge Cokeworks have secured 50,000 tons of coking coal at 14s. 6d. to 14s. 9d. free on board for shipment January to March. General quotations are as follow:—Special Wear gas, 16s.; best gas, 15s. 6d.; seconds, 14s. 9d.; coking unscreened and smalls, 15s.; households 15s.; bests, 16s.; smithies, 15s.; peas and nuts, 16s.; foundry coke, 27s. 6d. to 28s. 6d.; gashouse coke, 22s.; blast-furnace coke, 26s. to 27s. 6d. Bunker quotations are: Morrisons, Marley Hill, Bearpark, 14s. 9d.; Consett, Priestmans, Burnhope, 14s. 3d.; Pease's, South Derwent, Framwellgate, 14s.; South Hetton, Ryhope, 14s. 3d.; North Hetton, 13s.—all free on board South Dock. Coal freights are easier. Coasting has paid: London 4s. 9d., Antwerp 5s. 6d., Rotterdam 5s., Havre 6s. 3d., and Hamburg 5s. Bay is on the basis of: Rochefort 7s., St. Nazaire 7s., and Bordeaux 7s. 3d. Baltic is represented by: Swinemunde 6s., Helsingborg 6s., Malmo 7s. 9d., Konigsberg, 7s. 6d., Pillau 7s. 6d., Stockholm 7s., Marieger 6s. 3d., and a contract for voyages over next season has been effected for Cronstadt at 5s. 9d. Mediterranean is distinctly on the easy side, with Genoa at 12s. 6d., Cette 12s. 6d., Civita Vecchia 14s. 4½d., Palermo 14s., Venice 15s., and Port Said 12s. 6d.

Middlesbrough-on-Tees.

COAL.

Fuel is very strong, with demand for nearly all kinds heavy. The Russian railways have recently bought 100,000 tons of coal from Yorkshire, Tyneside, and Scotland, and they require another 100,000 tons for this winter's shipment. Durham coal is in good and increasing demand, and there is a good deal of pressure for delivery. Best gas coal is quoted 15s. 6d., and seconds 14s. 9d. Bunker coal in large request, and ordinary Durhams are 13s. 9d. to 14s. f.o.b., whilst best sorts range from 14s. 6d. to 15s. 6d. Coking coal is fully taken up, and prices are strong. Unscreened runs from 14s. 9d. to 15s., and coking smalls from 14s. 6d. to 15s. Coke is very strong, and in excellent demand both for early delivery and for forward contracts. Consumers experience difficulty in obtaining supplies to fully meet their needs. Up to 27s. is now quoted for average blastfurnace quality delivered at Teesside works. Foundry coke for shipment is 28s. f.o.b. and upward. Gas-house coke is quoted 20s. 6d. to 21s. 6d.

IRON.

The pig iron trade is steady and firm, with a very satisfactory business passing. A new blastfurnace is being erected at the Skinningrove works, and the third blastfurnace in course of construction at the Cargo Fleet Works is approaching completion. The statistical situation of pig iron is very healthy. At this season of the year stocks generally increase, but they are not now being added to, and, in fact, nearly all kinds of pig are scarce. No. 3 g.m.b. Cleveland readily realises 66s. for early f.o.b. delivery, and there are buyers ready enough to pay that price for No. 4 foundry and No. 4 forge, both of which qualities are almost unobtainable for this year's delivery. Mottled and white iron each stand at 67s. 6d. No. 1 Cleveland pig is still plentiful, and is on sale at 71s. Further good enquiries and some business are reported in east coast hæmatite pig. The market quotation for early delivery of Nos. 1, 2 and 3 is 62s., but there is little or no iron to be had. For forward business 82s. 6d. is named, and sales have been made over the first half of next year at 62s. 9d. Foreign ore values are well maintained on the basis of 23s. ex-ship Tees for rubio of 50 per cent. quality, and that price has been paid this week. Producers of all descriptions of manufactured iron and steel are busily employed. They are booked well ahead, and they report continued good enquiries in the market. Common iron bars are £6 10s.; iron ship plates, £8; iron ship angles, £8 10s.; iron ship rivets, £9 15s.; steel bars (basic), £7 15s.; steel bars (Siemens), £8 5s.; steel ship plates, £6 5s.; steel ship angles, £7 17s. 6d.; steel joists, £7 10s.; cast iron railway chairs, £4 10s.; light iron rails, £7 to £7 5s.; heavy steel rails, £6 12s. 6d. to £6 15s.; and steel railway sleepers, £7 to £7 2s. 6d.—railway material net and all other descriptions less 2½ per cent. discount.

South-West Lancashire.

COAL.

There is not much to report that is new with regard to the inland household trade. It is proceeding upon rather quiet lines, and is simply waiting the advent of keener weather. Prices are unchanged at about the following: Best coal 16s. 3d., good second grades 14s. 6d. to 14s. 9d., and common coals 12s. 3d., all into wagons at the pit. A brisk demand is maintained for contract bunkering, and there is also a fairly good open sale enquiry. Supplies are not over plentiful. Quotations for screened Lancashire steam coals remain at 12s. 6d. to 13s. 3d. f.o.b., though small odd lots may possibly be picked up at slight reductions. The coastwise and cross-channel shipments of household coal are much interfered with by the boisterous weather, vessels being very much out of the time, and this is causing accumulations either at the port or at the colliery sidings. Prices for best coal rule at about 16s., with good medium grades at from 14s. 9d., both f.o.b. Garston and net. The slack trade keeps in a very healthy condition, and whatever little surplus accrues from time to time in the colliery sidings finds a ready disposal. Open sale prices for best qualities are up to 10s., good second grades 9s. to 9s. 3d., and the finer and commoner sorts about 8s. 6d., all into wagons at the pit.

South Lancashire and Cheshire.

COAL.

The household coal trade is not at all brisk, the demand being below the average for the season. Prices, however, remain unchanged from 16s. 6d. to 17s. for the best house grades, with good medium qualities at 15s. 3d. to 16s., and the commoner sorts from 12s. 6d. to 13s.—all into wagons at the pit. Furnace coal maintains its cheerful position, the price being about 12s. 6d. per ton at the pit. There is a good demand for shipping coal, and the price is firm at about 14s. f.o.b. Partington. Slack continues in good request, and prices are firm at about 9s. to 9s. 9d. for the best qualities, with the commoner grades at from 8s. to 8s. 6d.—all into wagons at the pit.

IRON.

Pig iron continues very firm and prices are well maintained. The forges are extremely busy with crown iron bars at £8 10s., second quality £8, hoops £8 12s. 6d., sheets £9, and deliveries are still very belated. Steelworks are very busy with bars at £8 5s. less 2½ per cent. and billets £6 5s. net. Foundries and heavy engineers fairly well employed. Wagonbuilders and textile machinery makers full of work.

Yorkshire and Derbyshire.

Leeds.

COAL.

The West Yorkshire coal trade continues exceedingly brisk in all branches except house coal, and the output is sold for the various markets without any difficulty. The different qualities of steam and gas coal are all in good demand, but the total output of the pits is much below the maximum through the continued scarcity of wagons. Some of the pits have worked only four days this week, and the average is not quite five. The stocks at the pits are entirely composed of house coal. Business with London merchants and factors is still on the quiet side, and scarcely anything beyond contract tonnage has been ordered this week. Factors' stocks at Peterborough, Toton, Willesden, Woodford and Hinton and Whitemoor are said to be considerably less than last week; but a spell of real cold weather is needed before the collieries can reduce their stocks. Pit prices for London average as under:—Haigh Moor selected, 14s. to 14s. 6d.; Wallsend and London best, 13s. to 13s. 6d.; Silkstone best, 13s. to 13s. 6d.; Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. to 11s. 6d. The coastwise trade is quiet. The recent gales have seriously delayed shipping, and stocks of house coal at Goole and Hull are considerable. For fairly prompt shipment, representative firms quote about as follows, per ton, f.o.b. Hull:—Haigh Moor best 16s. to 16s. 6d.; Silkstone best, 15s. 6d. to 16s. 3d.; Silkstone house, 14s. to 14s. 9d.; house nuts, 13s. to 13s. 6d. In the West Riding, merchants report a little improvement in the retail trade, with the bulk of the business in the secondary qualities. Pit prices are officially unchanged, but concessions of wagon hire are frequently offered. Current quotations:—Haigh Moor selected, 16s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 15s. 6d.; ordinary house coal, 14s. to 15s.; secondary sorts, 13s. to 14s. The irregular working of the pits has further reduced the available supplies of slacks, nuts, and coking smalls, and prices of all these have a hardening tendency. For prompt delivery of best slacks fancy prices are paid, and pits with easy railway rates to Bradford and Leeds are getting up to 10s. per ton at the pits. Other quotations are firm, as under:—Large double-screened engine nuts, 10s. 6d. to 11s.; small nuts, 9s. 6d. to 10s.; washed samples, 6d. per ton extra; rough unscreened engine coal, 10s. to 10s. 6d.; best rough slacks, 8s. 6d. to 9s.; small slacks, 8s. to 6s. 6d.; coking smalls, 7s. 6d. to 8s. 3d. Prices of washed furnace coke still tend upward, and 19s. per ton at the ovens is no uncommon price for guaranteed prompt delivery. The gas coal pits are behindhand with contract deliveries, and the big works are buying small lots in the open market at about 1s. per ton above June prices. Current quotations:—Screened gas coal, 11s. 6d. to 12s. 6d.; gas nuts, 10s. 6d. to 11s. 6d.; unscreened gas coal, 10s. to 10s. 6d. For export at Hull:—Screened gas coal, 13s. 6d. to 14s.; gas nuts, 12s. 6d. to 13s.; unscreened gas coal, 12s. to 12s. 6d. The market on Tuesday was fully attended, and buyers of all qualities except house coal were in the majority. There was no special feature except the persistent enquiry for small fuel.

Barnsley.

COAL.

Generally there is a stronger tone prevailing this week in regard to all classes of steam fuel, and coalowners are expecting to be able to maintain prices at something like the present level, at all events, until the early part of next year. The prospect of easier prices for large steams, which was evident a week ago, has now largely disappeared, in view of the unexpected considerable enquiry by the Russian railway companies. There are several reasons why it appears probable that the coal from this district will be taken, and, coming at this period of the year, the market will no doubt be strengthened in a considerable degree. Apart from this outlet, there continues to be a steady demand on export account, and quotations of a week ago of 11s. for the best hards are firmly held. The situation with regard to secondary qualities of large steams is hardly so satisfactory to colliery owners, owing to the tendency of factors disposing of their tonnage at prices which colliery owners consider are lower than should be taken. What effect this element will have on the market is not very clear, but no doubt quotations for this class of fuel are of a more varying character, and range from 10s. 3d. to 9s. 9d. per ton. Following upon the settlement of the North-Eastern Railway Company's contracts in this district, a move is now being made by the Lancashire and Yorkshire and Hull and Barnsley companies, but there are some coalowners who feel that better terms than 11s. 6d. per ton for the best hards should be obtained, having regard to the brighter prospects for next year. The steam trawler companies are also seeking tenders, and though it is expected it will be a struggle to obtain a higher price than that which has been accepted, there is a strong division of opinion as to the necessity of holding out for bigger figures in regard to the several contracts named. Collieries supplying Parkgate and Shafton fuel for railway companies also expect to obtain the full 1s. 6d. per ton increase, but up to the present nothing very decisive has been done in regard to these contracts. The position in regard to small steam coal has not been in any way altered. There is the same active demand and the same difficulty to obtain adequate supplies, whilst arrangements for forward business are being completed by colliery owners in a very cautious manner. Best washed nuts are firmly quoted at from 10s. 9d. to 11s. per ton, and secondary qualities from 9s. 9d. to 10s. 3d. per ton. The best quality slacks are still commanding as high as 8s. 9d. per ton, and rougher descriptions up to 8s. per ton. Both on coke making and manufacturing account the demand is very heavy, and buyers are making every effort to get hold of any stocks they can, though having great difficulty in even obtaining the supplies which are now needed from week to week. The bulk of the increased demand for coke continues to come from the north, where apparently the furnaces are having to supplement their ordinary supplies. Buyers continue to pay abnormal prices in order to obtain ready delivery, and business is still being done at from 18s. to 20s. per ton, the latter figure being paid where deliveries over a short period can be guaranteed. In the house coal trade there is practically no change in the position on the week. Collieries are still accumulating stocks and refuse to offer low prices with a view to stimulate buying, feeling confident that the colder weather must before long come to their assistance. The best qualities are now more affected than formerly, and quotations are still held as a week ago as follow:—Best Silkstone, 14s. 6d. to 15s. per ton; best Barnsley softs, 14s. to 14s. 6d. per ton; and seconds, 11s. 6d. to 13s. per ton.

Hull.

COAL.

A marked factor in the Humber coal market this week has been the partial satisfying of the requirements of the Russian State Railways for 250,000 to 300,000 tons of steam coal for December-February shipment to Baltic ports. Up to the time of writing, more than half of the order had been placed, and of this about 50 per cent. has been allocated to the Humber. The price reported given is 14s. 1d. or thereabouts, f.o.b. at Hull, which compares with 14s. stated to have been paid for 35,000 tons of best Blyth steams. About 100,000 tons, for which fresh offers are asked, returnable this week, have still to be placed, and it is fully anticipated that South Yorkshire will be able to secure a fair share. It is also expected that South Yorkshire will be able to command a substantial portion of the Zeebrugge Cokeworks contract for coking coal which has been wrested back from the Westphalian Syndicate by a north-country firm. The Hull and Grimsby steam trawling companies are also in the market for their next year's supplies, amounting to about 600,000 tons, which Yorkshire and Derbyshire usually secure. Under the influence of the Russian demand, best Yorkshire hards have assumed a firmer tone, and were to-day quoted at 6d. advance on the week. Forward business is also beginning to pick up, though colliery owners are still quoting up to 15s. and are showing willingness to negotiate on a lower basis. Smalls and nuts of all kinds are scarce and in big demand, prices being well maintained. With the advent of frost, house coal is in better request. A fully average quantity of coal is being exported at the docks, while coastwise shipments are on a large scale. Loading turns are easy. The freight market is considerably easier in all directions, the Mediterranean, especially Genoa, having been done to-day at as low as 12s. for a 4,000-ton steamer. Buenos Ayres has been done at 19s. 6d. for December loading. Baltic rates are tending downwards in common with the rest. The Humber freight market is not likely to be affected by the shipments under the Russian contract, for the reason that the coal has been bought f.o.b., and, it is understood, will be shipped in Russian bottoms in accordance with a decision of the Russian Government that coal imported by the State shall be conveyed only by vessels sailing under the Russian flag. The following are the approximate prices for prompt shipment f.o.b. Hull:—South Yorkshire: Best steam hards, 14s. to 14s. 6d.; washed double-screened nuts, 14s.; unwashed double-screened nuts, 12s. 6d. to 13s.; washed single-screened nuts, 13s. 6d.; unwashed single-screened nuts, 12s. 6d.; washed smalls, 11s. 6d. to 12s.; unwashed smalls, 10s. 3d. to 10s. 6d. West Yorkshire: Hartleys, 13s. 3d. to 13s. 6d.; rough slack, 10s. 6d. to 10s. 9d.; pea slack, 9s.; best Silkstone screened gas coal, 13s. 6d.; best Silkstone unscreened gas coal, 12s. 6d. to 12s. 9d. Derbyshire and Notts: Best steam hards at Hull, 14s. 6d. to 14s. 9d.; best steam hards at Grimsby, 14s. 3d. to 14s. 6d.; Derbyshire nuts (doubles) at Hull, 13s. to 13s. 3d.; Derbyshire nuts (doubles) at Grimsby, 12s. 9d. to 13s.; Derbyshire large nuts at Hull, 14s. 3d.; Derbyshire large nuts at Grimsby, 13s. 9d.; Nottinghamshire hards at Hull, 14s. 9d.; Nottinghamshire hards at Grimsby, 14s. 6d.

Chesterfield.

COAL.

With the prospect of a return of cold weather, house coal is in slightly better request, orders coming to hand a little more freely. Prices are unchanged, but somewhat firmer on the week. There is a strong demand for all other classes of fuel, but owing to a scarcity of wagons it is impossible to maintain regular deliveries, and customers are becoming loud in their complaints of the loss and inconvenience to which they are put. If the "fog fiend" were to appear suddenly, matters would be very serious indeed. Manufacturing fuel is in very pressing demand, and, in some cases, works have been compelled to "slow down" pending the arrival of supplies. The market generally is gaining strength week by week, and there are indications of a boom in coal with the turn of the year. Collieries are inundated with orders for cobbles, nuts and slack, and are not in a position to enter into any further commitments for next year. Steam coal for locomotive use is in greater request than ever, and most of the railway companies are asking for deliveries to be made in excess of the tonnage due on account of their contracts. There is greater activity in the export trade than is usual at this time of the year, and shipments are proceeding briskly. Russia has suddenly appeared a buyer of 100 tons of steam coal, and this has strengthened the tone of the market. The price of the best brands of Derbyshire Top Hard coal is now 14s. 6d. per ton delivered at Grimsby. The distinguishing feature of the market is the great demand for all classes of small fuel. There is now an actual scarcity, and collieries are absolutely compelled to decline to quote prices of any kind. Foreign buyers of steam coal are now showing much anxiety to arrange contracts for the next shipping season. To further delay their purchases may prove a costly policy. Washed nuts and washed slack are in great request for next year's delivery, but, as already stated, collieries are now fully booked, and are therefore off the market. The coke market fully maintains its strong position. There is a great demand for current consumption, and enquiries for next year's delivery are numerous. Coking fuel continues dear and scarce. Prices are as follow:—Best 14s. 6d., seconds 12s. 6d., cobbles 12s., nuts 11s., and slack 8s. 6d.

IRON.

Great activity prevails in every branch of the iron trade of the district. Enquiries coming to hand for pig iron and manufactured kinds for delivery next year foreshadow a still brisker state of things in 1913.

Nottingham.

COAL.

The general tone of the coal trade in Nottinghamshire is scarcely up to expectations for the time of the year, though a fair business, taking matters all round, is being done. So far, there has not been any material improvement in the household section locally, the demand being of a quietly steady character, and until the weather takes a wintry turn a brisk sale is not anticipated at the landsale depots. Apart from contracts, no heavy weight of fuel is being despatched to merchants in London and the country districts, with the result that stocks at collieries are keeping up. Notwithstanding, owners are holding out for full prices, and only in isolated cases is it possible to obtain lots at slightly reduced rates. The ruling prices are 12s. 6d. to 13s. 6d. per ton for hand-picked brights, 12s. to 13s. for good house coal, 10s. to 11s. seconds, nuts from 9s. to 10s., and cheap kitchens 7s. 6d. to 8s. 6d. In the steam coal branch, shipments have been going out of hand better during the past week. There is a good demand in the home market, manufacturing fuel being a strong feature. Quotations for best hards are from 11s. to 11s. 6d. per ton, and seconds 9s. 6d. to 10s. 6d. Coke and gas fuel are going out of hand satisfactorily. Slacks continue in active request, and late prices are being maintained.

Leicestershire.

COAL.

Business in this district has continued much the same since last writing. The collieries generally are very well employed, and working about the same time as last week. There is a good amount of business on hand, and most of the output is delivered. Stocks do not show any marked increase, being much about the same, nothing of any notable account. The demand for the best household coal is a little better, but the movement is not yet greatly accelerated. There is no abatement in the enquiry for the middle qualities of household coals, and a good demand is present for small coals of this class. Steam coals of all sorts are continuing in very good request. Cobbles and slacks of all qualities are in fair demand. An improvement in business has been felt by local merchants. The market is quite firm at late quotations, and there is little appearance of any decline. The tone of business here appears quite satisfactory.

South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL.

There is very little change to report this week in connection with the coal trade of the Cannock Chase district. A very good business is being done, and on the whole prices are satisfactory. Excepting for the best qualities of house coal, orders are fairly plentiful, and the collieries throughout the district are well employed. The demand for fuel for manufacturing purposes continues satisfactory, and the house coal trade is improving. There is a good demand for slack. Business is fairly brisk at the landsale depots.

Birmingham.

COAL.

A little more movement is discernible in the house fuel department owing to the arrival of more seasonable weather, but there is no rush. For works fuel and slack, on the other hand, there is a great demand, and slacks are, if anything, more difficult to get this week than last. Coke is dear and hard to get.

IRON.

The market was well attended, and revealed a strong and optimistic tone. The dominating feature is undoubtedly pig iron. From all sides came reports that it is practically impossible to get supplies for this year. Producers are selling for next year's delivery at considerably higher prices, and meantime better classes of Northampton iron cannot be obtained under 66s. a ton, the prices of other qualities ranging down to 63s. 6d. Staffordshire common ranges from 59s. to 60s., and part-mine 64s. 6d. to 66s. There is a tremendous call for pigs from the bar mills of the district, which are going in full swing from Monday morning. Prices for good merchant qualities remain at £8 5s. to £8 7s. 6d., and work is booked from two to three months ahead. With pigs high and furnace coke 25s. and upwards, makers cannot below these figures. Common iron makers for nuts, bolts and fencing are not quite so well off in the way of forward orders, but they keep up prices at £7 15s. to £8 a ton. Fairly extensive sales of galvanised sheets are being made for home and abroad, but owing to underselling by merchants it has been impossible to maintain quotations at the maximum recently reached. Manufacturers ask from £12 15s. to £13 a ton, but for good lines they are willing to meet purchases to the extent of 2s. 6d. or 5s. Black sheets remain as they were. It is found impossible to get the necessary sheet bars either from home or abroad at low prices. The minimum is £6 to £6 2s. 6d. for Bessemer qualities, and £6 5s. for Siemens. Producers of strip are busy, and so far the association price of £8 5s. to £8 7s. 6d. a ton is unchanged, but an early advance would come as no surprise. Hoops also maintain mills in full work at £8 5s for strong gauges and £8 7s. 6d. to £8 10s. a ton at works for special qualities and lighter gauges. The steel trade has probably never been in a stronger position. The advance last week in sections has stiffened demi-products, and £6 is the rock bottom price for largets and billets.

Forest of Dean.

Lydney.

COAL.

We have again to report another moderate week's work. The comparatively low demand has led to the inevitable reduction in output, and the collieries are only engaged four to five days this week. This length of time is found to be quite sufficient to meet the present requirements of customers. Stocks are more than they should be for the time of the year. The railborne enquiry does not get any stronger, but a fairly steady business is being done. Shipments are quiet again, the inclemency of the weather delaying tonnage very considerably. Quotations continue on the basis of—block 16s. 6d. at pit and 18s. 3d. f.o.b. Lydney or Sharpness, with the other qualities as given last week. All steam coals are selling well, and the pits are kept fully at work.

Gloucestershire, Somersetshire and Wilts.

Plymouth.

COAL.

Messrs. W. Wade and Son report that the mild weather has caused a reduced retail trade at the south-western ports, which has reacted on the wholesale demand all along the coast. With the exception of the shipments of contract coal by the larger importers, business has been only of a limited kind. The fact that freights have been maintained at their unprecedentedly high rates has acted as a deterrent to the usual flow of trade at this time of the year, excepting to such inland districts as are now being supplied by rail.

THE WELSH COAL AND IRON TRADES.

THURSDAY, NOVEMBER 28.

North Wales.

Ruabon.

COAL.

The state of the coal trade of this locality remains in a satisfactory condition, and with the approach of winter there is a tendency for the general demand for fuel to increase, though for some time past there has been no cause for complaint on the score of lack of orders. Some of the collieries are still suffering from loss of trade through the slow return of empty wagons, but most of them have been able to work a full complement of shifts during the past week. The landsales are fairly busy througout the district. Railway companies are taking large quantities on account of their contracts, and the demand for gas-making fuel is also good. Steam coal for general manufacturing purposes was never better in demand than at the present time, and this has been helped by the long spell of good weather, which has enabled the brickmakers and other similar works to get up their stocks. For shipment, the enquiries have been about the average, but the gales have affected this trade a little, though collieries generally have never much difficulty in disposing of any surplus coal for the shipping trade at the Mersey ports. Nuts are difficult to buy, apart from contracts, as most of the collieries are fully contracted for their output in connection with the gas coal trade. Slack still sells well, and contracts for the new year are being settled at greatly increased prices. With few exceptions all the new contracts are now running, and this should materially help the colliery companies in view of the extensive advances which was obtained in connection with locomotive, gas and steam coal. The average ruling prices are as follow:—Best large household coal up to 17s. f.o.r., second quality from 14s. to 15s. 6d., steam coal 12s. to 14s., and shipment coal about 12s. also. Nuts sell readily at 12s. when they are obtainable, and good rough slack about 7s. 6d. to 8s. 6d. per ton at the pit. Gas coke remains firm at the prices quoted last week.

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Monmouthshire, South Wales, &c.

Newport.

COAL

The improvement in the steam coal trade, which raised prices last week, has since been well maintained, and to-day values all round are being firmly held. There is at present very little free coal available, collieries being, as a rule, fully stemmed, and unwilling to quote at all for delivery during the remainder of the year. With this difficulty of getting prompt supplies for new business, current quotations are largely nominal, while for forward delivery sellers are quite firm and determined in holding to their values. These conditions prevail both as to small coals and large, the former being even shorter in supply and firm in price for every grade available. The house coal trade shows a steady volume at maintained values. In the outward freight market there is still a demand for prompt handy-sized tonnage, for which freights are fully upheld, while for positions further off rates show an easier tendency with the exception of the River Plate, but the amount of tonnage on the market altogether is not plentiful. Latest approximate ruling quotations may be taken as follow, coal quotations cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 15s. 9d. to 16s. 3d.; western-valleys, ordinaries, 15s. 3d. to 15s. 9d.; eastern-valleys, best, 15s. to 15s. 3d.; other sorts, 14s. 3d. to 14s. 9d.; colliery smalls, best, 9s. 9d. to 10s. 3d.; seconds, 9s. to 9s. 3d.; inferiors, 8s. 9d. to 9s.; screenings, 10s. to 10s. 3d.; through coals, 12s. 6d. to 12s. 9d.; nuts, best washed, 13s. 3d. to 13s. 6d.; house coals, best, 18s. to 18s. 6d.; seconds, 17s. to 17s. 6d.; patent fuel, 18s. 3d. to 18s. 6d. Coke: Furnace, 22s. to 23s.; foundry, 25s. to 28s. Pitwood: Best French fir, 23s. 6d. to 24s. ex-ship.

IRON.

There is little or no change to report in the local iron and steel trades since last week. Work in most departments continues satisfactory, but with only small fresh business passing. Values remain strong, with the position unaltered on the part of the manufacturer, who in every case, being well placed, is showing no inclination to make any concessions for future business. Work at bar mills continues up to the average, and arrears of deliveries are still heavy. For Welsh bars, quotations remain unaltered at £5 17s. 6d. Bessemer and £5 17s. 6d. to £6 Siemens qualities. Fair work is reported at rail mills, where fresh enquiry is not quite so good as could be wished. Values remain, however, firm at last quoted figures of £6 10s. to £6 15s. for heavy sections, with the usual extra for light ditto. Blastfurnaces continue fully engaged, pressure being experienced from buyers, who wish delivery completed of orders in hand now overdue. No easing of the situation here can be expected until the furnaces now preparing are blown in and so increase the present output. Welsh hæmatite is exceedingly firm at 86s. 6d. to 87s. 6d. delivered locally. Iron ore rules unchanged at 22s. to 22s. 6d. for best rubio, with no sign of weakness. Tin-plates are at the moment an uneven market, specifications not coming to hand as readily as can be dealt with, so makers are showing willingness to consider slight concessions for prompt orders. For forward bookings, however, the market is as firm as ever. Latest official figures show 15s. 9d. Bessemer and 15s. 9d. to 15s. 10½d. Siemens for I C 20 × 14 × 112, with other grades and sizes according. Finished blackplate is £11 12s. 6d. to £11 15s., as last week.

Cardiff.

COAL.

The views which have been consistently expressed in these reports for some months past are now rapidly being realised. Supplies of tonnage have become more plentiful, and rates, though still high, are consequently less than they have been. The result is that the demand for coal has been very good, and there is a sharp upward movement in prices, especially as regards best steam descriptions. Sales have been negotiated for colliery screened coals for prompt shipment at over 18s. per ton, while, so far as December is concerned, the current quotation for the premier qualities is round about 18s. 3d. Even at this figure, there is no great anxiety on the part of sellers to do business, as they are of opinion that as December will be little more than a three weeks' full working month, coal will be very scarce, and consequently even a higher price than that mentioned may be looked forward to in the second half of the month. The improvement in the market is no doubt due to the three causes indicated. Notwithstanding the recent boisterous weather tonnage has come forward in very satisfactory quantities, the number of vessels in port when the week opened being 220, and this number was exceeded by 10 or more on several days in the preceding week. The termination of the Baltic season no doubt led to the liberation of considerable tonnage, whilst the congestion on the railways in Germany and Austria, and in certain parts of America appreciably reduced the employment of steamers. With the arrival of more vessels in the Bristol Channel there has been a corresponding easiness in freights, as compared with the rates ruling a fortnight previously. For instance, Genoa has dropped to 12s. 3d. as against 13s. 9d. 14 days before; Port Said has gone back to 12s., a reduction of 1s. 6d.; Marseilles has fallen to 14 fr., or 1½ fr. less; whilst Algiers has receded to 12¾ fr., a decline of 1¼ fr. within a week. To Buenos Ayres within a fortnight the rate has fallen from 23s. to 19s. 6d. The weakness in the freight market was, of course, bound to have an effect on the prices of coal. What the future will disclose it is very difficult to determine, but sellers still maintain the view, as stated in these columns time after time, that contract prices will rule at least 1s. to 1s. 6d. per ton higher than those at which contracts were made over the year now ending; in fact, current prices for best steam qualities for delivery over 1913 are 18s. 6d. per ton, and though no business may yet have been done at this figure, there is no doubt that buyers are fast coming to the conclusion that they will not be able to obtain any supplies under 18s., and indeed may consider themselves fortunate if they are able to effect any sales at all at this figure. Coalowners generally seem to have been very loyal to the Admiralty in not disclosing the price paid for the coals they require for next year, but the writer of this report has every reason to believe that they are quite satisfied with the prices obtained, and which, there is no doubt, have confirmed them in their views as to next year. Charterings last week were on a very satisfactory scale, the number of vessels taken up for foreign ports representing an aggregate carrying capacity of 426,800 tons. As a matter of fact, it was one of the best chartering weeks recorded this year. Great pressure for tips still continues, and the payment of demurrage arising solely from shippers having to wait for loading berths, has been very frequent. There is no question that until a very much larger number of tips are provided, this state of things is likely to endure. Happily there is some prospect of relief within a reasonable period. The Cardiff Railway Company are erecting several new tips alongside the Queen Alexandra Dock, the whole of which are likely to come into operation within the next five or six months. The Barry Dock Company, too, are also providing additional tipping accommodation, but in this case a longer period will elapse before the extra facilities will be available. There are several very large enquiries in the market. Tenders went in the other day for 45,000 tons of Admiralty coals for the Swedish Navy for delivery from December 1 to the end of February. The Egyptian State Railways are asking for tenders for 160,000 metrical tons of Cardiff steam coals, and best Monmouthshires for delivery from February 1 till July 31. In this case tenders have to be deposited by December 12, and they are to remain open for acceptance for 10 days. It will be remembered that in October the Egyptian authorities considered tenders for 300,000 tons of coal, but whether on account of the high prices quoted, or from other causes, it is not believed that they contracted for more than one-half of their requirements. The fresh tenders now applied for are certain to be substantially higher, to the extent perhaps of 1s., than those sent in in October. The Russian State Railways have also been in the market for nearly 300,000 tons, for delivery at Riga and Windau, but it is believed that these contracts will go to the north. In fact, it is stated that St. Petersburg merchants have already purchased about 70,000 tons of Scottish and Yorkshire coals on account for December-February shipment. The statistical tables published by the Customs authorities show that the exports of coal to foreign countries from the Bristol Channel for the ten months ending October 31 amounted to 21,024,968 tons, as against 20,577,142 tons in the corresponding period of last year, being an increase of 447,826 tons. Notwithstanding the increased shipment of large coal, and the consequently larger output of small, prices of the latter are much firmer. Fully 10s. has been paid for cargo qualities for prompt shipment, and even at this figure, too, it has been almost impossible to get supplies. Bunkerings are sold at from 11s. 6d. to 12s., and best ordinaries at 11s. 3d. per ton. Washed nuts are 15s. 6d. to 16s., and washed peas 13s. 6d. to 14s. A very firm tone also characterises the market for Monmouthshire coals. Very little free coal is offering, and prices of best Black Veins are 16s. 3d. to 16s. 6d., western-valleys 15s. 6d. to 16s., and eastern-valleys (best) 15s. 6d., and lower grades 15s. to 15s. 3d. all f.o.b. Cardiff. Bituminous coals are also stronger, No. 3 Rhondda large being 17s. 6d., through-and-through 14s. 6d. to 15s., and small 12s. 6d. to 13s.; No. 2 large 14s. 3d. to 14s. 6d., through-and-through 12s. 9d., and small 10s. per ton. There is a good enquiry for patent fuel, and shipments for the week exceeded 23,000 tons, the Crown Company despatching 10,010 tons, other local makers 6,600 tons, and Swansea 7,236 tons. As much as 21s. is now asked for best brands for shipment in December. Coke is in strong demand, and ordinary foundry realises 28s., and special 30s. to 31s. per ton. Best furnace coke is 22s. 6d., lower grades 21s. to 22s. Pitwood is 24s. to 24s. 6d. per ton.

IRON.

The Balkan war is seriously affecting the tinplate industry. Last week the shipments to all quarters only amounted to 68,645 boxes, whilst the receipt from works totalled 105,408 boxes, leaving 36,763 boxes to be added to stocks, which now stand at 189,446 boxes. Only 6 out of 16 mills are operating at the Duffryn Tin-plate Works, but the management are distributing the work amongst all the hands, so that the loss suffered by those directly concerned, nearly 250, is not so great as would otherwise be the case. The whole of the finishing departments, however, are at a standstill. Unless the war soon ceases it is feared other mills will have to shut down. At the Aber Works three mills have been stopped so as to allow of the laying down of new machinery to replace the present out-of-date engine. The alteration, it is expected, will occupy four months, during which time shifts of four hours duration will be established so as to give all the men an equal share of work. There is no change in prices. The Standard Oil Company have been in the market enquiring for quotations for their usual sizes for delivery during the first half of next year, but none of the Welsh makers would accept less than 15s. 6d., whilst some even asked as much as 15s. 9d., which was alleged to be 6d. to 9d. above the figures that American makers were willing to accept. Up to the present no business seems to have been negotiated. The steel trade is very active, and as much as £6 2s. 6d. is being paid for prompt parcels. For forward delivery makers are quoting £6. Bessemer bars £5 17s. 6d. There has been an unfortunate breakdown at the bar mills of the Ebbw Vale Company, and no bars are expected to be produced there for another fortnight. The galvanised sheet trade continues very quiet. Notwithstanding the recent heavy exports, the sheets produced are in excess of the demand, and 24-gauge corrugateds are selling at from £12 5s. to £12 10s. The blast furnaces are very busy, some of the works being still much behind in their deliveries, and Welsh hæmatite is firm at 87s. 6d. f.o.t. Makers who had bought largely of German hæmatite complain of difficulty in getting deliveries. Best rubio iron ore continues steady at from 22s. 6d. to 23s. per ton, but very little business is doing. There is no change in scrap metals.

Swansea.

COAL

Last week the supply of tonnage materially improved, and the returns showed a large increase compared with the week previous. Both the coal and patent fuel trades were brisk, the shipments amounting to 120,693 tons. There was a good attendance on 'Change this morning, and the anthracite coal market was exhibiting a very firm tone, the demand for nearly all qualities being excellent. Tonnage arrivals over the week-end were heavy, and collieries generally were very heavily stemmed for some considerable time. There was a brisk demand for Swansea Valley large, with prices advancing. Red Vein large was also a strong market. Machine-made nuts and cobbles were moving off satisfactorily. Beans, however, were weak. Rubbly culm quotations were steadily advancing, whilst duff was steady at last figures. In the steam coal market there is a better feeling in evidence, and an improved demand for all descriptions. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. 6d. to 25s. 6d. net; second quality ditto, 20s. 6d. to 22s. 6d.; Big Vein large, 18s. 6d. to 20s., less 2½ per cent.; Red Vein large, 15s. 3d. to 15s. 9d., less 2½ per cent.; machine-made cobbles, 21s. 6d. to 23s. 6d.; Paris nuts, 23s. 6d. to 26s. 9d.; French nuts, 23s. 6d. to 27s.; German nuts, 23s. 6d. to 26s. 6d.; beans, 21s. to 23s. 3d.; machine-made large peas, 12s. 6d. to 14s.; ditto fine peas, 11s. to 12s. 6d., all net; rubbly culm, 6s. to 6s. 6d., less 2½ per cent.; duff, 4s. 9d. to 5s., net. Steam: Best large, 17s. 6d. to 18s. 9d.; seconds, 13s. 6d. to 14s. 6d.; bunkers, 11s. 6d. to 12s. 6d.; small, 9s. 6d. to 10s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 18s. 9d.; through-and-through, 14s. to 15s.; small, 11s. 6d. to 13s., all less 2½ per cent. Patent fuel, 16s. 6d. to 17s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

The continued activity of the steel trade last week was very gratifying, and there was every prospect of a flourishing period in this industry to the end of the year. As regards the tin-plate trade, however, much will depend on the position of affairs in the Near East. Unless peace is secured very shortly, many tin-plate mills in this district will have to be closed down. The tube works and foundries were busy. The shipments of tin-plates were 68,645 boxes, receipts from works 105,408 boxes, and stocks remaining in the dock warehouses and vans 189,446 boxes.

Llanelly.

COAL.

There is no alteration of any note to report of the local coal trade, and the market is giving satisfaction in nearly every department. There is a slight easing off for one or two kinds, but generally speaking collieries are very well fixed over months to come, and in some cases over the whole of next year. It is surprising how many works have booked up their requirements over 1913, and have been quite prepared to pay advances of anything up to one shilling per ton. Wages certainly show no sign of being reduced and colliery costs have a tendency to go higher. Anthracite of nearly all kinds are firm, and prices with the exception of beans and peas are holding good. Steam and bituminous coals are still in excellent request, and prices are likely to hold good for months to come. Prices this week are:—Best malting large, 23s. to 25s.; second malting large, 21s. to 22s. 6d.; Big Vein large, 17s. 6d. to 19s. 6d.; Red Vein large, 15s. to 15s. 6d.; machine-made cobbles, 21s. to 22s.; German nuts, 25s. to 26s.; French nuts, 25s. to 26s.; Paris nuts, 25s. to 25s. 6d.; machine-made beans, 22s. to 22s. 6d.; ditto, second quality, 20s. to 21s.; machine-made peas, 12s. 6d. to 13s.; rubbly culm, 6s. to 6s. 6d.; duff, 4s. 6d. to 5s. 6d.; large steam, 16s. to 16s. 9d.; through-and-through, 10s. 9d. to 11s. 6d.; small steam, 9s. 6d. to 10s. 6d.; bituminous small, 10s. 6d. to 11s. 6d.—all f.o.b.

THE TIN-PLATE TRADE

Liverpool.

The market has been very quiet the last few days. Buyers are not disposed to book ahead, and makers on the other hand state that it is impossible to reduce the prices they are asking, with steel bars and tin at their present level. Some "bear" sales were reported at a shade under makers' prices, which may be called:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 15s. 1½d. to 15s. 4½d. per box; I C 28 × 20 (112 sh. 216 lb.), 30s. 3d. to 30s. 9d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 6d. to 15s. 9d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. 6d. to 15s. 9d. per box; I C 14 × 19¼ (120 sh. 110 lb.), 15s. 6d. to 15s. 9d. per box; I C 20 × 10 (225 sh. 160 lb.), 22s. 6d. to 22s. 9d. per box; I C squares and odd sizes, 15s. 6d. to 15s. 9d. basis. Ternes are easy at 26s. for I C 28 × 20 unassorted, and charcoal tins stand at 18s. basis for usual specifications in "Allaway" grade. Coke wasters are quiet as follow:—C W 14 × 20, 14s. 3d. per box; C W 28 × 20, 28s. 6d. per box; C W 14 × 18¾, 14s. 3d. per box; C W 14 × 19¼, 14s. 7½d. per box; C W 20 × 10, 19s. 10½d. per box—all f.o.b. Wales, less 4 per cent.

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Forthcoming Annual Meetings.

Institution of Mining and Metallurgy	March 13, 1913
International Geological Congress—	August 21, 1913 (Toronto)
Geological Society	Feb. 21, 1913
North of England Institute of Mining and Mechanical Engineers	August 2, 1913
South Wales Institute of Engineers—	
Annual Dinner	Jan. 23, 1913
Annual Meeting	March 18, 1913
Institution of Mechanical Engineers	Feb. 14, 1913
Annual Dinner	April 17, 1913
Mining Institute of Scotland—	
Annual Dinner	Dec. 7, 1912
Manchester Geological and Mining Society—	October 14, 1913
Institution of Mining Engineers—	June 5 & 6, 1913 (London)
	Sept. 24, 25 & 26, 1913 (Manchester)

The Colliery Guardian.

LONDON, FRIDAY, NOVEMBER 29, 1912.

At Cardiff on the 21st inst., Lord Merthyr was admitted an honorary member of the South Wales Institute of Engineers. Subsequently a long discussion took place on the subject of gas analysis.

The Miners' Federation is taking steps to ask the Home Office Committee on Industrial Diseases to schedule slow poisoning by gob fire gases as one of the occupational diseases of miners.

An interesting decision was given in the Scottish Justiciary Appeal Court on Saturday, in a case in which the management of the Montgomeryfield Colliery, in Ayrshire, was charged with contravening subsection 1 of section 2 of the Eight Hours Act, in having omitted to record the reasons why certain workmen were employed for a longer period below ground than that provided by the Statute. The court quashed the conviction on the ground that the interval between the descent of the last man and the ascent of the first man on the shift was not in excess of the statutory period. The case applied specially to firemen, who, although descending at long intervals, were adjudged to be on the same shift.

The Royal Sanitary Institute, London, held a sessional meeting at Doncaster on Saturday, and discussed town planning in relation to the development of the South Yorkshire coalfield.

A Blue-book [Cd. 6493] dealing with the statistics of compensation and of proceedings under the Workmen's Compensation Act, 1906, and the Employers' Liability Act, 1880, during the year 1911, has been issued by the Home Office.

A trade union case of some importance was decided by Mr. Justice Swinfen-Eady in the Chancery Division on Tuesday. The question was whether the executive committee of the Warwickshire Miners' Association was justified in 1908 in paying the costs of two of its officers, Mr. William Johnson, M.P., and Mr. Jewis, who brought slander actions against one Pat M'Nicholas for attacks made on the association and its officials. His lordship found that the payments were *ultra vires*, and an order was made against the defendant, William Johnson, to repay the sum of £775 7s., which he personally improperly paid out of the funds of the association on the 10th of July, 1908, with interest at the rate of 4 per cent. from the date of such payment. A stay of execution was granted.

The Northumberland miners have decided to carry out a vigorous campaign against the three-shift system.

Questions were asked in Parliament this week in regard to the appointment of pit pony inspectors.

A meeting of the North Staffordshire Institute will be held on Monday at Stoke, when Mr. Robert Nelson will read a short paper on electricity.

Mr. R. O. Lamb presided at a meeting of the Northumberland Coalowners' Association with the representatives of the men at Newcastle, on Saturday, when the latter applied for an advance in wages. After some discussion, 3¾ per cent. was granted, making an advance of 11¼ per cent. within the year. The increase takes place from pays commencing to-day, and makes the wages of underground workmen and banksmen 38¾ per cent. above the 1879 basis, and other classes of surface labour 31 per cent. above.

Official details of the voting on the question of the five days working week for all miners have been issued by the Federation of Great Britain to the affiliated unions. The voting shows 306,000 for and 283,000 against the proposal. The supporters were Lancashire, Notts, Scotland, Northumberland, Durham, North Wales, and Forest of Dean.

His Honour Judge Bradbury, K.C., the independent chairman of the Lancashire and Cheshire Joint Board formed under the Coal Mines (Minimum Wage) Act, has issued his decision on two points submitted to him. One was the definition of an adult—the men contended that a workman was an adult when he reached twenty years—and the other point had reference to the supply of coal free, or at less than market price, to men in the Haydock and St. Helens district. Judge Bradbury finds that an adult means a person who has reached twenty-one years of age, and on the second matter his award is that the men shall receive the coal at the prices charged to them on March 29 last, before the passing of the Act. A meeting of the board was held on Friday, when the owners would not assent to the uniform scale of wages for surface hands submitted to them.

A meeting of makers of miners' safety lamps was held in Manchester on Wednesday, in order to draw the attention of the Government to some points in the new regulations for safety lamps in mines. The makers were in favour of Home Office tests as likely to lead to the employment by collieries of a better finished type of lamp, but objected to certain conditions as at present imposed, notably the heavy fee for testing, the inaccessibility of the Eskmeals Station, and the high efficiency required for electric lamps. The Government were also asked to suspend the tests, so far as they relate to glasses, until 1914. Full details will appear in next week's *Colliery Guardian*.

The Coalfields of South Africa.

Amongst the many problems arising out of the advent of the Panama Canal as a new factor in commerce is the effect that this passage will have in changing the trade routes of the world, and intimately connected with this is the question: What effect will the Canal have upon international coal competition? In considering this question it must be remembered that a coal-driven industry tends to follow the fuel and not the fuel the industry.* So if, through any rearrangement of trade routes, a country possessing a potentially unlimited supply of cheap fuel is made more accessible to industry, it follows that such a country attracts such industry towards itself.

Any information regarding the coal resources of the world is therefore welcome with a view to judging if any particular area will be able to derive direct or indirect benefit in the way above suggested, and Mr. Rowland Gascoyne's excellent paper on the "Coalfields of South Africa," contributed to the twenty-first anniversary number of the *South African Mining Journal*, appears opportunely.

In 1910 the coal production of the Union of South Africa was 6,405,589 statute tons†, to which amount the Transvaal contributed 3,548,550 tons, Natal 2,294,746 tons, the Orange Free State 474,742 tons‡, and Cape Colony 87,551 tons. The total amount was more than the Union's requirements, and the excess of exports over imports of coal amounted to 1,247,000 tons (Coal Tables, 1911). The actual consumption was made up of 5,128,000 tons of home production and 61,000 of foreign production. The coal exported by South Africa in 1910, distinguishing the principal countries of destination to which exported, was as follows:—

	Statute tons.
India	21,000
Australia	2,000
Ceylon	4,000
Straits Settlements	6,000
Mauritius	5,000
Zanzibar	4,000
Kerguelen Islands	3,000
Reunion Islands	3,000
German East and South-west Africa	8,000
Portuguese East and West Africa	85,000
Other countries	2,000
Bunker coal	1,336,000
	1 474,000

The output of coal for the year 1911* was:—

	Statute tons.
Transvaal	4,842 770
Natal	3,323,908
Orange Free State	578,022
Cape Colony	122,558
	8,867,258

In a preliminary geological sketch, Mr. Gascoyne points out that the coalfields of South Africa have a striking similarity—as regards fossil fauna and flora, and general characteristics of the seams—to those of New Zealand, Australia, China, Japan, India, and South America, as distinguished from the coalfields of Europe and North America. The coalfields of South Africa belong to a collection of beds known as the Karroo system, which is considered to be equivalent to rocks in the European system, ranging from the upper carboniferous to the lower jurassic formations.

The following comparative table possesses considerable interest:—

South Africa.	Brazil.	India.	New South Wales.	Europe.
Stormberg Series: Drakensberg Beds Cave Sandstone Red Beds Molteno do.	St. Bento Series: Volcanic Rocks St. Bento Sandstone	Upper Gondwanas: Rajmahal Kota-Maleri	Wianamatta Beds	Lower Jurassic Rhætic
Beaufort Series: Burgersdorp Beds Middle Beaufort do. Lower do. do.	River Rasto Beds New Estrada Series	Lower Gondwanas: Panchet Damuda	Hawkesbury Series Upper Coal Measures: Newcastle Dempsey Tomago	Trias Permian
Ecca Series: Ecca Series				
Dwyka Series: Upper Shales Boulder Beds Lower Shales	Iraty shales Pigeon do. Pretty River Beds Orleans Conglomerate Sandstone Shales	Talcher	Lower Coal Measures: Upper Marine Series Greta do. Lower Marine do.	Upper Carboniferous

Turning to the resources of the coalfields of South Africa, Mr. Gascoyne says "there are few countries, probably, in the world where such an extensive area is covered by coal measures, productive and otherwise, as is the case with South Africa. The Transvaal Province leads, with an area of over 4,000 square miles of productive coal measures, not including the worthless Stormberg beds at Komati Poort and those north of Pretoria. Less than one-tenth of this area has been proved to carry coal equal to the present Middelburg standard of a theoretical calorific value of 12·50 lb. of water evaporated per pound of coal, nearly the whole of this extensive area containing coal ranging from a theoretical calorific value of 10 to 12, and therefore of second-rate quality. Another 10 per cent. runs under 10, and includes the inferior coal lying between Boksburg and the Wilge River, as also the scattered inferior coal deposits near Delmas, most of which carry coal far too inferior to use for steam purposes under to-day's requirements.

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* "International Coal Competition," a paper by Allan Greenwell, F.G.S., read at the annual meeting of the Canadian Mining Institute, Toronto, 1912. *Colliery Guardian* (Canadian Special Number), April 17, 1912, p. 31.

† Mines and Quarries. General Reports and Statistics for 1910, Part 4. [Cd. 6460.]

‡ Provisionally returned as 504,000, Coal Tables, 1910, House of Commons Reports of Papers, 1911, No. 284.

* Union of South Africa. Mines Department, Annual Report, for the year ended December 31, 1911.

Next to the Transvaal comes the Orange Free State, with an area of 3,000 square miles of workable coal measures, estimated to be capable of yielding a serviceable steam coal, but the quality is mostly third-rate as compared with the Transvaal gradings of coal to-day, and much of it is so inferior as not to be of any service.

Natal has an area of about 2,000 square miles of coal measures, but only one-fourth of this area is estimated to represent productive coalfields. Less than one-third of this reduced area contains workable coal, and much of this is unserviceable. Consequently Natal possesses a very limited area containing coal of standard quality for shipment or market purposes.

The coal resources of Cape Colony are confined to the Stormberg beds, where the coal occurs in such an irregular manner that it is difficult to make a reliable estimate.

The following is an estimate given by Mr. GASCOYNE of the coal resources of the different provinces reduced to figures, showing the probable number of marketable tons of coal of different qualities as graded in the different provinces to-day.

TRANSVAAL.

Witbank. Theoretical calorific value, exceeding 12.	Second grade. Theoretical calorific value, from 10 to 12.	Third grade. Theoretical calorific value, from 7 to 10.	Total tons of available coal under to-day's conditions.
Tons. 529,920,000	Tons. 5,093,092,000	Tons. 576,000,000	Tons. 6,199,012,000

ORANGE FREE STATE.

Theoretical calorific value, over 9.	Theoretical calorific value, from 7 to 9.	Total.
Tons. Say, 1,000,000,000	Tons. 4,529,000,000	Tons. 5,529,000,000

NATAL.

Standard quality. Theoretical calorific value, over 13.	Second quality. Theoretical calorific value, between 12 and 13.	Third grade. Semi-anthracite. Unmarketable to-day.	Total. Saleable coal.
Tons. 290,000,000	Tons. 340,000,000	Tons. Not estimated.	Tons. 630,000,000

With regard to Cape Colony, Mr. GASCOYNE says that this province probably contains 150 million tons of coal, but it is too much inferior in quality to be classed even with the third-grade qualities of coal of Natal and the Transvaal, and may be considered to add but little to the coal resources of South Africa.

As already stated, 3½ out of the 6½ million tons of coal produced by South Africa in 1910 came from the Transvaal. These coalfields, for obvious reasons, have been explored and developed to a greater extent than those of the other provinces, and especially those within profitable distances of the Rand.

According to the Government Mining Engineer's report, for the year ended December 31, 1911, the Springs-Brakpan and Middelburg coal areas contributed 15 per cent. and 76 per cent. respectively to the output of the Transvaal, but Mr. GASCOYNE states that the former is rapidly approaching exhaustion, and that the latter (Witbauk coalfield) has been taken up wherever within profitable reach of the railways, and is in a much further advanced state of exhaustion than generally known. He says that Tranvaal collieries, unlike Rand gold mines, have a habit of becoming prematurely and suddenly exhausted. There are, of course, exceptions, but the Brakpan Colliery was estimated at one time to have a life of a hundred years, and in fifteen years it was exhausted. The principal coalfield in the Transvaal, and the one to which resort must be had to meet the coal requirements of the province, extends eastwards of the Wilge River from near Devon, in the south, to near the point at which this river joins the Olifant River. The productive coal area, however, extends but little to the north of the Pretoria-Delagoa Bay Railway, having been reduced considerably in area by denudation. To the east it extends to the town of Middelburg, and from thence passes south-east a few miles east of Carolina, to a point near Amsterdam on the Swazi border. It then runs about half way between Ermelo and Piet Retief, and continues about fifteen miles south of Betbal on to the Wilge River, near Devon.

The Orange Free State coalfields, generally speaking, carry but one workable seam of coal, and the best coal worked is south of Klerksdorp, and known as the Vierfontein coalfield. The Government Mining Engineer says "the coal-mines of the Orange Free State are situated towards the northern boundary of the Heilbron district, and in the northern and north-western portion of the Kroonstad district. The output from the former district amounted to 81 per cent. of the total."

In Natal the largest and most important coalfield extends in an irregular shape from Elandslaagte to Newcastle, the best portion, from which nearly all the good coal in Natal is worked, lying between Dundee and Dannhauser. The Government Mining Engineer states: "In Natal the largest coal-producing area is the Klip River County. The fields extend north-west and south-west of the town of Dundee, about 40 and 30 miles respectively; 85 per cent. of the coal produced came from this area. The percentage for 1910 was 94 per cent."

The most important coal deposits in the Cape Provinces occur in the neighbourhood of Molteno, Cyphergat and Indwe.

As to the probable life of the South African coalfields, Mr. GASCOYNE says, in conclusion: "The 'life' of the coalfields depends upon so many future conditions that it is impossible to estimate the duration of the coal supply. Generally speaking—since the goldmines got in proper swing after the war—the output of coal has doubled itself in 10 years, and there seems every prospect of this condition of affairs being continued. If an adequate reduction be made on railway rates for export coal, then the increase will be even more marked both in the Transvaal and Natal. There is, however, one thing certain, and that is, if the same practice exists as to-day of working as much of the coal of the Witbank standard of quality as possible, this quality of coal will be long exhausted before the Rand, and the mines will be running on coal of second grade. The same thing will happen in Natal as regards bunker and export coal, the supply of which is smaller than generally admitted. Fortunately, however, both the Transvaal and Orange Free State possess large reserves of second-grade coal quite good enough for general purposes, even when the supplies of Witbank standard quality have been exhausted."

The area of the Union of South Africa is about four times that of the British Isles, and the exploration for coal in the former is comparatively recent. When we remember, therefore, that new coalfields are still being discovered in this country, it may well be that there are many pleasant surprises in store for South Africa.

Trade Summary.

The London coal trade during the past week has been very slow, but the presence of frosty weather at the end of the week greatly stimulated orders. The seaborne market was affected by the serious delay to vessels and craft in the river owing to the stormy weather, and until Wednesday's market the inland orders were very weak. Many merchants confined their dealings to buying from each other; colliery orders were neglected. Bakers' nuts and kitchener cobbles are fairly firm. Steam coals are weaker. All kinds of slacks are in good demand. Prices remain unchanged, but the market assumed a firmer tone on Wednesday.

The market for prompt shipment at Newcastle is firm and advancing, and supplies are scarce. This applies to all classes of fuel.

The Durham coal trade is strong all round, both as regards prompt and forward business.

The Lancashire house coal trade is quietly steady. There is a brisk demand for bunkering sorts, and manufacturing coals generally are cheerful.

The West Yorkshire house coal trade is dull, the coastwise trade being quiet. All other classes of fuel are in vigorous request.

There is a stronger feeling in regard to South Yorkshire steam coals, there being a steady demand on export account. Both on coke-making and manufacturing account the demand is very heavy. House coal is unchanged.

Derbyshire house coal is in rather better request, and manufacturing coals are in pressing demand.

There has been a sharp upward movement in prices at Cardiff, and tonnage is more plentiful. Small coals are firmer. Monmouthshire coals are also exceedingly strong, as are bituminous sorts. There is a good enquiry for patent fuel.

Scottish shipments have increased, notably from the Fife ports. Generally speaking, the market shows considerable activity.

LABOUR AND WAGES.

North of England.

At a sitting of the Industrial Council on the 26th inst., Mr. A. F. Pease, of Darlington, representing the Durham Coalowners' Association and the Cleveland Mineowners' Association, presented his views on the responsibility of a union keeping its agreements. He said he thought, in the first case, there should be some easy way of getting money from a union if the men break their contract by going out without notice, and as a last resort they should be sent to prison; and in the other case, if there was a strike, that the trade union should be held responsible. Witness disagreed with compulsory arbitration. He favoured persuasion, and not the application of pressure to bring non-associated owners within their association. Mr. Pease said that there were frequent local stoppages owing to contravention of agreements between the parties, and called attention to the fact that by far the greater number of these occurred in 1910 because of dissatisfaction with the eight hours agreement. Asked by Sir Hugh Bell whether he would say that the dissatisfaction that arose out of the Eight Hours Act was due to the intervention of Parliament, Mr. Pease said he did not know that he was allowed to say so, but if he was, he said "Yes." On the question of damages, he thought a recent decision made it impossible to recover from a trade union, even if an agreement existed beforehand. A union, on the other hand, could recover. If the hands of the men's leaders were strengthened, and if men inclined to be refractory knew that any action of theirs would penalise the union to which they belonged, they would think twice before going on strike. The whole good of arrangements between masters and men was in their voluntary nature.

On Saturday the Wages Board of the Northumberland Miners' Association met the coalowners of the county, at the Coal Trade Offices, Newcastle, in support of an application by the men's representatives for an increase of wages. Mr. R. O. Lamb presided. The wages of miners were advanced 1¼ per cent. in January; there was a further increase of 3¾ per cent. in May; and in August there was another advance of 2¼ per cent., making the wages of underground workers and banksmen 35 per cent. above the standard of 1879, and those of surface workers, other than banksmen, 28 per cent. above the 1879 basis. It was agreed that an advance of 3¾ per cent. be granted, with pays commencing on Monday. This makes the wages of underground workmen and banksmen 38¾ per cent. above the basis of 1879.

At a meeting of the Wages Board on Monday the Board expressed strong dissatisfaction with the attitude adopted by the owners in dealing with the application for an increase of wages, it being alleged that they refused to let the men's representatives know what prices had been paid for coal in the last quarter. It was agreed that the secretary should forward a letter of protest to the Northumberland Coalowners' Association.

ike at the Siddick pit decided to
day, the questions at issue to be the
on after work was resumed.

rt of the special meeting of the
liners' Council with regard to the
has been issued. The lodges are
before December 14 for or against
sals adopted by the council:—

gents and executive committee com-
s campaign throughout the county
of explaining to our members the
of the three-shift system, after which
ur members be taken on the following
you in favour of tendering 14 days'
necessary, striking to secure the
hree-shift system?"

ampaign proposed in Mr. Burton's
ocluded by February 22, 1913, and
ken not later than the 28th of the

Federated Area.

rge attendance of delegates at an
of the Lancashire and Cheshire
, held on Saturday at Salford. It was
nsiderable number of miners employed
owles' and the Clifton and Kersley
pits in the Pendleton, Pendlebury,
y districts had so far refused to join
decided, after discussion, to declare
unionists still refuse to come into the
e upon 6,000 miners and surface
yed by the two firms.

ensued upon the application for an
by surfacemen employed by various
nd South-east Lancashire. It was
the employers were prepared to do
particular districts to increase the
likelihood of the pits being stopped.
men were joining hands with the
r that the alleged low wages should

surface workers employed at Lord
e Clifton and Kersley Coal Company's
nester and Bolton districts, held on
was stated that formal applications for
ere to be forwarded to the employers.
concessions being refused notices to
s would be handed in.

ng of the Yorkshire Miners' Associa-
Barnsley on the 25th inst. The
ring notices at the Glass Houghton
urned pending a meeting with the
application to take a ballot on the
dering notices owing to alleged
the men at the Central Silkstone
, was also adjourned to the next
negotiations with the management.
e council had considered many cases
g out of the action of West Yorkshire
hey continued in their attitude of
t cases to arbitration or enquiry, the
n would have no other alternative but
to be taken at the collieries affected.
not stop where it was if there was a
he tactics by some coalowners who
n from other counties and getting
less rates than was agreed upon by
sociations of owners and men. The
joint council of the owners' section
to discuss these matters, and also
surfacemen's wages, and unless
re changed there would have to
by the county to see what could
about a general settlement. It was
plication was received from nearly
pay, and Mr. Smith said that a large
came from a certain colliery. The
mined this state of things could not
inue, and if managers insisted upon
vantage of men they would have to
thods than the paying of out-of-work
again considered political matters,
ecision recently to take the opinion
candidate should be adopted for the
erham, and Holmfirth divisions. The
was also now mentioned, and it was
ings should be held on trade union
ions in various constituencies in the
e next three months. At the close
be taken of the whole of the county
uencies should be contested. There
ngst delegates that other seats than
tioned should be contested.

ting of the conference between repre-
Erewash Valley colliery owners and the Notts Miners' Association in regard to the dispute as to the wages and hours of surfacemen at the New Hucknall and Bentinck collieries was held at Nottingham on Monday afternoon, November 25. After prolonged discussion, the owners submitted what was practically their ultimatum, but the men's representatives declined to accede to the terms offered.

The Joint District Board for Lancashire and Cheshire under the Coal Mines (Minimum Wage) Act held a meeting at the Queen's Hotel, Manchester, on the 22nd inst., and discussed the report of Judge J. K Bradbury, the independent chairman, on the age at which a worker becomes an "adult" and the supply of free or cheap coal to miners and drawers who are householders.

On the first of these two matters, Judge Bradbury reported:—

"I am of the opinion that 'adult' in clause 3 means a person who has attained the age of 21 years. I also am of opinion that a person 'of the age of 20 years and under' does not include a person who is over 20 and under 21 years of age. So construed, the clause does not, as it stands, fix the rate of deduction for a drawer between 20 and 21. I have therefore fixed the rate at 5s. 9d., and the following additions should be made to the clause as it now stands:—'Where the person acting as drawer is over 20 and under 21 years of age the sum deducted shall not exceed 5s. 9d. per day. In the above clause and in the addition thereto set out below the word 'adult' denotes the person who has attained the age of 21 years." The additional clause 3 will stand as set out and agreed on.

"On the price of house-fire coal the award was:—'Whereas at certain collieries in Lancashire it is a term of the contract of employment of colliers and drawers who are householders that they shall receive from their employers fire coal free or at less than the market price; and whereas questions have arisen as to the prices to be charged for such fire coal; and whereas the employers and workmen at the aforesaid collieries have through their respective agents agreed to refer the said questions to me for decision and have agreed to observe and abide by my award, now I, having considered the matters referred to me as aforesaid, do hereby award and determine as follows—that is to say:—From and after the date of this award the prices at which fire coal shall be supplied shall be the prices charged to colliers and drawers on the 29th day of March, 1912, and such prices shall not hereafter be altered in any case except by and with the mutual consent and agreement of the parties affected thereby. And I further direct that this award shall operate as from the date hereof, and that no claim shall be made in respect of the prices charged between the 29th day of March and the date of this award.'

"The following addition shall be made to the district rules:—'In all cases in which fire coal is supplied free or at less than the market price to colliers and drawers, such allowance shall be forfeited for the period in which any collier or drawer is being paid the minimum wage, but this is not to apply to a man working under the difficult places clause or day-wage coaling.' The prices charged to the colliers and drawers, of course, vary in different districts." The proceedings were presided over by Mr. Charles Pilkington (for the Employers' Association) and Mr. Thomas Greenall (Miners' Federation) as vice-chairman, and at the close the following additional report was supplied to the Press:—

"The owners were unable to agree to the uniform scale of wages to surface hands throughout the county submitted by the Federation, but stated that if any other proposal were made of a scale low enough they would submit the proposal for the consideration of the Coalowners' Association. It was further stated on behalf of the owners that cases where the wages were unduly low were being considered at various collieries with a view to adjustment."

INDIAN AND COLONIAL NOTES.

India.

The Traffic Problem.—A well-informed correspondent writes:—During the last few months, traffic on Indian railways has experienced its annual diminution due to the rainy season, and there have been fewer complaints of the inability of the Indian railways to deal with it. While the jute, rice and cotton crops are growing—while country roads are deep in mire and produce cannot be moved without the risk of damage from torrential rains, there is a pause in the flow of goods to Indian railway depots, and a time of comparative quiet gives opportunity for reflection. This time has been utilised by a railway conference under the presidency of Sir Trevredyn Wynne between representatives of the principal railways, of the Port Trust, of the Bengal Chamber of Commerce and Indian Mining Association, to consider ways and means to lessen the difficulties that were expected to recar when the crops then growing come to market—a time which has now arrived.

The conference has published their recommendations, a summary of which has been given by the *Statesman*. The report is an exhaustive one covering 90 pages of printed foolscap, and embodies nearly 50 recommendations. The reference suggested by the Chamber of Commerce stated as subjects to be considered:—

The distribution of wagons to collieries.
The loading of wagons at collieries.
The collection of wagons from collieries.
The hauling of wagons to destination.
The unloading of wagons.
The returning of wagons to the collieries.

The main heads were subdivided by the conference into 24 subheads dealing in detail with the special requirements of the Indian coal trade, with the weighment of coal, the provision of marshalling yards and the exchange of traffic between the four managements that connect the mines with the port of Calcutta, viz., the East India Railway, the Bengal Nagpore Railway, the Eastern Bengal State Railway, and the Calcutta Port Trust. The conference recommends the remodelling and extension of various marshalling yards and the making of new sidings and connections. There are notes of dissent to some of the recommendations by the representatives of the East Indian Railway and the Port Trust in reference to which the *Statesman* makes the following remarks:—

"The East Indian Railway is earning 9 per cent. on its capital. Now the railway is a State-owned line, worked by a company under a contract for a certain number of years, the company's share in the contract being repurchasable by Government at the end of the contract term at a price to be based on the current market value of the stock. It is, therefore, plainly to the interest of the company to keep this value at as high a figure as possible, its sole concern in the undertaking being for the period of its contract. Thus its interest is directly opposed to that of the commercial community, which demands a large expenditure of additional capital for the purpose of providing further traffic requirements. From the point of view of their shareholders, the attitude of the railway directors is perfectly intelligible. So long as the concern is earning 9 per cent., it is clearly against their interest to jeopardise that return by expending additional capital." All who are disinterested will agree with the *Statesman* that "It is monstrous that the trade and prosperity of Calcutta should be jeopardised for the benefit of shareholders in other parts of the world." That this should be possible shows that the giving of Government railways into the hands of companies located in England enables private persons to restrain the flowing current of India's prosperity and hold back its progressive course to turn their own private mills. In view of the fact that a railway which earns 9 per cent. is nevertheless always short of money, and always so to speak, "a day late for the fair," there seems no justification for a system that so lends itself to abuse. It may be admitted that the managers of private companies who have been selected by a process of competition and survival of the fittest, are usually more capable than officers of a Government service who rise by seniority, and the company system enables such managers to hold their appointments for many years, during which a whole procession of Public Works or Sapper officers marches through the offices of the State Railway. It may be asked, however, "Is this advantage worth the price paid, or is the management of the better man hampered by an absentee board more effective than that of the less capable one who has no other control than that of the Government on the spot?" Existing contracts must, of course, be carried out, but it is to be hoped that no other will be made on the same lines.

THE BY-PRODUCTS TRADE.

Tar products:—There is a quiet tone about the market, but prices keep very steady. Benzols and pitch are somewhat feeble, and carbolics continue at the current low-level prices. Naphthas are firm and unchanged, while the same may be said of toluol and creosote. Nearest closing values are:—

Benzols, 90's, 11¼d.; ditto 50's, 10¾d.; toluol, 11½d.; carbolic acid, crude (60 per cent.), 1s. 10½d. to 2s.; ditto crystals (40 per cent.), 7½d.; solvent naphtha, 1s. 1d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 3½d. for ordinary qualities; pitch, 43s. to 43s. 6d. f.o.b. east coast; ditto, 42s. 6d. to 43s. f.a.s. west coast; ditto, 47s. 6d. gas companies.

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

Sulphate of ammonia:—There is not much actual change in the position of the market, and quotations, when reported as lower, are more the father of the wish than of actualities. The constant harping on the weakness of the American market shows how anxious buyers are to "get in" at any reduction, however small. It is a pity more is not said about the healthy tone of the other big markets—and there are others. It would be unwise to give way in the price of sulphate with all other fertilisers (even nitrate of soda) so firm, even if the American market was closed to us for evermore. Small wonder sellers are holding firmly, as a whole. Closing prompt prices are:—

London (ordinary makes), £13 5s.; Beckton £13 15s.; Liverpool, £13 17s. 6d. to £13 18s. 9d.; Hull, £13 15s.; Scotch ports, £14 to £14 2s. 6d.; nitrate of soda (ordinary), 11s. 9d. per cwt.

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

THE CASE OF THE FIREMEN.—V.

Sir,—It now only remains to consider whether, in any practical or effective sense, it is true that, for the purpose of the genuine gas test, the coal-gas flame can be so completely robbed of its normal luminosity as to justify the substitution of coal gas in place of firedamp.

It is obvious that the most effective method of destroying this luminosity consists in the removal of its cause. This cause, as shown by Sir Henry Roscoe (quoted in my previous letter), consists in the presence of solid incandescent carbon in the flame. This, however, is but the effect of a previous cause—viz., the more active affinity for oxygen possessed by hydrogen as compared with carbon. When the heavier hydrocarbon molecules are broken up, their hydrogen atoms seize on the available oxygen and combine violently with it. The heat liberated by the combustion renders the uncombined carbon incandescent, and it is this incandescent carbon which emits the light seen in the flame.

Observation of common things agrees with this theory and confirms it. The luminosity of various samples of coal gas, for instance, varies with the specific gravity—*i.e.*, with the proportion of heavier hydrocarbons entering into the mixture. Let $R =$ the ratio of the carbon atoms to the hydrogen atoms contained in the molecule of any familiar combustible. Then we start by noting that the flame is non-luminous when pure hydrogen is burned in air, or oxygen. In this case, of course, $R =$ zero. In the case of methane, the principal constituent of firedamp, $R = 0{\cdot}25$, and the flame is so nearly non-luminous that we often call it actually so. In olefiant gas, an important constituent of coal gas, the value of $R = 0{\cdot}5 =$ twice the ratio for methane, and the consequence is that the luminosity of the flame becomes so great that we can illuminate our streets with it. Coming to gas of the benzene order (an even more important constituent of coal gas), the ratio R rises to 1, and the luminosity is now greater than even that of olefiant gas. There is more solid incandescent matter in the flame, and if you still further increase the solid matter by adding a common gas mantle, this mantle also becomes incandescent and adds still more to the luminosity, although the quantity of gaseous matter has not been varied at all. Coming to the electric arc lamp, we have $R =$ infinity (practically), and the luminosity is unsurpassed by any artificial illuminant.

Now when solid carbon is thus separated out in the flame, the ultimate result is the formation of smoke and soot. Everyone knows, or ought to know, the great difficulty attaching to the problem of smoke-prevention. The only means of prevention is perfect combustion at the outset. Forced draught, hot blast, blowpipes and Bunsen burners are all instances of effort to attain the complete combustion of the heavier hydrocarbons. The oxygen must, at the very outset, be enabled to take up all the nascent carbon atoms as well as all the hydrogen. If this instantaneously complete combustion be effected, we shall do away both with luminosity in the flame and with smoke and soot in its products; but not otherwise. That is a familiar illustration of a particularly difficult job.

To do away, then, with the luminosity of the coal gas cap there must be perfectly *complete combustion*. But for perfect combustion there must be *perfect diffusion* of the various inflammable gases with the air. Perfect diffusion of gases, as every man of experience in fiery mines is aware, *requires time*. Every such man knows that the tendency of these gases to stratify themselves in accordance with their specific gravities is much more promptly manifested than is their tendency to diffuse in accordance with their molecular velocities. Nevertheless, it is true that, ultimately, the diffusion attains perfection. But it must have time—you never find diffusion alone clearing the gas out of a working place in a mine—you have to shift it bodily by the kinetic force of the air-current, or, if not bodily, by mixing it lumpily with the air. That kind of thing, however, represents a state of affairs very different from the perfect diffusion which makes possible the perfect combustion of the heavier hydrocarbons. Such diffusion ranges the molecules, one by one, in absolutely definite and uniform order throughout the mixture. In that case, every thousandth part of a cubic millimetre of the mixture is then of exactly the same composition as every other thousandth part of a cubic millimetre in the mixture. This perfect diffusion can be effected only by the natural molecular forces. Therefore, if such perfection of diffusion is to be attained—and in this particular case it is indispensable—you must wait until the molecular forces have had time to accomplish their work. Given time, they will ultimately accomplish the work, for the molecular velocities are immensely great; but time they *must* have, for the length of the molecular path is infinitesimally small, and the complete route is an exceedingly tortuous one. Whether the approved authorities are exactly the right kind of people to solve this intricate problem of perfect diffusion, or whether, indeed, they even know that such a problem exists, may be judged from the circumstances set forth in succeeding paragraphs. I may here say that it gives me much pleasure to be able at this stage to complete the case for the firemen by quoting the testimony of other men rather than by further pursuing an argument which some readers might consider all my own.

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Deshargur coal 22s. per ton, and Welsh (Powell Duffryn), 29s. 5d.; at Karachi, Indian coal, 23s. 8d., and Welsh 28s. 5d.

It is desired by the Cardiff Railway Company to "vary" the tolls, rates, and charges authorised by the existing Acts relating to their undertaking; and they have issued notice of application to Parliament next session for the necessary powers. We are, therefore, likely to witness a renewal of the strenuous conflict that was waged over a previous Bill drafted with the object of increasing the charges.

More settled conditions are the certain result of advantages which have been given to different classes of men in the employ of the Newport Docks and Railway. For coalmen the minimum wage will henceforward be 23s. per week, which entails an immediate advance of 1s. to 2s. to some among them; and in the traffic and other departments there are to be higher rates established.

The resignation is announced of Mr. John Macaulay, general manager of the Alexandra (Newport and South Wales) Docks and Railways Company; but it will not take effect till May next, and Mr. Macaulay will continue to act as adviser to the company after that period for a term of five years. Mr. Macaulay has been at Newport for about 13 years, having previously been connected with the Mersey Railway; prior to that, traffic superintendent at Liverpool for the Cheshire lines. His career at Newport has been signalised by immense development of the property, a process not yet complete, for when the new dock is finished it will be the largest single dock in the world, a mile long and a quarter of a mile wide, with an entrance direct from the Bristol Channel. These developments, in which the railway portion of the property also has shared, have coincided with great increase of trade, as, for example, last year, when, despite labour troubles, the shipments reached a total of nearly seven and a half million of tons, an increase of over 330,000 tons on the preceding twelvemonth. Mr. Macaulay has a very high reputation in the whole industrial area, as was evidenced by his being called into consultation from time to time upon difficult matters of undertaking other than that at Newport. In many directions, such as ambulance work and the interests of local philanthropic institutions, he has been prominent, rendering splendid service.

Lord Merthyr, as briefly mentioned in our last issue, has been admitted by unanimous ballot an honorary member of the South Wales Institute of Engineers. Prof. Galloway, this year's president, occupied the chair at the meeting on Thursday of last week, when the album containing the certificate of honorary membership was handed to his lordship, now the oldest member of the institute, having been connected with it more than 54 years. Among those present at the meeting were Mr. W. D. Wight, Mr. J. McMurtrie, A. J. Stevens, H. W. Martin, H. K. Jordan, T. H. Deakin (past presidents), with Mr. Hugh Bramwell, W. Stewart, H. T. Wales, Principal Griffith, and Leonard Llewellyn.

In the course of his speech acknowledging the album, Lord Merthyr gave some very interesting particulars as to the changes that have been brought about in the coal and iron industries. He said that the membership of the first year, 121, had grown to 706 (counting both members and associates). At the time of establishing the institute the district was acknowledged to have the largest and best-equipped ironworks in the world. Mr. Menelaus, the first president, stated in 1857 that 200 tons of iron per blast furnace per week was a common make, and that they were looking forward to 300 tons as the next step. But in the Dowlais Works, recently, one furnace exceeded 2,800 tons in one week—about the largest make of any furnace in Europe. As illustrating economy in the production of pig iron or steel, Mr. Menelaus complimented a neighbouring ironmaster upon having reduced the quantity of coal to 22¾ cwt. per ton of pig iron, whereas now the modern furnaces consumed only from 17 to 20 cwt. of coke per ton of pig iron.

Turning to mining, his lordship said that in 1857, and for years afterwards, the equipment and arrangement of Welsh collieries were far behind those of the North of England. Changes in the iron trade occasioned by the inventions of Bessemer and Siemens brought about the closing of ironworks in the district, but the coal trade had more than made up for this. The output of coal, which in 1857 was 9,000,000 tons, had exceeded 50,000,000 tons in 1911; and the number of men employed had risen from 32,143 to 220,887. Shipments at Cardiff, which were less than one and a half millions of tons, had risen to more than 25 millions. The deepest pit was, in 1857, about 400 yards; but now the greatest depth was above 800 yards; and whereas the largest output in ten hours was 500 tons, the largest at the present time was 4,000 tons in nine and a half hours. The greatest volume of air circulated by mechanical ventilation in 1857 was 30,000 cubic feet per minute; and now 450,000 cubic feet was being circulated per minute in some collieries. Notwithstanding the increased difficulties of working at greater depths and long distances from the pits, it was very gratifying to know that the accidents to life and limb had been reduced to about one-fifth.

The Lancashire firm which is understood to have the intention of prospecting for coal in Pembrokeshire—the anthracite area—will, it is stated, soon commence boring operations.

At a meeting of the Western Miners' Association, in Swansea, one of the delegates asserted that payment of £3 3s. per day would be made to the panel chairmen under the Minimum Wage Act; and he regarded it as an intolerable state of affairs that the Federation should have to pay for the administration of an Act of Parliament. It was decided to send a protest to the central executive.

The Joint Committee under the Minimum Wage Act met in Cardiff, on Saturday, and several questions were disposed of; some others being adjourned. In ascertaining the rate per shift at the Cambrian Collieries, the owners refused to accept the suggestion that the wages earned on afternoon shifts should be divided by six and not five.

Cardiff Chamber of Commerce discussed once again, on Wednesday, the question of delays in shipping coal at the docks, Mr. J. Andrews (Albion Company) stating that his firm, notwithstanding notice given on Saturday week, had not been able to get a tip until that (Wednesday) morning, whereas the loading-time had expired on Monday. He asked why no action had been taken by the Committee which the Chamber appointed some months ago to deal with the difficulty. It was a most serious matter for a great number of colliery people. At Newport there was practically no waiting, although (proportionally to acreage of docks) the number of vessels to be loaded there was as great as at Cardiff.

The president (Mr. North Lewis), replying, said that the question of increase of coal-mixing charges had intervened to prevent dealing with that of delays in shipments. His own company had that day a vessel going into berth which was already 24 hours on demurrage because they had not been able to get a tip, although coal had been standing for the boat ever since she came into dock. Something was radically wrong: the dock company blamed the railway, and *vice versâ*, and the colliery was also blamed. The docks were like the neck of a bottle—coal at the back waiting to come through, with enquirers on the other side waiting for it. He should do all he could to push forward the matter of quicker despatch.

Mr. A. J. Griffith declared that more docks were wanted; more storage accommodation; more tips. Even if dock extension were put in hand at once, it would be five or six years before increased area could be given. Mr. Andrews advocated the Newport system giving vessels their proper turns, instead of allocating tips to certain firms. Further steps are to be taken, by approach to the dock companies, in order to obtain improvement in the working.

COASTWISE SHIPMENTS IN OCTOBER.

According to the monthly coal tables the following were the coastwise shipments in October:—

From	Total cargo.		Total bunker.	
	1911.	1912.	1911.	1912.
	Tons.	Tons.	Tons.	Tons.
Bristol Channel ports	451,831	327,326	22,205	22,027
North-western ports	282,287	301,755	60 665	66,771
North-eastern ports	811,414	703,450	37,796	19,889
Humber ports	228,191	230,652	13,142	11,771
Other ports on east coast	16,590	18,553	8,408	7,160
Other English ports	2,589	3,230	4,120	2,827
Total from England and Wales	1,792,902	1,584,966	155,336	130,445
Ports on east coast of Scotland	124,125	115,757	20,776	19,961
Ports on west coast of Scotland	162,943	140,117	37,818	34,175
Total from Scotland	287,068	255,874	58,594	54,136
Irish ports	—	—	2,993	4,142
Total from United Kingdom	2,079,970	1,840,840	216,923	188,723

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22s. per ton, and Welsh (Powell
d.; at Karachi, Indian coal, 23s. 8d.,
d.

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l by the Cardiff Railway Company to
, rates, and charges authorised by the
ating to their undertaking; and they
ce of application to Parliament next
necessary powers. We are, therefore,
a renewal of the strenuous conflict
over a previous Bill drafted with the
ing the charges.

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d conditions are the certain result of
h have been given to different classes
employ of the Newport Docks and
oalmen the minimum wage will hence-
per week, which entails an immediate
2s. to some among them; and in the
r departments there are to be higher
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ion is announced of Mr. John Macaulay.
of the Alexandra (Newport and South
nd Railways Company; but it will not
ay next, and Mr. Macaulay will continue
to the company after that period for a
rs. Mr. Macaulay has been at Newport
ars, having previously been connected
Railway; prior to that, traffic superin-
pool for the Cheshire lines. His career
been signalised by immense development
, a process not yet complete, for when
finished it will be the largest single
ld, a mile long and a quarter of a mile
trance direct from the Bristol Channel.
ents, in which the railway portion of
o has shared, have coincided with great
de, as, for example, last year, when,
roubles, the shipments reached a total
and a half million of tons, an increase
tons on the preceding twelvemonth.
as a very high reputation in the whole
as was evidenced by his being called
n from time to time upon difficult
ertaking other than that at Newport.
ons, such as ambulance work and the
l philanthropic institutions, he has been
ering splendid service.

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hyr, as briefly mentioned in our last
admitted by unanimous ballot an
ber of the South Wales Institute of
rof. Galloway, this year's president,
air at the meeting on Thursday of last
e album containing the certificate of
ership was handed to his lordship, now
ber of the institute, having been con-
more than 54 years. Among those
meeting were Mr. W. D. Wight, Mr. J.
J. Stevens, H. W. Martin, H. K. Jordan,
(past presidents), with Mr. Hugh
tewart, H. T. Wales, Principal Griffith,
ewellyn.

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rse of his speech acknowledging the
erthyr gave some very interesting parti-
changes that have been brought about
d iron industries. He said that the
the first year, 121, had grown to 706
members and associates). At the time
the institute the district was acknow-
he largest and best-equipped ironworks
Mr. Menelaus, the first president, stated
tons of iron per blast furnace per week
make, and that they were looking
tons as the next step. But in the
, recently, one furnace exceeded 2,800
—about the largest make of any furnace
illustrating economy in the production
steel, Mr. Menelaus complimented a
ronmaster upon having reduced the
to 22¾ cwt. per ton of pig iron, whereas
n furnaces consumed only from 17 to
per ton of pig iron.

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mining, his lordship said that in 1857,
fterwards, the equipment and arrange-
collieries were far behind those of the
nd. Changes in the iron trade occasioned
ons of Bessemer and Siemens brought
ng of ironworks in the district, but the
more than made up for this. The output
n 1857 was 9,000,000 tons, had exceeded
in 1911; and the number of men employed had risen from 32,143 to 220,887. Shipments at Cardiff, which were less than one and a half millions of tons, had risen to more than 25 millions. The deepest pit was, in 1857, about 400 yards; but now the greatest depth was above 800 yards; and whereas the largest output in ten hours was 500 tons, the largest at the present time was 4,000 tons in nine and a half hours. The greatest volume of air circulated by mechanical ventilation in 1857 was 30,000 cubic feet per minute; and now 450,000 cubic feet was being circulated per minute in some collieries. Notwithstanding the increased difficulties of working at greater depths and long distances from the pits, it was very gratifying to know that the accidents to life and limb had been reduced to about one-fifth.

The Lancashire firm which is understood to have the intention of prospecting for coal in Pembrokeshire—the anthracite area—will, it is stated, soon commence boring operations.

At a meeting of the Western Miners' Association, in Swansea, one of the delegates asserted that payment of £3 3s. per day would be made to the panel chairmen under the Minimum Wage Act; and he regarded it as an intolerable state of affairs that the Federation should have to pay for the administration of an Act of Parliament. It was decided to send a protest to the central executive.

The Joint Committee under the Minimum Wage Act met in Cardiff, on Saturday, and several questions were disposed of; some others being adjourned. In ascertaining the rate per shift at the Cambrian Collieries, the owners refused to accept the suggestion that the wages earned on afternoon shifts should be divided by six and not five.

Cardiff Chamber of Commerce discussed once again, on Wednesday, the question of delays in shipping coal at the docks, Mr. J. Andrews (Albion Company) stating that his firm, notwithstanding notice given on Saturday week, had not been able to get a tip until that (Wednesday) morning, whereas the loading-time had expired on Monday. He asked why no action had been taken by the Committee which the Chamber appointed some months ago to deal with the difficulty. It was a most serious matter for a great number of colliery people. At Newport there was practically no waiting, although (proportionally to acreage of docks) the number of vessels to be loaded there was as great as at Cardiff.

The president (Mr. North Lewis), replying, said that the question of increase of coal-mixing charges had intervened to prevent dealing with that of delays in shipments. His own company had that day a vessel going into berth which was already 24 hours on demurrage because they had not been able to get a tip, although coal had been standing for the boat ever since she came into dock. Something was radically wrong: the dock company blamed the railway, and *vice versâ*, and the colliery was also blamed. The docks were like the neck of a bottle—coal at the back waiting to come through, with enquirers on the other side waiting for it. He should do all he could to push forward the matter of quicker despatch.

Mr. A. J. Griffith declared that more docks were wanted; more storage accommodation; more tips. Even if dock extension were put in hand at once, it would be five or six years before increased area could be given. Mr. Andrews advocated the Newport system giving vessels their proper turns, instead of allocating tips to certain firms. Further steps are to be taken, by approach to the dock companies, in order to obtain improvement in the working.

COASTWISE SHIPMENTS IN OCTOBER.

According to the monthly coal tables the following were the coastwise shipments in October:—

From	Total cargo.		Total bunker	
	1911.	1912.	1911.	1912.
	Tons	Tons	Tons.	Tons.
Bristol Channel ports	451,831	327,326	22,205	22,027
North-western ports	282,287	301,755	69 665	66,771
North-eastern ports	811,414	703,450	37,796	19,889
Humber ports	228,191	230,652	13,142	11,771
Other ports on east coast	16,590	18,553	8,408	7,160
Other English ports	2,589	3,230	4,120	2,827
Totel from England and Wales	1,792,902	1,584,966	155,336	130,445
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AWARDS UNDER THE MINIMUM WAGE ACT.

West Yorkshire.

The following is the full text of the supplementary award of his Honour Judge Amphlett:—

Whereas a Joint District Board for the District of West Yorkshire has been constituted for the purposes of the Coal Mines (Minimum Wage) Act, 1912, and was duly recognised by the Board of Trade on the 9th day of May, 1912;

And whereas I have been appointed Chairman of the said Joint District Board;

And whereas on the 10th day of June, one thousand nine hundred and twelve, district rules and rates under the provisions of the above-mentioned Act were finally settled and brought into operation;

And whereas differences have arisen at the said Joint District Board between the representatives of the employers and the workmen as to the interpretation to be put upon some of the said rules and have been referred to me as Chairman to determine as provided by the said rules;

And whereas the representatives of the said Joint District Board were unable to agree among themselves as to a chairman to settle any differences which might arise under Rule 8, and in default of agreement it is provided that such chairman should be nominated by myself;

And whereas for the purpose if possible of determining such differences, I, at the request of the said Joint District Board, convened two meetings of the Board, which were held at Leeds on the 13th of September and the 14th of October, 1912, when the matters in difference between the parties were discussed between the representatives of either side, and were finally left for my determination;

Now I, as Chairman of the said District Board, do adjust and determine these differences as follows:—

1. A question was raised by the miners' representatives as to the validity of Rule 7, paragraph (*b*), which provides that "in ascertaining the earnings of coal-getters or other workmen paid by the piece, the amount to be deducted for trammers and fillers shall be the amount of daily wage actually paid, but not exceeding 1s. more than the minimum wage paid for that class." This rule, though carried by my casting vote, was the outcome of much discussion between the representatives on either side and follows in terms a similar rule adopted in the South Yorkshire District. As originally framed by the miners' representatives, this rule stopped at the words "actually paid," while the employers suggested the following rule:—

> In ascertaining the earnings of a workman paid according to tonnage or other contract rates, who employ other workmen and pay them out of his gross earnings, only the minimum wage applicable to such other workmen shall be deducted from his gross earnings.

I expressed myself unable to support either rule as framed, but suggested the South Yorkshire rule as a fair compromise between the parties, and on the owners' representatives, after some consideration, agreeing to adopt this suggestion and putting it in the form of a definite proposition, it was carried as hereinbefore stated. This rule deals with a difficult question in some of its aspects—namely, piecework—and in my opinion in no way contravenes the provisions of the Coal Mines (Minimum Wage) Act, 1912, and so far as it goes, seems to me to operate in favour of the employed rather than of the employer.

2. A further question was raised as to whether the rules for the West Yorkshire district were retrospective, so as to date back to the time when the minimum wage rate had to be reckoned from. These rules, it is true, were not framed so as to become operative until a considerable time after the passing of the Act already referred to, but in my opinion they are retrospective, and the safeguards provided by them should be taken into account in considering what is the amount of any back payments which the workman is entitled to under the provisions of the Statute. To decide otherwise would, as it seems to me, involve consequences which I cannot bring myself to believe the Legislature ever seriously contemplated.

3. On the question of whether "explosives" should be deducted, in considering what is the minimum wage which a workman is entitled to receive, I cannot feel any difficulty at all. My opinion is quite clear that no such deduction can be permitted. The use of these explosives under certain circumstances is certainly not for the advantage of one party only. And even if it were, the minimum wage settled under the rule ceases to be a minimum wage at all if such a deduction as is suggested was allowed to be made.

4. A further question dealt with class 5 and gave rise to lengthy arguments on both sides. The question which was discussed was whether "boys" who were within the definition of class 5 and were employed as "hurriers," doing, in some cases, a certain amount of filling between times, were "trammers and fillers" within class 2, the result of which, in many cases, would be to more than double the amount of the minimum wage rate. It needs no figures to see what the consequences of such a construction of the rule would be in the collieries, which, though it would operate largely in favour of one particular class, would assuredly at the same time cause discontent and a sense of inequality of treatment among other classes of workmen. Still, however serious the consequences might be, one has still to determine whether these "boys," though "boys" under class 5, are to be paid as if they were included in class 2. But class 2 "trammers and fillers" was, in my opinion, never intended by the rules to embrace "boys" as specified in class 5, even though employed as "hurriers." In a sense, both classes no doubt "tram," but the "tramming" is of a different kind altogether in either class. "Trammers and fillers," as defined by class 2, may not be so numerous as in South Yorkshire, but are yet to be found in parts of the West Yorkshire District, where the tubs or corves are of quite a different capacity to those ordinarily used by "hurriers." I have only to add in connection with this matter that any other conclusion than the one at which I have arrived would, in my judgment, distinctly violate the provisions contained in the latter part of Section 2 (subsection 1) of the Coal Mines (Minimum Wage) Act.

I wish to add a few words connected with this matter, which, though foreign to any question relating to the interpretation of the rules, was the subject of some complaint at the meetings over which I have had the honour to preside. Many speakers seemed to express views consistent only with the theory that the minimum wage is equivalent to the maximum wage, which it was never intended to be. That many boys earn beyond what has been frequently stated to be only a minimum wage, I am confident, but it was said that in some cases employers had reduced wages to the mimimum rate, and had even gone so far as to pay members of class 5 below the rate applicable to them. I can scarcely bring myself to believe that upon thorough investigation such instances could be proved to exist, unless in accordance with the safeguards provided by the rules. Otherwise such a proceeding would appear to be not only contrary to the proviso contained in Section 2 (1) of the Statute, but also a direct violation of the district rules. But, as I have had more than once to point out, though I have no power to enforce the rules, a tribunal exists which can and would remove these grievances if upon investigation they should turn out to be well founded.

5. A question has been raised as to who are included in the term "Leading bye workmen" in class 3, who are defined to be "those in charge of pit bottom or otherwise entrusted with superintendence." A difficulty, it is said, arises as to who should be included as "leading bye workmen" within the latter part of this class as being "entrusted with superintendence." The discussion before me proved to be an interesting one, and certainly had the effect of removing, at all events, some misapprehension in the minds of the miners' representatives. It was apprehended that the result of the Act and the rules framed thereunder might be to diminish seriously the number of "leading bye workmen" and to result in the appointment of "deputies" to take their place, but any fear on this head has been removed by the undertaking given on behalf of the employers that no "deputies" should be appointed, nor apparently could they be. Any misgiving also that existing leading bye workmen who are set temporarily to such work as for the time being might disentitle them to their minimum wage as "leading bye workmen" has also been removed by the undertaking of the owners' representatives. "Leading bye workmen" who have been employed as such prior to the statute will also, by agreement, continue to be so regarded and paid accordingly; indeed, I do not, as at present advised, see how it could be otherwise, having regard to the statutory provisions. Such cases will not, I hope, be the subject of much controversy, having regard to what has transpired before me, and I do not understand that, as yet, there has been any real difficulty in determining who are or who are not included in this class. Common sense and a desire to do what is fair and just ought to prevent any such difficulty in the future. But to give a close definition of the words "entrusted with superintendence," so as to embrace every possible case, appears to me impossible, and I am not going to attempt it. There are cases which, to some extent, depend upon the particular facts of a particular case. I must content myself with a few general observations. Superintendence in its ordinary sense is to oversee, to overlook, to take care of others with authority. A workman in charge of a gang would clearly be a "leading bye workman." So, also, in my opinion, would be a workman whose duty it was to direct men where they had to go and what work they had to do, and who, it may be presumed, has some special skill and knowledge. It follows that a leading bye workman may exist where only two are employed. But the fact that one of two men at the same work happens to receive a higher wage than the other, or to be older than the other, does not of itself constitute him a leading bye workman. He may, or may not, be such, according to the circumstances of the particular case. Nor does a workman working by himself, even at skilled work, make himself by reason of such work a "leading bye workman," because the element of superintendence is wanting. But, as already pointed out, a workman ordinarily employed at superintending, but sometimes engaged in doing work by himself, would not on that account, apart from the owners' admission, lose his position as a leading bye workman. It is not practicable to give a definition which will include every case that may arise, but the Committee or independent chairman will, I think, have little difficulty in deciding where the dividing line should be drawn in case of dispute. And if the rule in found not to be broad enough to include a particular class who ought fairly to be included within its provisions, it is open to either side to reopen the matter at no very distant period.

6. I have appointed Mr. C. M. Atkinson, Stipendiary Magistrate for Leeds, to act as chairman under Rule 8 upon the terms agreed in case his services should at any time be required. It is unfortunate for me that his name should have appeared on the panel of either side, inasmuch as I had previously made up my mind that in case it should be incumbent upon me to appoint a chairman, it would be impossible for me to select a more trustworthy gentleman. Mr. Atkinson is, I know, esteemed very highly among all classes at Leeds and elsewhere, and is a thoroughly broad-minded man, and I am confident that both by employers and employed alike his fitness for the position will be cordially recognised. For the present, at all events, I do not consider that it will be either necessary or advisable to appoint any second chairman; it will be more prudent to await the course of events before taking any further steps in this matter. In conclusion, let me say that though no construction of the rule is involved, but procedure only, I am glad to be assured that proper committees have now been appointed by both sides to deal with disputes as, and when, they arise, inasmuch as it is essential they should be dealt with without any unnecessary delay. Some friction, however, seems to have arisen by the omission, as it is said, to furnish proper particulars of the cases which, in ordinary course, would have to come before the committees. In such cases, as well as in cases which come before the chairman, I cannot see how it is practicable for either tribunal to act until they are made acquainted with the particular colliery where the grievance arises and the name of the workman who seeks their assistance. Without such particulars are furnished, delay and much waste of time and money must inevitably result. Coalowners should also impress upon the managers and other officials at the mines that a workman has, for his own protection, an absolute right to avail himself of the procedure provided in Rule 8; for if any such consequences followed as were foreshadowed during the discussions before me, they could only produce unrest and ill-feeling at the pits, such as no colliery proprietor could view with equanimity.

(Signed) R. H. Amphlett,
Chairman of the Joint District Board.

October 23, 1912.

COAL, IRON AND ENGINEERING COMPANIES.

Andrew (Frederick) and Co. Limited.—This private company has been registered, with a capital of £6,000 in £1 shares (4,500 6 per cent. cumulative preference), to carry on the business of iron, steel and general merchants, &c. First directors, F. A. S. Andrew (managing director) and S. J. Prevost. Qualification, £100. Registered office, 57, Gracechurch-street, E.C.

Arniston Coal Company Limited.—The directors have resolved to recommend, after providing for depreciation, extension of power plant and other improvements, a dividend of 24s. per share, making, with the interim dividend, 32s. per share, or 20 per cent. for the year.

Bleichert's Aerial Transporters Limited.—This private company has been registered, with a capital of £15,000 in £10 shares, to acquire inventions for improvements in apparatus for transporting and hauling loads by means of ropes or cables, and to adopt an agreement with Adolf Bleichert and Co. First directors, Beda Becker and P. Bleichert.

Bradford Coal Merchants' and Consumers' Association Limited.—The directors announce an interim dividend at the rate of 4 per cent. per annum, less income-tax, on the ordinary shares for the half-year.

Brown (John) and Co. Limited.—Interim dividend at the rate of 5 per cent. per annum on the ordinary shares, less tax, payable on December 31.

Cairntable Gas Coal Company Limited.—The report for the 12 months ended September 30, 1912, shows a profit of £1,055, which, with a balance of £1,604 brought forward, makes a total of £2,659 at credit of profit and loss account. The directors regret that they are unable to recommend a dividend. The report recalls that the Glenbuck collieries had to be closed and abandoned in consequence of the workings taking fire by spontaneous combustion, and that considerable loss of capital resulted therefrom. Since then Auldhouseburn Colliery has also been abandoned, owing to exhaustion, and the plant has been sold by public auction. The amount realised from this sale—namely, £1,585—is deducted from plant and property account, and the balance remaining at debit of this account of the capital expenditure on the above collieries—namely, £21,956—falls to be written off, as there is now no available asset representing the amount. The directors have resolved to recommend that the capital be reduced to the extent of £3 10s. per share, which on the 6,038 shares issued will represent £21,133, and that there be transferred from profit and loss account the sum of £823—together £21,956. An extra-ordinary meeting will be held immediately after the ordinary meeting to consider and, if so resolved, pass the necessary resolutions to reduce the capital. In consequence of the action of the railway companies prohibiting furthers traders' wagons being put upon their lines, the company have been unable to have their wagons transferred from the Caledonian Railway to the Glasgow and South-Western for the traffic of Kerse Colliery, and the wagons have been running on other traffic for some time, but the results have proved unsatisfactory. The directors have, therefore, resolved to dispose of the wagons, which they estimate will realise £1,900, and as the wagons stand in the books at £3,105, they propose to set aside £1,200 to meet the deficit from profit and loss account. They also propose that £500 be written off for depreciation of Kerse Colliery plant and lease. In regard to the working of Kerse Colliery for the past year, and its result, the directors have met with disappointment, as they had hoped to get over, to some extent, the troubles or faults in the strata referred to in previous

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receive, I cannot feel any difficulty
uite clear that no such deduction
e of these explosives under certain
y not for the advantage of one
it were, the minimum wage settled
be a minimum wage at all if such a
d was allowed to be made.

dealt with class 5 and gave rise to
th sides. The question which was
boys" who were within the defini-
e employed as "hurriers," doing, in
unt of filling between times, were
within class 2, the result of which,
to more than double the amount of
It needs no figures to see what
a construction of the rule would
, though it would operate largely
lar class, would assuredly at the
tent and a sense of inequality of
lasses of workmen. Still, however
might be, one has still to deter-
s," though "boys" under class 5,
ey were included in class 2. But

class 2 "trammers and fillers" was, in my opinion, never intended by the rules to embrace "boys" as specified in class 5, even though employed as "hurriers." In a sense, both classes no doubt "tram," but the "tramming" is of a different kind altogether in either class. "Trammers and fillers," as defined by class 2, may not be so numerous as in South Yorkshire, but are yet to be found in parts of the West Yorkshire District, where the tubs or corves are of quite a different capacity to those ordinarily used by "hurriers." I have only to add in connection with this matter that any other conclusion than the one at which I have arrived would, in my judgment, distinctly violate the provisions contained in the latter part of Section 2 (sub-section 1) of the Coal Mines (Minimum Wage) Act.

I wish to add a few words connected with this matter, which, though foreign to any question relating to the interpretation of the rules, was the subject of some complaint at the meetings over which I have had the honour to preside. Many speakers seemed to express views consistent only with the theory that the minimum wage is equivalent to the maximum wage, which it was never intended to be. That many boys earn beyond what has been frequently stated to be only a minimum wage, I am confident, but it was said that in some cases employers had reduced wages to the minimum rate, and had even gone so far as to pay members of class 5 below the rate applicable to them. I can scarcely bring myself to believe that upon thorough investigation such instances could be proved to exist, unless in accordance with the safeguards provided by the rules. Otherwise such a proceeding would appear to be not only contrary to the proviso contained in Section 2 (1) of the Statute, but also a direct violation of the district rules. But, as I have had more than once to point out, though I have no power to enforce the rules, a tribunal exists which can and would remove those grievances if upon investigation they should turn out to be well founded.

5. A question has been raised as to who are included in the term "Leading bye workmen" in class 3, who are defined to be "those in charge of pit bottom or otherwise entrusted with superintendence." A difficulty, it is said, arises as to who should be included as "leading bye workmen" within the latter part of this class as being "entrusted with superintendence." The discussion before me proved to be an interesting one, and certainly had the effect of removing, at all events, some misapprehension in the minds of the miners' representatives. It was apprehended that the result of the Act and the rules framed thereunder might be to diminish seriously the number of "leading bye workmen" and to result in the appointment of "deputies" to take their place, but any fear on this head has been removed by the undertaking given on behalf of the employers that no "deputies" should be appointed, nor apparently could they be. Any misgiving also that existing leading bye workmen who are set temporarily to such work as for the time being might disentitle them to their minimum wage as "leading bye workmen" has also been removed by the undertaking of the owners' representatives. "Leading bye workmen" who have been employed as such prior to the statute will also, by agreement, continue to be so regarded and paid accordingly; indeed, I do not, as at present advised, see how it could be otherwise, having regard to the statutory provisions. Such cases will not, I hope, be the subject of much controversy, having regard to what has transpired before me, and I do not understand that, as yet, there has been any real difficulty in determining who are or who are not included in this class. Common sense and a desire to do what is fair and just ought to prevent any such difficulty in the future. But to give a close definition of the words "entrusted with superintendence," so as to embrace every possible case, appears to me impossible, and I am not going to attempt it. There are cases which, to some extent, depend upon the particular facts of a particular case. I must content myself with a few general observations. Superintendence in its ordinary sense is to oversee, to overlook, to take care of others with authority. A workman in charge of a gang would clearly be a "leading bye workman." So, also, in my opinion, would be a workman whose duty it was to direct men where they had to go and what work they had to do, and who, it may be presumed, has some special skill and knowledge. It follows that a leading bye workman may exist where only two are employed. But the fact that one of two men at the same work happens to receive a higher wage than the other, or to be older than the other, does not of itself constitute him a leading bye workman. He may, or may not, be such, according to the circumstances of the particular case. Nor does a workman working by himself, even at skilled work, make himself by reason of such work a "leading bye workman," because the element of superintendence is wanting. But, as already pointed out, a workman ordinarily employed at superintending, but sometimes engaged in doing work by himself, would not on that account, apart from the owners' admission, lose his position as a leading bye workman. It is not practicable to give a definition which will include every case that may arise, but the Committee or independent chairman will, I think, have little difficulty in deciding where the dividing line should be drawn in case of dispute. And if the rule is found not to be broad enough to include a particular class who ought fairly to be included within its provisions, it is open to either side to reopen the matter at no very distant period.

6. I have appointed Mr. C. M. Atkinson, Stipendiary Magistrate for Leeds, to act as chairman under Rule 8 upon the terms agreed in case his services should at any time be required. It is unfortunate for me that his name should have appeared on the panel of either side, inasmuch as I had previously made up my mind that in case it should be incumbent upon me to appoint a chairman, it would be impossible for me to select a more trustworthy gentleman. Mr. Atkinson is, I know, esteemed very highly among all classes at Leeds and elsewhere, and is a thoroughly broad-minded man, and I am confident that both by employers and employed alike his fitness for the position will be cordially recognised. For the present, at all events, I do not consider that it will be either necessary or advisable to appoint any second chairman; it will be more prudent to await the course of events before taking any further steps in this matter. In conclusion, let me say that though no construction of the rule is involved, but procedure only, I am glad to be assured that proper committees have now been appointed by both sides to deal with disputes as, and when, they arise, inasmuch as it is essential they should be dealt with without any unnecessary delay. Some friction, however, seems to have arisen by the omission, as it is said, to furnish proper particulars of the cases which, in ordinary course, would have to come before the committees. In such cases, as well as in cases which come before the chairman, I cannot see how it is practicable for either tribunal to act until they are made acquainted with the particular colliery where the grievance arises and the name of the workman who seeks their assistance. Without such particulars are furnished, delay and much waste of time and money must inevitably result. Coalowners should also impress upon the managers and other officials at the mines that a workman has, for his own protection, an absolute right to avail himself of the procedure provided in Rule 8; for if any such consequences followed as were foreshadowed during the discussions before me, they could only produce unrest and ill-feeling at the pits, such as no colliery proprietor could view with equanimity.

(Signed) R. H. AMPHLETT,
Chairman of the Joint District Board.

October 23, 1912.

COAL, IRON AND ENGINEERING COMPANIES.

Andrew (Frederick) and Co. Limited.—This private company has been registered, with a capital of £5,000 in £1 shares (4,500 6 per cent. cumulative preference), to carry on the business of iron, steel and general merchants, &c. First directors, F. A. S. Andrew (managing director) and S. J. Provost. Qualification, £100. Registered office, 57, Gracechurch-street, E.C.

Arniston Coal Company Limited.—The directors have resolved to recommend, after providing for depreciation, extension of power plant and other improvements, a dividend of 24s. per share, making, with the interim dividend, 32s. per share, or 20 per cent. for the year.

Bleichert's Aerial Transporters Limited.—This private company has been registered, with a capital of £15,000 in £10 shares, to acquire inventions for improvements in apparatus for transporting and hauling loads by means of ropes or cables, and to adopt an agreement with Adolf Bleichert and Co. First directors, Beda Becker and P. Bleichert.

Bradford Coal Merchants' and Consumers' Association Limited.—The directors announce an interim dividend at the rate of 4 per cent. per annum, less income-tax, on the ordinary shares for the half-year.

Brown (John) and Co. Limited.—Interim dividend at the rate of 5 per cent. per annum on the ordinary shares, less tax, payable on December 31.

Cairntable Gas Coal Company Limited.—The report for the 12 months ended September 30, 1912, shows a profit of £1,055, which, with a balance of £1,604 brought forward, makes a total of £2,659 at credit of profit and loss account. The directors regret that they are unable to recommend a dividend. The report recalls that the Glenbuck collieries had to be closed and abandoned in consequence of the workings taking fire by spontaneous combustion, and that considerable loss of capital resulted therefrom. Since then Auldhouseburn Colliery has also been abandoned, owing to exhaustion, and the plant has been sold by public auction. The amount realised from this sale—namely, £1,565—is deducted from plant and property account, and the balance remaining at debit of this account of the capital expenditure on the above collieries—namely, £21,956—falls to be written off, as there is now no available asset representing the amount. The directors have resolved to recommend that the capital be reduced to the extent of £3 10s. per share, which on the 6,038 shares issued will represent £21,133, and that there be transferred from profit and loss account the sum of £823—together £21,956. An extra-ordinary meeting will be held immediately after the ordinary meeting to consider and, if so resolved, pass the necessary resolutions to reduce the capital. In consequence of the action of the railway companies prohibiting furthers traders' wagons being put upon their lines, the company have been unable to have their wagons transferred from the Caledonian Railway to the Glasgow and South-Western for the traffic of Kerse Colliery, and the wagons have been running on other traffic for some time, but the results have proved unsatisfactory. The directors have, therefore, resolved to dispose of the wagons, which they estimate will realise £1,900, and as the wagons stand in the books at £3,105, they propose to set aside £1,200 to meet the deficit from profit and loss account. They also propose that £500 be written off for depreciation of Kerse Colliery plant and lease. In regard to the working of Kerse Colliery for the past year, and its result, the directors have met with disappointment, as they had hoped to get over, to some extent, the troubles or faults in the strata referred to in previous reports. Unfortunately these troubles have rather increased and lessened the output of coal—hence the falling-off in the earnings.

D. P. Y. Syndicate Limited.—This private company has been registered, with a capital of £500 in £1 shares, to deal in iron, coal, ironstone, fireclay, bricks, earth and metals, minerals and substances, to manufacture and sell patent fuel, &c. The subscribers are Mr. G. F. Mounsey and Mr. J. Arnott, both residing at Newcastle-on-Tyne.

Duffields Limited.—This private company has been registered, with a capital of £1,500 in £1 shares, to take over the business of a sheet metal worker, &c., carried on by Mrs. A. J. Duffield as Duffield and Park. First directors, A. J. Duffield and H. Ferris.

Gartness Coal Company Limited.—This private company has been registered in Edinburgh, with a capital of £10,000 (5,000 preference and 5,000 ordinary shares of £1 each), to acquire the Gartness Colliery, Airdrie, worked by the Waverley Iron and Steel Company Limited. First directors, T. Davie, W. Symington, H. S. Davie and N. McFarlane. Registered office, 19, Waterloo-street, Glasgow.

Cwaun-cae-Curwen Colliery Company Limited.—The directors in their report intimate that the profit for the year is £23,723 17s. 8d., to which is added £5,868 19s. 5d. brought forward from last year, making £29,592 17s. 1d. A final dividend of 1s. 6d. per share, free of income-tax, on the fully-paid ordinary shares, and of 9d. per share, free of tax, on the ordinary shares having 10s. paid, is recommended, absorbing £12,933. The half-year's preference interest absorbs £219 7s. 5d., £3,000 is placed to depreciation account, £3,000 to reserve, and £5,910 2s. 3d. carried forward.

Harrison, Ainslie and Co. Limited.—In the Chancery Division, on Tuesday, Mr. Justice Eve sanctioned a reduction of the capital of Harrison, Ainslie and Co. Limited, ironmasters, of Lindal-in-Furness, Lancashire. Mr. Frank Dodd presented the petition, which, he said, was to reduce the capital of the company from £200,000 to £50,000. The reduction would be effected by writing off from the 200,000 shares of £1 each, which had already been issued, the sum of 15s. per share, which was not represented by available assets.

Higginson (Montagu) and Co. Limited.—This private company has been registered, with a capital of £10,000 in £1 shares (4,000 5 per cent. preference), to carry on the business of coal merchants, &c., to acquire the business carried on at Liverpool as Montagu Higginson and Co., and to adopt an agreement with M. R. W. Higginson and A. Leighton. First directors: M. B. W. Higginson and A. Leighton (permanent joint managing directors, subject to holding 1,500 ordinary shares. Remuneration, £360 each per annum.

Hornsby (Richard) and Sons Limited.—The directors announce that the profits for the year ended September 30, 1912, show a disposable balance of £35,342. It is proposed to pay a dividend on the ordinary and new shares of 6¼ per cent., less income tax, placing £10,000 to reserve account, and carrying forward £3,877.

Hyderabad (Deccan) Company Limited.—Interim dividend of 1s. 6d. per share, free of tax, payable on December 2.

L. W. Tools Company Limited.—This private company has been registered, with a capital of £5,000 in £1 shares, to carry on the business of tool and machinery manufacturers, &c. First directors are to be appointed by signatories. Qualification, £100.

North Lonsdale Iron and Steel Company Limited.—The directors have declared a dividend of 10 per cent. for the year.

Partington Steel and Iron Company Limited.—Applications have been invited for 100,000 6 per cent. cumulative preference shares of £1 each, the dividend on which is guaranteed by the Pearson and Knowles Coal and Iron Company Limited, who hold 250,000 ordinary shares. The capital consists of 350,000 £1 6 per cent. cumulative preference shares, and the same amount of ordinary shares.

Pease and Partners Limited.—Interim dividends on both the fully-paid ordinary shares and on the deferred shares of 8s. per share, being at the rate of 8 per cent. per annum.

Powell Duffryn Steam Coal Company Limited.—In view of further capital expenditure the directors recommend the issue of about 100,000 ordinary shares of £1 each at a premium of £1 per share, the shares to be offered *pro rata* to the ordinary shareholders.

Ruston, Proctor and Co. Limited.—The directors have declared an interim dividend of 5 per cent. per annum on the ordinary shares.

St. George's Coal and Estate Company Limited.—The directors have declared a dividend of 2½ per cent.

Smith (Alfred J.) Limited.—This private company has been registered, with a capital of £30,000 in £10 shares (1,500 5 per cent. cumulative preference), to take over the business of a coal and general fuel shipper and merchant, &c., carried on by A. J. Smith at 9, Queen-square, Bristol, and Coleford, Gloucestershire, and at various branches. First directors, A. J. Smith, A. S. L. Smith, H. S. Smith, and P. Berrill. Qualification, £50.

United Collieries Limited.—The directors announce that the half-year's interest on the first B debentures, which fell due on October 1 last, will be paid on and after December 2 next.

Weardale Steel, Coal and Coke Company Limited.—The directors, in submitting the statement of accounts for the year ended September 30, 1912, duly certified by the auditors, state that the profit for the year, after providing for all accrued liabilities, amounts to £109,060 6s. 2d. This, with £20,350 16s., the balance brought forward from last year, makes a total amount available of £129,411 2s. 2d., which the directors recommend should be appropriated as follows: Interest on 4 per cent. debenture stock for the year, £16,000; subscriptions and donations and Tudhoe Colliery Explosion Widows' Fund, £164 6s.; reserve for income tax, £2,500; dividend of 6 per cent. per annum on preferred ordinary shares for half-year to March 31, 1912—Paid May 1, £15,000; ditto for half-year to September 30, 1912, £15,000; dividend of 6 per cent. per annum on deferred ordinary shares for 12 months ended September 30, 1912, £13,500; reserve for depreciation (bringing total up to £295,000), £35,000; carried forward to next year, £32,246 16s. 2d. It is with feelings of deep regret that the directors refer to the death of the Right Hon. Lord Furness, the chairman of the company, which took place on the 10th inst. Having regard to the loss sustained by the company during the national coal strike, the directors consider the results for the year satisfactory. Prices of coal, coke and pig iron have improved recently, but the extra expenditure necessitated by the new Mines Act, the Minimum Wage Act and the Insurance Act—the full effect of which cannot at the present time be determined—must not be lost sight of. The scheme of electrification at Wheatley Hill Colliery, to which reference was made in the last report, is proceeding satisfactorily, and the generating plant is expected to be in operation early next year.

THE FREIGHT MARKET.

Outward chartering has been quiet, with some ease in rates, on the north-east coast this week. The following are typical quotations for Tyne loading:—London, 4s. 9d.; Hamburg, 5s. 3d.; Havre, 6s.; Swinemunde, 6s.; Bordeaux, 7s.; and Genoa, 12s. 6d. At South Wales, chartering has been active. Rates are somewhat weaker, excepting for the River Plate, for which there is more enquiry. At the Clyde business is quiet, and rates are generally steady. The Humber is dull, and the tone is weak. Homewards, a good deal of business has been done. New York advices are to the effect that chartering is moderately active. Boats are more numerous, and rates tend against owners. Forward orders for grain, cotton and timber tonnage are fairly good. Time-charter business is quiet, at about late rates. Eastern markets are dull and easy, tonnage being pressed on the market. Black Sea business is practically at a standstill. The Mediterranean and ore trades are active and firm. The Baltic is steady. The River Plate is dull and weak.

Tyne to Aalborg, 2,100, 7s., 500; Andorf, 1,600, 7s.; Amsterdam, 1,500, 5s.; 1,000, 5s.; Ancona, 5,700, 15s. 6d.; Barcelona, 5,500, 12s. 4½d., 700; Boucan, 2,100, 7s. 6d.; Civita Vecchia, 4,300, 14s. 3d.; Cronstadt, 12,000, 5s. 9d., voyages over next season; Gibraltar, 2,400, 9s. 9d., 700, 10d.; Genoa, 4,200, 13s.; 5,200, 12s. 6d., reported; Guernsey, 770, 6s. 3d.; Honfleur, 1,200, 6s. 3d.; Las Palmas, 2,200, 11s. 6d.; Leghorn, 2,000, 14s. 4d., 300, 10d., from Dunston; London, 2,100, 4s. 9d.; 1,600, 4s. 9d.; 1,500, 4s. 6d.; Memel, 1,400, 6s. 6d.; Malaga, 1,800, 12s. 6d.; Nykjobing Falster, 1,500, 7s. 3d.; Port Said, 6,600, 12s. 6d.; 5,000, 12s. 6d.; Rotterdam, 2,400, 5s. 1½d.; 1,000, 5s.; 1,500, 5s.; 1,200, 5s. 6d.; 2,250, 5s.; Rochefort, 2,150, 7s.; Schiedam, 1,000, 5s.; 1,500, 5s.; Stockholm, contract for 18,000 tons, 6s. 10½d., voyages January-March; Sheerness, 400, 5s. 6d.; St. Nazaire, 2,150, 6s. 9d.; Teneriffe, 4,000, 11s. 6d.; Venice, 5,700, 15s. 6d.; Ymuiden, 1,000, 5s.; 1,500, 5s.

Cardiff to Almeria, 2,700, 11s. 6d., December 6; Aden, 5,500, 14s., December; Alexandria, 5,000, 12s. 3d., December 8; 4,900, 12s. 9d., 400, December 6; 3,600, 13s., 500, December 8; Algiers, 4,700, 13 fr., December 2; 3,200, 13 fr., 800, December 5; 4,800, 12¾ fr.; 3,000, 13 fr.; 2,800, 13 fr., 600, December 2; Bombay, 15s., free brokerage; Bizerta, 3,000, 14½ fr., November 28; Barcelona, 1,900, 13s., November; 3,300, 13s.; 2,900, 13s.; Bordeaux, 3,200, 8¾ fr., ppt.; Bari and Brindisi, 4,000, 13s. 9d., December; Brindisi, 4,500, 12s. 3d., 800, December 10; Bari, 4,500, 12s. 3d., 800, December 10; Cherbourg, 560, 7s. 6d.; Colombo, 5,000, 14s., net terms, January; Civita Vecchia, 3,600, 13s. 6d.; Devonport, 2,300, 3s. 6d., with options; Genoa, 6,000, 13s., December 6; 2,600, 13s., December 2; 3,600, 13s. 3d.; 2,700, 13s. 1½d.; 13s. 0½d., ppt.; 3,400, 13s. 1½d., ppt.; 2,900, 13s., ppt.; 4,800, 12s. 7½d., December 2; 4,600, 12s. 6d., December 6; 5,500, 12s. 3d., December 10; 4,000, 13s., December 6; Gibraltar, 950, 10s. 6d., ppt.; 1,600, 10s.; 1,000, 10s. 3d.; Islands, 11s. 6d., December; 4,000, 11s. 6d., November 28; 4,500, 11s., November 28; Leghorn, 3,600, 12s. 9d., December 9, Genoa terms; 3,300, 13s. 6d., 500, end November; Las Palmas, 4,400, 11s.; 5,000, 11s. 3d.; Lisbon, 2,800, 9s., 400, December 6; La Pallice, 3,300, 8 fr., with option; Marseilles, 2,800, 15 fr., ppt.; 6,400, 14 fr., mid-December; 5,100, ditto, ditto; 5,200, 14 fr., December 9; 3,500, 14¾ fr.; 5,000, ditto; 7,500, 14½ fr., December 8; 3,000, 13 fr.; Madeira, 11s. 6d., ppt.; Naples, 3,300, 13s. 6d., 500, end November; 3,600, 13s., 800, December 2; 5,000, 12s. 6d., 800, December 10; Oran, 1,350, 14½ fr.; Port Said, 7,500, 12s. 3d., December 8; 8,000, 14½ fr.; 6,500, 12s., December 15; 5,500, 12s.; 4,500, 12s., December 7; 4,600, 12s., December 20; Pernambuco, 3,500, 21s. 9d.; River Plate, 19s. 6d., December; 5,300, 20s., mid-December; 4,300, 20s., December 7; 4,200, 20s., with option; 19s., early January; 19s., January 1; Rosario, 20s. 9d., December 1; Shanghai, 5,000, 20s., December; St. Nazaire, 3,100, 9½ fr., December 2, Trignac terms; Savona, 4,800, 12s. 7½d., December 2; 4,600, 12s. 6d., December 6; 5,500, 12s. 3d., December 10; Spezzia, 4,600, 12s. 6d., December 6; 5,500, 12s. 3d., December 10; Teneriffe, 4,400, 11s., November; Taranto, 4,500, 12s. 3d., 800, December 10; Torre, 3,600, 13s. 6d.; Villa Constitucion, 20s. 3d., December 1; Venice, 3,000, 15s. 6d., November 28; Valencia, 950, 12s. 3d.; Villa Real, 1,200, 13s. 3d., ppt.; Wei-hai-wei, 6,000, 20s.

Partington to Buenos Ayres, 21s., December; Riga, 2,000-2,500, 6s.

Hull to Buenos Ayres, 20s., reported; Riga, 2,400, 5s. 9d.

Aalborg to Santos, sail, 24s. 6d., cement.

Burntisland to Buenos Ayres, 21s. 6d., December; Rosario, 23s., December; London, 1,100, 5s.; 3,000, 5s.

Methil to Genoa, 3,000, 14s.; Alexandria, 3,700, 13s. 9d.

Wales to Port Nolloth, sail, 35s., coke, December; Iquique, sail, 19s., April-May.

Thames to Pensacola, 3,000, 10s. 9d., chalk, early December.

Newport to Naples, 5,500, 13s., ppt.; Brest, 620, 7s. 3d.; Gibraltar, 1,600, 10s., December 5; 1,500, 10s. 3d.; Buenos Ayres, 5,000, 19s. 6d., December; Marseilles, 5,000, 14¾ fr.; Torre, 3,200, 13s. 6d.; Civita Vecchia, 3,200, 13s. 6d.; Genoa, 4,600, 12s. 6d.; Savona, 4,600, 12s. 6d.

Newport River to Algiers, 2,900, 14½ fr., fuel, December 10.

Swansea to Venice, 3,000, 16s., early December; 3,200, 15s. 6d., 400, December 2; 2,600, 16s., spot; 3,500, 15s. 3d. coal, 16s. fuel; Rochefort, 2,000, 9¾ fr., end December; Bari, 2,500, 14s. 3d.; 14s. 6d.; Rouen, 1,000, 7s. 3d.; Cabadello, sail, 18s., ppt.; Bahia, sail, 18s., ppt.; Trapani, 1,700, 14s.; Licata, 2,100, 14s., ppt.; Caen, 1,200, 7s. 3d.; Dieppe, 980, 7s. 1½d.; Stettin, 1,600, 8s.; Chantonay, 2,400, 9 fr., ppt.; 1,600, 9 fr., ppt.; Naples, 4,200, 13s. coal, 13s. 9d. fuel, December 10; Civita Vecchia, 2,700, 14s., ppt.; Dieppe, 1,000, 7s.; Calais, 1,100, 7s.; Honfleur, 1,600, 7s.

Wear to Pillau, 1,200, 7s. 6d.; Konigsberg, 1,200, 7s. 6d.; Cette, 3,400, 12s. 6d.; Civita Vecchia, 5,200, 14s. 4½d., 400.

Blyth to Stockholm, 1,600, 7s.; Devonport, 000, 7s. 6d.; Caen, 000, 8s.

Seaham Harbour to Cadiz, 2,000, 12s. 3d.

Goole to St. Malo, 900, 7s. 9d.; Bruges, 980, 6s.; Rotterdam, 900, 5s. 9d.; Boulogne, 750, 7s.

Glasgow to Bordeaux, 2,000, 9 fr.; Buenos Ayres, 20s. 6d.; River Plate, 4,200, 20s. 6d.; Barcelona, 3,500, 12s. 6d.; Bayonne, 1,800, 1,800, 9½ fr.

East Norway to Buenos Ayres, 25s., granite setts.

Leith to Hamburg, 1,000, 6s. 3d.; Stockholm, 3,400, 7s.

Antwerp to Buenos Ayres, 3,196 net, 26s. 3d., option Rosario 26s. 9d., December 15-20; Buenos Ayres, sail, 25s., January-February.

Liverpool to Melbourne and Newcastle, N.S.W., 32s. 6d.; Bahia, sail, 19s.

Narvik to Philadelphia, 6,000, 7s. 9d., ore.

Norway to Melbourne, sail, 75s.

Hartlepool to Leghorn, 3,900, 13s. 4½d., 500, 6½d.

Forth to Rouen, 1,850, 7s. 6d.; Wismar, 1,400, 7s. 10½d.; Kiel, 1,700, 8s. 6d.

Immingham to Rotterdam, 1,500, 4s. 7½d.; 1,450, 4s. 9d.

Bo'ness to Buenos Ayres, 21s. 6d.

Rotterdam to Barcelona, 3,300, 13s., December; 3,000, 13s. 3d., November 25; Genoa, 4,700, 13s. 3d., December 20; Marseilles, 4,000, 15 fr. with 600, 14¾ fr. with 900, December 1; Bagnoli, 3,900, 13s.

Grimsby to East Norway, 650, 8s. 6d.

Port Talbot to Algiers, 2,800, 13 fr.

Homeward charters:—Danube, 6,400, Rotterdam, 13s., on d.w., ppt.; Sulina, 4,500, Leghorn and (or) Genoa, 16¾ fr. one port, 17 fr. two ports, ppt.; 3,400, Torre Annunziata and Salerno, 17 fr., ppt.; Kustendje, 3,800, Marseilles or St. Louis, 16 fr., ppt.; 3,400, West Italy, 17½ fr. one port, 18 fr. two ports, ppt.; Madras Coast, 2,548 net, Marseilles, 37s., less 5 per cent., January 5-20; 2,518 net, 37s., with 500 tons unshelled 62s., less 5 per cent., January 15-February 18; Newcastle, New South Wales, 14s., Sourabaya, early December; Australia, 7,000, United Kingdom-Continent, 46s. 3d., option South Africa, 31s. 3d. one port, 32s. 6d. two ports, 33s. 9d. three ports, January; Kurrachee, 2,444 net, United Kingdom-Continent, 21s. one port, 21s. 6d. two ports, less 2 per cent., early December; New York, Philadelphia or Portland (Me.), 1,767 net, Mediterranean, 5s. 9d. one port, 5s. 10½d. two ports, December; Pensacola, 1,990 net, Antwerp and Holland or London, 142s. 6d., December-January; New York, 32 c., North China; 2,443 net, River Plate, 34 c., January-February; 3,120 net, Philippines, 33s., December-January; Baltimore, 33,000 qrs., 10 per cent., Rotterdam, 3s. 7½d., Hamburg 3s. 9d., December; Norfolk, 3,500, Campana, 30s., January; Larmes, 1,793 net, Glasgow, 12s., ppt.; Carthagena, 4,000, Glasgow, 8s., December; Bilbao, 1,517 net, Rotterdam, 6s. 10½d., ppt.; 1,114 net, 6s. 10½d., early December; 2,800, Jarrow, 7s. 3d., early December; 1,750, Newport, 6s. 6d., ppt.; Santander, 2,200, Rotterdam, 7s. 3d., ppt.; Galveston, 2,869 net, Antwerp, Rotterdam, Bremen or Hamburg, 61s. 6d., December; 2,492 net, Liverpool or Bremen, 61s. 6d., ppt.; New Caledonia, sail, 35s., Glasgow, nickel, May-June; time charter American trades, &c., 4s. 6d. and 5s. 3d., each about two years; Philadelphia, 5s. 9d. one port, 5s. 10d. two ports Mediterranean, not east of Italy; Poti, 6,800, Antwerp, 13s. 6d., ppt.; Christmas Island, 5,000, Fiume, 33s. 3d., January; 33s., January; Bombay, 1,711 net, Middlesbrough, 23s., ore, December; Saleef, 2,565 net, Calcutta, Rs. 7, December; 2,530 net, Singapore, 10s. 6d., Jan. 15-Feb. 15; Aden, 2,323 net, Chittagong, Rs 8, January 20-February 10; Rs. 7·8, Buenos Ayres, 5,000, 10 per cent., United Kingdom-Continent, 19s. o.c., less 6d., ppt.; 4,500, 10 per cent., London and Hull, 20s. 6d., ppt.; La Goulette, 2,800, Middlesbrough, West Hartlepool or Jarrow, 9s. 6d., f.t., early December; 4,000, 9s., f.t., end December; Benisaf, 3,400, Middlesbrough, 9s., f.t., ppt.; Alexandria, 3,000, 10 per cent., Bristol Channel, 10s. o.c., early December; time charter, River Plate, 7s., one round trip, delivery Wales, re-delivery Baltic; Huelva, 4,500, Northern States, 11s. 9d., f.d., December; 3,700, Charleston or Savannah, 10s. 9d., Tinto terms, early December; 4,800, New York, Philadelphia, or Baltimore, 11s. 9d., f.d., December 1-20; Baltimore, 2s. 1½d. oats, 3s. 7½d. heavy grain, p.p. United Kingdom-Continent; San Lorenzo, 3,600, 10 per cent., United Kingdom-Continent, 22s. 3d. o.c., less 6d., ppt.; 4,400, 10 per cent., 25s. o.c., less 6d. with options, January-February; 6,800, 10 per cent., 21s. 6d. o.c., less 6d., ppt.; 5,600, 21s. o.c., less 6d., France 1s. extra, seed 1s. extra, with Mediterranean and Adriatic options, ppt.; 3,700, 10 per cent., 21s. o.c., less 6d., ppt.; time charter, Transatlantic trade, one round trip, delivery Antwerp, re-delivery United Kingdom-Continent, *via* Cuba, December; 7s., one round trip, delivery U. K.-Cont., re-delivery U. K.-Cont., *via* U. States; 11s., one trip, delivery Gulf, re-delivery United Kingdom-Continent; 11s. 6d. one trip, New York to Cardiff or Tyne; time charter, States, West Indies, &c., about 5s., three years, delivery Tyne, redelivery United Kingdom-Continent, *via* United States, January 1-20; Burmah, 5,000, Trieste or Fiume, 32s. 6d., February-March; Calcutta, 2,416 net, Bombay, Rs. 6.8, November-December; Gulf, 2,470 net, United Kingdom-Continent, 24s. one port, 24s. 6d. two ports discharge, net form, December-January; 2,732 net, 32s. 6d., net form, January; 2,762 net, 22s. 6d., net form, January; Smyrna, 3,250, London 12s., Hull 13s., spot; nitrate ports, 2,722 net, United Kingdom-Continent, 34s. 6d., December-January; Sydney, New South Wales, sail, 36s. 3d., United Kingdom-Continent, December; Nicolaieff, 5,000, Antwerp, 13s., ore, spot; Australia, 6,000, 10 per cent., United Kingdom-Continent, about 42s. 6d., with options, January; Kohsichang, 7,000 max., Holland, 35s., January; Norfolk, 6,800, Algiers, 20s., early December; Galveston, 2,808 net, Antwerp, Rotterdam, Bremen or Hamburg, 61s., December-January; Port Larath, 2,079 net, Middlesbrough, 10s. 7½d., option loading Port Romain 10s. 9d., ppt.; Porman, 3,200, West Hartlepool, 7s. 9d., ppt.; Bougie, 4,000, Cardiff, 5s. 9d., ppt.; Hornillo Bay, 3,500, Cardiff, 6s., ppt.; Bilbao, 2,000, Newport, 6s. 4½d., ppt.; 2,500, Middlesbrough, 7s. 3d., ppt.; 2,500, Stockton, 7s. 4½d., ppt.; South Australia, sail, 1,100, United Kingdom-Continent, 38s. 9d., January-February; Walla Walla, sail, 2,000, United Kingdom, 38s., ore, May; Halifax, sail, 13 dols., Monte Video or Buenos Ayres; Pensacola, sail, 16 dols., Rio de Janeiro, March; time charter, Eastern and Australian trade, 6s., one trip, delivery Moji, redelivery Australia; about 7s. 6d., one trip, Australia to Java; time charter, European trade, 2,550 d.w., £900, 12 months, delivery and re-delivery United Kingdom.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER *and* LAST WHITE *pages.*

Abstracts of Contracts Open.

ALEXANDRIA (EGYPT), DECEMBER 5.—Tenders are invited for the supply and delivery of (1) 3,340 tons of Cardiff and 30 tons of Newcastle coal; (2) 19 tons of benzine in 4-gallon tins; and (3) 85 tons of petroleum in 4-gallon tins; required for the service of the Coast Guard Administration. Copies of the conditions and forms of tender for each of the above contracts can be seen by British firms at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

DOWNHAM, DECEMBER 2.—For about 60 tons of best Cresswell large nuts coal. Mr. Walter Hutson, Stow Bridge, Downham.

DUNDEE. DECEMBER 11.—For coals, for the Harbour Trustees.

GOOLE, DECEMBER 3.—For 70 tons of steam coal and 100 tons of house coal, for the Guardians.

HATFIELD (HERTS).—For steam coal and coke, for the Hertfordshire County Council.

ISLEWORTH, DECEMBER 10.—For 250 tons of Midlands slack and 250 tons small Welsh coal, for the Guardians of Brentford Union.

LANCASTER, DECEMBER 2.—For house coal and slack, for the Committee of the Royal Infirmary.

LONDON, S.W., DECEMBER 3.—For Welsh smokeless steam coal, for the Commissioners of his Majesty's Works and Public Buildings.

TREDEGAR, DECEMBER 2.—For about 2,000 tons of small and about 750 tons of large gas coal, for the Urban District Council.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

BALLSBRIDGE, PEMBROKE (DUBLIN), DECEMBER 16.—*Motor Ambulance Chassis and Bodies.*—For two petrol motor chassis and two ambulance bodies, for the Pembroke Urban District Council.

BRIDGEND, DECEMBER 5.—*Slant.*—For driving a slant, 500 yards in coal, main deep, dipping about 10 in. in yard. Further particulars obtainable from Mr. Morgan, Ton Phillip Colliery, Cefn, near Bridgend.

CHELMSFORD, DECEMBER 16.—*Borehole.*—For the sinking of a 12 in. borehole, for the Corporation.

COPENHAGEN (DENMARK), DECEMBER 4.—*Rails, &c.*—The Danish State Railways are prepared to receive tenders for the supply of about 6,300 tons of rails and fastenings. Forms on application to Banekontoret, Gl. Kongevej 1 E, Copenhagen B.

DRAMMEN (NORWAY), DECEMBER 2.—*Iron Bars, &c.*—Tenders are invited by the Norwegian State Railway authorities for the supply of iron bars, plates and angle iron. A copy of the specification, &c, (in Norwegian), may be seen by British makers at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

GOVAN (GLASGOW), DECEMBER 9.—*Motor Ambulance Wagon, &c.*—For a motor ambulance wagon, for the Combination Parish Council.

GRAVESEND, DECEMBER 2.—*Cables.*—For high-tension cables, for the Corporation.

HALIFAX, DECEMBER 3.—*Water-tube Boilers.*—For two water-tube boilers, complete with superheaters and mechanical stokers, for the Corporation (Contract No. 6).

HAMPTON (MIDDLESEX), DECEMBER 10.—*Air-compressing Machinery.*—For a duplicate set of condensing steam engine air compressors, and other subsidiary works, for the Urban District Council.

LEEDS, DECEMBER 2.—*Centrifugal Pumps.*—For six No inter-dependent units of combined centrifugal sewage pumps, direct coupled to three-phase alternating-current motors, for the Sewerage Committee of the Corporation (Contract No. 42).

LONDON, S.W., DECEMBER 3.—*Girder Bridges.*—For girder bridges (12, 15, 20, 30, and 100 feet clear span), for the directors of the Madras and Southern Mahratta Railway Company Limited. Mr. H. Bonham-Carter, secretary, 91, York-street, Westminster, S.W.

LONDON, DECEMBER 4.—*Pig Iron.*—For grey hæmatite pig iron, for the directors of the East Indian Railway Company. Mr. C. W. Young, secretary, Nicholas-lane, London, E.C.

LONDON, DECEMBER 5.—*Cornish Boiler.*—For a steel dish-end Cornish boiler and sundry works connected therewith, for the Kensington Guardians.

LONDON, DECEMBER 5-9.—*Steel Tires, &c.*—For the following for the board of directors of the Burma Railway Company:—(*a*) 450 steel tyres for engines and tenders; (*b*) 5,506 helical springs; (*c*) 500 steel axles for carriages and wagons; (*d*) fittings for carriages and wagons; (*e*) 120 pairs wheels and axles.

LONDON, DECEMBER 6.—*Girder Bridges.*—For girder bridges (B), 8 spans, from 26 ft. to 69 ft., for the directors of the Madras and Southern Maharatta Railway Company Limited.

LONDON, DECEMBER 10.—*Electric Lifts.*—For three electric lifts, for the Lambeth Guardians.

MELBOURNE (AUSTRALIA), JANUARY 24.—*Turbo-alternators.*—For two 4,000 kw. three-phase steam turbo-alternators, for the Electric Supply Committee.

SEAFORD, DECEMBER 4.—*Cast Iron Pipes, &c.*—For 1,100 yards of 4 in. cast iron open socket pipes and specials, for the directors of Seaford Gas Company.

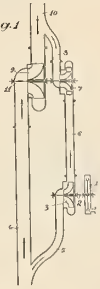
SOUTHEND-ON-SEA, DECEMBER 6.—*Steel Rails, &c.*—For approximately 200 tons of Sandberg steel rails and fish-plates, for the Corporation.

TORONTO (CANADA), DECEMBER 10.—*Pumping Plant.*—For one or more 15,000,000-gallon pumping engines and boilers. Forms, &c., can be obtained from the office of Mr. J. Milne, mechanical and electrical engineer, Department of Works, City Hall, Toronto. A copy can be seen by British makers at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

4304 (1912). *Improvements in or Relating to Centrifugal Pumps, Ventilators, or the like.* G. Möller, 12, Röntgenstrasse, Charlottenburg, Germany.—This invention relates to improvements in centrifugal pumps, ventilators, or the like adapted to be driven by high-speed engines, such as steam turbines or the like. In a centrifugal pump having a given lift the external diameter of the pump depends upon the speed of rotation, so that, according as the number of revolutions increases, the diameter of the pump decreases. If, for example, a centrifugal pump for a short lift is driven direct by a high-speed engine, such as a turbine, or electromotor, the external diameter of the pump must of course be very small. For larger quantities of liquid the drawback would then arise that the diameter of the inlet, or suction, opening would have to be very large, and would eventually much exceed the external diameter, because the inlet speed cannot much exceed 10 ft. per second, so that a practically useful pump cannot be constructed. This invention consists in coupling the very quickly rotating driving engine or motor with a centrifugal pump adapted to force a comparatively small quantity of the fluid to be acted upon to a very great height, and in conducting the fluid from said pump to a turbine in which the energy contained therein is utilised to such an extent that the fluid issuing from said turbine still has sufficient energy to rise up to the height to which it has to be forced. Said turbine is coupled with the main centrifugal pump acting upon the remainder of the fluid, and is so constructed that its speed of rotation conforms with the normal speeds of rotation of centrifugal pumps—that is, said pump rotates at the speed at which a large quantity of liquid can be forced with good efficiency. Fig. 1 is a diagrammatic representation of the manner of connecting the various apparatus. 1 is the driving engine (a quickly rotating steam turbine, gas turbine, electromotor, or the like) to the shaft 2 of which is directly coupled the high pressure pump 3, which draws a comparatively small quantity of liquid out of the pipe 4 through a branch pipe 5, and forces the same at a high pressure through the pipe 6 to the turbine 7. After leaving the turbine 7 the water flows through the branch pipe 6 to the pressure main 10 and still has sufficient energy to attain the same height as the liquid forced by the low pressure pump 9. The low pressure pump 9 is coupled with the turbine 7 by which it is driven. Said low pressure pump draws the water out of the suction pipe 4 and forces it into the pressure pipe 10, in which the liquid from the turbine 7 also flows. The turbine is coupled with the low pressure pump 9 by the shaft 11. The advantages obtained by the invention are—(*a*) for the high pressure pump: a considerably larger external diameter and smaller internal diameter, because the lift or head is increased and the quantity of the liquid is reduced; (*b*) for the low pressure pump: likewise increase of the external diameter by lessening the number of revolutions and, in addition, an improvement in efficiency, so that for the entire combination the drawbacks of high speed pumps of this kind are effectively overcome. (Four claims.)

Fig. 1



6356 (1912). *Improvements in or Connected with Cutters for Cutter Bars and Cutter Bars of Cutting Machines for Use in Mining Coal.* Mavor and Coulson Limited, 47, Broad-street, Mile End, Glasgow, and A. W. Davies, the Croft, Carmyle, Lanarkshire.—This invention refers to cutters for cutter bars and cutter bars of cutting machines for use in mining coal of the type employed for undercutting or overcutting at the working face, comprising a cutter bar, to which a rotary and usually a reciprocatory motion is imparted when in operation, furnished with cutters arranged to project from the periphery of the bar and with an end cutter fitted axially into the outer end of the bar, and the invention relates to improvements in or connected with the end cutter and outer end of the bar. Fig. 1 is an elevation of the end of a cutter bar with its end cutter removed; fig. 2 is an elevation of the side of the bar with the end cutter in position; fig. 4 is an end view of the end cutter; fig. 5 is an elevation of the end of a cutter bar with its end cutter removed; fig. 6 is an elevation of the side of the bar with the end cutter in position; and fig. 7 is a longitudinal sectional elevation of the end of the cutter bar. A designates a cutter bar of which the end portion alone is shown, and B designates one of the cutters arranged to project from the periphery of the bar, the bar being furnished with an end cutter formed with a head having, as is common to end cutters of the type in question, two or more teeth C, so arranged that as the bar is rotated and reciprocated, they produce an end cutting effect. The head of the cutter is provided with a shank D of cylindrical form, and the end of the bar A is correspondingly axially bored to receive the shank D, the shank when introduced affording lateral support to the cutter, which is secured against endwise movement by means of a pin E passing at right angles through a hole in the bar A near its end and through a transverse hole in the shank D. The hole may be cylindrical, and the pin may consist of the shank of the peripheral cutter B. Additional endwise support may also be obtained by the head of the end cutter presenting a base to bear against a seat F at the end of the cutter bar. For sustaining the strain to which the cutter is subjected when in cutting operation due to the rotary motion of the bar, the head, according to this invention, is formed to present lateral shoulders adapted to engage with the sides of a recess formed across the end of the bar. In the construction illustrated, the head is formed with two shoulders G arranged to extend diametrically from opposite sides of the shank, the shoulders presenting flat sides G¹ parallel to the diameter about which the shoulders are set and a flat base. Each of these shoulders G may constitute the root of a tooth C, a very efficient support being thereby obtained. The end of the bar A is transversely recessed, and, in order to accommodate the shoulders G as above described, the recess, as best seen at fig. 1, is formed with a flat transverse seat F and flat longitudinal sides F¹. Another method of securing the cutter against endwise movement is exemplified in the construction illustrated at figs. 5, 6 and 7, and consists in providing the shank D with two laterally projecting tongues K and forming the end of the bar with two lips L, so arranged that when the shank D of the end cutter has been introduced into the axial bore at the end of the bar A, by partially rotating the cutter about its axis, the tongues K are caused to pass beneath the lips L. (Six claims.)

FIG 1

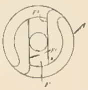
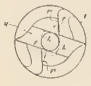
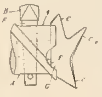


FIG 5



FIG·2.



FIG·6

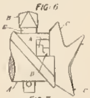


FIG 4

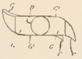
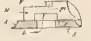


FIG 7.



6439 (1912). *Improvements in or Relating to Eye-guards for Pit Ponies.* J. McKendrick, 22, Muir-street, Motherwell, Lanarkshire.—This invention has for its object to provide an eye-guard for pit ponies capable of convenient attachment to and detachment from the bridle, being applicable to existing bridles. In the accompanying drawings figs. 1 and 2 are elevations at right angles to each other of an eye

Fig 1

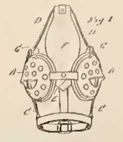
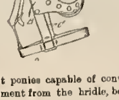


Fig. 2



guard embodying the invention. Each guard A proper, which is composed of wire netting or openwork metal or the like, and is of substantially cup-shaped form, has a lateral extension B whereby it may be removably fastened to the corresponding cheek strap C by means of screws, rivets, loops or the like. Each guard proper is further connected, as by means of a buckle fastening or the like, on the corresponding cheek strap to the usual head or crown strap D and the two guards are connected by a uniting strap E, with or without a buckle, secured to the face strap F. Each eye-guard proper is provided with an inner facing G of leather or the like and is padded, so as to prevent the guard proper injuring the face of the pony. The face strap F is padded at H to protect the forehead of the pony, and thus dispenses with the necessity of providing a bonnet therefor. (Two claims.)

17782 (1912). *Improved Automatic Lubricating Apparatus for Elevators, Conveyors and the like.* O. Wetzel and A. Kuntz, 2, Römerstrasse, Heidelberg, Germany.—The object in lubricating devices for the guide rails and cables of elevators and conveyors is to secure a delivery of lubricant only at considerable intervals of time. The intermittent operation is in accordance with this invention attained by actuating the lubrication by the aid of a friction gearing preferably guided upon the guide rail of the elevator, or running with a limited projection or motion. Fig. 1 shows this device in side elevation; fig. 2 in plan view. *a* represents the distributing block supporting the cushion for the spreading of the lubricant, to which is fastened at the back the lubricant holder *b*; *c* indicates a little plunger pump, the piston *d* of which moves in and out under the influence of the oscillating lever *f* actuated by the shaft *e*. Upon the shaft *e* are screwed fast the two lever arms *g* and *h*. These levers *g* and *h* are made elastic, so that the friction blocks *i* and *k* fixed at their ends press with gentle pressure against the guide rail *l* of the lift. The operation of the device is as follows: As soon as the lubricating apparatus connected with the lift moves, for instance, in the direction of the arrow *m* on fig. 1, the levers *g* and *h* revolve about the shaft *e* upwards until the piston *d* of the plunger pump *c* is entirely moved inwards. In this position the parts of the lubricating apparatus remain as long as the motion lasts in the direction of the arrow *m*. As soon as the elevator commences its journey in the opposite direction, the levers *g* and *h*, in consequence of the friction, are moved down, so that the piston *d* of the pump *c* is again moved outwards. Consequently, by two reversals in the direction of the travel, one stroke of the oil pump is caused. The lubricating mechanism may obviously also be so arranged that at each motion a complete stroke of the piston shall be effected. The use of a friction piece or friction pieces on the side surfaces of the guide rail or of two pieces travelling upon the side surfaces of the guide rail has the advantage that the necessary play requisite for the guidance of the lift in the guiding devices remains without influence upon the action of the device. (Two claims.)

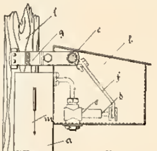


Fig. 1.

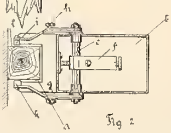
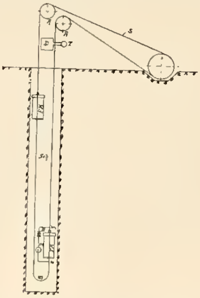
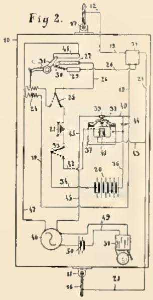


Fig 2

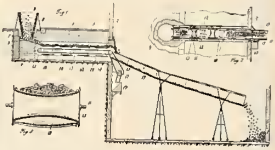
19102 (1912). *Improvements in Means for Telephonic Communication with Mine Cages.* J. H. Reineke, Graf Engelbertstrasse 33, Bochum, Germany.—It has been proposed to establish communication from mine cages by means of wireless telegraphic apparatus, the cable being used as a conductor along which the waves travel. This arrangement cannot, however, be used for practical purposes, as on one hand the cable is earthed by being connected to the cable pulleys, and, on the other hand, because telegraphic communication alone is not sufficient. The object of the present invention is to provide means for telephonic communication with the cage, utilising the cable as a conductor. The invention is illustrated in the accompanying drawing, in which S represents the cable supporting the cages F K and travelling over pulleys R R. The cable S forms an endless conductor, and if part of this cable—for example, the part *x y*—going through one cage is placed in an electric circuit, the main current will flow through the short piece *x y* of the cable, and a branch current will flow through the remainder of the cable, in parallel with *x y*. If a microphone is placed in the circuit of the battery B and the cable part *x y*, the continuous current is converted during conversation into an alternating current in the known manner and the whole of the cable has an inductive effect. The induction can be caused to act outside the cable on a resonator or coil D, in the well-known manner, and can be caused by means of a telephone to produce sound waves. By connecting the coil D with a battery and microphone, instead of with the telephone T, currents can be produced in the cable by means of this microphone and transmitted to a telephone at *x*—*y*. An essential of the arrangement is that there is no interruption of the cable between *x* and *y*. (Two claims.)



19103 (1912). *Improvements in Means for Telephonic and Telegraphic Communication with Mine Cages.* J. H. Reineke, Graf Engelbertstrasse 33, Bochum, Germany.—Specification No. 19102/1912 describes means for telephonic communication with mine cages, wherein a section of the endless cage cable forms part of a telephone circuit, the remainder of the cable, in parallel with the said circuit, being used to coact by induction with a resonator. The present invention consists in improvements in, and modifications of, the device. Fig. 2 shows the arrangement of the transmitting and receiving apparatus in one of the cages. The hoisting cable 12 carrying the cages is suspended in the shaft and runs over pulleys to the winding engine. If the winding engine is arranged, as is now usual, in a housing above the shaft, the pulleys are omitted. The cages are connected with each other by an electrically conductive loop 16, which descends to the bottom of the shaft; this loop may be formed by the connecting cable under the cages, if such connecting cable is available. The parts 17 and 18 of the cables 12 and 16 connected to the cage 10 are connected to a circuit 19 in which is arranged a battery 20 and a microphone 21. Arranged above ground between the mouth of the shaft and the pulleys 14 is a fixed coil or resonator 22, to which is connected a telephone 23. The act of speaking into the microphone 21 produces high-frequency alternating currents in the branch circuit formed by the cables 12, 16. Even if there is a partial short circuit at the pulleys 14, the current is practically confined to the cables at any rate below the pulleys 14, in the shaft. The alternating current acts by induction on the resonator or coil 22, and operates the telephone 23. The wire 19 is connected to the haulage cable above the point of connection of the latter to the cage 10, and leads to the telephone 24 and thence to a switch 25, which, under the influence of a spring or weight, has the tendency to move into the position shown by solid lines in fig. 2. A wire 26 connects the switch 25 with a contact 27. A wire 28 leading from the lower cable 16, below the point of connection 16 of the latter to the cage 10, is connected to a contact 29 which is conductively connected by a spring 60 to a bell crank lever 31 on which the telephone 24 is hung in the usual manner when not in use. The microphone 21, attached in the usual manner to the telephone, is electrically connected by a switch 33, similar to the switch 25, to a wire 34 which leads to the battery 20. From the latter a wire 36 passes to the housing 37 of a buzzer; the spring armature 38 of the latter normally makes contact with a screw 39. The latter is connected by a wire 40 to the wire 19. The second terminal of the microphone is connected by the switch 25 to the wire 26. The coil 41 of the buzzer is connected by a wire 42 to the switch 33 and by a wire 43 to a wire 28. The wires 40 and 36 are connected by a condenser 44. Another wire 45 leads from the screw 39 to an alternating current relay 46, which does not form part of the present invention and the second pole of which is connected by a wire 47 to the contact 48 on which the lever 31 rests when in its normal position. The relay 46 is connected by a wire 49 to a battery 50 and to a signalling appliance—for instance, a bell 51. A similar arrangement is used for the transmitting and receiving apparatus above ground. (Five claims.)



20385 (1912). *Improvements in Coal Conveyors.* B. Seppel and H. Dracke, 46, Spreestrasse, Charlottenburg, Germany.—The present invention relates to a device for conveying coal from the street into the cellar of a house. Fig. 1 represents a sectional side view of the device; fig. 2 a sectional top view of part of the same; and fig. 3 a cross-section of the endless belt with its supporting roller. A channel 20, leading into the cellar 3, is formed by means of masonry 5 underneath the street pavement 1, so as to accommodate an endless belt 10 supported on rollers 13 in a horizontal position. The belt is made of leather, wire-netting, or any other suitable material chosen in accordance with the nature of the coal to be delivered, and the rollers are made of a wider diameter at the ends than in the middle so as to present a concave supporting surface to the belt. Flanges are fitted at the ends of the rollers for the purpose of guiding the belt. The rollers are mounted by means of trunnions 11 in the cheek plates 12 of the channel 20, and are driven by a motor 14 through the medium of sprocket wheel 17 and 16 and chains 15 and 16. The motor is preferably mounted in the cellar 3, as shown in fig. 1. At the street end of the channel 20 a pit 4 is made, which is open at the top for the admission of the coal. The upper part of this pit is widened for the reception of a funnel or hopper 6, which rests with its bottom flange 7 on the shoulder formed by the widening. The hopper is conical in shape and is formed of telescoping rings, all of which can be pushed down into a concentric position in the pit, so as to allow the latter to be closed by a grate or a plate lying flush with the street. When the device is in operation, the hopper is supported by means of stays 8 in the position shown in fig. 1. Underneath the hopper 6 an inclined plate 9 is arranged so as to feed the material sparely and evenly from the hopper on to the belt 10. Within the cellar 3 a chute 19 is arranged so as to receive the coal from the belt 10. This chute is supported on trestles in such a position as to feed the material by gravity to the desired part of the cellar. The chute is made of overlapped channelled sections, the edges of which are beaded so as to keep the sections united and allow the chute to be adjusted in length and telescoped. The trestles are mounted on rollers, so that they can easily be moved from one position to another. The material is fed from the carts into the hopper 6 and passes along the plate 9 to the belt 10, which feeds it into the chute 19. The chute deposits the material in the proper position in the cellar 3, which can thus be stowed with coal without the latter having to be carried into the house, and without producing dust. (Five claims.)



The List of New Patents Connected with the Coal and Iron Trade will be found on page 1112.

At Blaenavon on the 19th inst., a Home Office summons was brought against the Blaenavon Company Limited, under the provisions of the Factory Acts, for placing iron ore within 6 ft. of the railway line at the Blaenavon Works, on October 9. A crane was being used for loading purposes, and, when it was swung round, the men who was working with the crane was caught between the crane and the ore and killed. For the defence it was submitted that there was no regulation that called upon the company to place this material a distance of 3 ft. from the line of rails, and, further, that the risk referred to in the Act was such as arose from locomotive traffic. The Bench fined the defendant company £25, including costs. Mr. Lawrence asked the Bench to state a case.

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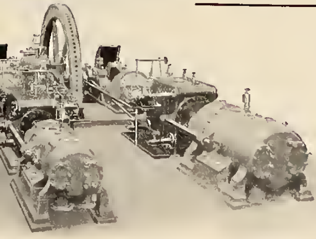
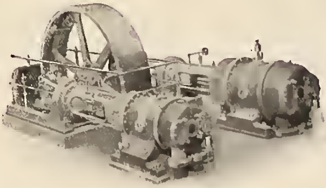
gefield Ironworks, WIGAN. New Broad Street House, LONDON.



Pair Compound Corliss Steam Two Stage Air Compressing Engines.



Pair Two Stage Air Compressing Engines for Belt Drive.

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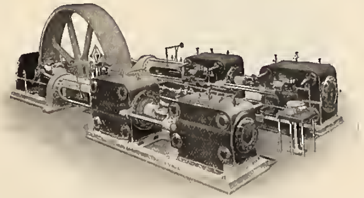
Applicable to existing Installations.



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FOR STEAM OR MOTOR DRIVING.

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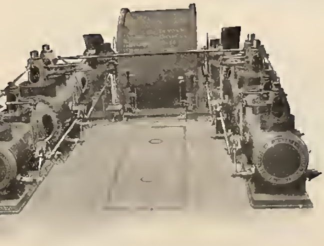
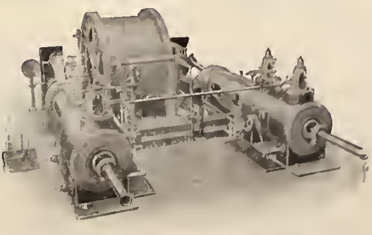


Twin Tandem Compound Winding Engines.



Horizontal Winding Engines with Two Non-Compound Cylinders

WINDING, HAULING AND GENERAL MINING MACHINERY.

le & Petries' Patent Overwind and Overspeed Device.

NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

Applications for Patents.

26430. Electric hauling plant. Akt.-Ges. Brown, Boveri et Cie.
26451. Truck tipplers or means for discharging the contents of trucks and like vehicles. G. A. P. Provay.
26480. Shaking grates for furnaces. A. Siegert.
26526. Rotary blowers, rotary pumps, and the like. T. Shepherd and J. S. Hayes.
26527. Fans or air propellers. T. Shepherd and J. S. Hayes.
26585. Aerial ropeway systems, trolley wire systems, and the like. A. C. W. E. Preetorius.
26590. Colliers. C. Pasquier.
26595. Process for the extraction of sulphur from metallic sulphides. W. A. Hall.
26604. Wooden and other plugs for the blasting holes in rock and improved method of firing. W. H Whitby.
26625. Mechanical lubricators. R. L. Ross and R. L. Ross and Co. Limited.
26626. Mechanical lubricators. R. L. Ross and R. L. Ross and Co. Limited.
26628. Steam-generators. Babcock and Wilcox Limited, and K. W. Branczik.
26629. Explosives. S. Salisbury and Lancashire Explosives Co. Limited.
26632. Safety-balance train for mining. J. T. Heycock.
26655. Apparatus for the purification of furnace gases. C. T. A. H. Eckhardt.
26670. Weighing and measuring apparatus. J. P. Kyd Clark.
26678. Pumps, motors, or like apparatus. R. F. Carey and A. A. Todd.
26695. Heating kilns or like apparatus. Georgs-Marien-Bergwerks-und Hütten-Verein, Akt.-Ges.
26740. Method of and means for dredging or excavating harbours, docks, and the like. D. McDougall.
26761. Brakes used in connection with mine cages, elevators, and the like. J. Wilson and W. Reah.
26762. Apparatus for preventing overspeeding and/or overwinding in connection with mine cages, elevators, and the like. J. Wilson and W. Reah.
26764. Means for preventing the corrosion of boiler plates. A. G. Marshall.
26784. Shackles for coupling trucks and the like. W. S. Powell and I. Powell.
26791. Displacement pumps or so-called pneumatic ejectors. J. Stone and Co. Limited and E. C. Maccormac.
26795. Treatment of minerals and the separation of the metallic oxides obtained thereby. H. C. Woltereck and J. Moeller.
26806. Blastfurnaces. R. Kunz.
26822. Presses for operating on metal and other sheets. H. A. Griffiths and R. H. Griffiths.
26838. Rolling mills. J. G. Smith and J. L. Hunthach.
26884. Process for the production of an exploding blasting medium from picric acid. R. Kolowratnik.
26888. Miners' air life tubes. P. McCarrick.
26889. Boiler feed purifiers. S. Bessonoff.
26899. Regulation of electric rotary converters. British Thomson-Houston Company Limited and F. P. Whiteker.
26900. Moulded materials and process of making same. British Thomson-Houston Company Limited.
26943. Furnaces for burning either refuse from woodworking and/or coal. E. G. Stockton.
26958. Air-compressor. H. P. Dinesen.
26970. Railway stops for controlling, retaining and releasing colliery corves and the like. J. McBean.
26978. Case-hardening and like treatment of iron and steel and alloys of iron and steel or like metals. E. H. H. Gordon and R. J. W. Brown.
26980. Manufacture of steel and the like metals and their alloys. E. H. H. Gordon and R. J. W. Brown.
27004. Valves for lubricators. C. C. Wakefield.
27005. Apparatus for determining deviations of boreholes from the vertical. Anschütz and Co.

Complete Specifications Accepted.

To be published on December 12.

1911.

25742. Surveying telescopes and like instruments. Eagle.
25776. Safety devices for electrical installations. Dierman.
25793. Steam generators. Soc. Anon. des Etablissements Delaunay-Belleville.
25821. Exhaust steam oil separator. Berker.
25822. Steam generators. Sumner.
26033. Steam superheaters for locomotive and other fire tube boilers. Robinson.
26240. Metal mixers, open-hearth furnaces and the like. Head.

1912.

7899. Method of and apparatus for superheating steam. De Boer.
8713. Centrifugal pumps and compressors. Huguenin.
9292. Distillation of bituminous coal and the like. Glasgow.
10117. Process for improving the properties of ingot iron and the like. T. H. Goldschmidt Akt.-Ges.
11717. Mechanism for moving the lower doors of vertical retorts or of the chambers of chamber furnaces or ovens. Gumz.
15566. Automatic tub greaser for mines, quarries and the like. Sharp and Hall.
15681. Brake lever guard and holding-down pins for railway brakes. Bowles.
21419. Pile plankings made of rolled iron sections. Schiffler.

Complete Specifications open to Public Inspection before Acceptance.

1912.

16441. Method of and apparatus for preventing the spreading and reducing the effect of coaldust and firedamp explosions. Kehler and Junker.
26165. Electric electrode furnaces. Jossingfjord Manufacturing Company A.S.
26166. Tilting arrangement for metallurgical furnaces. Jossingfjord Manufacturing Company A.S.

CATALOGUES AND PRICE LISTS RECEIVED.

Messrs. **Siemens Brothers Dynamo Works Limited**, of Caxton House, Westminster, London, S.W., have placed before us a copy of their No. 15 price list relating to their electric drilling machines.

Messrs. **Valor Company Limited**, Aston Cross, Birmingham, have forwarded us a folding leaflet which contains some important data on the all-important subject of being provided with suitable extinguishing appliances in case of fire.

We have received from Messrs. **Lancaster and Tonge Limited**, of Pendleton, Manchester, a copy of their latest piston catalogue. The new catalogue has been thoroughly rearranged, and contains a large number of excellently reproduced photographs of some of their workshops and of the specialities manufactured therein. The arrangement of the catalogue provides for very ready reference to the various sections, and also contains lists of some important engineering firms who are using the Lancaster and Tonge piston rings and packings, while a large number of copies of excellent testimonials complete the work.

PUBLICATIONS RECEIVED.

La Fabrication du Coke. By Adrien Sey. Paris: H. Dunod et E. Pinat. Price 15 fr.

Memoirs of the Geological Survey, England and Wales. Explanation of Sheet 359. "The Geology of the Lizard and Meneage." By J. S. Flett, M.A., and J. B. Hill, R.N. London: H.M. Stationery Office. Price 5s.

Business Prospects Year Book, 1913. By Joseph Davies and C. P. Hailey. Cardiff: Business Statistics Company Limited. Price 10s. net.

"Mining and Metallurgical Abstracts" (August 1912); "Transactions of the Institution of Mining Engineers" (Vol, 44, Part 1); "Journal of the Canadian Peat Society" (Vol. 1, Nos. 3 and 4), May and August, price 25c.; "Mine Department, Union of South Africa, 'Statistics for the Month of September'"; "Transactions of the Institution of Engineers and Shipbuilders in Scotland" (Part 1); "Trade of the Union of South Africa, Southern and North-western Rhodesia, and British South Africa for the Month of September"; "Bulletin Mensuel de la Société Industrielle du Nord de la France" (No. 185), Octobre); "The Monthly Magazine of the Incorporated Chamber of Commerce of Liverpool" (Vol. 11, No. 11), November; "The Engineering Magazine" (Vol. 44, No. 2), November, price 1s.

GOVERNMENT PUBLICATIONS.

⁂ Any of the following publications may be obtained on application to this office at the price named post free.

National Health Insurance: Orders under Section 78, three at 1d. each; Customs Order No. 3, 1½d.

Consular Reports: Fiume, 2½d.; Riga, 6½d.

Railway Rates Order, 1½d.

Friendly Society Regulations, 1½d.

List of Acts and Regulations Relating to Merchant Shipping now in Force, 3½d.

Foreign Enlistment Bill, 1d.

Industrial Provident Societies Bill, 2d.

WORKMEN'S COMPENSATION: STATISTICS FOR 1911, 8½d.

Irish Minerals.—During the progress of the recent Irish Exhibition, held in London, Mr. St. John Lyburn, of the Department of Agriculture and Technical Instruction for Ireland, delivered an address on the subject of the mineral industries of the country. Mr. Lyburn said it was satisfactory to note that Ireland was making steady progress with the development of her mineral resources, and there were now about 5,500 men employed in mining and quarrying industries in the country, and the value of the output was about £250,000 per annum. Taking coal first, anthracite occurred and was being worked in the following counties:—Tipperary, Kilkenny and Queen's county; and recently extensive developments had been carried out in the two last-mentioned districts. These deposits were handicapped owing to the absence of railway transport, which matter was now receiving the consideration of those interested in the development of the coal deposits. Bituminous coal occurred in the Arigna district, county Leitrim, the Coalisland district, county Tyrone, and the Ballycastle district, county Antrim. Coalmining was being carried on in the Arigna district, and in a small way at Coalisland, Tyrone and Ballycastle. In conjunction with Prof. Cole, he had estimated the probable amount of coal in Ireland at about 300,000,000 tons, of which about 167,000,000 tons were anthracite, the remainder being bituminous or semi-bituminous, including the reserve of the county Tyrone coalfield, which was estimated at about 63,000,000 tons. The principal working iron ore mines were situated in the county of Antrim. Iron ore also occurred in the counties of Down, Londonderry, Longford, Cavan and Leitrim. Bog iron ore also occurred in various parts of the country, and was exported to be used in the purification of gas. Dealing with other minerals, the lecturer said ochres were being worked in the county of Wicklow, and were exported; pyrites or sulphur ore was being worked near Ovoca, county Wicklow; the deposits of bauxite were confined to the Antrim iron ore measures. Prospecting for lead was at present being carried out near Bantry, county Cork, and Newtownards, county Down. The copper ores occurring in Ireland were chiefly copper pyrites. The Beauparc Copper Mines were working deposits in the county of Meath. He also referred to the deposits of gypsum, barytes, rock salt, steatite (soapstone), felspar, clays, silica, kieselguhr, building and ornamental stone, sandstone, slates, granite, flags, paving setts and macadam. In conclusion, he said he would put himself in the position of being asked the question, "What deposits of minerals in Ireland are at the present moment worthy of being prospected with a view of development proper," and his answers were as follow:—"The Coalisland coalfield and fireclay deposits; the gypsum deposits near Carrickmacross; the felspar deposits of Donegal; the manufacture of cement on an increased scale in Ireland. Attention might also be paid to the undeveloped deposits of iron ore in Ireland. There are many deposits well worthy of the attention of the capitalist, and in my opinion our mineral resources must be largely developed in the future."

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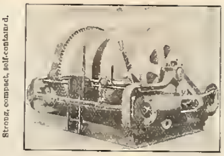

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Showing the Position of Collieries with regard to Railway Communications, Canals and Shipping Ports.

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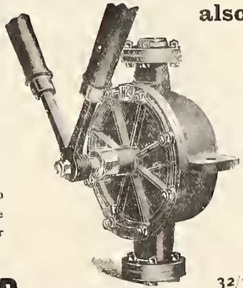

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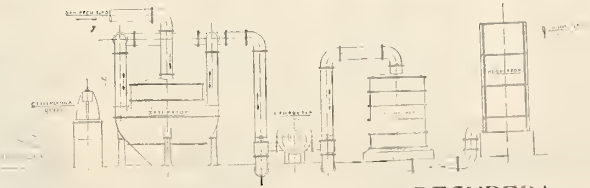
SEMET-SOLVAY COKE OVENS



with or without CONTINUOUS RECUPERATORS, and "DIRECT" AMMONIA RECOVERY PLANT, which requires no Steam for Distillation, or Cooling Water, and makes no Effluent.

THE COKE OVEN CONSTRUCTION CO. LD.
Howard Chambers, 155 Norfolk Street, SHEFFIELD.

Purchasers' Guide to Advertisers' Specialities.

Further information can be obtained on reference to the Weekly Alphabetical Index to Advertisers.

ACETYLENE LAMPS
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

ACCUMULATORS

ACID PLANT
Daglish, Robert, and Co. Ld., St. Helens, Lancs.

AIR ANALYSIS APPARATUS
Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

AIR COMPRESSORS
Alley and MacLellan Ld., Polmadie, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Belliss and Morcom Ld., Birmingham
Savor, Dorling and Co. Ld., Bradford, Yorks
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co., St. Helens, Lancashire
Davis, John, and Son (Derby) Ld., Derby
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
International Channelling Machines Ld., Sheffield
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Mining Engineering Co. Ld., (The), Sheffield
Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., F. Department, Ipswich
Robey and Co. Ld., Globe Works, Lincoln
United States Metallic Packing Co. Ld., Bradford
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

AIR PIPES
Allen, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Son, Thompson-street, Bilston
British Mannesmann Tube Co. Ld., London Wall
Lewis, William, and Son, Bilston
Mining Engineering Co. Ld., Sheffield
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C., Ld., Dudley

AIR PUMPS.
Bailey, W. H., and Co. Ld., Salford, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Wood, John, and Sons Ld., Wigan

ALTERNATORS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Mavor & Coulson Ld., 47, Broad-street, Glasgow

AMBULANCE CARRIAGES, STRETCHERS, &C.
County Ambulance Carriage Works, Mill-street, Pontypridd
Theedam, E. C. Ld., Dudley

ANCHORS
Wright, Joseph, and Co., Tipton

ANEMOMETERS
Davis, E., 2, Aire-street Leeds
Davis, John, and Son (Derby) Ld., Derby
Humble, Stephen, 9, Victoria-st., London, S.W.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

ANGLES AND SECTIONS (STEEL)
Firth, Wm., Ld., Water-lane, Leeds

ANTHRACITE BREAKING, SIZING AND WASHING PLANT
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Sheppard and Sons Ld., Bridgend
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

ANTI-CORROSIVE COMPOSITIONS
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

ANTI-FRICTION METAL
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

ANVILS
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

ASBESTOS
Asbestos and General Paint Co. Ld., Birmingham
Northern Rubber Co., The Wicker, Sheffield

AXLE GREASERS
Wakefield, C. C., and Co., 27, Cannon-street, E.C

BARROWS (ORE)
Bagnall, W. G., Ld., Stafford
Haslam and Schontheil Ld., Cardiff
Heenan and Froude Ld., Worcester
Theedam, E, C., Ld., Dudley

BARS (IRON AND STEEL)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mining Engineering Co. Ld., Sheffield

BARS (SCREEN)
Firth, Wm., Ld., Water-lane, Leeds
Head, Wrightson and Co. Ld., Stockton-on-Tees
Benton, B. M., and Co., Sheffield
Wood, John, and Sons Ld., Wigan

BEARINGS
Bridge, David, & Co. Ld., Castleton, Manchester
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham

BELLOWS
Hardy Patent Pick Co. Ld., Sheffield
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

BELLS (SIGNAL)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Humble, Stephen, 9, Victoria-st., London, S.W.
Theedam, E. C., Ld., Dudley

BELT FASTENERS
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

BELT FOOD

BELTING
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Frost, Albert, and Co., Sheffield
Northern Rubber Co., The Wicker, Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Sutcliffe, H., Horbury, near Wakefield
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

BELTS (CHAIN)
Ewart's Chain Co., Derby, England
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Wright, Joseph, and Co., Tipton

BENZOL PLANTS
Coke Oven Construction Co. Ld., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

BITUMASTIC SOLUTION
Wailes, Dove & Co., Ld., Newcastle-on-Tyne

BLASTING APPARATUS
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Reavell and Co. Ld., Ipswich
Theedam, E. C., Ld., Dudley

BLOWERS
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Tickle Brothers, Vulcan Ironworks, Wigan

BOILER (CLEANING APPARATUS)
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

BOILER AND STEAM PIPE COVERING
Asbestos and General Paint Co. Ld., Birmingham
Kenyon, W., & Sons Ld., Dukinfield, Manchester

BOILER FEEDERS
Feet, B. G., & Co., 11, Queen Victoria-street, E.C.
Royles Ld., Irlam, Manchester
Tangyes Ld., Cornwall Works, Birmingham

BOILER MERCHANTS
Stringer, John, and Son, Blackburn

BOILER MOUNTINGS
Bailey, W. H., and Co. Ld., Salford, Manchester
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 26, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Royles Ld., Irlam, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Wellington Tube Works Ld., Great Bridge, Tipton

BOILER REMOVERS
Stringer, John, and Son, Blackburn

BOILER TUBES
Lewis, Edwin, and Sons, Wolverhampton
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Gt. Bridge, Tipton

BOILERS
Avonside Engine Co. Ld., Bristol
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs, E.C.
Heenan and Froude Ld., Worcester
Horsfield, J. and J., Ld., Dewsbury
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Peckett & Sons, Atlas Locomotive Works, Bristol
Robey and Co. Ld., Globe Works, Lincoln
Spurr, Inman and Co. Ld., Wakefield
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Uskside Engineering Co. Ld., Newport, Mon.
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Boiler Co. Ld., Bradford

BOLTS, NUTS, &C.
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Bute Docks, Cardiff
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Jardine, John, Deering-street, Nottingham
Mining Engineering Co. Ld. (The), Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, & Sons Ld., Darlington
Theedam, E. C., Ld., Dudley
Ward, Thos. W., Ld., Albion Works, Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

BOOKS ON MINING
Colliery Guardian Co. Ld., 30 & 31, Furnival-st., Holborn, E.C.
Griffin, Charles, and Co. Ld., Exeter-st., Strand
Sweet and Maxwell Ld., 3, Chancery-lane, E.C.
South Wales Institute of Engineers, Cardiff
Southern, T. A., Universal Mining School, Cardiff

BORING CONTRACTORS
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-rd., Lambeth, S.E.
Davidson, J. S., & Son, St. Bees, Cumberland
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Holland Drilling Co., 56, Moorgate-street, E.C.
Lancaster and Tonge Ld., Pendleton, Manchester.
New Calyx Drill and Boring Co. Ld., Millwall, E.
Thomson Bros. (Dunfermline) Ld., Glasgow
Trefor Boring and Mining Co. Ld., Brussels
Vivian's Boring Co. Ld., Cleator Moor, Cumb.

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Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Holland Drilling Co., 56, Moorgate-street, E.C.
Robey and Co. Ld., Lincoln

BORING (PROSPECTING) PLANTS AND TOOLS
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Hardy Patent Pick Co. Ld., Sheffield
Holland Drilling Co., 56, Moorgate-street, E.C.
New Calyx Drill and Boring Co. Ld., Millwall, E.

BRAKES (LININGS FOR)
Frood, Herbert, Co. Ld., Chapel-en-le-Frith

BRAKE (WINDING ENGINE)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Thornewill and Warham Ld., Burton-on-Trent
Wood, John, and Sons Ld., Wigan

BRASSFOUNDERS
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, John, and Son (Derby) Ld., Derby
Lancaster and Tonge Ld., Pendleton, Manchester
Peckett & Sons, Atlas Locomotive Works, Bristol
Railway and General Engineering Co. Ld., Notts
Royles Ld., Irlam, Manchester
Russell, John, and Co. Ld., Alma Works, Walsall

BRATTICE CLOTH
Davis, John, and Son (Derby) Ld., Derby
Evans, D. Llewellin, 120, Bute-street, Cardiff
Moritz, George, Ld., Clayton, Manchester
Mudford, R. H., & Sons, 55, Exchange-st., Sheffield

BREATHING APPARATUS
Siebe, Gorman and Co. Ld., Westminster, S.E.

BRICK MACHINE MERCHANTS
Stringer, John, and Son, Blackburn

BRICKMAKING MACHINERY
Bradley & Craven Ld., Wakefield
Briquette Machinery Ld., 161, Water-lane, Leeds
Fraser & Chalmers Ld., 3, London Wall Bldgs, E.C.
Nuneaton Engineering Co. Ld., Nuneaton
Thompson and Southwick Ld., Tamworth
Ward, Thos. W., Limited, Albion Works, Sheffield
Whittaker, C., and Co. Ld., Accrington
Wootton Bros. Ld., Coalville, near Leicester

BRICKS
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BRIDGES
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Newton Heath, Manchester
Isca Foundry Co., Newport, Mon.
Norton's (Tividale) Ld., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

BRIQUETTE MACHINERY
Bradley & Craven Ld., Wakefield
Briquette Machinery Ld., 161, Water-lane, Leeds
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

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Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley

BUCKETS AND BASKETS
Baker, John, and Son, Bilston, Staffs
Frost, Albert, and Co., Sheffield
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

BUFFERS
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Northern Rubber Co., The Wicker, Sheffield

BUFFERS (SELF-CONTAINED)
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.

BUYERS OF ANY KIND OF PLANT (LARGE OR SMALL)
Stringer, John, and Son, Blackburn

BY-PRODUCT RECOVERY PLANT
Coke Oven Construction Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Koppers, Coke Oven & Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

CABLE CONNECTORS
Haslam and Schontheil Ld., Cardiff

CABLE SLINGS
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.

CABLES
British Insulated and Helsby Cables Ld., Prescot
Diamond Coal-Cutter Co., Wakefield
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Shaw, John, Ld., Sheffield

CABLES (SHOT-FIRING)
British Insulated and Helsby Cables Ld., Prescot
Curtis's & Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
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Haslam and Schontheil Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

CAGES (PIT)
Allen, W. G., and Sons (Tipton) Ld., Tipton
Cantrell, W. E., and Co. Ld., Beeston, Notts
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Humble, Stephen, 9, Victoria-st., London, S.W.
Norton's (Tividale) Ld., Tipton
Ormerod, Edward, Atherton, near Manchester
Thornewill and Warham Ld., Burton-on-Trent
Tickle Bros., Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

"CAMEL HAIR" BELTING
Reddaway, F., & Co. Ld., Pendleton, Manchester

CANVAS FIRE HOSE
Reddaway, F., & Co. Ld., Pendleton, Manchester

CAPSTANS (ELECTRIC)
Bridge, David, & Co. Ld., Castleton, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

CARRYING AND CONVEYING BELTS
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Coulson, M., and Co. Ld., Spennymoor
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Reddaway, F., & Co. Ld., Pendleton, Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Sheppard and Sons Ld., Bridgend, South Wales
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, H., Horbury, near Wakefield
Tickle Bros., Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan.
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

CASTINGS (BRASS OR WHITE METAL)
British Wagon Co. Ld., Rotherham
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, John, and Son (Derby) Ld., Derby
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Royles Ld., Irlam, Manchester

CASTINGS (IRON AND STEEL)
British Wagon Co. Ld., Rotherham
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Isca Foundry Co., Newport, Mon.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway and General Engineering Co. Ld., Notts
Stewarts and Lloyds Ld., Birmingham & Glasgow
Summerson, Thomas, and Sons Ld., Darlington
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

CASTINGS (MALLEABLE)

CEMENT
Earle, G. & T., (1912) Ld., Wilmington, Hull
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

CEMENT-MAKING MACHINERY

CEMENT MANUFACTURERS
Earle, G. & T., (1912) Ld., Wilmington, Hull

CENTRIFUGAL FANS
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson & Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Waddle Patent Fan and Engineering Co., Llanelly
Walker Bros. (Wigan) Ld., Wigan

CENTRIFUGAL PUMPS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey & Co. Ld., Sun Foundry, Leeds
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Tangyes Ld., Cornwall Works, Birmingham

CHANNELS (STEEL)
Scott, Walter, Ld., Leeds Steel Works, Leeds

CHAINS
Firth, William, Ld., Leeds
Haggie Brothers Ld., Gateshead-on-Tyne
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

CHAINS FOR DRIVING AND POWER TRANSMISSION

CHECKS AND LABELS (BRASS)
Pryor, Edward, and Son, 68, West-st., Sheffield

CLING SURFACE (FOR BELTS AND ROPES)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

CLIP PULLEYS

CLIPS (HAULAGE)
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bradley & Craven Ld., Wakefield
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Humble, Stephen, 9, Victoria-st., London, S.W.
Smallman, J. W., Nuneaton
Theedam, E. C., Ld., Dudley
Tickle Bros., Vulcan Ironworks, Wigan

CLUTCHES (FACINGS FOR)
Frood, Herbert, Co. Ld., Chapel-en-le-Frith

COAL BUNKERS
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Coke Oven Construction Co. Ld., Sheffield
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Koppers Coke Oven & Bye-Product Co., Sheffield
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

COAL CARRYING BELTS
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Cantrell, W. E., and Co. Ld., Beeston, Notts
Cort, Arthur, & Co., 303½, Camberwell Rd., London
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark street, S.E.
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, R., Horbury, near Wakefield
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

COAL COMPRESSING MACHINERY
Coke Oven Construction Co. Ld., Sheffield
Koppers Coke Oven & Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

COAL CRUSHING PLANT
Coke Oven Construction Co. Ld., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Leech, Goodall & Co., Hunslet, Leeds
Simon-Carves Ld., 20, Mount-st., Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

COAL-CUTTING MACHINERY
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Gillett, John, & Son, Lancaster Works, Barnsley
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Hurd Coal-Cutter and Engineering Co. Ld., 183, St. Vincent-street, Glasgow
International Channelling Machines Ld., 327 Penistone-road, Sheffield
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Waterfall, H. & H., & Barber, Bridge-st., Sheffield

COAL DRILLS
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

COAL DRYERS
Briquette Machinery Ld., 161, Water-lane, Leeds

COAL HANDLING PLANT
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.
Coke Oven Construction Co. Ld., Sheffield
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Simon-Carves Ld., 20, Mount-st., Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

COAL HEADING MACHINES
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
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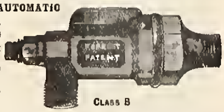

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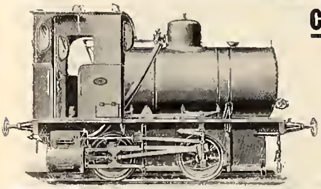

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Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Ward, Thos. W., Limited, Albion Works, Sheffield

Electrical Pumps
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Electrical Stores *
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C. Ld. Dudley

Emery Wheels

Enamelled Plates for Notices for Mines
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Theedam, E.C., Ld., Dudley

Enamel Manufacturers (for all Metals)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalbitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Engineers (Consulting)
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Feil, C. A., Dronfield, near Sheffield
Rodford, H. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

Engines (Blowing)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Gas-Compressing)
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Hauling and Winding)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos
Llewellyn & Cubitt Ld., Pentre, H.S.O., Glam.
Longbotham, R. H., and Co. Ld., Wakefield
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Notts

Engines (Hauling and Winding)—continued.
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, H., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

Engines (Locomotive)
Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Orenstein and Koppel—Arthur Koppel (Amalgamated). 27, Clements lane, London, E.C.
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)
Mather and Platt Ld., Manchester

Engine Merchants
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

Engines (Oil)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping) (See Pumps)

Engines (Rolling Mill)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.

Engines (Steam)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, H.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Hoyles Ld., Irlam, Manchester

Exhaust Turbine Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

Fans (Exhaust)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, H.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Boyles Ld., Irlam, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Ferro-Concrete Constructions
Yorkshire Hennebique Contracting Co. Ld., Leeds

Files
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

Filters (Oil)
Pulsometer Engineering Co. Ld., Reading
Boyles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

Filters (Water and Grease)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Boyles Ld., Irlam, Manchester
Wright, Joseph, and Co., Tipton

Fire Appliances
Feil, C. A., Dronfield, near Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods
Witton Firebrick Co. Ld., Darlington

Firewood Machinery
Glover, M., and Co., Holbeck-lane, Leeds

eck-lane, Leeds
L.,1, Pearson-pl., Cardiff
ts
Arthur Koppel (Amal-
ts-lane, London, E.C.
ineering Co. Ld., Notts
Midland Works, Sheffield
l Co. Ld., Stoke-on-Trent
bion Works, Sheffield
EL)
Co. Ld., Chorley, Lancs.
llie-street, Birmingham
ed, Great Bridge, Tipton
, Little Hulton, Bolton
ectric and Manufacturing
d., Hednesford, Staffs.
elfast
Worcester
leford, Nottingham
d., Sheffield
ford
Co. Ld., Chorley
d., Sheffield
oor Ironworks, Bradford
Midland Works, Sheffield
Ld., Newport
d., Wigan
, Tipton
L. Sheffield
Ld., Bradford, Yorks.
., Castleton, Manchester
. Ld., St. Helens, Lancs
London Wall Bldgs., E.C
Ld., Nailsworth, Glos.
l Co. Ld., Wakefield
Tipton
wich
, Pendleton, Manchester
udley
Ironworks, Wigan
n) Ld., Wigan
., Brook Foundry, Wigan
., Tipton
., Chapel-en-le-Frith
ear Sheffield
ord, Nottingham
, Dept. 11, Blackburn
d. Bradford
epscar Foundry, Leeds
o. Ld., Newport
lbion-place, Leeds
d., Little Hulton, Bolton
Hunslet, Leeds
pleford, Nottingham
Ironworks, Wigan
Worcester and Manchester
Hunslet, Leeds
n Ironworks, Wigan
Ld., Wigan
32, Queen Victoria-st., E.C.
., Cannon-st. House, E.C.
Derby) Ld., Derby
ratus Co. Ld., Cinderford
Ld., Glasgow
, Elverton-st., Westminster
Electric and Manufacturing
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Engineering Co. Ld., Notts
coln
Works, Birmingham
ven and Bye-Product Co.,
Electric and Manufacturin
er
Oven and Bye-Product Co.,
Manchester
Co., 10, Victoria-street,
, Morley, Leeds
(Derby) Ld., Derby
NGS
ne, Wolverhampton
., Birmingham & Glasgow
ks Ld., Great Bridge, Tipton
il Ld., Bristol
et, Leeds
(Derby) Ld., Derby
mund-pl., Aldersgate, E.C.
o. Ld., Huddersfield
anchester
Dudley
, 8 & 13, Vauxhall-rd., L'pool
TORS
et, Leeds
o. Ld., Huddersfield
anchester
Dudley
et, Leeds
Ld., 23, New Bridge-st., E.C.
o. Ld., Huddersfield
Ld., Bradford
otor Lorries Cars &c.)
s (Hudd.) Ld., Huddersfield
l Helsby Cables Ld., Prescot
s (Hudd.) Ld., Huddersfield
or Ld., Hednesford, Staffs.
Co., 27, Queen Victoria Street
Co. Ld., St. Helens, Lancs.
ng-street, Nottingham
Ld., Pendleton, Manchester
, Hunslet, Leeds
ham Ld., Burton-on-Trent
igan) Ld., Wigan
Ld., Brook Foundry, Wigan
teel)
Co. Ld., St. Helens, Lancs.
ter-lane, Leeds
Ld., Manchester
, Liverpool
ewport, Mon.
o., Midland Works, Sheffield
Leeds Steel Works, Leeds
and Coal Co. Ld., Stoke-on-
ited, Albion Works, Sheffield
rs (Tube Rods Enamels)
Edmund-pl., Aldersgate, E.C.

Purchasers' Guide to Advertisers' Specialities.—(continued).

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Leech, Goodall & Co., Hunslet, Leeds
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, B., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hoists
Bletchort, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Hooks or Links (Safety)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Loampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Northern Rubber Co., The Wicker, Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Hose (Coal-Cutter)
Northern Rubber Co., The Wicker, Sheffield

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Hydraulic Jacks
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Ryland-street Works, Birmingham

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Leech, Goodall & Co., Hunslet, Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Youngs, Ryland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hydrometers
Davis, John, and Son (Derby) Ld., Derby

Incline Rollers
Bagnall, W. G., Ld., Stafford
Leech, Goodall & Co., Hunslet, Leeds
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Northern Rubber Co., The Wicker, Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 23, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 23, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Royles Ld., Irlam, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Hardy Patent Pick Co. Ld., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

Jointing Cement
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

Jointing (Sheet)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Joists (Rolled Steel)
Heenan and Froude Ld., Worcester
Renton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Keps (for Winding Cages)
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Lamp Cleaning Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Gauze Brushes
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Glasses
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Oil Filling Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Re-Lighting Apparatus (Underground)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Arc)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Lamps (Electric)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

Lamps (Electric Safety)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pape, Ed., Ld., Belvedere Works, Belvedere, Kent
Photos Miner's Electric Lamp Ld., Queen's-road, Battersea
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Miners' Safety)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Outdoor)
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ROPE PRESERVATIVE
Wright, J. and E., Ld., Birmingham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

ROPES (WIRE)
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Cooke, William and Co. Ld., Tinsley, Sheffield
Elliot, George, and Co. Ld., Westminster, S.W.
Glover, Wm. Jas., and Co., St. Helens, Lancs.
Haggie Brothers Ld., Gateshead-on-Tyne
Latch and Batchelor Ld., Hay Mills, Birmingham
Shaw, John, Ld., Sheffield
Thompson and Co., Wigan
Wright, John & Edwin, Ld., Garrison-st., B'ham

ROPEWAYS
Bleichert, Adolf, and Co., 99-100, Palmerston House, Bishopsgate-st. Within, 60. E.C.
Tickle Brothers, Vulcan Ironworks, Wigan

RUBBER-COVERED ROLLERS
Northern Rubber Co., The Wicker, Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester

SAFETY VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster and Tonge Ld., Pendleton, Manchester
Royles Ld., Irlam, Manchester

SAWS AND SAWING APPLIANCES
Appleby, E. G., and Co., 10, Victoria-street, Westminster

SCOVINS FOR COAL AND COKE
Baker, John, and Son, Bilston
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley

SCREENING
Barns, W., and Son, Globe Works, Holloway, N.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

SCREENING PLANT
Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester and Manchester
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

SCREWING MACHINES
Frost, Albert, and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

SCREWS (STRETCHING)
Youngs, Ryland-street Works, Birmingham

SEWAGE TREATMENT PLANT
Mather and Platt Ld., Manchester

SHAFTING
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Fonçage de Puits, 5, Rue de Surène, Paris
Hardy Patent Pick Co. Ld., Sheffield
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Phillips, C. D., Newport, Mon.
Spencer and Co. Ld., Melksham, Wilts
Tickle Bros., Vulcan Ironworks, Wigan
Uskside Eng. Co. Ld., Newport Mon.
Wright, Joseph, and Co., Tipton

SHAFT SINKERS
Trefor Boring and Mining Co. Ld., Brussels

SHEET IRON
Firth, Wm., Ld., Water-lane, Leeds
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

SHEET METAL WORKS (FOR CYLINDER CASINGS)
Baker, John, and Son, Bilston
Kenyon, Wm., & Sons, Ld., Dukinfield
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

SHOT-FIRING BATTERIES AND CABLES
British Explosives Syndicate Ld., Glasgow
British Insulated and Helsby Cables Ld., Lancs.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Haslam and Schontheil Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

SHOVELS AND SHOVEL TREES
Baker, John, and Son, Bilston, Staffs
Fell, C. A., Dronfield, near Sheffield
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

SHOVELS (SPRINKLING)
Fell, C. A., Dronfield, near Sheffield

SIDINGS
Bagnall, W. G., Ld., Stafford
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, & Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

SLEEPERS (IRON AND STEEL)
Allen, W. G., & Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
Baird, J. W., and Co., West Hartlepool
Bute Works Supply Co. Ld., Cardiff
Firth, Wm., Ld., Water-lane, Leeds
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Renton, B. M., and Co., Midland Works, Sheffield

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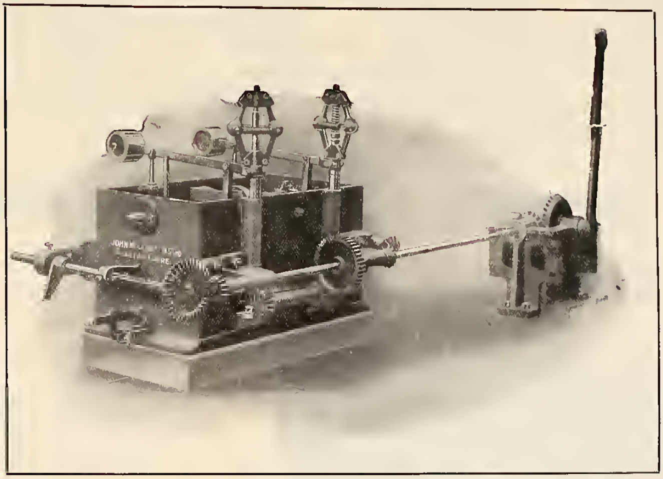

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Smiths' Tools
Hardy Patent Pick Co. Ld., Sheffield

Smith Work
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Wright, Joseph, and Co., Tipton

Smoke Helmets
Siebe, Gorman and Co. Ld., Westminster, S.E.

Speed-Reducing Gears
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Sphincter Grip Armoured Hose
Reddaway, F., & Co. Ld., Pendleton, Manchester

Springs
British Wagon Co. Ld., Rotherham
Lancaster and Tonge Ld., Pendleton, Manchester
Skinner, J. P. and Co. Ld., Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

Stampings
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Steam Experts
Fell, C. A., Dronfield, near Sheffield
Royles Ld., Irlam, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

Steam Fittings
British Mannesmann Tube Co. Ld., London Wall
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Royles Ld., Irlam, Manchester
Russell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staffs.

Steam Mains and Pipe Installations
Stewarts and Lloyds Ld., Birmingham & Glasgow
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

Steam-Saving Appliances
Pillatt and Co. Ld., Stapleford, Nottingham
Royles Ld., Irlam, Manchester
Yorkshire Boiler Co. Ld., Bradford

Steam Traps
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster & Tonge Ld., Pendleton, Manchester
Royles Ld., Irlam, Manchester
Stewarts & Lloyds Ld., Birmingham and Glasgow
United States Metallic Packing Co. Ld., Bradford
Wright, Joseph, and Co., Tipton

Steam Windings
Bridge, David, & Co. Ld., Castleton, Manchester
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Phillips, C. D., Newport, Mon.
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Steel
Cooke, William, and Co. Ld., Tinsley, Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Latch and Batchelor Ld., Hay Mills, nr. B'ham
Mining Engineering Co. Ld. (The), Sheffield
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Stewarts & Lloyds Ld., Birmingham and Glasgow
Thompson and Co., Wigan
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

Steel Blooms Billets
Benton, B. M., and Co., Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Flats and Rounds
Scott, Walter, Ld., Leeds Steel Works, Leeds

Steel Tinbars
Scott, Walter, Ld., Leeds Steel Works, Leeds

Stencil Plates, Steel Stamps, &c.
Pryor, Edward, & Son, 68, West-street, Sheffield

Stone Breakers
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln

Structural Steel Work
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Horton's (Tividale) Ld., Tipton
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Wright, Joseph, and Co., Tipton

Sulphate of Ammonia Plant
Koppers' (Tho) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Sulphur Recovery Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (Tho) Coke Oven and Bye-Product Co., Sheffield

Superheaters
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
Pulsometer Engineering Co. Ld., Reading
Stringer, John, and Son, Dept. 11, Blackburn

Surgical Appliances

Surplus Steam Valves (Full Bore)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Hopkinson, J., and Co. Ld., Huddersfield
Royles Ld., Irlam, Manchester

Surveying (Books on)
Thomas, Wm., Cambrian Mining School, Porth

Surveying (Instruction)
Thomas, Wm., Cambrian Mining School, Porth

Surveying Instrument Makers
Gavis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavement, London
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Switch Boards
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Switch Gear
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Swivels (Ball-Bearing)
Bridge, David & Co., Ld., Castleton, Manchester
Youngs, Hyland-street Works, Birmingham

Tamping Plugs

Tanks
Bagnall, W. G., Ld., Stafford
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Harvey, G. A., and Co. Leamplt Vale, Lewisham
Isca Foundry & Engineering Co., Newport, Mon.
Leech, Goodall & Co., Hunslet, Leeds
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Valor Co. Ld., Aston Cross, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan
Yorkshire Hennebique Contracting Co. Ld., Leeds

Tanks (Ferro-Concrete)

Tar Distilling Plant
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

Technical Education
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Telephones
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

Timber (Colliery)
Baird, J. W., and Co., West Hartlepool
Oebeck and Co., Newcastle-on-Tyne

Tipplers.
Bagnall, W. G., Ld., Stafford
Cantrell, W. E., and Co. Ld., Beeston, Notts
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Spencer and Co. Ld., Melksham, Wilts
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

Tools
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Holland Drilling Co., 56, Moorgate-street, E.C.
Tangyes Ld., Cornwall Works, Birmingham
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Tram and Wagon Corner Plates
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Theedam, E. C., Ld., Dudley

Transformers (Electrical)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Transport Plant
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Trommels
Barns, W., and Son, Globe Works, Holloway
Heenan & Froude Ld., Worcester and Manchester
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts

Truck Shunting Plants
Bleichert, Adolf, and Co., 99/100, Palmerston House, Bishopsgate, London, E.C.

Tubbing and Well Cylinders
Head, Wrightson and Co. Ld., Stockton-on-Tees
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Tub Drawbars
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Ormerod, Edward, Atherton, near Manchester
Benton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

Tube Expanders
Hardy Patent Pick Co. Ld., Sheffield
Youngs, Hyland-street Works, Birmingham

Tube Fittings
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Wednesbury
Stewarts & Lloyds Ld., Birmingham and Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tubes (Iron and Steel)
Allan, W. G., and Sons (Tipton) Ld., Tipton
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Lewis, Edwin, and Sons Ld., Wolverhampton
Lewis, William, and Son, Bilston
Russell, John, & Co. Ld., Alma Tube W'ks, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staff.

Tub Greasers and Controllers
Theedam, E. C., Ld., Dudley

Tubs (Colliery)
Allen, A., and Son Ld., Lower Gornal, Staffs.
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Humble, Stephen, 9, Victoria-st., London, S.W.
Longbotham, R. H., and Co. Ld., Wakefield
Theedam, E. C., Ld., Dudley
Wigan Wagon Co. Ld., Springs Branch, Wigan
Wright, Joseph, and Co., Tipton

Tunnel Segments
Railway and General Engineering Co. Ld., Notts
Tickle Brothers, Vulcan Ironworks, Wigan

Turbines
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester

Turbines (Exhaust)
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Turbo Compressors
Tickle Brothers, Vulcan Ironworks, Wigan

Turntables
Heenan and Froude Ld., Worcester
Isca Foundry & Engineering Co., Newport, Mon.
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Tuyeres
Baker, John, and Son, Bilston, Staffs
Railway and General Engineering Co. Ld., Notts
Royles Ld., Irlam, Manchester
Russell, John, and Co. Ld., Walsall
Stewarts & Lloyds Ld., Birmingham and Glasgow
Theedam, E. C. Ld. Dudley

Valuers
Radford, R. H., Son, and Squire, Sheffield
Stringer, John, and Son, Blackburn

Valves
Alley and MacLellan Ld., Polmadie, Glasgow
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Green and Boulding Ld., 28, New Bridge-st., E.C.
Haslam and Schontheil Ld., Cardiff
Hopkinson, J., and Co. Ld., Huddersfield
Mather and Platt Ld., Manchester
Royles Ld., Irlam, Manchester
Russell, John, & Co. Ld., Alma Tube Works, Walsall

Vices
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley
Youngs, Hyland-street Works, Birmingham

Vulcanised Fibre
Cort, Arthur, & Co., 303½, Camberwell-rd., London

Washers
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Jardine, John, Deering-street, Nottingham
Benton, B. M., and Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Waterproof Covers and Sacks
Madford, J. H., & Sons, 55, Exchange-st., Sheffield

Waterproof Garments
Northern Rubber Co., The Wicker, Sheffield

Water Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
Royles Ld., Irlam, Manchester

Purchasers' Guide to Advertisers' Specialities.—(continued).

Water Filters
Pulsometer Engineering Co. Ld., Reading
Boyles Ld., Irlam, Manchester
Wright, Joseph, and Co., Tipton

Water Softening and Purifying
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Boyles Ld., Irlam, Manchester
Wright, Joseph, and Co., Tipton

Water Tube Boilers
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.

Water Wheels

Welding Apparatus

Well Tubes
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Russell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Wellington, Staffs

Weighing Machinery
Thompson and Co., Wigan

Wheelbarrows
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Son, Thompson-street, Bilston
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Haslam and Schontheil Ld., Cardiff
Lewis, Wm., and Son, Bilston, Staffs.
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Theedam, E. C., Ld., Dudley

Wheels Axles and Tyres
Bagnall, W. G., Ld., Stafford
British Wagon Co. Ld., Rotherham
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lancashire & Yorkshire Wagon Co. Ld., Heywood
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn and Cubitt, Ld., Pentre, Glam.
Moy, Thomas, Ld., Railway Works, Peterborough
Orenstein and Koppel—Arthur Koppel (Amalgamated, 27, Clements-lane, London, E.C.
Railway and General Engineering Co. Ld., Notts
Benton, B. M., & Co., Midland Works, Sheffield
Thompson and Southwick, Ld., Tamworth
Wigan Wagon Co. Ld., Springs Branch, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Winches
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Bros., Vulcan Ironworks, Wigan
Youngs, Ryland-street Works, Birmingham

Winding Engine Indicators
Daglish, H., and Co., St. Helens, Lancashire
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Wire
British Insulated and Helsby Cables Ld., Prescot
Cooke, Wm., and Co. Ld., Tinsley, Sheffield
Elliot, George, & Co. Ld., 16, Gt. George-st., S.W.
Glover, Wm. Jas., and Co., St. Helens, Lancs.
Latch and Batchelor Ld., Hay Mills, Birmingham
Renton, B. M., and Co., Sheffield
Shaw, John, Ld., Sheffield

Wire Mesh and Gauze
Ackroyd & Best Ld., Morley, near Leeds
Barns, W., and Son, Holloway, London, N.
Cousland, Alex., and Son, 3, Mitchell-st., Glasgow

Wire Mesh and Gauze—continued.
Davis, John, and Son (Derby) Ld., Derby
Harvey, G. A., and Co., Lewisham, London, S.E.
Theedam, E. C., Ld., Dudley

Wire Rope Greaser
Mining Engineering Co. Ld. (The), Sheffield
Theedam, E. C., Ld., High-street, Dudley
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Wire Rope Pulley Blocks
Hardy Patent Pick Co. Ld., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Wire Work
Barns, W., and Son, Globe Works, Holloway, N.
Cousland, Alex., and Son, 3, Mitchell-st., Glasgow
Harvey, G. A., and Co., Lewisham, London, S.E.
Shaw, John, Ld., Sheffield

Wood-working Machinery
Stringer, John, and Son, Dept. 11, Blackburn

Worm Gearing
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan

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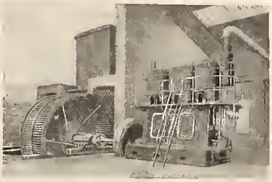

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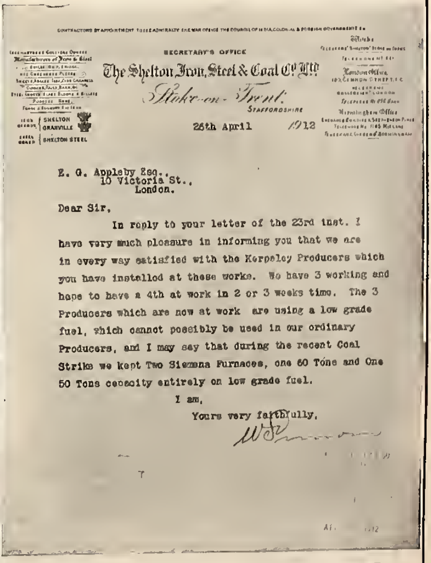

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26th April 1912

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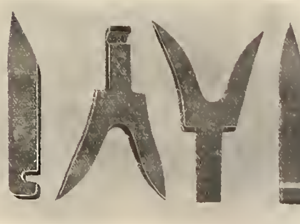

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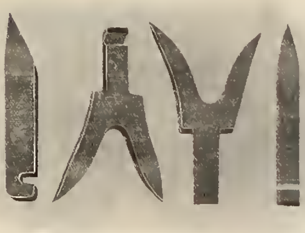

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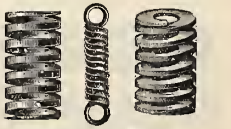

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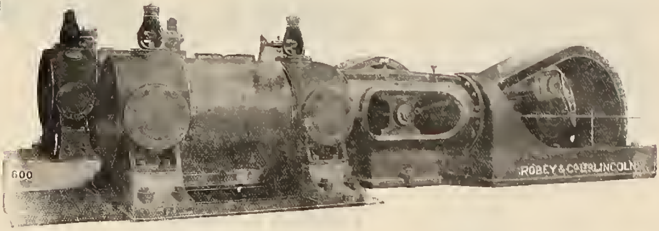

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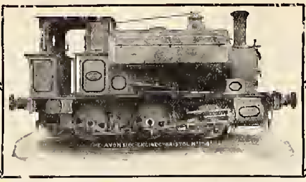

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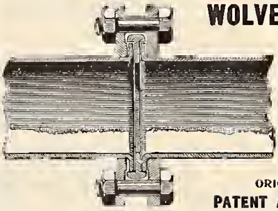

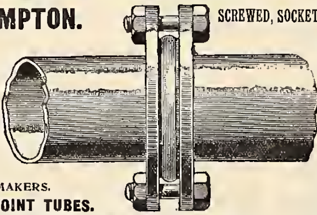

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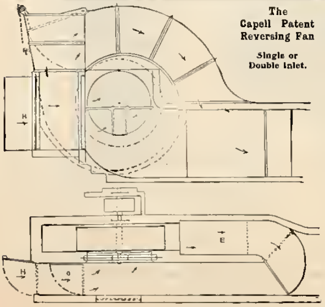

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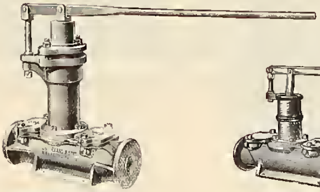
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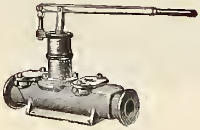
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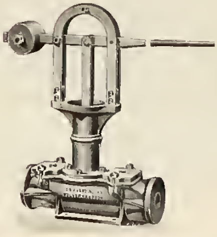
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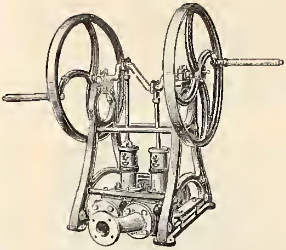
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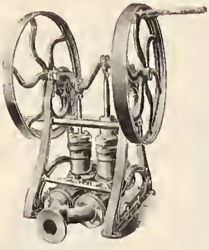
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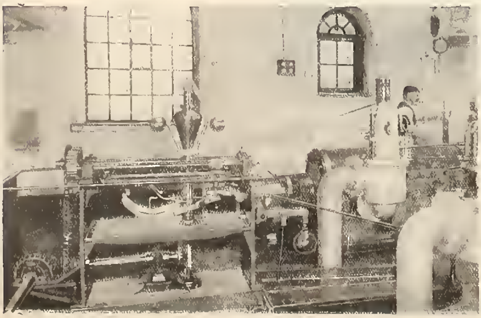

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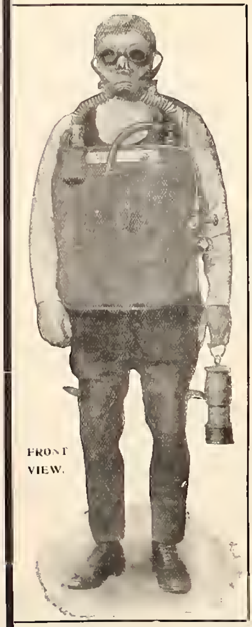

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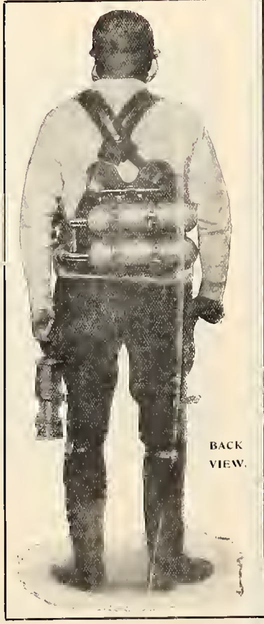

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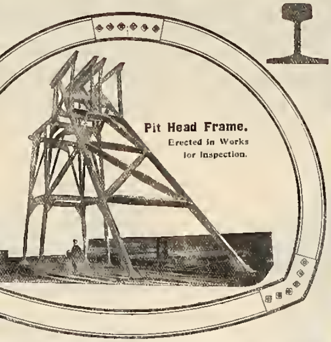
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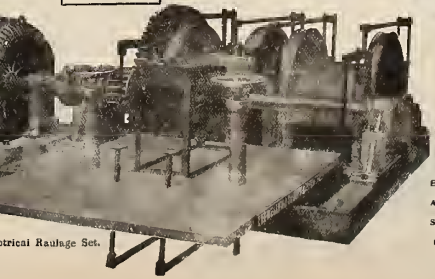

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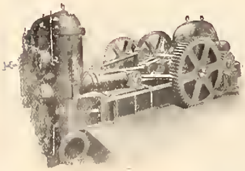

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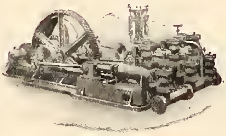

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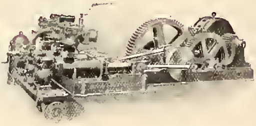

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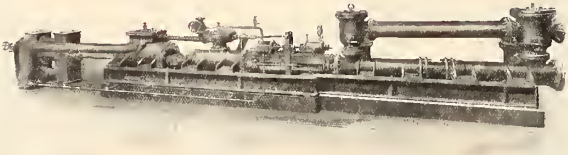

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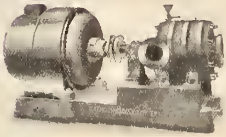

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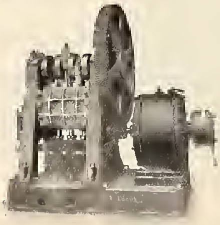

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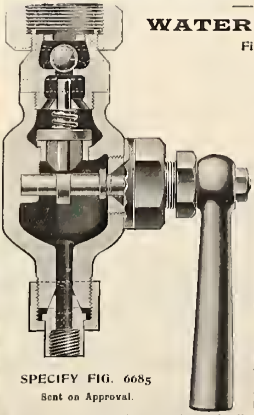

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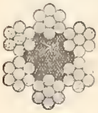
Fig. 2. HAULING.



Lang's Lay Ropes.

Fig. 26. WINDING.

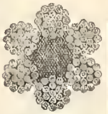


Fig. 1. HAULING.

Patent Flattened Strand Ropes.

Fig. 4. WINDING.

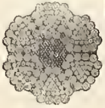
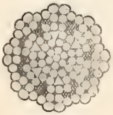


Fig. 13a. SINKING.



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3. Spliced easily and more effectively.
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Fig. 13a for Sinking and Fig. 11b for Cranes, &c., are non-twisting.

Fig. 11b. CRANE, &c

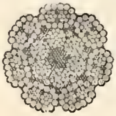

Fig. 15a.

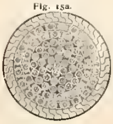

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Fig. 20.

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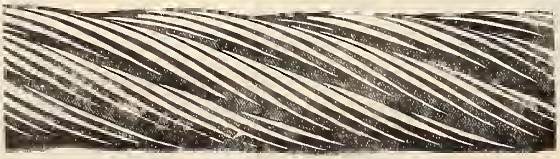

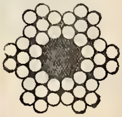

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THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

CIV. FRIDAY, DECEMBER 6, 1912 No. 2710.

GES OF COALMINERS IN 1911.

ual report of the Labour Department of
Trade on changes in rates of wages and
ur in the United Kingdom in 1911, it is
the outstanding feature of the year was
wages in the transport group of trades.
increase in the wages bill resulting from
in the wages of transport workers is not
as complete statistics are not available,
information given in the report it is
t greatly outweighs the net advance in
stries, which amounted to about £18,500
ad over the 800,000 workpeople affected.
movement in these non-transport trades
ughout 1911, and has become more rapid
months. The slight upward movement
commenced in 1910 was maintained on
ng 1911, but although the changes in the
f the year showed a stronger upward
those of the first half, the movement did
ne become very marked. At the end of
the general level of wages was higher
nd of any year since 1893, except 1907
ver the whole period the net increase
vages amounted to £388,563. The
orkpeople reported to the Department
by changes in wages during the
s 916,366.* Of these, 507,207 received
unting to £46,247 per week and 399,362
eases amounting to £11,669 per week,
naing 9,797 had upward and downward
left their wages at the same level at the
beginning of the year. The net result of
es was thus an increase of £34,578 per
10 changes affecting 548,938 workpeople
net increase of £14,534 per week. There
eases in every group of trades with the
ining and pig iron manufacture, in which
nward tendency in the prices of coal and
ned to affect wages adversely.

tion of the net results of the changes in
k in each of the years 1896-1911 shows
900, 1906-07, and 1910-11 wages rose, while
1908-09 they fell. The following table
results of the changes in each of the
ps of trades in the years of rising wages
wages respectively, and the net amount
the whole period:—

rades.	Net amount of increase (+) or decrease (−) in the weekly wages of those affected in the Years of rising wages (1896-1900, 1906-7, 1910-11).	Years of falling wages (1901-05, 1908-09).	Net amount of increase in period 1896-1911.
	£	£	£
. ...	+ 41,054	+ 764	41,818
	+469,861	−311,441	158,420
iron, &c.)	+ 11,249	− 8,757	2,492
. .	+ 1,928	− 1,601	327
iron and cture . .	+ 47,332	− 31,967	15,365
nd ship- .	+ 68,634	− 17,244	51,390
ades	+ 9,332	− 1,787	7,545
. ..	+ 39,290	+ 3,368	42,658
... .	+ 3,229	+ 1,226	4,455
es .	+ 21,822	− 721	21,101
rades.	+ 2,245	+ 2,665	4,910
., trades	+ 6,091	− 1,418	4,673
.. ...	+ 10,846	+ 956	11,802
public	+ 12,651	+ 8,956	21,607
....	+745,564	−357,001	388,563

e of agricultural labourers, seamen and railway servants.

n the 16 years under observation show a
n every group of trades. Coalmining
n increase of £158,420, or nearly half of the total amount, whilst the building, engineering and shipbuilding, and textile trades together account for £135,866, or about one-third of the total.

The proportion of the industrial population * affected by ascertained changes in rates of wages in 1911 was 9·3 per cent. During the previous nine years the highest percentage (13·1) occurred in 1907, and the lowest (5·6) in 1910. The proportion of workpeople affected by the changes in 1911 was highest in the coalmining industry (37·8 per cent).

The number of workpeople whose wages were changed by conciliation, arbitration, &c. in 1911, though much larger than the corresponding number for 1910, was not so great as in 1907, 1908 and 1909, in which years general changes in the wages of coalminers in Lancashire, Yorkshire, the Midlands, North Wales, &c., were arranged by the Board of Conciliation for the "Federated Districts." The number of workpeople whose wages were changed by direct arrangement, &c., was larger than in any of the three previous years, though not so large as in 1905, 1906 and 1907.

In the coalmining industry, in which 381,600 workpeople had their wages changed by conciliation boards, whose decisions are largely, though not entirely, influenced by the selling price of coal. Of the remaining 140,532 workpeople, whose wages were changed under the second group of methods, 75,875 engaged in the transport trades were affected by settlements arrived at by the arbitration or mediation of Board of Trade representatives or others. By conciliation, mediation or arbitration, 149,486 workpeople received increases and 365,276 (mainly coalminers) sustained decreases. The general improvement in conditions in the labour market and trade generally is chiefly reflected in the third group of settlements—direct negotiation, &c.—in which 322,385 workpeople, or 95 per cent. of the total number of workpeople whose changes were settled by direct methods, received increases.

The proportion of workpeople whose changes were preceded by stoppage of work was higher in 1911 than in any of the other years shown in the table.

The changes in hours of labour reported as taking effect in 1911 affected 155,407 workpeople, of whom 4,351 had their aggregate working time increased and 151,056 had it reduced, the net effect of all the changes being a reduction of 715,459 hours in the weekly working time of the workpeople affected. It will be understood that the changes recorded do not include temporary alterations in working hours owing to changes in the state of trade, or regularly recurring seasonal alterations, as in the building trades.

In the coalmining industry the changes in wages taking effect in 1911 resulted in a net decrease of £9,553 per week in the wages of 390,793 workpeople. Of the total number affected 368,650 were employed in Northumberland, Durham, and South Wales and Monmouthshire, in each of which districts wages fell.

In the Federated districts* and Scotland no changes occurred, whilst in Cumberland there was an upward as well as a downward change, leaving wages at the same level as at the beginning of the year. An increase took place in the Forest of Dean, whilst in the Bristol and Radstock districts the hewers received net increases owing to their basis rates being raised. The number of workpeople affected by changes in wages in this industry (390,793) formed 43 per cent. of the total number affected in all industries.

The following table shows the number of workpeople affected and the amount of change in weekly wages, distinguishing net increases from net decreases, for each of the last 15 years:—

Year.	Total. Work-people affected.*	Net increase (+) or decrease (−) as compared with each preceding year.
	No.	£
1897	240,331	+ 6,553
1898	659,919	+ 56,595
1899	652,654	+ 51,164
1900	680,518	+ 164,474
1901	704,681	− 57,081
1902	735,524	− 73,872
1903	752,190	− 32,488
1904	658,390	− 31 294
1905	200,746	− 13,471
1906	427,156	+ 27,188
1907	806,339	+ 173,613
1908	661,750	47,065
1909	869,870	− 56,150
1910	383,586	+ 5,488
1911	390 793	− 9 553

* Including those workpeople whose wages were changed both upwards and downwards during the year, and at the end of the year stood at the same level as at the beginning.

The years 1897-1900, 1906-1907 and 1910, were years of rising wages, while 1901-1905, 1908-1909 and 1911 were years of falling wages. The aggregate amount of the increases exceeded that of the decreases by £164,081 per week. The wages fluctuations in this industry are further illustrated in the following summary, showing by districts the percentage change in coalhewers' wages in each of the above-mentioned periods of rising and falling wages, and also the percentage of wages above standard at the end of 1896 and at the end of 1911. The general percentage changes are calculated by percentage additions to, or deductions from, the

District.	Percentage of wages above standard at end of 1896.	Percentage increase (+) or decrease (−) on or off hewers' standard rates in the years 1897–1900.	1901–1905	1906–1907.	1908–1909.	1910.	1911.	Percentage of wages above standard at end of 1911.
Northumberland	3¾	+67½	−46½	+32½	−17½	+1¼	−3¾	27½
Durham	15	+50	−37½	+26¼	− 8¾	−1¼	−5	38¾
Cumberland.....................	30	+30	−22½	+17½	− 7½	...	. .	47½
Federated Districts *............................	30	+20	−10	+15	− 5	...	...	50
South Staffordshire and East Worcestershire...	30	+20	−10	+15	− 5	...	...	50
Forest of Dean	15†	+35	−25	+20	−10	...	+5	40†
Bristol	17½, 22½‡	+22½	−10	+15	− 5	...	...	40, 45‡
Somerset (Radstock District).....................	15	+27½	−15	+17½	− 5	...	...	40
South Wales and Monmouthshire	10	+63¾	−43¾	+30	−12½	+3¾	−1¼	60
Fife and Clackmannan	§	+97½	−60	+50	−37½	...	...	50
West Scotland	12½	+87½	−62½	+60	−37½	...	...	50

* Comprising Yorkshire, Lancashire, Cheshire, Nottinghamshire, Derbyshire, Leicestershire, Warwickshire, Shropshire, Staffordshire (parts of) and North Wales.

† At certain collieries the percentage above standard was 5 per cent. less.

‡ The lower percentage was on the Gloucestershire side of the district, the higher on the Somersetshire side.

§ At standard.

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ffecting agricultural labourers, seamen and
e are not included, as the numbers affected

* Exclusive of agricultural labourers, seamen, and railway servants.

* Comprising Yorkshire, Lancashire, Cheshire, Nottinghamshire, Derbyshire, Leicestershire, Warwickshire, Shropshire, Staffordshire (parts of) and North Wales.

PROFIT-SHARING AND LABOUR CO-PARTNERSHIP.

The Labour Department of the Board of Trade has just published a Report on Profit-sharing and Labour Co-partnership in the United Kingdom. In a prefatory note Mr. G. S. Barnes observes that in this report, as in the previous one, issued in 1894, profit-sharing is understood to involve an agreement between an employer and his workpeople, under which the latter receive, in addition to their wages, a share (fixed beforehand) in the profits of the undertaking. A grant or bonus, therefore, made at the absolute discretion of the employer, and not upon any prearranged basis, is not a case of profit-sharing for the present purpose. It may further be remarked that, without a special enquiry, it would be difficult to determine in the less well-organised trades in which many of the profit-sharing schemes have been started, whether the wages paid are the full current district rates. Labour co-partnership is an extension of profit-sharing, enabling the worker to accumulate his share of profit in the capital of the business employing him, thus gaining the rights and responsibilities of a shareholder. A still further stage is found in some co-partnership schemes which provide for a direct share in the management, as well as a share in the profits, one or more seats on the board of directors being expressly reserved for representatives of the workpeople.

The present investigation has brought to light a large number of profit-sharing schemes in private firms and companies which were not mentioned in the 1894 report, and the number of schemes now known to be in operation is 133, the number of workpeople employed by the firms having such schemes being about 106,000. These 133 schemes are the survivors of nearly 300 profit-sharing arrangements, of which 163 have been abandoned. It is shown that 81 out of the 133 surviving schemes were started since 1900, and 62 since 1905.

The number of workers under existing schemes who were entitled to share in profits at the end of 1911 (or in 1912, in the case of schemes started since 1911) was 57·3 per cent. of the total number of workers in the firms where those schemes were in force. The average bonus or share in profits in 1911 represented an addition to the wages of participants of 5·5 per cent. in the case of those firms who furnished particulars to the department; this was also the average for the whole period 1901-1911.

There is a great diversity in the schemes as regards the form of bonus to workers. In about three-fifths of the schemes the bonus is paid in cash; this is especially the case with the older schemes. In a certain number of schemes the whole of the bonus is paid to a provident fund, or it is partly paid in cash and the remainder paid to a provident fund. A more common type of scheme, however, is that in which the whole or part of the bonus is retained for investment in the capital of the undertaking, the other part (where all is not so invested) being paid out in cash or retained on deposit with the employers for provident purposes. This capitalising of the bonus may perhaps be regarded as the characteristic feature of the more recent profit-sharing schemes, and is invariably found in the large and important group of gasworks. Many industrial undertakings are, however, not capable of absorbing annual additions to capital, and success is, in some cases, only attained by keeping the capital account as low as possible.

For one reason or another a large number of failures seem to have occurred in the various attempts which have been made to give the workers a direct share of profits. In more than half the cases of abandoned schemes the cause of abandonment seems, however, to be traceable not to any inherent fault in the scheme as such, but to the falling off of business and to the fact that there were no profits to share. This form of weakness is less likely to affect undertakings which are more or less of the nature of monopolies. Gas companies account for 33 out of the 133 profit-sharing schemes now known to be in existence; but it would probably be unsafe to deduce from their experience any general principles applicable to commercial undertakings of an ordinary character.

To what extent it may be possible for profit-sharing and co-partnership arrangements to become general throughout British industry, and what influence the adoption of such systems would be likely to exert in promoting industrial peace, are questions which are not touched upon in this report, which is intended, not to formulate opinions, but only to supply the facts and materials upon which a judgment may be formed.

A section of the report deals briefly with profit-sharing and labour co-partnership in co-operative societies. This section presents some special features arising out of the fact that here there is no separate employing class, and the capital is provided by the members of these workmen's societies. In the retail distributive societies, or "co-operative stores," 195, or about one in seven of the whole "store" group, have profit-sharing schemes for the workers employed. The number of profit-sharing workers in these societies was upwards of 17,000 in the year 1910; and the bonus divided amounted to about 4½ per cent. on the wages of the workers participating. In addition, one of the co-operative wholesale societies, and three of the consumers' productive societies, had profit-sharing schemes, with about 7,600 and 1,300 participating workers, respectively, in the year 1910.

Another group of co-operative societies are the productive associations of workers, that is to say, societies formed and managed primarily in the interests of the workers employed, and not of the consumers. In view of this feature of their constitution, it is not surprising to find that 40 of them, or nearly half of the total number, allotted a share in their profits to their workers in 1910, either as bonus on wages or as contributions to provident funds, or both. Moreover, a large proportion (36½ per cent. in 1910) of the committeemen who manage such societies are themselves workers.

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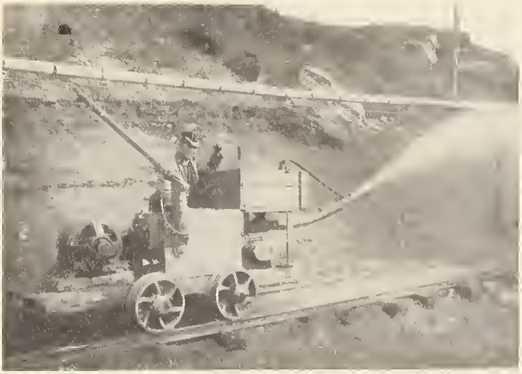
The quantity of dust which the machine will blow or distribute is 100 lb. per 12 minutes, and the finer particles of dust propelled from the blower will travel a distance of over half-a-mile suspended in the air where the air-current is travelling at a speed of 300 ft. per minute. The electrical dust-distributing train consists of a locomotive, mine car containing dust, and the machine. Two men are employed, one on the locomotive, with the other feeding the machine and handling the hose. The machine seldom stops, but proceeds at a slow pace with the man at the hose spraying from side to side, and on the roof. In this way over two miles of haulage ways can be covered in a night, and it is interesting to notice that after treatment of this kind headings driven through solid coal resemble rock tunnels.

In addition to the stonedust distributed in this manner, all holes, ledges, and natural projections along the haulage ways and headings are cleared of coaldust and filled with stonedust by hand. Hundreds of shelves loaded with stonedust are also strung along the haulage ways. All shelves which have been erected recently are practically fireproof, being covered on the underside with thin sheet-iron. Reliance is not placed upon Taffanel barriers, or zones.

A photograph of the dust-distributing apparatus is given herewith.



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SHARING AND LABOUR
-PARTNERSHIP.

rtment of the Board of Trade has
port on Profit-sharing and Labour
ho United Kingdom. In a prefatory
nes observes that in this report, as in
sued in 1894, profit-sharing is under-
agreement between an employer and
nder which the latter receive, in
ges, a share (fixed beforehand) in the
aking. A grant or bonus, therefore.
ate discretion of the employer, and
ranged basis, is not a case of profit-
resent purpose. It may further be
hout a special enquiry, it would be
he in the less well-organised trades in
e profit-sharing schemes have been
the wages paid are the full
tes. Labour co-partnership is an
t-sharing, enabling the worker to
are of profit in the capital of the
him, thus gaining the rights and
shareholder. A still further stage is
rtnership schemes which provide for
he management, as well as a share in
more seats on the board of directors
eserved for representatives of the

tigation has brought to light a large
haring schemes in private firms and
ere not mentioned in the 1894 report,
chemes now known to be in operation
of workpeople employed by the firms
es being about 106,000. These 133
urvivors of nearly 300 profit-sharing
hich 163 have been abandoned. It is
of the 133 surviving schemes were
nd 62 since 1905.

workers under existing schemes who
re in profits at the end of 1911 (or in
schemes started since 1911) was 57·3
otal number of workers in the firms
s were in force. The average bonus
n 1911 represented an addition to the
ts of 5·5 per cent. in the case of those
particulars to the department; this
e for the whole period 1901-1911.

diversity in the schemes as regards
to workers. In about three-fifths of
nus is paid in cash; this is especially
lder schemes. In a certain number
le of the bonus is paid to a provident
paid in cash and the remainder paid
. A more common type of scheme,
which the whole or part of the bonus
estment in the capital of the under-
rt (where all is not so invested) being
or retained on deposit with the
ident purposes. This capitalising of
haps be regarded as the characteristic
e recent profit-sharing schemes, and
in the large and important group of
ndustrial undertakings are, however,
rbing annual additions to capital, and
cases, only attained by keeping the
ow as possible.

r another a large number of failures
rred in the various attempts which
o give the workers a direct share of
than half the cases of abandoned
of abandonment seems, however, to
any inherent fault in the scheme as
ling off of business and to the fact
o profits to share. This form of
ely to affect undertakings which are
nature of monopolies. Gas companies
of the 133 profit-sharing schemes
n existence; but it would probably
e from their experience any general
e to commercial undertakings of an

t may be possible for profit-sharing
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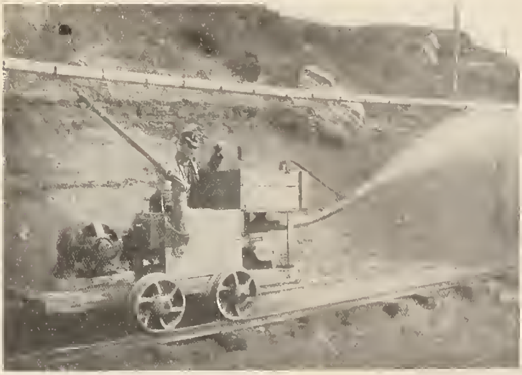

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of the plant. The wages costs of a small plant are very low, for such plants do not take up the whole time of one man.

Reviewing the two systems, steam and gas, the result may be tabulated as follows:—

Table III.

Type of plant.	Calorific value of the coal in B.T.U.	Consumption of fuel per B.H.P. per hour.	Cost of fuel per ton.		Fuel cost per B.H.P. per hour.	Running cost per B.H.P. per hour.
		Lb.	s.	d.	d.	d.
Average steam plant of about 25- to 50-horse power[a].	9,700	7·6	14	0	0·57	—
	8,500	8·69	8	0	0·37	—
Large steam plant using modern fuel and labour-saving appliances.	10,000[b]	—	14	0[c]	—	0·6[c]
Suction gas plant	9,700[b]	1·56[c]	18	6[c]	0·15[c]	—
[a]	9,700	1·4	14	0	0·1	—
	8,500	1·6	8	0	0·063	—
Large pressure gas plant	10,000[b]	1·3[c]	14	0[c]	0·97[c]	—
[a]	9,700	1·5	14	0	0·11	—
	8,500	1·7	8	0	0·073	—

[a] Calculated from data given in Prof. D. B. Waters *The Present Status of Coal Power.*

[b] Assumed approximate calorific value.

[c] Results obtained from plant in constant use.

Besides being used as a means for generating power, producer-gas is eminently suited for certain metallurgical purposes in which a continued high temperature is required. Lime and cement making are two industries in which producer-gas might be largely used in New Zealand. To these may be added the smelting of gold ores.

Freeman's Jubilee Colliery, Fernhill.

The gas generator used in conjunction with these processes would, of course, be of the pressure type. Elaborate cleaning apparatus would be unnecessary. Plants of this nature have been installed by the Milburn Lime and Cement Company Limited, with highly satisfactory results.

The advantages of gas firing as compared with the old method of direct coal firing are:—

(1) Economy of fuel, a saving of 40 per cent. being effected in many kilns now working.

(2) Capability of using a lower grade, and therefore cheaper, fuel.

The amount of ash in the fuel is not of so much consequence, for it does not come in contact with the finished product, which is therefore cleaner and of higher grade.

(3) Greater capacity for the same size of kiln.

This applies more especially to limekilns, where the space formerly occupied by coal is now available for lime.

(4) Easier regulation of the temperature. It is also found that a higher mean temperature can be maintained, thereby obtaining a higher-grade finished product.

Gas firing can also be used in connection with steam plants where the gas engine is unsuitable as a motor. By this method of firing, an economy of fuel would be effected, and the smoke nuisance greatly reduced. It is more applicable to large plants, however, than to small ones, a number of boilers being fired from one central generator or battery of generators.

(*To be continued.*)

NORTH STAFFORDSHIRE INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

A general meeting of the members of this institute was held at the North Stafford Hotel, Stoke-on-Trent, on Monday, the chair being occupied by the president, Mr. Hugh Johnstone.

Mr. R. Nelson, H.M. electrical inspector of mines, had been expected to read "Electricity: A Short Paper Addressed to Colliery Managers," but he was unable to attend, and the paper was therefore referred to the next meeting of the institute.

Haulage Clips in Use in North Staffordshire.

Mr. W. G. Salt, of Norton Colliery, Stoke-on-Trent, read a paper, written by himself and Mr. A. L. Lovatt, of the same colliery, entitled "Some Notes on Haulage Clips in Use in North Staffordshire." Their remarks were illustrated by a number of excellent slides made from photographs and drawings.

The advent of the mechanical clip for use in mines was simultaneous, they stated, with the introduction of the "endless rope" system of haulage, and since its adoption, innumerable forms and types of clips for attaching and detaching the pit tubs to and from the haulage ropes had been brought before the notice of colliery officials. A small percentage of the early designs survived the severe tests to which they were subjected, and were now in use to some considerable extent in modified form, but the remainder failed hopelessly to even comply with the requirements of the most reasonable and least difficult forms of endless haulage, and became obsolete almost immediately after their introduction. However, one by one the difficulties were dealt with, until now there were a number of clips that could be said to be satisfactory, but to the writers' knowledge there was no single clip on the market at the present day that would successfully negotiate all the conditions that were often to be found at a mine. The object of the paper was to tabulate as far as possible the types and makes of clips that would to advantage be suited to the various conditions of haulage to be found in that (the North Staffordshire) district. It was their desire to provoke a healthy discussion on the subject, as there appeared to be so very little reliable information that could be obtained on the subject.

The essential qualities of a good clip were:—

1. A clip must be made sufficiently strong with a margin of safety, to do the work that is required and to withstand rough usage. If, however, the design of the clip is over liberal, the desired results would not be obtained, for if the tub or tubs became derailed, serious damage might be caused to the rope or hauling machinery if the clip did not act in the nature of a safety valve.

2. Its design and construction should be such as to allow of its gaining and retaining a firm grip on the rope the moment it is attached.

3. The jaws of the clip should have a good bearing on the rope of at least 70 per cent. of the circumference of the rope, and should embrace all the strands of the rope with a minimum length of clip jaw

4. A good margin for wear should be arranged, and easy adjustment by the person using the clip should also be allowed for.

5. The design and construction should be as simple as possible; the fewer parts the better, and such as to allow of its being easily attached and detached from the rope, the detachment being clean and certain.

6. The gripping surfaces should be so arranged as not to kink the rope when under working conditions. If the kinking effect is reduced to a minimum, the wear on the rope will also be reduced, and consequently the life increased.

7. A clip should be capable of being automatically detached from the rope, and ideally should be of such a design as to work satisfactorily under any one or all the conditions prevailing at a mine.

The following controlling factors must be taken into account in the adoption of a clip:—

1. *Inclination.*—When the inclination of a road is great, a strong clip with attachments made of the best materials should be adopted, preferably of the lever type, so as to adapt itself to the varying diameters of the rope. The clips suitable for these conditions are as follow:—Sylvester and Weaver and Stubbs, &c., for under-rope, and Aspinall for over-rope, but when the inclination is less, other clips may be used with good results, such as the Smallman, and Craven and Bradley.

2. *Undulating or Varying Gradients.*—When the road is dipping first in one direction and then in another, the clip is then required to act in a pulling position or in a holding-back position. Only a few clips are used with a certain amount of success under these conditions, such as Stubbs, Smallman and Craven and Bradley.

3. *Level Roads.*—Various types of clip are in use under such conditions, which is the easiest method of applying haulage clips. Those which may be used under these conditions are Stubbs, Smallman (drop-down clip), Elswick and Craven and Bradley, &c.

4. *Direction of Road* (when the road is not straight).—Under these conditions a number of clips are successfully used to advantage, but are not absolutely infallible, as there is a tendency when a clip is attached to a rope and is coming round a bend for the rope to slip out of the groove of a pulley. Should this happen there would be damage caused both to the clip and the rope. Under these conditions there is a large amount of wear on the clip and rope. A number of clips may be used under these conditions, such as Stubbs, Smallman and the Craven and Bradley.

5. *Under and Over Rope.*—To the writer's knowledge, no clip is suitable for the two conditions unless certain alterations are made, and even then these alterations can only be accomplished in the case of a few clips. For the over-rope haulage lashing chains are used, but latterly have been superseded by the Swan clip, or, preferably, the Aspinall clip.

Classes of Clips.—Clips may be divided into three classes—namely, the lever type, screw type and wedge type.

Examples of the lever type are as follow:—Stubbs, Sylvester and Weaver, Smallman, Bulldog and Aspinall.

Examples of the wedge type are Stubbs and the Smallman.

Examples of the screw type are Craven and Bradley and the Elswick.

There are many other types of clips owing to the fact that most collieries have designs of their own, and each particular type is assumed to be the best for the system of haulage in use. Examples:—Drop-down clip and Swan clip.

The lashing chain is extensively used at some collieries, and, although not a clip, it is used for the same purpose. The chain is about 10 ft. long, having a hook at one end which is attached to the drawbar of the tub. The other end is coiled a few times round the rope and hooked into the chain near the rope. When the road is undulating, it is necessary to use two chains—one attached to the front end for pulling, and the other attached to the back end for holding back.

The lever type of clip is mostly adapted for inclines, as it adjusts itself to the varying diameter of the rope caused by the weight on the rope. It is a well-known fact that there is a difference in the diameter of a rope, working on an incline plane, between the top and bottom. The writers have carried out experiments on a rope $1\frac{1}{4}$ in. diameter which had worn down to $1\frac{3}{16}$ in. Taking several parts of the rope, they found a difference of $\frac{1}{16}$ in. diameter on the same point of the rope between the top and bottom of an incline 800 yards long, varying from 13 to 20 degrees. These tests were made when there was less than half the working load on the rope. The authors have no doubt this variation would be more noticeable with the rope working on full load, and especially so in the case of a new rope, when the hempen core is large and the strands not properly bedded in their places.

The screw type of clip does not adjust itself to the varying diameter of the rope, so that it is not suitable for heavy haulage on a steep gradient. The writers know of a case where a youth was stationed at a point in a dip to tighten the grip of the clip on the haulage rope.

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The advent of the mechanical clip for use in mines was simultaneous, they stated, with the introduction of the "endless rope" system of haulage, and since its adoption, innumerable forms and types of clips for attaching and detaching the pit tubs to and from the haulage ropes had been brought before the notice of colliery officials. A small percentage of the early designs survived the severe tests to which they were subjected, and were now in use to some considerable extent in modified form, but the remainder failed hopelessly to even comply with the requirements of the most reasonable and least difficult forms of endless haulage, and became obsolete almost immediately after their introduction. However, one by one the difficulties were dealt with, until now there were a number of clips that could be said to be satisfactory, but to the writers' knowledge there was no single clip on the market at the present day that would successfully negotiate all the conditions that were often to be found at a mine. The object of the paper was to tabulate as far as possible the types and makes of clips that would to advantage be suited to the various conditions of haulage to be found in that (the North Staffordshire) district. It was their desire to provoke a healthy discussion on the subject, as there appeared to be so very little reliable information that could be obtained on the subject.

The essential qualities of a good clip were :—

1. A clip must be made sufficiently strong with a margin of safety, to do the work that is required and to withstand rough usage. If, however, the design of the clip is over liberal, the desired results would not be obtained, for if the tub or tubs became derailed, serious damage might be caused to the rope or hauling machinery if the clip did not act in the nature of a safety valve.

2. Its design and construction should be such as to allow of its gaining and retaining a firm grip on the rope the moment it is attached.

3. The jaws of the clip should have a good bearing on the rope of at least 70 per cent. of the circumference of the rope, and should embrace all the strands of the rope with a minimum length of clip jaw.

4. A good margin for wear should be arranged, and easy adjustment by the person using the clip should also be allowed for.

5. The design and construction should be as simple as possible; the fewer parts the better, and such as to allow of its being easily attached and detached from the rope, the detachment being clean and certain.

6. The gripping surfaces should be so arranged as not to kink the rope when under working conditions. If the kinking effect is reduced to a minimum, the wear on the rope will also be reduced, and consequently the life increased.

7. A clip should be capable of being automatically detached from the rope, and ideally should be of such a design as to work satisfactorily under any one or all the conditions prevailing at a mine.

The following controlling factors must be taken into account in the adoption of a clip :—

1. *Inclination.*—When the inclination of a road is great, a strong clip with attachments made of the best materials should be adopted, preferably of the lever type, so as to adapt itself to the varying diameters of the rope. The clips suitable for those conditions are as follow :—Sylvester and Weaver and Stubbs, &c., for under-rope, and Aspinall for over-rope, but when the inclination is less, other clips may be used with good results, such as the Smallman, and Craven and Bradley.

2. *Undulating or Varying Gradients.*—When the road is dipping first in one direction and then in another, the clip is then required to act in a pulling position or in a holding-back position. Only a few clips are used with a certain amount of success under these conditions, such as Stubbs, Smallman and Craven and Bradley.

3. *Level Roads.*—Various types of clip are in use under such conditions, which is the easiest method of applying haulage clips. Those which may be used under those conditions are Stubbs, Smallman (drop-down clip), Elswick and Craven and Bradley, &c.

4. *Direction of Road* (when the road is not straight).—Under these conditions a number of clips are successfully used to advantage, but are not absolutely infallible, as there is a tendency when a clip is attached to a rope and is coming round a bend for the rope to slip out of the groove of a pulley. Should this happen there would be damage caused both to the clip and the rope. Under these conditions there is a large amount of wear on the clip and rope. A number of clips may be used under these conditions, such as Stubbs, Smallman and the Craven and Bradley.

5. *Under and Over Rope.*—To the writer's knowledge, no clip is suitable for the two conditions unless certain alterations are made, and even then those alterations can only be accomplished in the case of a few clips. For the over-rope haulage lashing chains are used, but latterly have been superseded by the Swan clip, or, preferably, the Aspinall clip.

Classes of Clips.—Clips may be divided into three classes—namely, the lever type, screw type and wedge type.

Examples of the lever type are as follow :—Stubbs, Sylvester and Weaver, Smallman, Bulldog and Aspinall.

Examples of the wedge type are Stubbs and the Smallman.

Examples of the screw type are Craven and Bradley and the Elswick.

There are many other types of clips owing to the fact that most collieries have designs of their own, and each particular type is assumed to be the best for the system of haulage in use. Examples :—Drop-down clip and Swan clip.

The lashing chain is extensively used at some collieries, and, although not a clip, it is used for the same purpose. The chain is about 10 ft. long, having a hook at one end which is attached to the drawbar of the tub. The other end is coiled a few times round the rope and hooked into the chain near the rope. When the road is undulating, it is necessary to use two chains—one attached to the front end for pulling, and the other attached to the back end for holding back.

The lever type of clip is mostly adapted for inclines, as it adjusts itself to the varying diameter of the rope caused by the weight on the rope. It is a well-known fact that there is a difference in the diameter of a rope, working on an incline plane, between the top and bottom. The writers have carried out experiments on a rope $1\frac{1}{4}$ in. diameter which had worn down to $1\frac{3}{16}$ in. Taking several parts of the rope, they found a difference of $\frac{1}{16}$ in. diameter on the same point of the rope between the top and bottom of an incline 800 yards long, varying from 18 to 20 degrees. These tests were made when there was less than half the working load on the rope. The authors have no doubt this variation would be more noticeable with the rope working on full load, and especially so in the case of a new rope, when the hempen core is large and the strands not properly bedded in their places.

The screw type of clip does not adjust itself to the varying diameter of the rope, so that it is not suitable for heavy haulage on a steep gradient. The writers know of a case where a youth was stationed at a point in a dip to tighten the grip of the clip on the haulage rope.

Advantages.—The writers proceeded to give detailed descriptions of the various clips named. As to the advantages of the various types, they stated that the Bulldog, which was of the lever type, had given a certain amount of satisfaction, but its disadvantages far outweighed its advantages. It could be adopted when the load was against the gradient, as it was dependent on the load for its grip on the rope, and it adjusted itself to the varying diameter of the rope.

As to the Sylvester and Weaver, which was of the cam and lever type, the advantages over those of the Bulldog type were that it had a guard to prevent the cam from splitting or opening the rope; also that it was a very strong clip and would work on a steep incline with safety, and would adjust itself to the varying diameter of the rope. At collieries in the district the clip was working satisfactorily. At Norton Colliery this clip drew two loads up an incline of 1 in 3, each weighing 15 owt. At one time the pivot was a weak point in the clips and occasionally broke. Experiments were made with several qualities of steel pivots, and were subjected to a dead shearing strain with the following results:—

	Tons	cwt.
Bessemer steel pivot...	14	10
Mild " " (case hardened)...	17	7
Silver " " (not ")...	21	12
Nickel " " (" ")...	22	10

The connecting rod was also tested at the same time, the hook of which straightened out with a dead load of 1 ton.

The Stubbs clip was constructed on the new wedge principle, introducing the wedge frame. It was automatically detachable and attachable, and did not kink the rope when working in a forward position. It adjusted itself to the varying diameter of the rope, and would work on either steep gradients, undulating or level roads.

The Smallman clip had been used with success, not only on level roads, but on undulating roads and round bends in the road.

The Craven and Bradley (a screw clip) was giving satisfaction in the district, and each clip was capable of drawing up an incline of 1 in 3 a run of three tubs, weighing 2 tons, at a speed of 2 miles per hour. Its advantages were it could be used on level and undulating roads.

The Elswick was also a screw clip. The jaws of this clip, by which the rope was gripped, acted almost like a clamp. It might be used on undulating roads.

The clip known among miners by the name "Collar clip" very much resembled a pair of blacksmith's tongs. It was cheaply produced and very easily repaired.

The light haulage clip belonged to the lever-wedge type; it was very useful and simple. Its advantages were that it was cheap and light, and was adapted to undulating and level roads. It was automatically detachable.

The Aspinall clip was used for overhead haulage. At a local colliery this clip was drawing one tub weighing 10 owt. up an incline of 30 degs. It adjusted itself to the varying diameter of the rope. The heavier the load, the better was the grip.

The writers added that the disadvantages had been omitted, because they were common to the particular circumstances under which the clips worked, as what would be a safeguard at one colliery might prove a source of danger at another.

The following particulars of the clips used locally were quoted by the authors of the paper:—

Name of clip.	Diameter of rope.	Circumference of rope enclosed.	Strands enclosed.	Loads on clip.	Gripping strain.	Length of leverage.	Weight of clip.	Type of clip.
	In.		Per cent.		Cwts.	In.	Lb.	
Collar clip	¾	50	50	10	28	7	—	Lever.
Norton clip	¾	50	83	10	15·5	7	11¾	"
Bull-dog clip	1¼	59	41·5	10	18·1	10	28½	"
Sylvester & Weaver..	1¼	78 12	83·34	10	18·1	10	31¾	"
Aspinall	¾	75·6	66·7	10	14·7	7	12	"
Craven and Bradley	1	50	100	10	2·69	1 75	24	Screw.
Elswick...	¾	78·7	83·34	10	5·5	2·5	19	"
Smallman.	1¼	50	83·34	10	4 5	2·5	22¼	Wedge and lever.
Stubbs	¾	78	83 34	10	3·8	1·75	23	Wedge frame.

N.B.—¾ in. rope is based on 5 in. lay, 1 in. ditto 6¼ in. lay, 1¼ in ditto 8 in. lay.

Discussion.

Mr. E. B. Wain said the authors of the paper did not go beyond the truth when they said there was no single clip in the market at the present day which would successfully negotiate all the conditions that would be found at a mine. He had been struggling with the problem for 18 years, and he was bound to admit that the statement was supported by his experience. The essentials of a good clip were well set forth in the paper, but there were some points that might have been mentioned—one in particular. He thought one essential of a really good clip must be that the grip on the rope was not too sudden. In the old days, when they were satisfied with ¾ or 1 mile per hour for haulage, a clip that acted fairly quickly was quite satisfactory, but with a rope running at 2 or 2½ miles an hour such a clip might cause serious trouble. In the third essential it was stated: "The jaws of the clip should have a good bearing on the rope of at least 70 per cent. of the circumference of the rope, and should embrace all the strands of the rope with a minimum length of clip jaw." He was not sure that the authors meant to convey what the words conveyed. His experience had gone to show that the longer the length of clip jaw, the more satisfactory working they got. They were dealing with a rope of about 1¼ in., which must have a lay of something like 10 in., and they wanted a grip on the whole of the strands of the rope to get the best effect, so the nearer they approached to the lay of the rope in the length of the clip the better the work they would get out of the rope. One of the drawbacks of the old Bulldog was that the arc of contact was a very small one—that it only gripped one small point on the circumference of the rope. The result was that if a wagon went off the road the whole strain of the load went on to that one infinitesimal point and upon one strand. The greater the length of the clip, the better service, he thought, they would get; and for that reason Mr. Sylvester and Mr. Weaver worked out the clip which had been illustrated, and which had done very excellent service. Then as to the direction of the road, it was hardly possible to obtain any clip that would do useful work round a sharp curve in a steep dip such as they had in North Staffordshire. For undulating gradients certain clips had been recommended, but he ventured to say that no endless-rope haulage could be worked satisfactorily on undulating gradients if the rope were on the floor. He had never worked to any extent with overhead ropes, but he was satisfied that no undulating road could be worked satisfactorily with an under-rope. The danger of having the clip too strong had been pointed out by the authors; they must have a clip to act, to some extent, as a safety valve when they had such enormous weights on the ropes as they now had.

Mr. Joseph Wain referred to trouble he had had in a dip having a fairly even gradient of 30 degs., in the centre of which there was a right-angle curve. They tried putting the pulleys alternately—one on the inside and one on the outside—in order to keep the rope as straight as possible at the curve, but that was not successful. Eventually they overcame the difficulty by raising the road 6 or 7 feet at the turn, so that the tendency of the rope was to bear down on the floor. After that there was very little trouble with it.

The President said he wondered if any of the members had tried the experiment, in the case of haulage on a curve, of keeping the outer rail of the curve lower than the near rail. That was the opposite to the practice in railway work, but in endless rope haulage the tubs were travelling at a speed that enabled them to discard centrifugal force altogether.

Mr. Salt, replying to Mr. E. B. Wain, said the writers of the paper considered the jaws of the clip should not be too long, because in passing over a pulley it would do the rope harm if they were too long. At the top of the dip it would cause a considerable kink in the rope.

Mr. E. B. Wain said they had overlooked what was one of the most important features in connection with an endless haulage rope on a steep gradient—that there should be no sharp bend from the level to the dip. Half the failures in starting endless-rope haulages had been due to the use of too small guide pulleys at the brow.

Mr. G. A. Mitcheson said he did not see how they could discuss the merits of individual clips without taking into consideration the general arrangements of the "endless-rope" haulage. His own experience went to show that a great many of the difficulties with clips had arisen from the peculiar way in which the "endless rope" haulage had been applied. One had seen such curves put in by an ordinary underground platelayer, that he could quite understand Mr. Wain's remarks when he said that no clip would be satisfactory on an "endless rope" round such a turn. But when the turn had been properly made and carefully engineered, experience had shown that more than one clip would work satisfactorily round that particular turn.

Mr. J. W. Hartley offered to provide an illustration—when the paper was further discussed—of a clip used in South Africa, and known as a "jockey." It was similar to the Swan clip, but was fixed on the end of the tub in a socket.

The President said he had no doubt it formed no part of the intention of the writers to single out any one clip as the best for all circumstances. When he suggested the preparation of the paper to Mr. Salt, his idea was that it would form the basis for a very full discussion, and that they would hear from the members what difficulties they had had with certain clips and how they had overcome them. One could understand that a clip that would be best for some mines would be useless in others. The clip which Mr. Hartley spoke of as being in use in South Africa was exactly the one of which he had seen thousands in Scotland. It was called there a "jigger." It was simply the double swan bend, the grip being due to the rope dropping into the last bend. It was used for very slight gradients only. He hoped at the next meeting, when the discussion was resumed, that many of the members would give them the benefit of their experience. He asked them to accord a hearty vote of thanks to Mr. Salt and Mr. Lovatt for their trouble in preparing an exceedingly practical paper.

Mr. F. H. Wynne seconded the vote of thanks, which was unanimously passed.

Mr. Lovatt replied, and said that in preparing the paper they were afforded the opportunity of seeing a number of clips, new and old, which were in the possession of Mt. E. B. Wain and Mr. J. R. L. Allott.

Mr. Wain said he had quite a collection of these clips, and would exhibit them at the next meeting.

Mr. W. G. Peasegood exhibited and explained a model of the cage fence gates in use at the Fair Lady Pit of the Madeley Collieries, near Newcastle.

THE USE OF CORDEAUX FUSE.

In reading his recent paper on "Alterations and Improvements of the Port Talbot Docks and Railways during the last Decade" before the Institution of Civil Engineers, Mr. W. Cleaver, M.Inst.C.E., described in an appendix an interesting application of the Cordeaux fuse in the demolition of an old hydraulic engine-house.

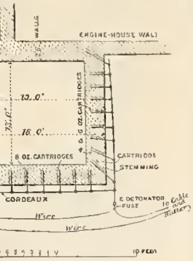
One of the greatest dangers in the use of ordinary explosives in the demolition of structures is the risk that when a number of cartridges are fired simultaneously one or more of them may miss-fire. The author therefore invited tenders from various manufacturers of explosives for the supply of material and the carrying out of the work.

As a result of the enquiries made, the tender of the Ammonal Explosives Company, of London, was accepted for the supply of material only, it being subsequently agreed that the dock company's own men could do the work, assisted for a short time by the Ammonal Company's representative for the purpose of demonstrating the use of the special detonating fuse employed. Although this fuse had only been used on one previous occasion in Great Britain, it proved eminently satisfactory and economical, and over 5,000 tons of mass concrete and brickwork in cement was removed from the work without a single accident, either from explosives or any other cause. After seeing the effect of the Cordeaux detonating fuse on other portions of the building, the author decided to attempt the felling of the tower in one blast.

The salient features of the Cordeaux fuse are the following:—Under ordinary circumstances it is as harmless as the ammonal cartridges with which it was used; both can be hammered, bent, or handled in any manner, or even ignited by ordinary means, without any harm being done, as the fuse and cartridges are effective only when connected with a detonator. One great advantage of the fuse is that the detonators need only be attached to its ends, at any convenient distance from the work to be blasted, and in the open, where they can be inspected before actual firing takes place. No detonators need to be inserted in the cartridges. The fuse is simply laid parallel to the cartridge, secured to it by binding with string or wire, and then inserted in the borehole and stemmed in the usual manner. The branches from each cartridge are then connected in series with another main length of fuse, the loose ends of which are attached to the necessary detonators, either ordinary or electric, whichever method of firing is desired.

The peculiar property of the fuse is that when fired with a detonator attached to the end it becomes what may be termed an elongated detonator, firing each cartridge at once in precisely the same manner as, and if anything more effectively, than if a detonator had been inserted in each cartridge in the ordinary way, eat additional advantage that if, through nnection or other oversight, one or more -fire, there need not be the slightest fear ppening when excavating in the rubbish

anying figure shows clearly the method the arrangement of boreholes, &c., in the



ver. The arrangements on other portions were practically identical where it was e to use the Cordeaux fuse. The demoli- wer in one blast was quite successful, the eing blown out with very little flying e tower itself falling over on its side

AMINATION QUESTIONS.

ng is a copy of the printed questions set for managers' and under-managers the examination held in the Midland and rict in 1911.

ND AND SOUTHERN DISTRICT.

For First-class Certificates.

SUBJECT No. 1

Gases, Lighting, Geology and Ambulance.

the factors that make for a low water- olliery? Describe a good method for the asuring and recording of the ventilating cur- lliery, indicating where the measurements le in the workings, so as to present a true ate of the colliery ventilation.

given the following data relating to a fan to a two-cylinder simple vertical engine. n effective steam-pressure per square inch e cylinders:—

cylinders...	20 in.
peed	400 ft. min.
ower in air	120
y of fan	66 per cent.
y of engine	92 per cent.

he correct to the first place of decimals.

the action of a fan in setting up a ventilat What is the function of the évasée chimney? unction performed in the case of a Waddle

: to ventilate the accompanying colliery plan. roduced.)

te the instruments required in finding the quality of the air-current passing along the of a colliery.

ter gauge (in inches) is required to pass 9,000 air per minute through a circular airway r 4,000 feet long? oefficient of friction, 0.00000001.)

ay were, instead, rectangular, 6 feet high, me area and length, would the water-gauge nd, if so, what would it be?

d of a fan is to be doubled. If the airways emain unchanged, what will be the effect of speed

water-gauge at fan drift.

quantity of air passed by the fan,

power required to drive the fan?

hat the water-gauge of a mine is increased falls), but that the speed of the fan is kept the horse-power required to drive the fan crease?

scientific name and the miner's name (if any) ical symbol, of the gases usually composing re of a mine, and particularise those more und near a gob fire, after blasting and after Describe a simple test for detecting the y three of the gases.

you understand by the term "vapour den- in how it is that an increase of moisture in ic air causes the barometer to go down. In certain states of the atmosphere, cold objects, such as painted walls, iron tank sides, etc., are covered with moisture. Explain this phenomenon, and describe how it can be produced artificially.

10. Describe how the rise or fall of the barometer may indicate changes in the condition of a colliery in respect to its liability to suffer an explosion, with particular reference to gas and coal dust "Colliery Warnings" are sometimes published in the newspapers when the barometer is specially high. Is there any scientific basis for such warning, and, if so, what?

11. Are there any reasons why an explosion, occurring in a colliery which is making gas and is dusty, should be more violent if the colliery is well ventilated than if it is poorly ventilated? If so, enumerate them.

12. Sketch the points for and against the use of self-contained relighters in safety-lamps, for use by all hands underground, whereby a fresh light could be obtained anywhere. As between a Marsaut double gauze and a Mueseler lamp, which is the safer as regards passage of flame in presence of gas? Give reasons for your answer.

13. Name and describe a safety-lamp suitable for everyday use, but specially arranged for detecting firedamp and estimating the proportion of it present in the air.

14. Give a list of the chief groups of Geological measures between the Tertiary and Silurian formations. Name three distinguishing fossils and the formations they occur in.

15. In a colliery the seams are found to dip southwards, and to have fireclay roofs and sandstone floors. At surface, the mountain (or carboniferous) limestone is found south of the shafts, also dipping south. How can such circumstances be explained? If you know of any similar occurrence, describe it shortly.

16. The accompanying plan shows part of an incline (say, 10 feet wide by 6 feet high), driven in a coal seam 6 feet thick, that dips evenly in the direction indicated. In driving, a 70 feet downthrow fault was met as indicated and the incline was carried forward in stone, at an increased dip, until the seam was regained. Construct a section of the incline and coal seam on line AB taking the underlined figures as elevations in feet above the datum line shown at bottom of sheet. (Plan not reproduced.) Show the fault and the levels (or roads). The section is to be drawn below the plan on same sheet.

17. What is the general rule applying to apparatus to be kept at collieries in case of accident? What certificate, if any, do you hold from the St. John's Ambulance Association?

18. In what circumstances would rescue-apparatus be likely to be useful? Describe, briefly, what is being done in this district, to your knowledge, in regard to rescue-apparatus and its use.

SUBJECT No. 2.

Machinery, General.

1. Draw a longitudinal section and also a front elevation of a Lancashire Boiler, showing position of all necessary fittings. Give dimensioned sketches of seating of a 30 ft. by 9 ft. Lancashire Boiler.

2. Two 28 ft. by 7 ft. Lancashire Boilers are working under precisely similar conditions as to Grate Area, Heating Surface, Steam Pressure, Quality of Fuel, and Feed Water Temperature. The efficiency of one is 70 per cent., and that of the other 50 per cent. State, briefly, what, in your opinion, are the causes of the low efficiency and what are the essentials to the high efficiency.

3. What are the principal impurities commonly found in feed water? What method or methods would you adopt to deal with an impure feed water?

4. What are the advantages to be obtained from using steam (a) expansively (b) condensing, (c) superheated? If you have a steam plant which is working high pressure, in what way or ways can the exhaust steam be economically utilised? What precautions would you take before installing superheaters where plant is not modern?

5. State your views as to the care and management of (a) winding ropes, (b) cage bridles, (c) detaching hooks, (d) wire rope conductors.

6. Describe the process of changing a heavy winding rope at a deep shaft. State what method of capping you prefer, and give rough dimensioned sketch of cap for 5 in. circumference rope. In what ways should wire used in a winding rope be tested?

7. Describe, with sketches, the appliances you would use to enable coal and men to be wound from a mid inset in a deep shaft equipped with wire rope conductors.

8. What type and size of wire rope conductor would you adopt for use in a shaft 800 yards deep? How many conductors would you use in a shaft where clearances are small and cages carry two wagons on a deck? What system of weighing would you adopt and what amount of weight would you consider necessary?

9. What are the advantages and disadvantages of using compressed air for underground work? What do you consider the most economical air-pressure at the compressor?

10. In laying out a compressed air plant would you use two-stage compression? How would you secure the pipes in a deep shaft? Would you provide for expansion and contraction? If so, how?

Strength of Materials.

1. A rolled steel joist, 12 ins. by 6 ins., weighing 56 lbs. per foot, is supported at both ends, having a clear span of 14 ft. Find breaking weight in tons when loaded in the middle. What would be the safe dead distributed load which it would carry?

2. What is the average tensile strength of iron out of which ordinary bolts are made? What is a safe working load for bolts moderately tightened, and what for bolts carrying a great strain, e.g., bolts in a high pressure steam joint, and at what point would you measure area of section?

3. What is the safe working load in tons, and the breaking strain in tons, respectively, of a ¾ in. short link chain.

Sinking.

1. It is required to widen an Upcast Shaft, in which there are two cages installed, from 13 ft. diameter to 22 ft. diameter, and at the same time the shaft has to be maintained readily available as the second means of egress and also to ventilate workings in connection with the downcast. Describe how you would propose to carry out the widening safely, expeditiously, and economically.

2. The walling of a shaft used for coal winding shows signs of collapse. State how you would temporarily secure it, and describe fully what means you would adopt in renewing it permanently.

3. Describe, with sketches, the pit top arrangements of a sinking pit (other than the headgear), for safely and expeditiously handling the debris and materials for a sinking pit.

4. What steps would you take for insuring a deep shaft being sunk perpendicularly? and give sketch of best arrangement for plumbing a shaft.

Electricity.

1. How would you suspend electric cables in a deep shaft and in the roadways? Give sketches. Would you prefer to suspend the cables in the Main Intake Haulage Road, or in a Return Travelling Road?

2. Define Board of Trade Unit, Electrical Horse-power, Kilowatt, Neutral Point of Three-phase System.

Is Volts x Amps. = Watts always correct. State reasons.

3. Discuss, briefly, the advantages and disadvantages of Direct Current and Alternating Current for use in mines, including lighting.

4. What are the advantages and disadvantages of earthing Neutral Point of Three-phase System?

SUBJECT No. 3

Surveying and Laying Out a Colliery under Various Circumstances.

Candidates unacquainted with the Staffordshire or Warwickshire Thick Coals are not expected to answer questions relating thereto.

1. What means should you take to check variations of the magnetic meridian, or defects in the compass?

2. Describe, briefly, the principle and method of plotting a survey by co-ordinates.

3. Describe the method of making an underground survey with a fast needle. By what means should you check its accuracy?

4. What are the requirements of the Coal Mines Regulation Acts in reference to:—

- (a) Vertical and horizontal sections?
- (b) Faults and disturbances of the seam?
- (c) Depth of shaft and section of strata sunk through?
- (d) Scale of the plan?
- (e) How often are the workings to be surveyed?

5. In surveying mines of a steep inclination, what means should you take to ensure accuracy?

6. Assume you have an estate in the form of a parallelogram 2,000 yards long by 1,500 yards wide, in which, at a depth of 400 yards from the surface, the coals to be worked consist of the five Warwickshire seams as in section below.

	ft.	ins.
Two Yards Coal	6	2
Fireclay parting	0	3
Bare Coal	2	3
Ryder Coal ..	6	3
Bat .	0	1
Ell Coal ...	3	2
Fireclay ...	0	2
Slate Coal	6	6
	24	10

The dip is 1 in 17 at right angles to the longest side

- (a) What diameter of shafts and what size shaft pillar should you have?
- (b) Where would you place the inset?
- (c) How would you proceed to win and work these coals?
- (d) Show, by sketches, the general arrangement of underground roads, workings, and ventilation.
- (e) What precautions should you take against spontaneous fire?

7. Assume you have an estate in the form of a parallelogram 2,000 yards long by 1,500 yards wide, in which, at a depth of 400 yards from the surface, the South Staffordshire seam of Thick Coal of the section below is to be worked:—

	ft.	ins.
Rooves and Spires Coal	4	0
Bat	0	3
White Coal	3	6
Heath Coal	4	3
Brazils Coal	2	0
Veins and Fine Coal	4	0
Hard stone parting	0	3
Patchells and Stone Coal	4	3
Sawyer Coal	2	0
Slipper Coal	3	0
Benches Coal	2	6
	30	0

Seam practically level.

(a) What diameter of shafts and what size shaft pillar would you recommend?

(b) Where would you place the inset?

(c) How would you proceed to win and work these coals?

(d) Show, by sketches, the general arrangement of underground roads, workings, and ventilation.

(e) What precautions should you take against spontaneous fire?

8. Assume you have an estate in the form of a parallelogram 2,000 yards long by 1,500 yards wide, in which the following seams dipping 1 in 5 at right angles to the longest side, existed:—

	yds	ft	ins.	
Shale	0	2	0	
Coal	2	0	0	
Intervening strata	37	0	0	
Inferior Coal	0	0	8	soft shale on the top
Dirt parting	0	0	4	
Coal	2	2	0	
Intervening strata	51	0	0	
Coal	0	2	0	hard and heavy shale on the top.
Soft parting	0	1	0	
Coal	1	0	10	

Depth to the first seam of coal in the centre of the property is 400 yards.

(a) What diameter of shafts and what size eye-pillar would you recommend?

(b) Where would you place the inset?

(c) Describe how you would proceed to work these coals.

(d) Show, by sketches, the general arrangement of underground roads, workings, and ventilation.

9. Describe the method of opening and working a rib-and-pillar pit in the South Staffordshire Thick Coal.

10. In working seams given to spontaneous combustion, what precautions should you take in laying out the colliery, and what precautions when working?

11. Explain the working of coals of ordinary thickness at a steep inclination of 50°. Show, by sketches, the system of timbering you would adopt.

SUBJECT No. 4.

Underground Management, Practical Ventilation, Timbering, Shot-firing and General Knowledge of Explosives.

Candidates unacquainted with the Staffordshire and Warwickshire Thick Coals are not expected to answer questions relating thereto.

1. State briefly the requirements of the Coal Mines Regulation Acts as to—

(a) Ventilation.

(b) Rules regulating the use of Explosives.

(c) Supply of timber, and Spragging.

(d) As to conditions of sides and roof.

(e) Withdrawal of workmen.

(f) Where coal dust exists.

(g) Where inflammable gas exists to a dangerous extent.

2. What percentage of inflammable gas do you consider dangerous, and by what means should you ascertain the percentage of such gas?

3. If the roof begins to weight in a fiery mine, should you apprehend any danger? If so, what?

4. In a South Staffordshire Thick Coal pit giving off gas, how would you arrange to ventilate the openings?

5. What, in your experience, is the proportion of loss of air at the working faces through leakages? From what causes does this leakage arise, and what are the best means of preventing it?

6. Illustrate by sketches various ways of timbering with which you are acquainted, in main roads, gob roads, and longwall faces (or timbering in any other system of working) in level mines, and where the inclination varies from a dip of 1 in 8 to 1 in 1½.

7. Describe how you would replace timber in a heavily timbered road, with a heavy roof, where the timber was becoming decayed.

8. How would you secure a main road after a big fall, with a bad roof?

9. Under what conditions should you use steel girders, larch, or Norway in main roads?

10. Give your views upon cogging. Where do you consider it most useful?

11. Why is shot-firing in main roads dangerous, and what precautions are necessary when firing in these roads?

12. What is the cause of a blown out shot, and what is the danger arising therefrom?

13. How many High Explosives are you acquainted with? State, briefly, their constituents, and their advantages and disadvantages as compared with powder.

14. Where should you prefer to use permitted explosives as compared with ordinary gunpowder?

15. Have you formed any practical views upon the question of coal dust, and does it occur to you that any precautions are advisable beyond those already in force by law? If so, state them.

16. State your experience of gob fires, or spontaneous fire in solid coal. How did you account for its origin, what were the first indications, and how did you deal with it?

17. What is a Detonator, and how is it used?

For Second-class Certificates.

SUBJECT No. 1.

Ventilation, Gases, Lighting, Geology and Ambulance.

1. What is meant by the term "water-gauge"? Describe, and illustrate by sketches, an instrument for finding the water-gauge. How is it used?

2 What is an airbridge or crossing? Describe how to make one, with sketches. Is it better to make an air bridge or crossing in the roof or floor of a level? Give reasons for your answer.

3. What is General Rule 7?

4 Give, shortly, the distinguishing features of the following types of fan:—

Sirocco; Walker Indestructible; Waddle.

5. What is the nett horse-power required to pass 175,000 cubic feet of air per minute at 4 inches water gauge?

6. Give the following data in respect of any fan plant that you are acquainted with:—

(a) Type of fan.

(b) Revolutions per minute.

(c) Cubic feet of air passing per minute.

(d) Water-gauge at fan drift.

(e) Type of engine driving fan.

(f) Revolutions per minute of engine.

(g) Bore or diameter of cylinders and piston stroke.

(h) Steam pressure.

7. What is a barometer and what is it used for? Could a barometer be made with water? If so, why is this liquid not adopted?

8 Explain how an explosion is propagated (or spread) by the help of coal dust. What gas is likely to be present in unusual quantities after an explosion in which coal dust has assisted?

9. Describe an instrument for finding the amount of moisture in the air of a mine. What is the importance of knowing the amount of moisture in the air?

10. Discuss the Mueseler, Marsaut, and Wolf safety-lamps from the following points of view:—

(1 Safety in high speed currents of air.

(2) Detection of gas

(3) Illuminating power.

11. State the special rules in your district concerned with the handling of safety-lamps

(a) in a case of accident to a lamp,

(b) in case of a lamp going out,

(c) in case of gas firing in the lamp.

12. How would you distinguish between hand specimens of

(a) shale,

(b) sandstone, and

(c) limestone?

Which would you expect to be the hardest?

13. Describe what is meant by the following terms, illustrating your answer by sketches:—

(a) Upthrow fault.

(b) Anticline.

(c) Stratified deposits.

14. What is a tourniquet and what is it used for?

Do you hold any certificate from the St. John Ambulance Association?

SUBJECT No. 2.

Machinery, General.

1. Draw a longitudinal section and also a front elevation of a Lancashire Boiler, showing position of all necessary fittings.

2. What are the advantages to be obtained from using steam—

(a) expansively,

(b) condensing,

(c) superheated?

If you have a steam plant which is working high pressure, in what way or ways can the exhaust steam be economically utilised?

3. State your views as to the care and management of

(a) winding ropes,

(b) cage bridles,

(c) detaching hooks,

(d) wire rope conductors.

4. Describe the process of changing a heavy winding rope at a deep shaft. State what method of capping you prefer and give rough dimensioned sketch of cap for 5 inch circumference rope.

5. Describe, with sketches, the appliances you would use to enable coal and men to be wound from a mid inset in a deep shaft equipped with wire rope conductors.

6. What size winding engines would you employ for raising 100 tons of coal per hour from a shaft 500 yards deep?

Boiler pressure, 80 lbs per square inch.

7 What are the advantages and disadvantages of using compressed air for underground work, and how does it compare with electricity? What do you consider the most economical air-pressure at the compressor?

8. Describe fully and sketch, giving principal dimensions, the most satisfactory pump you are acquainted with for raising water—

(a) in a sinking shaft,

(b) in a coal-winding shaft,

(c) from dip workings.

9 State your practical experience of underground haulage.

Describe fully and give sketch of the best clip you are acquainted with

(a) for use on an undulating road,

(b) for use on a long plane with an inclination against the load of 1 in 4.

10. Give sketches of best safety appliances you know for use on landings and in inclined planes to prevent accidents from tubs running loose.

11. How would you suspend electric cables in a deep shaft and in the roadways? Give sketches. Would you prefer to suspend the cables in the Main Intake Haulage Road or in a Return Travelling Road?

Sinking.

1. It is required to widen an Upcast Shaft, in which there are two cages installed, from 13 ft. diameter to 22 ft. diameter, and at the same time the shaft has to be maintained readily available as the second means of egress and also to ventilate workings in connection with the downcast. Describe how you would propose to carry out the widening safely, expeditiously and economically.

2. The walling of a shaft used for coal-winding shows signs of collapse. State how you would temporarily secure it and describe fully what means you would adopt in renewing it permanently.

3. Sketch a segment of a water garland curb and describe the process of fixing same.

Arithmetic.

1 The area of a piston is 201.0624 square inches. Find its rubbing surface if the piston is 3 inches thick.

2. Required the weight to be placed at the end of a safety valve lever to be equal to 30 lbs. pressure per square inch on the valve. The diameter of valve = 6 ins.; distance from fulcrum to valve, 2 ins., and from valve to weight, 14 ins. The effective weight of lever is 49 lbs., and weight of valve, 9 lbs.

3. Extract the square root of 134,689.

4. Some repairs took nine men nine hours per day for nine days and cost £20 3s. 9d. If ten men had been employed for ten hours per day, how many days would they have taken? What would have been the daily wage per man supposing the same amount were paid for the job?

5. How long would it take a double-acting pump 9 ins. diameter, 13 ins. stroke, running 71 revolutions per minute, to empty a tank 42 ft. by 23 ft. 6 ins. by 4 ft. 9 ins., allowing 15 per cent. for slip?

SUBJECT No. 3.

Surface and Underground Management, Practical Ventilation, Timbering, Shot-firing and Explosives.

Candidates unacquainted with the Staffordshire and Warwickshire Thick Coals are not expected to answer questions relating thereto.

1. State, shortly, your views of the duties of a Second Class Certificated Manager to ensure the carrying out of the Coal Mines Regulation Acts.

2. What are the requirements of the Coal Mines Regulation Acts as to—

(a) Ventilation,

(b) Boreholes,

(c) Explosives,

(d) Shot-firing?

3. When the roof begins to weight in a fiery mine, should you apprehend any danger, and, if so, what?

4. In a South Staffordshire Thick Coal pit giving off gas, how would you arrange to ventilate the openings?

5. What is a Regulator? Describe how it is made, where fixed, and what it is used for.

6. How would you proceed to re-open after an underground fire? What precautions should you take?

7. What is the first indication of firestink? What, in your opinion, assists in causing spontaneous or gob fires? How should you deal with them, and what means should you take to prevent them?

8. What is systematic timbering? Describe any system you are acquainted with, and how far do you think it admits of general application?

9. Give a brief account of how you would get up a heavy fall in a main road.

10. Illustrate by sketches timbering of which you have had actual experience in main roads and working places, where the mines were level, where they were of moderate inclination, and where they were of steep inclination. State dip of the moderate inclination and the dip of the steep inclination.

not-firing in main roads dangerous, and
are necessary in doing so?
fiery and blasting necessary for economi-
nt precautions should you take?
constituents of some High Explosive, ex
ay it differs from gunpowder, and where
ate its use in preference to gunpowder?
ion of the seam or seams with which you
the nature of the roof and floor, explain
n upon which they were worked, the
ering, and why the systems of working

formed any opinion as to the dangers of
o, state shortly what they are, and what
adopt to prevent accidents arising there-

the physical conditions most suitable for
longwall working?
at circumstances should you consider it
the South Staffordshire Thick Coal on
in two sections?

rs to the Editor.

**ot responsible either for the statements
opinions expressed by correspondents.**

**ions must be authenticated by the name
of the sender, whether for publication or
ice can be taken of anonymous communi-**

**stions are only given by way of published
rrespondents, and not by letter, stamped
velopes are not required to be sent.**

E LOUGHOR ACCIDENT.

inquest held at Loughor on December 3,
leath at Caeduke Colliery, Loughor, of
ter, the late instructor at the Swansea
Station, Prof. Cadman, of the Bir-
ersity, gave evidence as to the dirty
he apparatus when received by him at
for testing, three weeks after the
he accident.

prominence has been given in the news-
o Prof. Cadman's evidence on this point,
has been made of the further evidence
cause of such condition of the apparatus,
e effect that Painter's body was dragged,
hrough some 12 yards of dirty colliery
at when the apparatus was taken off the
after the accident, a considerable quantity
ter ran out of the apparatus.

ng committee of the Swansea District
ue Association feel that it is only just
e given to this fact.

D. Ivor Evans,
Secretary, Swansea District
Collieries Rescue Association.

ning Station, Strand, Swansea.
nber 4, 1912.

DUST QUESTION IN AMERICA.

ry managers and others in America would
ling article in the issue of November 1
erest, if not surprise.

" at Bruceton the United States Bureau
een able to prove in dramatic fashion the
ts of introducing moisture into the mine
exhaust steam."

to say that the Bureau of Mines has not
rove anything of the kind. No experi-
aust steam have been made at Bruceton.
periments were made which resulted in
plosions, at a time when rain was falling
the moisture enthusiasts grasped the
proclaim the value of humidification.

ny coaldust explosion experiments have
ilures. Did not Sir Henry Hall, twenty
en experience difficulty in exploding the
old shafts?

er 20 last the final demonstration was
the members of the International Con-
ine Safety, but a day or two before this
r. Holmes made the following statement,
on page 890 in your November 1 issue:—

dust test at the Government experimental
burg to-day, witnessed by representatives of
nt mine experiment stations of Germany,
Belgium, Austria, and other countries, the
special interest as indicating the influence of
oisture in checking the progress of the

ber 20 the mine was in a very damp
account of continuous rains; the shelves
e coaldust was placed were damp or wet,
e galleries or headings were muddy, and
water underfoot was 4 in. deep. Two pounds of coaldust per lineal foot of heading was distributed on the shelves along the main heading, which was the return airway, and in part of the back heading or intake airway. In the back heading there was a Taffanel barrier, consisting of 10 boards sprinkled with stonedust.

The two main headings are driven in about 1,250 ft., and a black powder shot was fired near the face. The charge was lightly tamped in an iron tube let into the coal. The shot blew out and the result was a violent explosion, which travelled the main heading, but the flame stopped in the back heading at the stonedust barrier.

Before the shot was fired, numerous mining experts, colliery managers and inspectors carefully examined the mine, and the unanimous verdict appears to have been that an explosion was impossible, on account of the wet condition of the mine. The quantity of coaldust used only permitted of thin layers on the numerous shelves, and the dust appeared to quickly become damp through the moisture on the shelves.

Just before the experiment the fan was stopped, so that the shot was fired into still air.

The opinion of Dr. Holmes with regard to this last experiment—which was called the *grande finale*—is not recorded.

Samuel Dean.

Delagua, Colorado, U.S.A.
November 20, 1912.

THE VENTILATION OF THE BENTLEY COLLIERY.

Home Office Prosecution.

The hearing of the second series of summonses taken out by H.M. chief inspector of mines for the Yorkshire and North Midland district, Mr. Thomas Mottram, at the instance of the Home Office, against the officials of the Bentley Colliery, Doncaster, was proceeded with at the Doncaster West Riding Police Court, on Saturday last. The case excited the greatest interest in the colliery world, and the court-house was crowded with officials representing most of the well-known collieries in South Yorkshire. Mr. G. B. C. Yarborough presided over the Bench. The defendants were Mr. John William Fryar, of Eastwood, Notts, agent and general manager to Messrs. Barber Walker and Co., and Mr. Robert Clive, of Bentley, who at the time of the offences alleged was manager at Bentley Colliery, but is now sale agent to Messrs. Barber Walker and Co. Each of the defendants appeared in answer to three summonses alleging contraventions of the Coal Mines Act of 1911, in that the Bentley Colliery was, on July 22, 25 and 30, inadequately ventilated.

The Home Office was again represented by Mr. Gichard, of Rotherham, and counsel for the colliery company were Mr. Norman Craig, K.C., M.P., and Mr. H. T. Waddy, instructed by Mr. Robert Barber, solicitor, of Nottingham. The proceedings again lasted six hours.

At the commencement of the case Mr. Norman Craig raised a preliminary objection to the form of the summonses, which he submitted were inadequate. They did not specify the particular part of the mine referred to. There was no evidence specified in regard to any particular portion of the mine, and it had been held in the Scottish Courts of Justiciary to make the summonses bad. In this particular mine there were 2½ miles of face, 6 miles of main road, 8 miles of working road, and when they threw in the other parts they had 20 miles of lineal distance. The Act was difficult enough as it was from the point of view of managing mines, but if they were going to have summonses issued against them in this way it would be still more difficult. He felt so strongly about the matter that, should the Bench decide against him, he should ask them to state a case upon the point, as it was the first time it had arisen.

The Chairman said the Bench would hear the case on its merits. It was an interesting point of law, and they would give Mr. Craig a case if he asked for it.

Mr. Gichard said there were three dates mentioned in the summonses, but he proposed to deal with July 25. On that date there was an inspection of a district next adjoining that dealt with a fortnight ago. The present prosecution was taken under section 29, subsection 1 of the Coal Mines Act of 1911. Mr Hudspeth, one of the mining inspectors, visited the Bentley Colliery on the dates mentioned in the summonses, and on the 25th went into the south-west district. On the coal face on the low side of 28 working place, in the general body of air there was 2½ per cent. of gas and men were working. Between 28 and 56, the next adjoining place, there was 3 per cent. of gas in the general body of the air and men were working; and in 28 there was 2½ per cent. in the body of the air. About a yard from working-place 32, along which men travelled, there was sufficient gas to explode in the lamp about 1 ft. from the roof. For that explosion to take place there must have been something like 6 per cent. of gas present. There were large accumulations of gas in close proximity; 57 was fenced off but there was 3 per cent. of gas on the face. On the main return airway between Nos. 22 and 31 there was about 2½ per cent. of gas. There was also 2½ per cent. of gas on the 30th, and men were working and bringing coal out. In the district which Mr. Hudspeth examined other working places were fenced off—10, 23, 30—for gas, which showed that there was a great prevalence of gas in that part of the mine, and the question for the Bench was whether or not there was an adequate amount of ventilation. Subsection 3 provided that a mine should not be in a fit state for working if the air contained less than 19 per cent. of oxygen or more than 1¼ per cent. of carbon dioxide; and a place was dangerous if there was 2½ per cent. of inflammable gas. In a colliery like Bentley, where there might be spontaneous combustion at any moment, and where they must always fear it, it was essentially necessary that there should not be as large a quantity of gas as might safely be in another place; and as in numbers of working places there was 2½ per cent. or more, it showed that the ventilation was not sufficient, as it did not dilute the gas sufficiently to render it harmless. Owing to the large quantity of inflammable gas in Bentley Colliery, and its liability to gob fires, it was dangerous to have 2½ per cent. of gas in the general current of air, as it was an indication there was much more close by. The ventilation of the mine, having regard to the circumstances pertaining to it, was not adequate. Bentley Colliery had been working for five or six years, and the owners and managers knew the unfortunate conditions which obtained there. It was for them to take steps so that the danger from gas would be done away with altogether, or at any rate reduced to a minimum, and he should prove that this was not done. His friend had suggested that these proceedings were brought on the part of the Home Office because of the recent Cadeby disaster; but in fairness to the Home Office and the inspectors, he was going to tender evidence which would show that as far back as January 1911 the then inspectors of the district were in consultation with the management; and after an inspection of the pit it was arranged there should be an air crossing put in so as to divide up the ventilation of that mine and render it more effective in different parts. But from January 1911 until Mr. Hudspeth's inspection there had been practically nothing done in that direction. Mr. Gichard said it had been assumed that because there was a good ventilating plant at Bentley Colliery, it would answer all purposes. The face had been pushed on with abnormal rapidity, without due regard having been paid to the necessities for exceptional ventilation by reason of the unfortunate conditions which were obtaining in this mine.

Inspectors Cross-examined.

Mr. Henry Moore Hudspeth, one of the junior inspectors of the Yorkshire and Midland District, was then called, and gave evidence bearing out Mr. Gichard's statements. He commenced his inspection of the colliery on July 22. In regard to the visit on the 25th, he said in his opinion the south-west district of the mine was not adequately ventilated, and was dangerous; 57 gate was fenced off for gas. They were bringing coal from the face. Across the main return there was 2½ per cent. of gas. The men were withdrawn from 28 gate, where there was 2½ per cent.

Mr. Gichard: Were they withdrawn while you were there?—Yes, they were told to go out. He took a sample of the air on the 25th, which was handed to Mr. Weekes.

The Chairman: Does the amount of gas you found prove inadequate ventilation?—Yes, and from the fact that the men were withdrawn, the working place was shown to be unfit to work in. He measured the air at 57 gate in the return, and calculated it to be 32,900 cubic feet per minute. His lamp test for this part of the mine showed 3 per cent.

Mr. Gichard: What volume of gas would that give you?—Well, three times 329.

That is 987 cubic feet per minute of gas—that is a very large quantity?—Yes; analysis would have shown more.

You are dealing only with this particular part of the mine?—Yes, only with the return.

He measured the total air coming out of the pit during his inspections and calculated the total gas coming out of the mine, which was about 3,000 cubic feet per minute.

Mr. Craig: That sounds very formidable, but to an expert 3,000 cubic feet per minute is quite moderate, is it not?—I should not call it moderate.

Did you take notes of these inspections? Yes, I may have done.

Will you let me see them? I don't think you need see them all.

Mr. Craig: I am entitled to.

Mr. Gichard objected, but the Bench ruled that the witness must allow Mr Craig to see his notes, the latter undertaking only to deal with those for July 25, and to take no notice of memoranda in the notebook affecting other South Yorkshire collieries.

Mr. Craig here read out notes from the inspector's book.

Witness said he had said that his lamp was put out. He had said the gas exploded in the lamp, and he could have lost his light had he wished. He admitted none of the percentages in the general body of the air, taken by themselves, were explosive; but 2½ per cent. in the general body was indicative of danger, inasmuch as in places where that gas was drawn from there must be more than 2½ per cent. in such quantities as to be explosive; 2½ per cent. also reduced the efficiency of the safety lamp. He would not say the mine was particularly free from fine coaldust.

Do you suggest that when you were there, there was coal-dust in sufficient quantities to make gas, not itself explosive, liable to explosion?—Yes.

Mr. Craig: Why did not you take sample bottles to the pit with you?—Because I had found things so bad I had used all the bottles up so fast I had not any left when I went on the 25th.

Look here, Sir, how many samples had you taken? This sounds very funny, and is a little bit vicious, perhaps. Had you taken half-a-dozen samples in Bentley in your life?—Down that pit, no.

Then what do you mean by making a statement of that sort to the prosecution, you had found things so bad. You don't think that is fair, do you?—I had not any that day.

Then why add suggestions of that sort? Do you know that after receiving your report Mr. Redmayne, the Chief Inspector of Mines, wrote a letter bringing certain matters to the attention of the colliery company; and are you aware that he made certain complaints of what you had said on July 22 and 30, and no complaint at all about the 25th?—I have not read the correspondence.

Mr. Craig: I read the letter. It is a long letter. What proportion does the stonedust in the Bentley workings bear to the coaldust?—I don't know.

What is the amount approximately per lineal foot of coaldust in the workings of Bentley?—I don't know.

What per cent. does fine coaldust, capable of being carried in the air, bear to coaldust as a whole in Bentley?—I don't know.

You are not complaining there was too little oxygen or too much carbon dioxide?—No.

And you are not complaining of any excess of gas in any intake airway?—No.

Re-examined, witness stated that he found accumulations of gas in the waste. He did take one sample of air on the 25th, but it was handed to another gentleman.

Mr. Granville Poole, one of his Majesty's inspectors for the Yorkshire District, stated that, in his opinion, the Bentley Colliery was not adequately ventilated. He admitted he had not been down the mine since January 1911, and he was speaking of that date.

Mr. Craig: Is there anything, in what you have heard of Mr. Hudspeth's evidence, which does not occur, is not a matter of daily occurrence, in gassy mines?—Yes; I have been down mines quite as gassy as Bentley, perhaps, and not found the accumulations of gas reported by Mr. Hudspeth; 2½ per cent. of gas may be very easily and quickly increased by a fall in the barometer or a fall in the goaf.

Mr. Gichard: What has been done to avoid the accumulation of gas to the extent of 2½ per cent.?—The only thing to do would be to increase the number of splits. When I visited the mine on January 20, 1911, I found a very serious state of affairs. Men were working in gas.

Mr. Craig strongly objected to evidence relating to dates for which they were not summoned, and the Bench upheld him. The witness then declared that, in his opinion, the pit was not properly ventilated on July 25. Asked if any earlier complaints had been made, he said he believed after his visit to the pit on January 20 the late Mr. Pickering saw Mr. Fryar himself. Witness himself made a very serious complaint to his chief.

Mr. John Robinson Wilson, chief inspector of mines for the Liverpool and North Wales District, stated that he had visited the Bentley mine about four times. It was a very gassy mine, and one in regard to which great care should be taken with the ventilation. He was of opinion it was inadequately ventilated.

The Chairman: What, at the time of Mr. Hudspeth's visit?—Obviously.

Mr. Craig: You are deciding the question for the court, like the last witness.

Mr. Thos. H. Mottram, H.M. chief inspector for Yorkshire, and successor to the late Mr. Pickering, spoke to visits to Bentley Colliery on September 19 and October 11. Between those visits he found there had been an alteration in the ventilation of the mine, which improved it. A new intake aircourse had been opened up, and the effect of that was to reduce the percentage of gas. On October 11 there was still some gas there. There was no reason why the alteration, which had improved the ventilation, should not have been adopted earlier. It was a course which would have been obvious to practical men. Where there was gas they should endeavour to take a new aircourse if possible. As the face receded there should be additions to the ventilation works by putting in additional splits, which would reduce the percentage of gas. The ventilation of the mine, from the evidence of Mr. Hudspeth, was most decidedly inadequate on July 25.

Mr. Craig: And I say most decidedly that is a question for the court to decide.

The Chairman: It is for us to decide.

Mr. Craig: We get a procession of these inspectors in the box with more or less knowledge of ventilation.

Witness said he thought an intake aircourse and a crossing might have been put in at an earlier period. The people who managed Bentley Colliery were, he agreed, practical men. The system of ventilation was now more satisfactory. He attributed the improvement to extra splits. The air crossing was put in between his two visits.

Mr. Craig said the air crossing put in did not serve the area Mr. Hudspeth was dealing with at all.

Witness said on September 19 there were no men working in any gas, but there were 10 places fenced off on the occasion of his visit, owing to the presence of gas. He went back on October 11 and only found two places.

Mr. Charles Lawson Robinson, late senior inspector in West Scotland, now of the Yorkshire District, stated that he had visited the Bentley Colliery three times in September and October. It was a very gassy mine, and a percentage of 2½ of gas was dangerous in it. There could have been no difficulty in putting in the air crossing which was spoken about earlier. He examined the coaldust at the face, and was quite satisfied it was highly explosive. One place in the mine—he believed 56—was standing.

The Chairman: Is 2½ per cent. of gas dangerous without any added circumstance?—It is not harmless; I am not prepared to say it is dangerous. Accumulated gas in the waste was an added danger to the face, and had to be taken into consideration when dealing with the waste.

Mr. Craig: Do you think, with Mr. Hudspeth, that it is your duty to point out dangers and not compensating advantages?—I am quite willing to point out compensating advantages.

Dr. Cadman's Evidence.

Dr. John Cadman, professor of mining at Birmingham University, late inspector of mines, stated that he had been down Bentley Colliery the previous day. He considered 2½ per cent. of gas in a main air-current was certainly a dangerous condition in view of the circumstances of Bentley mine. He was rather surprised at the amount of gas which Mr. Hudspeth estimated was passing through the mine, something approaching 3,000 cubic feet per minute. This was equal to a total volume of gas for the 24 hours of something like 4 million cubic feet—a pretty large volume. If they looked at the amount of gas used in a city like Doncaster, the gas coming from Bentley shaft would illuminate six cities the size of Doncaster. Such a large volume required very extensive ventilation, and the liability of spontaneous combustion had also to be taken into consideration.

Mr. Craig: You have taken Mr. Hudspeth's figures and made some formidable arithmetical calculations which mean no more than that the percentage exists. It is a rather startling state of affairs which enables one to see and to realise the enormous quantities of gas.

Witness said he did not know a mine with either 4 or 5 million cubic feet coming out of the upcast shaft.

Do you know Tylorstown?—Yes.

Has not that, roughly speaking, twice the total volume?—I do not know. I do not think the amount of air passing at Tylorstown is 280,000 cubic feet, which you have in Bentley.

I am talking about gases?—I do not think it is; it may be very near it.

Replying to further questions, witness said he tested for gas in the Bentley mine the previous day and only found 1 per cent. of gas in the upcast shaft. The mine then seemed to be quite well ventilated. In no part of the workings did he see more than 2 per cent. of gas. But 2½ per cent. in a mine such as Bentley, with the enormous volume of gas there, was indicative of danger. He had no complaint at all to make about what he saw the previous day; he thought the mine was quite well ventilated, but he understood the conditions were now very different from what they were at the time Mr. Hudspeth made his inspection. He understood there was 220,000 cubic feet of air in the mine when Mr. Hudspeth was there; now there was 280,000 cubic feet. He thought there could only be one school of thought in regard to the removal of firedamp, which was by dilution of the air. Increasing the pressure increased the liability of gob fire. They could get within reasonable limits of accuracy by taking samples in mines.

Mr. William Galloway, past professor in mining at University College, Monmouthshire, formerly inspector of mines, president of the South Wales Institute of Engineers, stated he had had 30 years' experience of pits. The existence of 2½ per cent. of gas in such a mine as Bentley would be harmful. Dust also constituted another danger. He was satisfied with the fairness and accuracy of Mr. Hudspeth's evidence.

This closed the case for the prosecution, and Mr. Craig submitted he had no case to meet. He had already raised the question that the summonses were insufficient in law, and the second question was this: he entirely disregarded the evidence of a lot of inspectors who went into the box one after another to say, "We take it on ourselves to decide what the Bench has got to decide." This did not determine the matter one way or the other. When they got these two distinguished gentlemen who wound up the evidence, they got it correctly and frankly stated by Prof. Cadman that the conditions disclosed in evidence in this case would not lead him to assert danger was established. The only sort of evidence given at all was of the existence of gas in different percentages, and there were all sorts of variations. It was a monstrous proposition to come and say that 2½ per cent. was dangerous. It had never been run to ground, and it was only the workings they were concerned with. It was said that that percentage would weaken the lamps, but they were not kept long enough in it. They were tested three times every shift before the men went down, and Prof. Cadman had been frank enough and honest enough to say that, fitted with double gauze as they were, there was no danger at all. There was not a particle of evidence as to any danger arising from dust in the mine, and these were the only three things to suggest as adding danger to that which was not dangerous in itself. He asked for the dismissal of the summonses.

Mr. Gichard said there was a strong case to answer, for it had been clearly shown that 2½ per cent. of gas in a mine of this description was dangerous. The very object of the section was to cause and compel mineowners to be careful of indications of danger, and that was why he submitted the word "danger" had not been used in that section. If his friend's contention was accepted they would never be able to bring anyone forward and say they had not taken precautions, until after a disaster had occurred.

Dr. Haldane and the Home Office.

Dr. Haldane was then called. He said to his knowledge it was the practice in the Bentley mine to have constant inspection and constant reports made throughout the different shifts of the day. He should say the ventilation of the pit was extremely good. There were thousands of pockets full of gas in every gassy mine, and if they wanted to get sensational evidence they could find plenty of places where they could get their lamp put out or create an explosion, but where there was in reality very little danger at all. Coaldust was only dangerous if it was very fine, could be caught up in the air and carried forward to explosion, and the dust in the Bentley mine was coarse. Coarse coaldust was not a conductor of explosions. In Bentley it was largely mixed with stonedust at the face.

Mr. Craig: Taking the dust alone, is it of such a character that if it were not a fiery mine you could blast?—Yes. Dr. Haldane said he thought there would be considerable risk if the colliery was not managed very carefully. If it were sprinkled with air-crossings he thought it would blow up very quickly, and also if it were managed from the Home Office by correspondence.

You believe, Dr. Haldane, in the management by practical men on the spot?—I do believe in that.

Mr. Gichard: Or by management by yourself, I suppose?—No, certainly not.

You are not a mining engineer?—No.

And really mainly, so far as mining is concerned, you are a chemist?—Partly.

I mean mainly. Is that not so?—Physiologist, if you like.

Will you tell me when you say the colliery was managed by the Home Office why you introduced that. I want to know whoever suggested such an absurd thing?—I have seen letters from the Home Office.

There have been suggestions as to what may be done?—Yes.

Do you blame them for that?—I do.

Then, as I understand you, if the Home Office receives reports from its inspectors and makes suggestions, it is doing something wrong?—It ought to have enquired into the actual facts before making suggestions.

Are you prepared to say they did not. I only want to see how far you will go?—That was the inference I took.

So that for the purpose of this case, you suggest the Home Office has done a most absurd thing without enquiring or getting a report from its inspectors?—Well, if you like to put it so; the correspondence from the Home Office has not been put in.

Mr. Gichard handed the witness the Home Office correspondence, and asked him to point out any single suggestion made by them which was absurd.

Dr. Haldane: This is one of the things which rather struck me. This is from the Chief Inspector of Mines, who says that the Secretary of State stipulates that in the event of a gob fire, or any abnormal heating of the coal or other strata showing or having the appearance of a fire taking place in the mine, all the underground workmen, except those engaged in putting the fire out, must be drawn to the surface and not allowed to enter the mine until the fire or incipient fire has been successfully combated.

Mr. Gichard: What is wrong about that? Is it wrong, that it should be a precaution?

Dr. Haldane: There are plenty of fires where there is heating of the coal all over in different parts of any large mine in this neighbourhood, and it often takes weeks to deal with these places. They are always dealing with some little place or other. If you comply with this request—I call it managing the mine by correspondence from the Home Office—you may just as well shut up every mine in this part, or at least Brodsworth and Bentley.

Why introduce a matter of this description unless you have some feeling?—I have some feeling. I was very much concerned when introducing this regulation, and I wish it to be reasonably administered. I hoped it would lead to very great improvement in the safety of the mines, and this is what, I find, comes of it.

Do you still suggest there is no danger when there is 2½ per cent. of gas?—There may be the smallest danger.

Then is it not incumbent upon an inspector of mines, if he finds that quantity, to draw attention to it?—I think it is. Witness admitted he was very indignant with the Home Office for prosecuting a colliery because men were working in ripping the roof at a place in the return airway where it was necessary for them to work.

Do you suggest the inspector should not have reported that?—The inspector may feel that, according to the wording of the Mines Act, he was compelled to report it; but if he were looking to the safety of the mine and the circumstances of the case, I think he would have been very absurd to prosecute.

Do you suggest it was for the safety of the mine men should work there when there was 2½ per cent. of gas?—Yes, I do.

The Chairman intimated that the Bench must adjourn, and the resumed hearing was fixed for Saturday, December 14.

Dr. Haldane had not concluded his evidence in cross-examination. He promised to try to attend on the date named, but remarked he might have to be at sea on an Admiralty enquiry.

AL AND IRON TRADES.

HURSDAY, DECEMBER 5.

and, Durham and Cleveland.

nn.

COAL.

: 146,419 tons of coal and 1,314 tons of
ed from Tyne Dock, a decrease of 9,418
8 tons of coke when compared with the
corresponding week of last year. The
amounted to 50,073 tons of coal and
a decrease of 15,623 tons of coal and
The Blyth shipments totalled 82,440
ke, a decrease of 18,764 tons. Of the
m coals required for December-February
ssian State Railways, it is stated that
of Newcastle and (or) Yorkshire coals
nged for, mainly by Russian merchants
ver for their supplies on this side. The
for local coal are stated to run out at
f.o.b. for Blyth bests. Enquiries for
0 tons of best Blyth or other good steam
ion now to complete the balance of the
ents. Tonnage supplies in connection
have been an awkward item, but Russian
to have guaranteed that 50,000 tons
in Russian vessels. Of the coal
00 tons would appear to have been
Yorkshire. Local tonnage in connec-
ract is stated to have been arranged
about 80,000 tons from north-east coast
ember-February, at 7s. 6d. The North-
Company is stated to have closed for
e of its steam coal requirements for the
over next year. For the Durham coal
from 2s. 9d. to 3s per ton advance on
and for the Northumberland coal from
r the expiring contract rates. In one
ton more is stated to have been paid to
liery. About 600,000 tons are required
portant fuel sales are as follow:—A
hill steam smalls, for April-October
b.; a considerable quantity of Durham
January-February shipment, at from
b, according to brand; several lots of
for delivery at Middlesbrough over the
26s. 6d. per ton at the ovens; a quantity
delivery over the whole year, at 26s.;
ry Durham unscreened bunkers, for next
rom 13s. 3d. to 13s. 6d.; 6,000 tons best
similar delivery, at 13s. 6d.; 6,000 tons
for January-June shipment, at 13s. 7½d.;
eam smalls, for 1913 delivery, at 9s. 9d.;
steam smalls for January-February
d.; 6,000 tons of second-class Blyth
for next year's shipment at 11s. 9d.;
lyth best steams, sold by second-hand
., delivery over the year. The Hull and
e stated to have decided to draw their
over next year from South Yorkshire.
in all will be required. Tenders from
ased on too high figures. The British
ng for supplies of steam coals for dock-
se for land engine purposes over next
ks at Antwerp are enquiring for 200,000
king coal for 1913 delivery. The local
y strong during the week. The general
gly good and supplies are scarce, with
es have advanced smartly in several
uotations for prompt shipment are as
s, Blyths (D.C.B.), 14s. 9d. to 15s. per
l. to 9d. on the week; Tynes (Bowers,
ed; seconds, Blyths, 13s. 6d., from 6d
(Hastings or West Hartleys), 14s., from
creened, 12s. 6d. to 13s., steady; smalls,
ls., from 6d. to 9d. up; Tynes, 10s., 6d.
. 6d. to 12s., 6d. increased; smithies,
more; gas bests (New Pelton or Holm-
nced; seconds (Pelaw Main or similar),
cials, 16s., 6d. improved; unscreened
15s. to 16s., from 9d. to 1s. up; North-
d. up; coking coal, 16s., from 6d. to 1s.
s. to 15s. 6d., 6d. advanced; households,
6d. to 1s. higher; coke, foundry, 30s.,
, 27s., 1s. up; and gas coke, 22s. 6d.,
n authorities, having bought heavily
are now enquiring for considerable
coals for Black Sea shipment. Local
ted what they regarded as being very
bstantial quantity of steams for early
ave received the reply—"Useless." It
e customers intend taking Welsh coal,
relatively cheaper.

COAL.

Sunderland last week amounted to
nd 300 tons of coke, as compared with
nd 2,150 tons of coke for the corre-
11, being a decrease of 12,815 tons of
coke. There is a great scarcity of coal for prompt shipment, with the result that the market is very firm for all classes of fuel. Best gas coals are quoted at 16s. Seconds are strong at 15s., for good coking unscreened 15s. has been paid, and for a superior brand as much as 16s. could be got. Good ordinary bunkers are in very good request at prices ranging from 15s. 3d. to 16s. per ton f.o.b. Smithies are still 15s. with peas and nuts 16s. Households have a fuller sale and prices have advanced to 16s. for ordinaries and 17s. for bests. Coke is very strong both for home and export. Foundry is 28s. to 29s. per ton f.o.b. There is an exceptionally strong demand for furnace coke at about 27s. per ton at the Tees-side blastfurnaces. Gas coke is more plentiful and the price is 21s. 6d. to 22s. per ton. Freights are weaker, London being 4s. 6d., Hamburg 5s. 3d., Bay has paid 6s. 9d. for St. Nazaire, Baltic a contract for 80,000 tons for voyages to Riga has been done at 7s. 6d., and further voyages to Riga for 15,000 tons are reported at 8s. December to March. Mediterranean rates are easier, Genoa being 12s. and 11s. 9d., Marseilles 10s. 9d.

Middlesbrough-on-Tees.

COAL.

All classes of fuel are firm and in good demand. Deliveries of gas coal are heavy and best kinds now range from 15s. 9d. to 16s., whilst second qualities are in the neighbourhood of 15s. Bunker coal continues in good request, and ordinary Durhams run from 15s. to 16s. f.o.b., with special sorts 16s. 6d. to 17s. Coking coal is in heavy demand, and with supplies inadequate values are very strong. Coking unscreened range from 15s. to 16s., and coking smalls are 16s. Coke is very scarce, and high rates now rule both for home use and for export. The heavy demand for furnace coke for local consumption is difficult to meet. Average Durham furnace coke may now be put at 27s. delivered at Teesside works, and 25s. 6d. is being realised for Yorkshire coke. Foundry coke for shipment commands up to 30s. f.o.b. Sales have recently occurred at 28s., 29s. and 30s. As is usual at this season of the year, there is a fairly plentiful supply of gas coke, the price of which is about 22s. f.o.b.

IRON.

Iron and steel shipments from the Tees last month were poor, those of pig iron being the smallest for any month this year with the exception of January, when the clearances of pig amounted to but 86,268 tons. The total shipments of pig last month were returned at 90,196 tons, 82,592 tons of which went from Middlesbrough and 7,604 tons from Skinningrove. For the previous month the total clearances of pig reached 129,856 tons, and for November last year they amounted to 110,717 tons. The whole of the iron loaded at Skinningrove last month went to Scotland. Of the pig cleared at Middlesbrough during the eleventh month of the year, 42,110 tons went to coastwise customers, and 40,482 tons to foreign buyers. Scotland was again the largest customer, receiving 28,363 tons, then came Germany with 5,797 tons, Japan 5,658 tons, Belgium 5,247 tons, Italy 4,331 tons, France 4,140 tons, Sweden 3,787 tons, Holland 3,148 tons, and the United States 2,685 tons. Manufactured iron shipped at Middlesbrough last month amounted to 18,085 tons, and steel to 42,023 tons. India was the largest receiver of both manufactured iron and steel, importing 5,189 tons of the former, and 11,069 tons of the latter. The Argentine last month imported steel from the Tees to the extent of 8,463 tons, Cape Colony took 5,224 tons, Portuguese East Africa 2,614 tons, Natal 1,516 tons, and Canada 1,003 tons. A fairly good business in pig iron has been recorded this week, and buyers are still much in evidence. Considerable sales of No. 3 g.m.b. have occurred at 67s. 6d. to 67s. 7½d. for early f.o.b. delivery, and few sellers will now name below 67s. 9d. No. 4 foundry and No. 4 forge are still very scarce, and are in the neighbourhood of the quotation for No. 3, whilst mottled and white iron are each steady at 67s. No. 1 Cleveland is as plentiful as ever, and is offered freely at 71s. Fairly good enquiries for east coast hæmatite pig are reported, and for delivery over the spring of next year mixed numbers are 82s. 6d. to 82s. 9d. There is no hæmatite iron available for this year. A number of sales of foreign ore have been made this week. Market rates are still based on 23s. ex ship Tees for 50 per cent. rubio, but whilst rather more than that equivalent has been realised, some of the sales reported have been at a little below recognised market value. Very excellent accounts are given of manufactured iron and steel. Producers are very busily employed, and enquiries are on a good scale. Quotations all round are very strong, but the only actual change this week is an advance of 10s. in packing iron, bringing the quotation up to £6 15s.

South-West Lancashire.

COAL.

The household trade has improved considerably during the last week, but is not yet at a full winter average. Prices rule without change at about 16s. 3d., 14s. 6d. to 14s. 9d., and 12s. 3d. respectively for best, good medium grades and kitchen coals. A very satisfactory delivery continues of screened coal for forge and manufacturing purposes, with prices at about 12s. 6d. per ton at the pit. With regard to shipping, the arrival of steamers has to some extent been interfered with by the recent gales, but bunkering requirements this week for ocean-going steamers are well maintained, there being fair open sale business, in addition to the full quantities that are being taken under contract. Supplies, on the whole, are not much in excess of demand, but spot lots may be offered here and there at under current quotations, which range from 12s. 6d. f.o.b. for the cheaper grades of screened Lancashire steam coals to 13s 3d. or 13s. 6d. f.o.b. for the best. The coastwise and cross-Channel shipments are rather on the increase, with prices for best coal ruling at the moment about 16s., with good medium grades at 14s. 9d., both f.o.b. Garston and net. The consumers of slack continue to take the whole of the output as drawn, and sellers have a very firm tone for contract renewals over next year. In this respect the market is better than it was a couple of months ago. Open sale prices for best qualities are about 10s., in some cases slightly over, good second grades 9s. to 9s. 3d., and the finer and commoner sorts 8s. 6d., all into wagons at the pit.

South Lancashire and Cheshire.

COAL.

The Manchester Coal Exchange was well attended on Tuesday. House coal is in improved demand this week, but still below the average for the time of the year, especially in the best qualities of coal. Prices are firm at 16s 6d. to 17s. for the best house grades, with good medium qualities at 15s. 3d. to 16s., and the commoner sorts from 12s. 6d. to 13s.—all into wagons at the pit. Furnace coal continues brisk at about 12s. 6d. per ton at the pit. Shipping coal is in improving demand, with prices steady at about 14s. f.o.b. Partington. Slack still moves away in good quantities, and prices are strong at about 9s. to 9s. 9d. for the best qualities, with commoner grades at from 8s. to 8s. 6d.—all into wagons at the pit.

IRON.

There was a good attendance on 'Change in Manchester on Tuesday last. Pig iron continues strong, and prices are very firm. The barmakers have advanced the price of bars 5s. per ton, making crown £8 15s., second quality £8 5s., hoops £8 12s. 6d., sheets £9, and all works have full order books. Steelworks are very busy with bars at £8 5s.—less 2½ per cent., billets £6 10s. net. Textile machinery makers are full of work. Foundries and heavy engineers moderately employed. Wagon builders very busy.

Yorkshire and Derbyshire.

Leeds.

COAL.

The market on Tuesday was attended by a large and representative gathering of traders, and business in most departments was very brisk. The most noticeable feature of the market was the persistent enquiry for small fuel. There appears to be almost a famine in slacks and coking smalls, and it was stated that some of the big factories and dyeworks in the Bradford and heavy woollen districts are hard pressed to keep the boilers supplied. All throughout the West Riding trade generally is good, and many firms are working overtime. This pressure for supplies of manufacturing fuel is causing prices to harden still further. A surprisingly large number of collieries are fully sold in these qualities over the whole of next year. The pits this week have worked about five days on the average, and the house coal trade is better. The intensely cold weather of the week-end, along with the turn of the month, caused a sharp improvement in the demand from the local markets, but seemed to have very little effect as regards London and the south. Business with the last-named districts continues abnormally dull for the time of the year. Pit prices, however, are unchanged and average as follow:—Haigh Moor selected, 14s. to 14s. 6d.; Wallsend and London best, 13s. to 13s. 6d.; Silkstone best, 13s. to 13s. 6d.; Silkstone house, 12s. to 12s. 6d.; house nuts, 11s to 11s. 6d. Very little improvement is evident in the coastwise trade, the demand from Thames merchants being particularly quiet. For prompt shipment the following f.o.b. figures have been recently quoted in Hull:—Haigh Moor best, 16s. to 16s. 6d.; Silkstone best, 15s. 6d. to 16s. 3d.; Silkstone house, 14s. to 14s. 9d.; house nuts, 13s. to 13s. 6d. No alteration in pit prices for the West Riding markets has taken place, but sales more nearly approximate official figures, which average as under:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s to 17s.; Silkstone house, 15s. to 15s. 6d.; ordinary house coal, 14s. to 15s.; secondary sorts, 13s. to 14s. As indicated above, pit prices for all the smaller grades of fuel show increasing firmness. Current quotations:—Large double-screened engine nuts, 10s. 9d. to 11s.; small nuts, 9s. 9d. to 10s. 6d.; washed samples, 6d. per ton extra; rough unscreened engine coal, 10s. to 10s. 6d.; best rough slacks, 8s. 6d. to 9s. 6d.; small slacks, 8s. to 8s. 6d.; coking smalls, 7s. 6d. to 8s. 3d. Sales of spot lots of washed furnace coke are reported this week at 20s. per ton at the ovens, and contracts to the end of June at 19s. and 19s. 6d. Middlesbrough district buyers are seeking increased tonnage from this district. The output of gas coal is nearly all required to satisfy contract needs. Any spot lots offered sell readily at high prices, and sales this week are mentioned at about the following pit prices:—Screened gas coal, 12s. to 13s.; gas nuts, 11s. to 11s. 6d.; unscreened gas coal, 10s. 6d. to 11s. For fairly prompt shipment at Hull, the following f.o.b. prices are mentioned:—Screened gas coal, 14s. to 14s. 6d.; gas nuts, 12s. 9d. to 13s. 6d.; unscreened gas coal, 12s. 3d. to 12s. 9d.

Barnsley.

COAL.

The general improvement in all sections of the trade which was noted last week has been exceptionally well maintained. On forward account a big bulk of the business has already been quickly negotiated, buyers recognising the very firm position of the market, and some coalowners producing the best class of fuel are not disposed to undertake further obligations in regard to next year except at a higher range of prices. The fact that the North-Eastern Company clenched matters by giving an advance of 1s. 6d. per ton for large steam coal settled matters to a large extent. The fact that the same company have conceded an advance of from 2s. 6d. to 2s. 9d. per ton to the collieries in the northern district is naturally proving a somewhat disturbing factor in regard to business which has not yet already been arranged. It is reported that in some instances the steam trawler companies at Hull or Grimsby have paid 12s. per ton—a 2s. advance for the best quality district hards—but, generally speaking, arrangements have been completed at an advance of 1s. 6d. per ton. Although the Midland, Great Central, Lancashire and Yorkshire, and Hull and Barnsley companies have not yet agreed to pay the equivalent on the basis of 11s. 6d. per ton for the best district hards, it is not expected that there will be any difficulty in arranging matters, though coalowners feel that in the case of any short contracts running out in the course of the early part of next year a higher rate of increase will be obtained. The railway companies in several instances have settled their contracts for Parkgate and Shafton coal—a quality which they now more largely use, and there are instances where companies have paid a bigger advance—the best quality Parkgate coal being fixed up at 10s. 9d. per ton, an increase of 1s. 9d. per ton on last year. In regard to all classes of small steam coal, it is no exaggeration to say that a very large proportion of the output for the greater part of next year is already contracted for, and advances of from 2s. 6d. to 3s. per ton have been obtained, the demand for both nuts and slacks being exceptionally heavy. As far as current business is concerned, there is not a great deal of change in the position, except in the fact that the recent extra enquiry from Russia has had the effect of stiffening prices for large steam coal. Apart from this new business, the general trade through Hull is well above the average for this period of the year, and the active state of the trade is already causing trouble in regard to the supply of wagons. The best hards are now quoted at from 11s. to 11s. 6d. per ton, and secondary descriptions are considerably improved, making up to 10s. 6d. per ton. Buyers at the Barnsley Exchange this week found very little coal was on offer up to the end of this year, and coalowners' prices have generally to be paid. Best washed nuts are from 10s. 9d. to 11s. per ton, secondary sorts 10s. to 10s. 6d. per ton, best slacks 8s. 9d. to 9s. per ton, and rougher kinds 7s. 9d. to 8s. per ton. The house-coal trade has benefited slightly by the change in the weather, but not to any material degree, and there are still large stocks to be dealt with by most of the pits which are more largely concerned with this branch of the trade. However, prices are held as a week ago as follow:—Best Silkstone, 14s. 6d. to 15s. per ton; best Barnsley softs, 14s. to 14s. 6d. per ton; seconds, 11s. 6d. to 13s. per ton; and best house nuts, 11s. to 11s. 6d. per ton. The gas coal collieries are well employed, and a very big tonnage is being dealt with through Hull for abroad. The position in regard to coke still continues to be active, the enquiry being largely increased not only from the North but from some of the Midland iron smelting districts. The output is still well under the demand, and prices are firm at about 18s. per ton for ordinary qualities.

Hull

COAL.

The improved tone of the market continues, and prices have advanced in most directions during the week. South Yorkshire steam hards are quite buoyant, and while the actual value is about 14s. 6d., sellers are asking as much as 14s. 9d. for handy lots for prompt shipment. A further considerable quantity has again been bought in respect of the Russian State Railways contract, the prices being 14s. 6d. f.o.b. at Hull for delivery over the ensuing three months. In all it is estimated about 130,000 to 150,000 tons has been secured for shipment from the Humber under this contract. Further information is to hand concerning the 1913 contract of the Humber steam trawling companies. The price agreed upon is reported to be on the basis of about 11s. 6d. per ton at the pit for best steam hards, or 12s. delivered into keels, which is 1s. 6d. more than paid in the current contracts. Except for these and the local railway contracts, in which South Yorkshire this year gets a larger share than usual, the forward market is not very active. Foreign buyers are diffident about negotiating on the present prices quoted by the colliery companies, and are disposed to wait in the hope of prices easing, or in order to buy in the open market. The demand for coal for industrial purposes is strong, and all nuts and smalls are scarce and dear. The cold weather has stimulated the demand for house coal, and gas coal is in brisk demand. At the docks the appliances have been kept fairly busy, the export foreign and shipments coastwise still being quite up to the normal. The November returns are likely to show a substantial advance on last year. Prompt turns are available at Hull and Immingham, and 24 hours at Grimsby. The freight market is quiet. Baltic rates are a little dearer, but, in view of the statement that the coal for the Russian State Railways will be shipped in Russian bottoms, charterers are doing little of a speculative character. Riga is now quoted at 7s., Reval 7s. 3d. (at which business), Swedish Sound Ports 7s. 6d. There is nothing doing in the Mediterranean direction, business being invited on the basis of Genoa 11s. 3d., Alexandria 11s. For the Plate, Buenos Ayres is quoted at about 18s. The following are the approximate prices for prompt shipment f.o.b. Hull:—South Yorkshire: Best steam hards, 14s. 3d. to 14s. 6d.; washed double-screened nuts, 14s. to 14s. 3d.; unwashed double-screened nuts, 13s. to 13s. 6d.; washed single-screened nuts, 13s. 6d. to 13s. 9d.; unwashed single-screened nuts, 12s. 6d. to 12s. 9d.; washed smalls, 11s. 6d. to 12s.; unwashed smalls, 10s. 6d. to 11s. West Yorkshire: Hartleys, 13s. to 13s. 3d.; rough slack, 10s. 6d. to 11s.; pea slack, 9s. to 9s. 3d.; best Silkstone screened gas coal, 14s. to 14s. 6d.; best Silkstone unscreened gas coal, 12s. 6d. to 13s. Derbyshire and Notts: Best steam hards at Hull, 14s. 6d. to 14s. 9d.; best steam hards at Grimsby, 14s. 3d. to 14s. 6d.; Derbyshire nuts (doubles) at Hull, 13s. to 13s. 3d.; Derbyshire nuts (doubles) at Grimsby, 12s. 9d. to 13s.; Derbyshire large nuts at Hull, 14s. 3d.; Derbyshire large nuts at Grimsby, 13s. 9d.; Nottinghamshire hards at Hull, 14s. 9d.; Nottinghamshire hards at Grimsby, 14s. 6d.

Chesterfield.

COAL.

There is more business passing in house coal and colliery stocks have been substantially reduced during the last few days. The demand for fuel for manufacturing purposes is very active and prices are tending upwards. Slack for boiler firing is in great request, but it is found impossible to meet the needs of the market. Prices are higher than they have been for many years. Locomotive coal is moving freely and gas coal is urgently called for. The export trade is much more active than is usually the case at this time of the year. Russia is in the market for a substantial quantity of steam coal, and this has given much satisfaction to exporters, to whom the business is very welcome, coming as it does at the close of the Baltic season. Small fuel of the washed sorts is exceptionally strong, and the demand for coke is as great as ever. Prices are still moving upwards. Coking fuel continues scarce and dear, and it is only with difficulty that the ovens are kept fully at work. Prices are as follow:—Best 14s. 6d., seconds 12s. 6d., cobbles 12s., nuts 11s., slack 8s.

IRON.

The works of the district continue in a state of great activity, and full employment is assured for many months to come.

Nottingham.

COAL.

A rather more active tone has characterised the coal trade in Nottinghamshire during the past week. In the domestic fuel section a spell of severe weather—though of short duration—stimulated the business done by local merchants and also at landsale depots, and with a continuance of favourable climatic conditions this branch would soon assume its customary end-of-the-year briskness. Unfortunately, with the stocking in the summer, and the unusual mildness of the weather in the past month, the demand has been on the slow side until the last few days. The improvement has helped to harden prices, which rule from 12s. 6d. to 14s. per ton for hand-picked brights, 12s. to 13s. for good households, and 10s. 6d. to 11s. for seconds. There is a satisfactory tone in the steam coal branch, a brisk demand being maintained for manufacturing fuel, and for this class of coal slightly higher rates are being asked for new contracts. The prices for best hards are from 11s. to 11s. 6d. per ton, seconds 9s. to 9s. 6d. Slacks of nearly every description continue to sell briskly, and values are on the up grade. A fair business is being done in gas fuel, and coke is making good prices.

Leicestershire.

COAL.

There has been little variation in the course of trade in the past week. There is a very good amount of business being done. There is no lack of orders, as a rule the collieries have a good supply. Whilst there is no pressure for delivery, there is a full amount being delivered. Local merchants are busier, and there is every probability that between now and Christmas they will be making a satisfactory turnover. Best household coals have shown some further improvement, and good business is being done in the middle qualities and full deliveries made. For small household coals, cobbles and nuts, there is a very good demand. Steam coals are in request. Buyers are operating with freedom in these, not only for cobbles and main steam, but for slacks of all sorts. The good all-round enquiry has reduced stocks at the collieries to a low level. The market continues very firm indeed, and any weakness is very unlikely. The outlook gives a feeling of confidence.

South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL.

The Cannock Chase coal trade continues brisk in all departments except the best house coal, the mildness of the weather preventing any particular rush for this kind of fuel. The collieries throughout the district are well supplied with orders for most qualities, and are working regularly. Prices, on the whole, are satisfactory. The demand for coal for manufacturing purposes and for slack continues brisk, and the cheaper sorts of house coal are in fairly good request. There is no change of consequence to report in canal and railway sales. A fair business is being done at the landsale depots.

Birmingham.

COAL.

A better, though by no means a full, demand exists for house coal. In a few instances small stocks have accumulated. There are no present indications of higher prices such as are announced in the North of England. The general prosperity of consuming industries keeps the call for all kinds of works fuel at a high level. Slacks are dear, ranging from 6s. 6d. and 7s. to 9s. for the better qualities.

IRON.

The market was well attended, and there were signs of further prosperity. The Wages Board returns, issued earlier in the week, provided material for interesting comment. The output of the district is steadily increasing. The figures for the 17 selected firms for September and October, the two months covered by the report, reached 44,408 tons, or 3,200 tons in excess of the preceding two months. The selling price showed an average of £7 17s. 7d. a ton, an increase of 7s. 4d. In every branch the figure was higher, bars leading the way with a difference of close on 6s. a ton, the average price in this department working out at £7 17s. 9d. The return gives ironworkers an advance of 5 per cent., making, with the bonus agreed upon in July last, 10s. 9d. per ton for puddling. The nearest approach to this in recent years was 10s. 3d. in 1900-01, and it is interesting to recall that then the average selling price of bars was £8 19s. 4d., and that for all classes of material £8 5s. 11d., so that now wages are relatively higher to selling values than 12 years ago, while the cost of production in respect of fuel is also greater. Pig iron was again dearer, Staffordshire common fetching 61s., part-mine 67s. to 68s., Northamptonshire 66s. 6d., and Derbyshire going as high as 70s. 6d. net. Makers having sold all their output for some time, cannot entertain contracts from new customers for early deliveries. Consumers are finding the constant advance in the price of pigs a matter of some concern. Bars, for instance, were recently a shade weaker than they were at the beginning of the quarter; and while there is a tendency now to quote up to £8 10s. for forward delivery, the market level was £8 7s. 6d. per ton. Makers hold a large bulk of work, and for best bar iron extra orders are also being received. It was announced that Yorkshire bars are to be advanced 10s. a ton to £9 on Monday, and North Staffordshire bars, in view of this case, 5s. to £8 15s. Gas strip underwent no change, and business is brisk at £8 5s. to £8 7s. 6d. Galvanised sheets have not gone back further, and there is rather more business doing at £12 10s. to £12 15s., with, in a few isolated cases, when the order is for small quantities, £13. Black sheets are firming up and cannot be bought, delivered in the district, under £8 10s. for doubles and £9 2s. 6d. for lattens. For merchant sheets quotations are £8 17s. 6d. to £9 at works, and with 5s. on the top of that for carriage, the price is regarded as stiff. In the steel trade mills are working to the fullest capacity, the recent advance in prices having offered no check to consumers, who, indeed, cannot get deliveries fast enough. In demi-products it is noteworthy that Continental makers are asking as much as those at home. It is rare to hear of orders being booked under £6 a ton, while English prices are £6 2s. 6d. to £6 5s.

Forest of Dean.

Lydney.

COAL.

Since our last report the colder weather has imparted a little more life to the house coal trade here, but considering the month of the year the enquiry is still of a disappointing character. The collieries, for the most part, are only at work about five days this week, and there are still fair stocks to be noticed. The demand from the inland merchants show some improvement on the last couple of weeks; the shipping business does not show much change, and light stems are the order of the day. Prices continue at—block 16s. 6d., Forest 15s. 6d., rubble 15s. 9d., and nuts 14s. at pit and 1s. 9d. per ton extra f.o.b. Lydney or Sharpness. Slacks are a strong market, and the price of the rough quality is advanced to 7s. at pit this week. Steam coals are meeting with a satisfactory demand, and the pits are all busy.

Miners' Libel Action.—The hearing of the action brought by Mr. Thomas Greenall, president of the Lancashire and Cheshire Miners' Federation, and prospective Labour candidate for the Leigh division of Lancashire, against Mr. Edward Wigley, a Leigh miner, and secretary of the United Mine Workers' Federation, and Messrs. Tillotson and Son Ltd., proprietors, printers and publishers of the *Leigh Journal and Times*, to recover damages for alleged libel, was heard by Mr. Justice Rowlatt and a special jury at Manchester Assizes last week. The alleged libel was contained in two letters written by Wigley criticising the plaintiff in regard to sums paid to him by his Federation. They were to the effect that although it had been stated that the miners' agents, of whom plaintiff was one, were to forego their salaries during the national coal strike, Mr. Greenall had received £8 17s. 6d. in respect of two meetings in one day, and £40 0s. 10d. during the strike. The plaintiff denied receiving the amount stated for one day's meetings, and said that of the £40 0s. 10d. shown in the balance-sheet £9 18s. 4d. was for wages earned before the strike, the balance being for railway fares and conferences in London, extending over 26 days. He also denied drawing any wages during the strike, and said he did not make one penny out of his expenses. Both defendants admitted publication, but pleaded that the words complained of were not libels, but were fair comments on facts. His lordship, in summing up, said the balance-sheets were not as clear as they might have been. If a man provoked controversy he must expect to be answered, and judgment must be formed according to the tones of the disputants on one side and another. The jury failed to agree, and were discharged.

NTAL MINING NOTES.

Belgium.

tphalian Coal Syndicate has renewed,
years, its agreement with the Belgian
gard to zones of influence.

-The coalmining industry is at present
d trouble, the dearth of wagons, which
he non-arrival of coal and coke from
ar reasons. Manufacturing coals are
The Coke Syndicate has raised prices
ary 1 next, making prices as follow.
.; half-washed do., 30 fr. 50 c.; washed
ducers of small lean coals have raised
for contracts up to the end of March,
themselves further ahead. The mild
prejudicial effect upon the household

Germany.

et.—The anticipated improvement in
y wagons is not yet very apparent, and
is respect is causing a serious loss of
ers as well as to the Syndicate. Other-
the market is unchanged, and is favour-
with previous years. The demand for
ry active and growing, and the condition
in general is such that a continuance of
expected for a long time ahead. House
request, in accordance with the advance
and similar coals are being despatched
ities, a high proportion being for export;
usy condition of the cokeries, coking coal
ter. In coke, whilst blastfurnace and
py the premier position, other kinds are
and. From South Germany complaints
nsufficient supply, especially in the case
he situation will become acute if really

and Coke.—The following shows the
in Germany during October and the ten
with :—

October.		January-October.	
11.	1912.	1911.	1912.
ns.	Tons.	Tons.	Tons.
9,261	16,102,206	133,470,434	147,404,184
9,947	7,947,179	60,292,946	67,659,847
0,632	2,651,076	20,887,181	23,838,693
3,725	475,687	4,150,600	4,422,625
9,916	1,777,613	13,906,098	15,748,884

rts of Fuel.—The following table shows
orts of fuel during the first nine months
:—

Imports.		Exports.	
1911.	1912.	1911.	1912.
Tons.	Tons.	Tons.	Tons.
012,286	8,478,727	22,245,553	25,723,783
813,871	6,028,872	48,366	44,766
497,380	494,174	3,718,423	4,816,143
81,551	41,271	1,595,467	1,761,136
93,398	104,995	407,108	475,536

om Great Britain amounted to 7,312,540
ith 7,764,829 tons in the first 10 months
in October included the following :—
ns (933,690 tons); lignite, 631,689
ke, 54,691 tons (47,176 tons); coal
tons (6,013 tons); lignite briquettes,
391 tons). Included in the total
are 892,540 tons of British coal,
tons last year. Exports in the same
he following : — Coal, 2,308,513 tons
lignite, 4,978 tons (5,013 tons); coke,
404 tons); coal briquettes, 176,143 tons
ite briquettes, 59,805 tons (61,966 tons).
-off in the export of coal to Belgium
nce (113,000 tons), and Holland (94,000
er hand, exports of coke to France rose
o 240,957 tons.

ade.—Mr. H. W. Heidmann, of Hamburg,
rts of coals into Hamburg have been in

	1912. Tons.	1911. Tons.
l and Durham...	215,885	177,859
yshire, &c.	70,462	46,340
....	116,865	94,930
....	12,444	4,243
....	50	485
....	415,706	323,857

Upper Silesia.—The chief point in the
rtage of railway transport facilities, the
ily put in arrear with their deliveries,
s inconvenienced, whilst the earners of
diminished, and a large section of the
suffers in consequence. In itself the
good, and a sufficient demand prevails to
output if it could be got away from the
s of the iron industry are large and likely
e consumption of house coal is increasing,
ul whether dealers' stocks will be suffi-
ers' needs. Gas coals are enquired for
an before, and coking coals cannot be
Large enquiries are coming in from

Northern Germany and the capital, and failure to respond will enable English coal to dominate these markets once more. Austria-Hungary remains a good customer, but deliveries to Russian-Poland have slackened off of late. The coke market is also flourishing, the entire production of blastfurnace and foundry coke being taken over at once.

Russia.

At a conference, over which he is presiding, the Minister of Trade stated on Monday that, in view of the scarcity of coal, it would be necessary to import from 15,000,000 poods to 25,000,000 poods from abroad next year.

THE SCOTCH COAL AND IRON TRADES.

Thursday, December 5.

Glasgow and Lanarkshire.

COAL.

There was a very decided falling off in the shipments at Scottish ports in the past week, resulting from extremely boisterous weather, which on one or two days not only made the movements of vessels impossible, but also stopped the loading of cargoes. The total clearances at the Scotch ports amounted to 266,800 tons, a reduction of 78,933 tons as compared with the preceding week, and 64,011 tons less than in the corresponding week of 1911. While the shipment business has thus been reduced, the sudden occurrence of frost led to an extraordinary demand for household supplies for home use. The previous mild weather has made consumers indifferent as to holiday supplies, and in the larger communities the cold weather found the great majority of householders unprovided with coal. The demand in Glasgow, for example, at the end of last and the beginning of the present week, was such that not a few found it impossible to obtain supplies, and the retail coalmen obtained enhanced prices without question. Coal was selling retail up to 1s. 2d. per hundredweight, which meant an increase on the former rates of 1s. 8d. to 2s. per ton. Of course this increase can only be temporary, unless other departments of the trade also improve, and especially the shipping branch. The Glasgow shipments in the past week amounted to 61,080 tons, compared with 74,203 in the preceding week and 77,428 in the corresponding week of last year. Steam and ell coal have been in fair request for shipment, and there is a ready market for splint coal. The f.o.b. quotations at Glasgow are for steam 11s. 6d. to 12s., ell 12s. 3d. to 12s. 9d., splint 14s. to 14s. 6d., treble nuts 12s. 6d. to 13s., and doubles and singles 12s. to 12s. 6d. per ton. Complaints are still made regarding irregular supplies of railway wagons, and a committee of traders is endeavouring to find means of redress.

IRON.

The demand for raw iron is active, and considerable purchases are being made both for present and future delivery over the next three months. Since last report Cleveland warrants have been done from 67s. 9d. to 67s. 2½d. cash, 68s. 1d. to 67s. 8d. one month, and 68s. 8d. to 68s. 7½d. three months. For delivery on January 10, 68s. 5d. has been paid. Cumberland hæmatite warrants sold at 83s. three months. Scotch hæmatite is quoted 87s. 6d. for delivery at west of Scotland steelworks. For Scotch pig iron there is a steady outlet, and prices are firm. Govan and Monkland Nos. 1 are quoted 76s. 6d., Nos. 3, 75s.; Carnbroe, No. 1, 80s., No. 3, 76s.; Clyde, Calder, and Summerlee, Nos. 1, 82s., Nos. 3, 77s.; Gartsherrie, No. 1, 82s. 6d., No. 3, 77s. 6d.; Langloan, No. 1, 83s. 6d., No. 3, 78s. 6d.; Coltness, No. 1, 99s., No. 3. 81s.; Eglinton, at Ardrossan or Troon, No. 1, 76s., No. 3, 75s.; Glengarnock, at Ardrossan, No. 1, 83s. 6d., No. 3, 78s. 6d.; Dalmellington, at Ayr, No. 1, 78s. 6d., No 3, 75s. 6d.; Shotts at Leith, and Carron at Grangemouth, Nos. 1, 82s., Nos. 3, 77s. per ton. There are 89 furnaces in blast in Scotland, compared with 88 in the preceding week and 84 at this time last year. The shipments of pig iron from Scotch ports in the past week were 1,735 tons foreign, and 2,987 coastwise, the total of 4,622 tons being 3,303 tons behind the quantity despatched in the corresponding week of last year. The finished iron and steel departments are very busy. Makers of finished iron have raised their prices 7s. 6d., and the quotations are now on the basis of £8 10s. for crown bars, less the usual discount.

Renfrew, Ayr and Dumbarton.

COAL.

There has been a marked reduction in the coal shipments from this district, owing to vessels being detained by very stormy weather. The clearances were at Bowling 278 tons, Ardrossan 1,358, Irvine 1,490, Greenock 3,142, Troon 4,134, Ayr 15,730—total 24,132 tons, against 34,718 in the preceding week, and 39,649 in the corresponding week of last year. The prices of shipping coal are steady. There has been a sharp improvement in the demand for house coal for home use in consequence of the sudden occurrence of severe frost, and householders have been paying increased prices for supplies. The demand for iron and steel works and manufacturing purposes generally continues on an extensive scale.

Stirling, the Lothians and Fife.

COAL.

There has been a decrease of fully 25,000 tons in the coal shipments at Firth of Forth ports owing to stormy weather. The clearances in the past week were at Bo'ness 9,710 tons, Granton 11,000, Grangemouth 27,961 and Leith 41,458—total 90,129 tons, compared with 116,727 in the preceding week, and 95,173 in the corresponding week of 1911. Best screened steam coal is quoted at Leith 13s., secondary qualities 12s. to 12s. 3d., treble nuts 13s. 6d. to 14s., doubles 12s. 9d. to 13s., and singles 11s. 6d. to 12s. per ton. There has been a decrease of about 30,000 tons in the coal shipments at Fife ports. At Methil 43,106 tons were despatched, Burntisland 41,000, Alloa 2,773, Dysart 653, Wemyss 584, Tayport 726 and Charlestou 527—total 89,459 tons, compared with 120,085 in the preceding week, and 118,561 in the corresponding week of last year. First-class screened navigation coal is quoted at Methil and Burntisland 16s. 6d. to 17s., unscreened 13s. 6d. to 14s., first class steam coal 13s. 3d., third qualities 11s. 6d., treble nuts, 13s. 3d. to 14s., doubles 12s. 3d. to 12s. 6d., singles 11s. 6d. to 12s. per ton. Navigation qualities and first-class steam coal have been in good demand. The inland house coal trade has been very active on account of the cold weather.

THE LONDON COAL TRADE.

Thursday, December 5.

The London coal trade during the past week has shown an improvement in the volume of trade doing and a better tone has been noticeable at the Coal Exchange. The turn of the month has had something to do with it, as it was clearly indicated that the closing days of November were marked by a distinct falling off in the orders of the wholesale market. The stimulus given by the sharp frost during the two or three closing days of the month was amply provided for by the huge stocks on hand at all the depots and traffic centres, so that merchants were not eager to give any material increase in the orders until the month had turned. In many cases, however, a fairly large quantity was purchased, with the proviso that deliveries did not commence until December 2, and as the weather turned somewhat milder in the first few days of the new month, some little concern was felt as to dealing with the new coal on its arrival in the Metropolis. Seaborne coals have had a somewhat better demand, but no cargoes have been offering. The official quotations continue at 21s. 6d. for best and 20s. 6d. for seconds. Yorkshire Wallsend have again been quoted at 21s. 6d. On Monday 27 cargoes are reported to have arrived in the River Thames, and on Wednesday's market nine. The weather, though not quite so cold as in the latter end of November, continues sufficiently cold to constitute it good coal-consuming weather and the demand is fairly good. The various Christmas clubs and other charitable institutions are now beginning to make themselves known, and a fairly strong demand is anticipated between now and the end of the year. The attendance on market has been better during the past week or so, and it is evident a keener interest is being taken in all classes of fuel just now, and orders are more abundant. Very large quantities of house coal have changed hands lately amongst the merchants and factors themselves. Manufacturing coals also have been moving freely and prices all round are firm and steady. Electric lighting power stations are now running at their full limit, and whilst the short days and long evenings are in evidence, they are requisitioning their full contract quantity of fuel. The bulk of these are using small coals (some double-screened nuts and some slack) and this constitutes a strong demand for this quality of fuel. Occasional fogs also which belong peculiarly to the London area often increase the daily requirements and these have hitherto been somewhat difficult to obtain.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, November 29.—There were no seaborne house coal cargoes pressing for sale at to-day's market, which continued quiet. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston (W.E. Yorks) 21s. 6d. Cargoes 27.

Monday, December 2.—The change in the weather caused a slight improvement in the enquiry for seaborne house coal at to-day's market, but no cargoes of either Durham or Yorkshire reported sold. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston (W.E. Yorks) 21s. 6d. Cargoes 27.

Wednesday, December 4.—The seaborne house coal market was quiet to-day, with no sales reported. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston (W.E. Yorks) 21s. 6d. Cargoes 9.

THE BY-PRODUCTS TRADE.

Tar products :—The market is much about the same, but there has been a distinct improvement in crude carbolic. Naphthas and creosote firm. Pitch steady. Benzols are not quite so firm, but toluol keeps on the strong side, while 50's benzol are appreciating and look like taking the precedence over 90's once more. Closing prices are :—

Benzols, 90's, 10d. to 10¼d.; ditto 50's, 10¼d.; toluol, 11½d.; carbolic acid, crude (60 per cent.), 1s. 11d. to 2s. 4d.; ditto crystals (40 per cent.), 7¼d.; solvent naphtha, 1s. 0¼d., as in quality and package; crude ditto, 5¼d. in bulk; creosote, 3¼d. for ordinary qualities; pitch, 42s. 6d. to 43s. f.o.b. east coast; ditto, 40s. 6d. to 42s. f.a.s. west coast; ditto, 47s. 6d. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia :—Steady, and offering a bold front to the seemingly disappointing export figures for October (though really they are just about normal) is about the position of affairs in sulphate. Satisfactory enquiries for forward are prevalent, though business is practically *nil*. The situation as a whole is quite reassuring, especially in the face of the outlook for nitrate of soda. Nearest prompt prices are :—

London (ordinary makes), £13 5s.; Beckton, £13 15s.; Liverpool, £13 17s. 6d. to £13 18s. 9d.; Hull, £13 16s. 3d.; Scotch ports, £14 to £14 2s. 6d.; nitrate of soda (ordinary), 11s. 9d. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

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(A Classified List appears on page 1168.)

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— See Page 1162. —

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*** *For other Miscellaneous Advertisements see Last White Page.*

The Colliery Guardian.

LONDON, FRIDAY, DECEMBER 6, 1912.

The Home Secretary gives notice that he has approved the following institutions for the purpose of granting certificates under his Order, dated February 27, 1912, prescribing the qualifications of surveyors for the purpose of sections 20 and 21 of the Coal Mines Act, 1911:—City and Guilds of London Institute, Royal School of Mines, Wigan and District Mining and Technical College, University of Birmingham, University ottingham. Examinations for sur- ificates are also held by the Board for minations in May and November in the following centres:—Edinburgh, n-Tyne, Sheffield, Wigan, Cardiff and n.

ce Pickford has given judgment in ng case heard recently at Newcastle question being the right of the t to detain workmen in the pit until time for raising the shift. His d he was not prepared to assent to ion that miners had a right to leave ny time they wished, and he was not hold that miners who refused to do were entitled at any moment to t the cage should be put at their conveyance to the surface. But the were not entitled to retain them r will, until the end of the shift, if es for raising them existed.

eedings taken by the Home Office cials of the Bentley Colliery with the management of the mine were the Doncaster West Riding Police turday, the hearing being adjourned. nce given by Drs. Cadman and s of an especially interesting nature. t appears elsewhere in this issue.

lish and Welsh railway companies notice that the charges for de- n railway companies' wagons and been revised, the revised charges to and after January 1, 1913. The not refer to wagons conveying coal affic.

g to the twelfth report by the Board proceedings under section 31 of the l Canal Traffic Act, 1888, the total omplaints for 1910-11 was 284. The taken by the Board of Trade resulted ement, or partial settlement, of 88 7 cases the complaints were not ith, while in 98 cases an amicable could not be effected. In the ase it is stated that the proceedings been completed.

bers of the Midland Institute of il and Mechanical Engineers held l dinner, on Tuesday night, at the l, Sheffield. A general meeting was same day, at which a discussion on k place.

st was held on Tuesday on Ernest superintendent of the miners' rescue Swansea, who was killed whilst operations at a pit at Loughor. und a verdict that death was due monoxide poisoning, and that the pparatus worn by the deceased was

tish Government have notified that ger consider coal contraband.

usand miners employed at the large ollieries in the Carw Valley, South t on strike this week as a protest employment of non-unionists.

eting of the executive committee of Federation of Great Britain in Tuesday, the secretary stated that ons day he had been served with a pear in the action of Parr *v.* the and Southport Branch of the and Cheshire Miners' Federation, the Miners' Federation of Great also joined as a defendant. The is for the production of the books ashire and Cheshire Federation and eration of Great Britain, for the f the Court.

The North Wales Miners' Association has decided unanimously to refuse the employers offer of increases of 1d. a day for boys and 2d. a day for men in the wages of surface workers.

The Labour Department of the Board of Trade has issued its annual report on strikes and lock-outs in 1911 and on Conciliation and Arbitration Boards, and a special report on profit-sharing and labour co-partnership.

The executive committee of the Miners' Federation of Great Britain waited upon Mr. Ellis Criffith, Under-Secretary, at the Home Office on Wednesday, on the subject of the draft regulations under the Coal Mines Act. It was stated later that a sub-committee had been appointed to confer with the Home Office on the matters in dispute. The executive committee subsequently considered an invitation from the Industrial Council to give evidence before the enquiry into labour conditions and industrial unrest, and selected the following:—Messrs. J. Robertson, Scotland; John Wilson, M.P., Durham; W. Brace, M.P., South Wales; and W. E. Harvey, M.P., Derbyshire.

A meeting of the Mining Institute of Scotland will be held at Clasgow on Saturday, the 14th inst.

The members of the Manchester Geological and Mining Society meet on Tuesday next.

In the House of Commons, on Wednesday, Mr. Syduey Buxton introduced a Bill to amend Section 1 of the Railway and Canal Traffic Act, 1894, with respect to increases of rates or charges made for the purpose of meeting a rise in the cost of working a railway due to improved labour conditions. Notices of motion for its rejection have already been placed upon the paper by Sir Alfred Mond, Mr. Peto, Sir Maurice Levy, and other members of both parties.

At a meeting of the North Staffordshire Institute at Stoke, on Monday, a practical paper on haulage clips was read by Messrs. W. G. Salt and A. L. Lovatt.

The Home Office enquiry into the Cadeby Colliery disaster, which took place in July, was resumed yesterday at Doncaster before the Chief Inspector of Mines. Mr. Chambers, the manager, said it was not likely they would get to the sealed portion for a long period—certainly months, and possibly a year. Mr. Redmayne, in closing the enquiry, said the evidence enabled him to form an almost positive idea of what took place.

The men's section of the Coal Conciliation Board for the Federated districts of England and North Wales met at Westminster Palace Hotel yesterday, and decided to make an application to the owners for an increase of 5 per cent. in wages, which would bring the men's wages 60 per cent. above the 1865 standard.

We propose in our next issue to consider the interesting points raised in discussion of Messrs. Hutchinson and Evans' paper on "Analyses of Mine Air," especially with regard to the influence of barometric pressure upon the methane content.

Firemen's Certificates. In last week's issue we published the last of a series of letters dealing with the grievance of "firemen, examiners and deputies" under the provisions of the Coal Mines Act, 1911.

Without entering into the merits of the complaint—the discussion of which can be left to other correspondents—we purpose giving here a short summary of the circumstances which have led up to it.

In July 1909 the Royal Commission on Mines reported as follows:—"We have come to the conclusion that some steps should be taken to secure the competency of firemen in testing for gas, and we think the most satisfactory arrangement would be to require that every person appointed under General Rule 4 should obtain a certificate from a mining school or other place approved by the Secretary of State as to his ability to make accurate tests."[*]

It is common knowledge that the Reports of the Royal Commission on Mines formed the groundwork of the Coal Mines Act, 1911, which is now the principal Act regulating the law relating to coal mines. The following are extracts from the Act:—

> Section 14.—(1) For every mine there shall be appointed by the manager in writing one or more competent persons (hereinafter referred to as firemen, examiners, or deputies) to make such inspections and carry out such other duties as to the presence of gas . . . . . .
>
> Section 15.—(1) A person shall not, after the first day of January, nineteen hundred and thirteen, be qualified to be appointed or to be a fireman, examiner, or deputy, unless he
>
> (*b*) has obtained a certificate in the prescribed form from a mining school or other institution or authority approved by the Secretary of State as to his ability to make accurate tests (so far as practicable with a safety lamp) for inflammable gas . . .
>
> (*c*) has, within the preceding five years, obtained from such approved school, institute, or authority as aforesaid a certificate in the prescribed form to the effect that his eyesight is such as to enable him to make accurate tests for inflammable gas . . .
>
> Provided that a person shall not be required to have obtained a certificate as to ability to make tests for inflammable gas or as to eyesight if he is employed in a mine in which inflammable gas is unknown.

The "fireman, examiner or deputy," or, for the sake of brevity, the fireman, is therefore required to be able to make accurate tests (so far as practicable with a safety lamp) for *inflammable gas*. This duty is straightforward, for the inflammable gas found in mine air is almost entirely methane, and this gas gives a definite "cap," in each case, according to the percentage of the gas which is present.

We now arrive at the second stage of the history of the fireman's grievance.

Section 88 (1) of the Coal Mines Act, 1911, reads as follows:—

> For the purpose of making known the provisions of this Act and the regulations of the mine to all persons employed in and about a mine, the prescribed abstract of this Act and a correct copy of all the regulations of the mine shall be published as follows:
>
> (*a*) The owner, agent, or manager of the mine shall cause a copy of the abstract and a copy of the regulations . . . . to be posted up in some conspicuous place at or near the mine where they may be conveniently read or seen by the persons employed. . . .

This abstract was duly prescribed and issued by the SECRETARY OF STATE, and, presumably, has the same legal force as the Act itself. In the portion of the prescribed abstract referring to "Firemen, Examiners and Deputies," it is stated that "He (the fireman) must also hold a certificate from an approved institution that he is able to make accurate tests (so far as practicable with a safety lamp) for firedamp. . . ." This section of the abstract is intended to correspond to Section 15 (1) (*b*) of the Coal Mines Act, quoted above, but in the former the term "firedamp" is used instead of "inflammable gas," as in the latter. This is an importation, as the term "firedamp" does not once appear in the Act.

Mr. R. A. S. REDMAYNE, H.M. Chief Inspector of Mines, in *Modern Practice in Mining*,[†] vol. iv., p. 32, says:—

> The chief constituent of firedamp, or marsh gas, or simply "gas," as it is sometimes called, is methane or

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[*] Second Report of the Royal Commission on Mines, 1909 [Cd. 4820] p. 49.

[†] Published by Longmans, Green and Co London, 1911.

light carburetted hydrogen gas (CH_4), but it is not entirely composed, as is frequently supposed, of this explosive gas. *Pure* firedamp would be entirely composed of methane, but all analyses that have been carried out have, so far, shown it to contain small quantities of other gases.

Mr. Redmayne gives the following eight analyses of firedamp in British mines:—

	Wallsend pipe.	Wallsend Bensham.	Jarrow Bensham.	Hebburn Bensham.	Jarrow, Low Main.	Jarrow seam.	24 ft. below Bensham, Hebburn Colliery.	Gateshead, Oakwellgate.
Methane	92·8	77·5	83·1	86·0	93·4	79·7	92·7	98·2
Nitrogen .. .	6·9	26·1	14·2	12·3	4·9	14·3	6·4	1·3
Oxygen	—	—	0·6	—	—	3·0	—	—
Carbonic acid	0·3	1·3	2·1	1·7	1·7	2·0	0·9	0·5
Hydrogen.. ...	—	—	—	—	—	3·0	—	—

From the above it will be clearly seen that "firedamp," properly speaking, is not the same thing as "inflammable gas," but is a mixture of inflammable and non-inflammable gases. A 2½ per cent. mixture, with air, of the sample of Wallsend Bensham firedamp, referred to by Mr. Redmayne, would give less than 2 per cent. of inflammable gas.

As in a sample of mine air the "cap" indication depends—*ceteris paribus*—upon the proportional amount of inflammable gas (practically methane) present; and as firedamp is a mixture of inflammable and uninflammable gases, in varying proportions, it necessarily follows that a person cannot determine, by means of a safety lamp, the amount of *firedamp* present in a sample of mine air, without first knowing the analysis of the particular firedamp, and then making a calculation therefrom.

The third stage of the history was marked by the issue by the Home Office of a memorandum on "Firemen's, Examiners', and Deputies' Certificates." This memorandum, which is neither dated nor marked for identification, appeared about the end of July or the beginning of August last, and confirms the innovation introduced into the abstract of the Act—the terms "inflammable gas," "gas," and "firedamp" being employed impartially to indicate the same subject.

The fourth and last stage of this remarkable history was reached when the "approved institutions" (or some of them) unaccountably determined that they would be complying with the requirements of section 15 (1) (*b*) of the Coal Mines Act, 1911, by using ordinary coal gas mixed with air when examining candidates for certificates.

Now coal gas, although obtained from coal, differs in important characteristics from the "inflammable gas" found in coalmines. The following is an analysis given by Prof. Vivian B. Lewes as representative of modern purified coal gas.

	Per cent.
Hydrogen	47·9
Illuminants of the	
Ethylene series	3·5
Benzene do.	0·9
Methane do.	7·9
Methane	33·3
Carbon monoxide	6·0
Oxygen	0·5
	100·0

On comparing this analysis of coal gas with the composition of the inflammable gas met with in coalmines, it will be noted that whilst the latter consists almost entirely of methane, the former contains only 41·2 per cent. of methane and its congeners (ethane, &c.), mixed with 47·9 per cent. of hydrogen, together with quantities of gases belonging to the ethylene and benzene series, which have a marked effect upon the "cap" indication.

In addition to the important difference in composition between coal gas and the inflammable gas met with in coalmines, there is a further serious objection to the use of coal gas which was pointed out by Mr. Noah S. Williams, of Manchester University, at a meeting of the South Wales Institute of Engineers held at Cardiff on November 21 last.†

Referring to his experience of the Winstanley apparatus, extending over a period of six months, morning and evening, in training 1.300 firemen in South Wales, Mr. Williams said that the gas obtained from different gasworks gave varying results, and that gas obtained from the same gasworks differed in composition during the day.

Clearly the recommendation of the Royal Commission on Mines has become involved in a hopeless tangle, and it would seem now that the simplest, and perhaps the only, course for the Home Office to take is to make a clean slate and start afresh.

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† *Colliery Guardian*, November 29, 1912.

Trade Summary.

The London coal trade for the past week has been brisk, and the volume of trade done has been exceedingly good. Prices remain unaltered, but the colder weather has stimulated the demand. Enquiries for both household and manufacturing qualities since the turn of the month have been fairly large, but the demand from the general public has not been heavy. Double-screened nuts and all kinds of smalls have sold freely, and the pressure from electric works continues strong. Bakers' nuts and kitchener cobbles are moving steadily. The export trade continues good.

The market at Newcastle is very strong, and prices of best, secondary, and small steam coals, best gas coals, bunkers, coking, and house coals have all advanced sharply. Coke is firm.

The Durham coal trade is firm in all departments, there being a great scarcity of coal for prompt delivery.

There is an improved demand for Lancashire house coal. In all other departments a vigorous demand exists.

Business in West Yorkshire is brisk, there being an especially strong call for small coal, prices of which are hardening. Business with the south is dull.

The improvement in South Staffordshire is well maintained, and forward buyers are more tractable. The position of house coal is slightly better.

There is more business passing in Derbyshire house coal, and stocks have been reduced. The demand for fuel for manufacturing purposes is very active, and prices are tending upwards. The export trade is much more active.

The improvement at Cardiff has been more than maintained, and charterings have been exceptionally heavy. Both large and small steam coals are extremely brisk. Monmouthshire coals are active. House coals have been advanced. Shipments of patent fuel have been heavy.

Shipments from Scottish ports have been greatly interfered with by bad weather; at the same time the household demand has been visibly strengthened. Manufacturing sorts are in heavy request.

Mining Institute of Scotland.—A general meeting of the Mining Institute of Scotland will be held in the rooms of the institute, 39, Elmbank Crescent, Glasgow, on Saturday, the 14th inst., at 3 o'clock. Mr. David M. Mowat's paper on "Facts and Theories Relating to Fans," Mr. John M'Luckie's paper on "The Use of Old Wire Ropes in Timbering Roadways," and Mr. Henry Briggs' paper on "Testing for Firedamp and Blackdamp by Means of a Safety Lamp" will be discussed; the committee appointed to make investigation and experiment as to the utility of the appliance described by Mr. Briggs will submit their report. The president of the institute having offered a prize of £5 5s. for the best paper on a given subject by an associate or student of the institute, the council invite a paper on "Accidents in Shafts: Their Causes and Prevention," from associates and students on the roll of the institute for session 1912-1913, subject to the following conditions:—The paper is not to exceed 5,000 words in length; the plans and sketches illustrating the paper will be taken into account in the adjudication, and these are to be on special sheets of paper; the paper is to be sent to the secretary not later than March 31, 1913; the paper to be on foolscap, written on one side of the sheet only, and may be either typewritten or in MS.

INDIAN AND COLONIAL NOTES.

India.

The Railway Scandal.—Last week we printed a comment from a singularly well-informed correspondent on the report and proceedings of the recent Indian Coal Traffic Conference. The full text of the report and proceedings of the conference and of the petition of the Indian Mining Association to the Secretary of State for India, have now reached this country. These show how urgently the recent enquiry was needed, and that the need of reform was not confined to the supply of more wagons. It was among other things shown that one large colliery company had received regularly very preferential treatment in the matter of supply of wagons, "based, it was understood, on some past arrangement under which it was to be provided with this preferential supply for a particular colliery." It was ascertained that at one station, Koosunda, 5,000 tons of coal removed from wagons that had been overloaded at the collieries had disappeared during the nine months of short wagon supply. It is stated that the state of the yards at all the weighbridges, but particularly at Koosunda, "exhibited indescribable confusion." Every square foot of ground was littered with coal from a few inches to piles 5 or 6 feet high taken from adjusted wagons. "The track was in some places blocked, rendering the movement of rolling stock subject to derailment." Criticism was chiefly directed at the East India Railway, whereas the Bengal Nagpore Railway appears to have dealt comparatively well with its customers. This is the more surprising, as it is shown that the coal traffic of the East India Railway was 44 per cent. in 1910 and 42 per cent. in 1911 of their gross receipts, and as shown last week, the railway earns 9 per cent. on its capital.

The memorial to the Secretary of State which the Mining Association intimates has been delayed, pending the publication of the report of the conference, directs attention to the grave situation that exists in India by reason of the failure of the railways to cope with traffic offered. It does not repeat evidence, but says that examples of this failure might be multiplied indefinitely, and that the extent to which trade is restricted by inadequate transport cannot be estimated, and that the capital available annually for extensions is never sufficient, and has never yet reached the minimum of £12·5 millions per annum recommended by the Indian Railway Finance Committe of 1907-8. It suggests the issue of 4 per cent. railway bonds, and calls attention to the enormous sums raised in the London market for the development of foreign countries and British possessions other than India. It calls attention to the fact that in 1910 the capital raised in London for foreign enterprises aggregated £114¾ millions, and for British possessions £92½ millions, of which £18 millions were destined for India, and that in 1911 foreign enterprises drew £100¼ millions, and British possessions £65 millions, of which only £5 millions went to India. The memorial also asks that there should be added to the Railway Board five experts in, respectively, bridge construction, locomotives, station designing, traffic, and stores. Finally, it protests against Indian railways being allowed to divert any portion of the capital which, it is shown, they so urgently need for their own development, to the acquisition and equipment of their own collieries.

The Railway Administration report for the calendar year 1911 shows a net profit to the State of £3·62 millions, after covering the deficits of non-paying railways, and paying interest on lines under construction.

THE TIN-PLATE TRADE.

Liverpool.

The general tone of the market during the past week or so has been very dull. Several makers are short of specifications, and for prompt delivery are prepared to take low prices in order to keep their mills going. For forward shipment, however, they are not disposed to sell unless at the figures quoted. Buyers are holding off for the present, but it is difficult to see how prices are going to fall to any extent if works are to make a profit with steel bars, tin, &c., at their present levels. Quotations run, nominally:—Coke tin-plates: I C 14 × 20 (112 sh. 108 lb.), 15s. 3d. per box; I C 28 × 20 (112 sh. 216 lb.), 30s. 3d. to 30s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 7½d. to 15s. 9d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. 9d. per box; I C 14 × 19¼ (120 sh. 110 lb.), 15s. 9d. per box; I C 20 × 10 (225 sh. 156 lb.), 22s. 6d. per box; I C squares and odd sizes, 15s. 6d. to 15s. 9d. basis. Ternes are quiet at 26s. for I C 28 × 20, and charcoal tins are quietly steady at 18s. basis and upwards according to tinning. Finished black-plate stands at £10 15s. per ton for 30-gauge. Coke wasters are quoted as follow:—C W 14 × 20, 14s. 3d. per box; C W 28 × 20 28s. 3d. per box; C W 14 × 18¾, 14s. 1½d. per box; C W 14 × 19¼, 14s. 6d. per box; C W 20 × 10, 19s. 9d. per box—all f.o.b. Wales, less 4 per cent.

Manchester Geological and Mining Society.—The ordinary meeting of the members of this society will be held at 5, John Dalton-street, Manchester, on Tuesday, December 10, 1912, at 4 p.m. The following papers will be read:—"The Relation between Subsidence and Packing, with special Reference to the Hydraulic Stowing of Goaves," by Mr. George Knox; "A New Mining Dial," by Mr. Frederick P. Mills.

ABOUR AND WAGES.

North of England.

from the council of the Northumberland
tion met the Coalowners' Association at
Offices, Newcastle, on Saturday, to place
uests from the council meeting in May,
om a special council meeting held later
here were nine resolutions from the May
ine from the special meeting of the
ere was also down for discussion the
re-establishment of the joint committee.
rtant resolution in the first batch was
s the abolition of the three-shift system.
er requests, one asking for better wages
kers occupied a prominent place. A
e night workers is that lower-grade and
are sent to do the work of higher-grade
men. Restoration of the short shifts
men under the Eight Hours Act was
ections of the men also asked for free
and fire coal on the same conditions as
d to hewers. The owners intimated that
uests submitted would have their due
nd that reply would be communicated to
later.

; of the Cumberland Coal Conciliation
kington, on Tuesday, it was agreed to
wers' minimum rates by 8¾ per cent.,
per cent. above standard.

Federated Area.

at the New Hucknall and Bentinck
rd to the grievances of surface workers,
rectly employed in manipulating coal,
onsideration at the monthly meeting of
rs' Association on Saturday afternoon,
when the secretary, Mr. C. Bunfield,
s no settlement had been arrived at after
tween the representatives of the owners
e men had tendered their notices, which
December 10. With a view to avoiding
uncil instructed the officials to ask for
; with the owners' representatives. It
at a great deal of Sunday work was
certain collieries in the county. The
protested against any unnecessary work
l in and about the mines on the Sabbath.
of the North Wales Miners' Association
Monday, the agent reported that the
committee had met the North Wales
pecting the minimum wage for surface
The owners offered an increase of 1d.
and 2d. for men, conditionally that no
was asked for before March 1915. The
nimously rejected this offer, and decided
s terminating contracts. The date on
ices will be handed in will be decided at
e held later on. The decision affects
.

presentatives on the Conciliation Board
l North Wales met at the Westminster
ondon, to-day, to consider as to whether
hall be made to the Board for a further
r cent. in wages to the men employed in
nines. Mr. W. E. Harvey, M.P., Derby-

unanimously decided to make application
of 5 per cent. on the present rate of
etary (Mr. Thos. Ashton) was instructed
e with the coalowners' secretary (Sir T.
and arrange for a meeting of the
ard to consider the application. Under
Conciliation Board the meeting must be
days, so that the probabilities are that it
eek previous to Christmas. The present
the English Federated area is 55 per
standard wage of 1888. An advance of
granted from the third making-up day
ditional on the signing of a new wage
March 31, 1915, and terminable there-
onths' notice, with a fixed minimum of
the standard and a fixed maximum of
he standard. If the present application
ges will be raised to a point within 5 per
imum.

be the intention of the coalowners to
ion of the revision of the relation of
wages. The contention is that recent
Coal Mines Act of 1911, the Minimum
l the Insurance Act—has materially
et of production, and proper allowance
or this in determining the wage rate as
the selling price of coal. In the last
ed in South Wales the coalowners
cession equivalent to 9d. per ton in
there is no movement in wages now on selling prices between 14s. and 14s. 9d. per ton. This does not take into account any increased cost on production from the Minimum Wage and Insurance Acts.

Miners' Federation of Great Britain

The executive committee of the Miners' Federation of Great Britain met at the Westminster Palace Hotel, London, on Tuesday afternoon, to consider several important matters affecting the Federation, and to arrange for the deputation on the following morning to the Home Secretary on the Orders issued under the Coal Mines (Regulation) Act, 1911. The secretary informed the committee that on the previous day he had been served with a writ to appear in court in London in the action of Parr *v.* the Havannah and Southport branch of the Lancashire and Cheshire Miners' Federation, with which the Miners' Federation of Great Britain is also joined as a defendant. The action was originally heard in 1910, when Parr sued the trustees of his branch and the Lancashire and Cheshire Miners' Federation for an injunction to restrain them from the payment of any money to a Parliamentary fund for the contesting of any Parliamentary election, or the maintenance of any member of Parliament. An injunction was then granted against the branch and the Lancashire and Cheshire Federation, and later the Miners' Federation of Great Britain was also included in the injunction. The present writ is for the production of the books of the Lancashire and Cheshire Federation, and of the Federation of Great Britain, for the inspection of the court.

A meeting of the executive committee was held on Wednesday, when an invitation from the Industrial Council to give evidence in the enquiry on the subject of labour conditions and industrial unrest was considered. The secretary stated that the executive had decided that any evidence from the mining districts must be given through the executive and by persons appointed by the executive. The following were selected to give evidence on behalf of the Federation:—Mr. J. Robertson (Scotland), Dr. John Wilson, M.P. (Durham), Mr. W. Brace, M.P. (South Wales) and Mr. W. E. Harvey, M.P. (Derbyshire).

Mr. Ellis Griffith, Under-Secretary, received a deputation from the Miners' Federation of Great Britain at the Home Office on Wednesday on the subject of the regulations to be issued under the Coal Mines Act, 1911. The purpose of the deputation was to make representations from the miners as to the amendment and improvement of certain of the draft regulations which have been prepared by the Home Office. The Home Office had previously received a deputation from the Mining Association of Great Britain who had stated the views of the coalowners and made certain recommendations for the consideration of the Home Office. The proceedings were private, but it is stated that Mr. Ellis Griffith gave a sympathetic consideration to the various matters submitted to him, and a committee, consisting of Messrs. W. E. Harvey, M.P., Derbyshire; W. Brace, M.P., South Wales; J. G. Hancock, M.P., Nottinghamshire; A. Stanley, M.P., Cannock Chase; T. Ashton, Manchester, secretary; H. Smith, Yorkshire; W. Straker, Northumberland; J. Robertson, Scotland; and G. Barker, South Wales, was appointed to confer with the Home Office on the subject of the draft regulations.

The Iron, Steel, and Engineering Trades.

The secretaries to the Midland Iron and Steel Wages Board publish the report of the accountants (B. Smith, Son and Wilkie) for the two months ended September and October, and announce that in accordance with the sliding scale arrangements the wages for puddling during the months of December 1912 and January 1913 will be 10s. 3d. per ton, and all other mill and forge wages will be advanced 5 per cent. These wages will take effect from Monday, December 9, and continue until Saturday, February 1, 1913. In addition to the puddling rate of 10s. 3d. per ton under the sliding scale there will be an increase of 6d. per ton bonus given to the puddlers by resolution of the wages board which met on Monday, July 15, 1912. This increase applies to puddlers only, and will make the total puddling rate 10s. 9d. per ton.

The ascertainment of Messrs. Price, Waterhouse and Co. of production and prices in the manufactured iron trade in Cleveland and the North of England district has been made known by the secretaries of the Conciliation Board. There will be an advance of 3d. per ton on puddling and 2½ per cent. on all other forge and mill wages, taking effect from Monday last.

After lengthy sinking operations the Astley and Tyldesley Coal Company Limited reached the Arley seam at a depth of 900 yards, at their Kermishaw Nook Pit, Astley, near Manchester, last week. The new pit is one of the deepest in Lancashire.

THE IRISH COAL TRADE.

Thursday, December 5.

Dublin.

The coal trade generally is more active since the month opened, a week of wintry weather having given an impetus to the household branch, although there has been no advance in prices in any class of fuel. Stocks at present are not large, as merchants find it difficult to get supplies as needed owing to the pressure at the collieries, besides which the recent storms have greatly interfered with the cross-channel trade. Quotations in the city are as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; steam coals from 20s. per ton upwards; best coke 23s. per ton, or 18s. per chaldron. Irish coals, at Wolfhill, from 5s. to 20s. per ton at the pit mouth. The coaling vessels arriving during the week amounted to 56 as compared with 48 the week previously, chiefly from Liverpool, Troon, Partington, Garston, Preston, Ayr, Newport, Point of Aire, Cardiff, Workington, Swansea, West Bank Dock, Irvine, Glasgow, and Whitehaven. The total quantity of English, Scotch and Welsh coal discharged upon the quays was 25,164 tons.

Belfast.

Upon the whole the market is firmer, but there is no change in prices at this port. There has been more enquiry for house coals than of late weeks, and manufacturing, steam and works fuel are in good demand owing to the satisfactory position of the local industries. City prices of house coals are from 22s. 6d. to 26s. 6d. per ton; best Orrell slack, 22s. 6d. Quotations ex-quay are from 19s. 0d. to 22s. 8d. per ton for house coals, steam coals from about 16s. 6d. to 17s. 6d. per ton (Scotch and English). Business between this and Scottish ports is fairly active. Cargoes arriving during the past week were chiefly from Ayr, Maryport, Whitehaven, Liverpool, Glasgow, Girvan, Garston, Troon, Bowling, Swansea, Saundersfoot, Ardrossan, Ellesmere Port, Campbeltown, and Lydney.

It is stated that steps have been taken to open a coalmine at Gubaveeny, near Blacklion, County Cavan. An English coal expert has made an exhaustive analytical examination of the place, and has decided to float a company, with a capital of £100,000, for the purpose of opening up mines. It is understood that the promoter has taken a lease of 2,000 acres of land for mining purposes.

THE WELSH COAL AND IRON TRADES.

Thursday, December 5.

North Wales.

Ruabon.

COAL.

The wintry snap created quite a boom in the demand for house fuel, and the demand was greater than the collieries were able to cope with. There is a threatened strike of the surfacemen employed at the North Wales collieries, but it is hoped that an amicable settlement will be arrived at in time to stop any extreme action, as a strike at this time of the year would be disastrous to masters and men alike. In regard to the demand generally for coal, all the pits are working full time, and there is no lack of orders for the different kinds of fuel. House coal is sold at prices reaching 17s. 6d. per ton for the best hard large quality, and 14s. to 16s. for good seconds quality and small best coal. There is not such a large demand for steam coal for manufacturing purposes, owing to the weather affecting some classes of trades, but any surplus has been readily sold to merchants or at landsale depots for the house coal market. The railway companies are now sending in a goodly number of wagons for fuel on account of their contracts. The supply of gas-making fuel remains normal, and there is no fluctuation in price, as all this coal is sold under contracts. Steam coal for manufacturing purposes averages about 13s. per ton at the pit, and for shipment about 1s. per ton less. Nuts are readily sold at 12s. per ton, and are very scarce as usual; so is slack, and good rough qualities are worth up to 8s. per ton f.o.r. There is an advance too in the price of gas coke, which is now being sold at 18s. 4d. per ton at the works, and at this figure there is a good demand.

Monmouthshire, South Wales, &c.

Newport.

COAL

The trend of business in the steam coal market disclosed last week has been gradually accentuated, the general tendency of values being higher all round. For best qualities collieries are fully booked up, and have no room for fresh business, so what there is coming on the market goes to those collieries not quite so full up, with the result that secondary qualities are relatively higher priced than at normal periods. Smalls especially are now scarce, and much below the current demand, best qualities ruling up to 12s. in consequence. In throughs, nuts, and house coals there has been no such pressure placed upon sellers, so while values certainly remain firm there have been no material advances. Patent fuel likewise rules firm but unadvanced. Pitwood supplies are now more plentiful, with values easier accordingly, good wood being quoted to-day around 25s. ex-ship. In the freight market outward chartering is greatly hampered by the difficulty of arranging for loading this month, stems being so congested. Freights in all directions are weaker, and owners are experiencing difficulty in placing tonnage. Latest approximate ruling quotations may be taken as follow, coal prices f.o.b. cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 16s. 3d. to 16s. 6d.; western-valleys, ordinaries, 15s. 9d. to 16s.; eastern-valleys, 15s. 3d. to 15s. 9d.; other sorts, 14s. 9d. to 15s.; colliery smalls, best, 11s. 6d. to 12s.; seconds, 10s. 3d. to 10s. 9d.; inferiors, 9s. 3d. to 10s.; screenings, 11s. 9d. to 12s.; house coal, best, 18s. 6d. to 19s.; seconds, 17s. 6d. to 18s.; through coals, 13s. to 13s. 6d.; nuts, best washed, 13s. 6d. to 13s. 9d. Patent fuel, 18s. 6d. to 19s. Coke: Furnace, 22s. to 23s.; foundry, 25s. to 27s.

IRON.

The local iron and steel trades continue in all departments satisfactory, each branch being fully engaged and forward enquiry ruling rather better than a week ago. Prices are strong all round, and most departments show advances on the week. Officially the prices for tin-plate bars and sheet bars are unaltered on the basis of £5 17s. 6d. Bessemer and

£6 Siemens, but to enquirers quotations are generally considerably in advance of these figures. Arrears of deliveries are heavy, and foreign arrivals are not up to expected quantities. Rail mills are reported well engaged, with quotations strong at £6 10s. to £6 15s. for heavy sections. Welsh hæmatite shows a sharp increase in values on the week, now being strongly quoted 90s. delivered to works in the district, with a distinct trend towards still higher values. There are no stocks at works, and urgent pressure is being continually brought to bear for arrears of deliveries on account of current contracts. Tin-plates are, perhaps, hardly so good a market, with quotations eased a shade. I C's 20 × 14 are quoted 15s. 6d. Bessemer and 15s. 6d. to 15s. 9d. Siemens, with 28 × 20 31s. 6d. Bessemer and 31s. 6d. to 31s. 9d. Siemens. Finished blackplate £11 12s. 6d. to £11 15s. per ton.

Cardiff.

COAL.

The improvement which was manifest in the coal market last week has since been more than maintained. Despite the fact that arrivals of tonnage have not been so great as anticipated, owing to delays occasioned by the boisterous weather, yet the shipments for the week from Cardiff alone amounted to 432,500 tons. Charterings have been exceptionally heavy, the week's total representing an aggregate tonnage of 446,700 tons, so that there is every prospect of very great pressure for coals right up to Christmas. The easiness in freights has, no doubt, given a stimulus to chartering, for since the beginning of last month there has been a drop in Mediterranean rates of 1s. 3d. to 2s. 6d. per ton, Genoa being now 11s. 6d., Port Said 12s., Alexandria 12s. 6d., Algiers 12½ fr., Barcelona 12s., Marseilles 13½ fr., Gibraltar 9s. 6d., Malta 10s. 3d., Lisbon 8s., and Las Palmas 10s. 3d. Freights to the River Plate have also fallen to 20s., or 4s. lower than at the beginning of November. From all directions there is a very strong demand for coal, and best steam qualities are selling freely at 18s. for prompt, and 18s. 3d. for later shipment, whilst superior Admiralty seconds are quoted at 17s. 3d. to 17s. 6d., and ordinary seconds at 16s. 9d. to 17s. per ton. The British Government departments are asking for tenders for the supply of from 17,000 to 20,000 tons of steam coals for the stationary engines, &c., at the dockyards, arsenals, and workshops. The Swedish Naval Department, who recently applied for tenders for the supply of 46,000 tons of best Welsh steam coals, have placed an order for about one-half of that quantity with the Ferndale Colliery Company. Though the price has not been disclosed, there is reason to believe that it amounts to 18s. per ton, less 2½ per cent., and delivery is to extend from the date of the contract to February 28. Large quantities of coal continue to be taken for the German coaling depots in the Mediterranean and elsewhere, and also on Grecian and Italian account. There is an enquiry from the Roumanian State Railways for 80,000 tons of double-screened steam coals. Tenders in this case are to be deposited by the 16th inst., and delivery is to extend for eight months from the date of acceptance. All these enquiries have had a marked effect on the market and depot owners have placed contracts for next year at 18s. 6d. per ton. Sellers are very sanguine that even this figure will yet be exceeded. There seems to be an extraordinary demand from Russia. Formerly St. Petersburg and the Baltic provinces imported most of their supplies from the United Kingdom, but after the strikes of last spring the contracts were transferred to Polish and South Russian coalmines, which now have no surplus for buyers. St Petersburg merchants are alleged to have made arrangements for the supply of bunkerings to the Russian Volunteer Fleet at the various ports of call, but without taking the precaution of covering themselves. There have been considerable enquiries by agents, both at the Welsh and north-country ports, but, so far as can be ascertained, very little business has yet resulted. For Russian naval requirements several cargoes of Welsh steam coal have been purchased for ports in the Black Sea. With regard to the enquiries for the Russian State Railways, it is stated that merchants in St. Petersburg have purchased about 80,000 tons of Yorkshire and Scottish coals at 14s. 1d. and 12s. 9d. f.o.b. respectively. Welsh steam coals, despite the higher price at which they are quoted, are more than holding their own in the River Plate district. Increasing supplies are constantly being called for, both on railway and electrical power account, and though great efforts have been made by American and German collieries to obtain entry into the Buenos Ayres market, they have not yet met with any appreciable success. Of the 2½ million tons imported last year, the British consul at that capital states that the bulk of the coal came from South Wales. Germany appears to have been more successful in its attempts to capture some of the Italian business, for, whereas last year she despatched 442,000 tons to Italy, in the eight months of the present year—viz., from January to August, she sent 600,000 tons. This has apparently attracted the attention of the British coal import agents resident in Genoa, and to prevent business drifting further into German hands, they have suggested that a uniform standard contract note for all sales to Italian ports should be instituted. For f.o.b. sales there is such a note already in existence, but not for c.i.f. sales, and the Cardiff Chamber of Commerce, recognising the advantage of the proposal, have appointed a committee to go thoroughly into the matter, and draw up clauses dealing with it. Some interest has also been excited by another movement on the part of the shipowners. Anticipating that an application for an advance in wages would probably be made in the near future, the council of the Shipping Federation have decided from January 1 next to grant an advance of not less than 10s. per month, bringing up the wages of the seamen to £5 10s. This amount the superintendent of a Bristol Channel port for the Seamen's Union says the men are entitled to by the increased freights, but that there is another very important question which will have to be dealt with, viz., that relating to manning. It is contended that there ought to be an increase of 40,000 men to the mercantile marine Of course, any increase in the wages of seamen may have a tendency to keep freights up, but coalowners generally view the situation with considerable equanimity. They are convinced that nothing now can prevent a boom in trade, and they look forward with every confidence to a year of almost unexampled prosperity. The small coal market at present is stronger even than that for large coal. Notwithstanding the larger supplies coming forward they are very readily absorbed, and best bunkering qualities are selling freely at 13s., best ordinaries at 12s. 6d., and cargo qualities at 11s. to 11s. 3d. per ton. Even these figures may be exceeded before the end of the year, for it is well known that as the Christmas holidays approach, colliery managers begin to stock large quantities of small for driving the engines during the stoppage. Washed nuts are 16s., and washed peas 14s. to 14s. 6d. per ton. Monmouthshire coals are equally firm, Black Vein qualities selling at 16s. 6d. to 16s. 9d., western-valleys 15s. 9d. to 16s., and eastern-valleys (best) 15s. 6d. f.o.b. Cardiff. House coals have been advanced 2s. per ton, quotations at the pit mouth being now 19s. to 20s. for best qualities. This means that consumers will have to pay 26s. to 27s. per ton. There is no change in Rhondda bituminous coals, No. 3 large still selling at 17s. to 17s. 6d., through-and-through 15s., and small 13s.; No. 2 large is 14s. 6d. to 15s., through-and-through 12s. 6d. to 13s., and small 11s. to 11s. 6d. per ton. Shipments of coal coastwise for the month show a decrease of 124,505 tons, the total quantity despatched from the Bristol Channel ports being 327,326 tons, as against 451,831 in October last year. From Cardiff the shipments amounted to 166,396 tons, of which Southampton took 47,000 tons, London 38,938, Liverpool 26,022, and Bristol 14,116 tons. From Newport the shipments were 65,993, Port Talbot 11,259, Briton Ferry 8,573, and Swansea 32,172 tons. The appended table gives the exports of coal to the principal foreign countries during the first 10 months of 1912, together with the increase or decrease as compared with the corresponding period of 1911:—

	Ten months' exports. Tons.	Increase. Tons.	Decrease. Tons.
Russia	444,134	84,792	—
Sweden	184,004	69,041	—
Norway	99,921	15,654	—
Denmark	31,031	2,602	—
Germany	199,532	119	—
Netherlands	119,204	—	1,706
Java	28,231	10,009	—
Dutch possessions in Indian Seas	9,910	—	7,433
Belgium	255,229	—	128,582
France	4,605,798	108,576	—
Algeria	434,605	—	4,027
French Somaliland	18,762	—	6,630
Madagascar	15,351	5,769	—
Portugal	514,930	61,607	—
Azores	27,015	3,408	—
Madeira	114 633	50,414	—
Spain	855,268	109,426	—
Canary Islands	572,597	—	46,684
Italy	4,279,924	230,231	—
Italian East Africa	26,112	16,741	—
Austria-Hungary	121,829	—	18,897
Greece	220,038	—	17,034
Bulgaria	19,745	—	39,111
Roumania	153,097	15,691	—
Turkey (European)	102,571	—	14,138
„ (Asiatic)	106,929	—	5,381
Egypt	1,403,131	—	144,532
Tripoli	12,207	8,130	—
Tunis	94,986	15,143	—
China (exclusive of Hong Kong)	18,584	4,521	—
Japan	15,521	7,118	—
Mexico	20,127	—	2,765
Peru	21,034	14,986	—
Chili	414,157	19,725	—
Brazil	1,091,637	—	3,334
Uruguay	607,875	—	27,401
Argentine Republic	2,267,290	66,565	—
Channel Islands	64 596	9,830	—
Gibraltar	189,568	—	3,034
Malta	253,746	—	17,997
Cape of Good Hope	13,667	—	6,411
Mauritius	17,481	10,470	—
Aden	164,992	23,983	—
British India	66,277	—	7,153
Straits Settlements	13,137	—	3,639
Ceylon	193,438	—	18,260
Hong Kong	23,213	—	11,662
Canada	11,714	1,656	—
West Africa, French	79,910	—	5,742
„ Portuguese	250,314	16,552	—
„ British	74,062	1,024	—

According to a table supplied by the Customs authorities to the *Cardiff Journal of Commerce* the average declared prices per ton of coal exported from the undermentioned ports in October were:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	15	11	15	3	15	2	15	6
Through-and-through	12	6	11	7	10	10	10	3
Small	9	2	10	5	7	10	8	9
Large anthracite	21	5	—		16	10	17	6
Household	13	9	—		15	3	17	6

In October of last year the prices were:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam	15	7	14	6	15	8	14	2
Through-and-through	—		10	0	9	11	9	8
Small	7	9	9	2	6	6	7	8
Large anthracite	22	2	—		18	4	16	6
Household	16	6	—		—		15	9

Shipments of patent fuel last week were heavy, the Crown Company exporting 7,868 and other local makers 11,600 tons, Swansea 17,624 tons, and Newport 3,100 tons, a total altogether of over 37,000 tons. Best brands are firmly quoted at 21s. The Bona Guelma Railways are in the market for 52,000 tons for delivery over the first half of next year. Of the 70,000 tons required by the Austrian navy for delivery up to October next, it is reported that 45,000 tons of Star fuel has been contracted for. Coke continues in strong demand, ordinary foundry being 28s., and special 30s. per ton. Furnace coke is 22s. 6d. to 23s. 6d. Pitwood has gone up to 27s. 6d., an advance on the week of fully 3s.

IRON.

There is very little change to report in the tin-plate trade. Shipments for the week only amounted to 73,629 boxes, being 9,846 boxes less than receipts from works. Stocks are now 199,292 boxes. In the Llanelly district the war has not yet effected any of the works, but a number of mills are still stopped at Morriston. Complaints are made that speculative buyers are very chary in sending in their specifications, and this is causing great difficulty, as the plates produced are in excess of requirements, and are consequently going into stock. Prices are nominally unchanged, but buyers prepared to take prompt delivery have no difficulty in obtaining slight concessions. The demand for steel bars is as strong as ever, and £6 2s. 6d. is being paid for prompt lots. For forward delivery the bulk of the makers quote £6. It is stated that nearly all the steelworks are much behind in their deliveries. The new steelworks in connection with the Duffryn Tin-plate Works, at Morriston, are now practically completed, and it is expected that next week will witness the new steel-bar mill at work. This is expected to turn out about 2,000 tons per week—sufficient to supply the 16 sheet and tin-plate mills, and also allow of some being put on to the market. There is no change in galvanised sheets. Business generally is slow, and though some works ask £12 10s. for 24-gauge corrugateds, others quote £12 5s. to £12 7s. 6d. It is expected that the new Wellfield Galvanising Works will commence operations early in the new year. The agitation by the speltermen for the abolition of Sunday labour still goes on. About 300 men are idle, and if they persist in their demand it is feared that some of the works will have to close, so strong is the competition by German and Belgian makers, who are not handicapped as regards Sunday labour. It has been suggested that the employers should offer the men one day a week each, on condition that they keep the furnaces going on the Sunday. Welsh hæmatite pig iron is steady at 87s. 6d. f.o.t., but best rubio iron ore, owing to the fall in freights, is now obtainable at 22s. per ton. New steel crop ends have been advanced to 72s. 6d.

Swansea.

COAL.

The supply of tonnage was very much reduced last week owing to bad weather, and as a consequence the trade of the port was not so good. The shipments of coal and patent fuel were 96,689 tons. There was a capital attendance on 'Change this morning, and there was a good all-round demand in the anthracite coal market, which displayed a firm tone. The demand for Swansea Valley large was excellent, with values again harder, and the prices for Red Vein large were moving in an upward direction. Machine-made nuts and cobbles were firm, but beans were very slow. Rubbly culm was firmer, and duff was also a better market. In the steam coal department there was much improvement. Bunkers were in brisk demand, and prices were advanced. Other varieties were also firmer. The closing quotations were approximately as follows:—Anthracite: Best malting large (hand-picked), 23s. 6d. to 25s. 6d. net; second quality ditto, 21s. to 22s. 6d. net; Big Vein large, 18s. 6d. to 20s. 6d., less 2½ per cent.; Red Vein large, 15s. 6d. to 16s. 3d., less 2½ per cent.; machine-made cobbles, 21s. 9d. to 23s. 9d.; Paris nuts, 23s. 6d. to 26s. 9d.; French nuts, 23s. 6d. to 27s.; German nuts, 23s. 6d. to 26s. 9d.; beans, 21s. to 23s.; machine-made large peas, 12s. to 14s.; ditto fine peas, 10s. 6d. to 12s., all net; rubbly culm, 6s. to 6s. 9d., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 17s. 6d. to 19s.; seconds, 13s. 9d. to 15s. 6d.; bunkers, 12s. 9d. to 14s. 6d.; small, 9s. 6d. to 10s. 6d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 19s.; through-and-through, 15s. to 15s. 6d.; small, 12s. to 13s. 6d., all less 2½ per cent. Patent fuel, 16s. 6d. to 17s. 6d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

During the past week there was no alteration in the condition of the iron and steel trades, which continued good. The weekly yield of pig iron at the blast furnaces was satisfactory, and the steel trade continued in a flourishing state; the outputs of ingots at most of the works compared very favourably with any week of the past quarter. Nearly all the tin-plate works in the district were kept going The shipments of tin-plates last week were 73,629 boxes, receipts from works 83,475 boxes, and stocks in the dock warehouses and vans 199,292 boxes.

Llanelly.

COAL.

The coal trade of the district is still in a very satisfactory position, and nearly all kinds have a strong demand, with every prospect of increased firmness. The market has been considerably helped by the better supply of tonnage, and the difficulties arising from shortage of wagons have been overcome. There seems to be a big run on steam coals, and a number of the collieries are oversold for months to come. Bunkers are again getting higher, and during the past few weeks have advanced quite 2s. per ton. For contracts over next year an increase of 1s. per ton is asked. House coals too are going very strong, and prices from the commencement of this month have gone up another 2s. per ton. Anthracite is about the same as last week, the only kinds showing any easiness being beans and peas. Large, cobbles, nuts, rubbly culm and duff are all moving well. Prices this week are:—Best malting large, 23s. to 25s.; second quality ditto, 21s. to 22s. 6d.; Big Vein large, 17s. 6d. to 19s. 6d.; Red Vein large, 15s. to 15s. 6d.; machine-made cobbles, 21s. to 22s.; German nuts, French and Paris nuts, 24s. 6d. to 25s. 6d.; machine-made beans, 22s. 6d. to 23s.; machine-made peas, 12s. 6d. to 13s.; culm, 6s. to 6s. 6d.; duff, 4s. 6d. to 5s. 6d.; large steam, 16s. to 16s. 6d.; through-and-through, 12s. to 13s.; small steam, 9s. 6d. to 10s. 6d.; bituminous small, 11s. to 11s. 6d.—all f.o.b.

Partnerships Dissolved.—The *London Gazette* announces the dissolution of the following partnerships:—S. C. Bruton and J. Lloyd, carrying on business as engineers at Vyse-street and Constitution Hill, Birmingham, under the style of Bruton and Lloyd; A. Shaw and J. Murchie, carrying on business as engineers at Chesterfield-street, Nottingham, under the style of Shaw and Murchie; A. H. Lea and J. B. Bent, carrying on business as electrical and general engineers, at Kettering, under the style of Lea and Warren; G. Acton, J. Acton and H. Acton, carrying on business as brick and pipe makers, at Cawthorne, near Barnsley, under the style of J. Acton and Sons; G. Christmas and E. R. Thomas, carrying on business as coal merchants, under the firm of the Cynon Coal Company, at the Upper Taff Vale Coal Yard, Aberdare; F. Parkin and T. W. Newbold, carrying on business as civil engineers, architects and surveyors, under the style of Parkin and Newbold at Nottingham, and Newbold and Parkin at Sheffield.

INTELLIGENCE.

OURT OF JUSTICE.

I DIVISION.—November 27.

Justice SWINFEN EADY.

r and his Legal Expenses.

is was an action on the part of a
ckshire Miners' Association against
e and trustees thereof for a declara-
ts of £511 19s. 4d. and £437 7s. 8d.
of the association to Mr. Pownall, a
in July 1908, by the direction of the
ments were made in settlement of
for costs in two actions of slander
hnson and Davis, two of the then
tion, against one McNicholas, were
r repayment. By their defence the
the slanders constituted an attack
tiffs in the said actions, but upon the
d responsible officers of the associa-
resolved that the association should
the payments were duly made in
lutions.
Eady, in the course of his judgment,
Act of 1871, as was pointed out by
the York Miners' Association v.
2), "requires that the rules of every
hall contain provisions in respect of
ntioned in the first schedule to the
tors are included 'the whole of the
ade union is established' and 'the
e funds thereof are applicable.'"
the rules, he says, "It is therefore
he association to apply its funds or
purpose not authorised by its rules."
f the rules in this case the whole of
plied for carrying out the objects
was not contended that these costs,
re brought by officers, were within
was said that the actions were for
iation, and it would be taking too
t it was not a proper application.
provision of the law against main-
assist another in the conduct of
such person had a common interest
e brought within the established
t contended here. The association
shed from a sentimental interest in
If any damages were recovered
personally or for the benefit of the
be trustees thereof on behalf of the
ants in terms said they did not see
the matter so high that really
; but it was urged that really
r the benefit of the association. So
statements were spread broadcast
aving or omitting to pay subscrip-
d have come to an end. Although
t of the actions really was in a way
d of him, that was not a matter
entitled to take into account in
could pay the costs of the actions
t payments made by officers of the
ds to cover costs of these two libel
and beyond the powers of the
d and seventy-four pounds was
o the solicitor, and the plaintiff
ed with judgment against Johnson
l by the treasurer to him. They
ation in his hands and applied by
ts, which was not an object of the
a declaration as against all the
nents of £775 7s. and £174 were
. Then there would be an order
the £775 7s. with interest at 4 per
ch payment. He must also pay
The other defendants must bear
were paid into court within seven
cation, execution might be stayed.

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ember 28

EY and Mr. Justice SCRUTTON.

ll Contract.

ark Coal Company.—This was an
Deputy-Judge Alexander's judg-
County Court.
t by Messrs. Usher and Co. for
ver 300 tons of hard coal, part of
Plaintiffs had taken all the 3,000
hich was the last delivery to be
e of the contract was that which
r should, a reasonable time before
e a "stemming" notice of the
ime allowed for loading of each
imes so notified should be subject
writing by the vendors, all dates
g dates; and that if the vessels
the spout for delivery within
vendors might treat the delivery
had given notice of a ship called the "Hermes," but it was not ready, so lighters were sent, but the respondents refused to deliver into these. The coal had been sold to others, who sold it to a firm called Lutze. It appeared on the evidence before the judge that objection was taken to Lutze having the coal because they were a local firm, and the judge held that on the evidence of the plaintiff there was no case made out. Counsel now submitted there was nothing whatever in the contract which allowed the vendors to take up the attitude they had done.

Their lordships, without calling on the other side, dismissed the appeal, with costs.

December 3.

Before Mr. Justice PHILLIMORE.

Mineral Rights Duty: Form 5.

Lord Mowbray v. the Attorney-General.—This was an action by Lord Mowbray against the Attorney-General as representing the Inland Revenue Commissioners with respect to Form 5, issued by them under section 20 of the Finance Act, 1910. The statement of claim alleged that the plaintiff was at all material dates receiving rents in respect of a coalmine situate at Lofthouse, near Wakefield, in Yorkshire, and comprised in a mining lease; that on or about December 7, 1910, the plaintiff received through the post a notice and (or) a form designated as "Mineral Rights Duty, Form 5, Land." The plaintiff pleaded that the notice and (or) form was illegal, unauthorised and *ultra vires*, and in particular that the Commissioners were not authorised by section 20 of or otherwise by the Act, and had no power to require the plaintiff to give the information or supply the particulars required by the notice or form; and he claimed a declaration to that effect. Counsel for the plaintiff stated that it had been agreed between the parties that judgment should be entered for the plaintiff without costs with a declaration. Mr. Austen-Cartmell, who appeared for the Attorney General, stated that the Commissioners were of opinion that Form 5 could not be supported, and consented to the agreed order being made which followed the form of the order and declaration that was made in Dyson *v.* the Attorney-General ([1912] 1 Ch. 159).

Mr. Justice Phillimore directed that judgment should be entered for the plaintiff accordingly.

RAILWAY AND CANAL COMMISSION.—December 3.

Before Mr. Justice LAWRENCE, Mr. A. E. GATHORNE-HARDY, and Sir JAMES WOODHOUSE

Undue Preference: Disclosure of Particulars

Clayton and Shuttleworth Limited and Others v. Great Central Railway and Others.—This was a summons applying for discovery and for leave to administer interrogatories in an application to have certain rates declared an undue preference. The summons had been referred to the Court by the Registrar. The applicants were traders who manufactured machinery at Lincoln and sent large quantities of such machinery for shipment to Grimsby, Hull, and Goole. There were other manufacturers at Gainsborough who carried on a similar business and also consigned machinery for shipment to the same ports. The applicants contended that the rates themselves as they stood in the books showed an undue preference favouring Gainsborough at the expense of Lincoln. The railway companies denied that there there was any undue preference, and said that it the Gainsborough rates were lower in proportion it was owing to the existence of water competition at Gainsborough; and they said that the rates charged were necessary in the interests of the public The summons asked for particulars showing how the interests of the public were secured by the rates complained of. It also asked for discovery of communications which had passed between the defendant railway companies as to the fixing of the rates, and of complaints made by the applicants with regard to the rates. And it asked for leave to administer interrogatories enquiring whether Gainsborough traders had not from time to time before the application sent goods of the kind mentioned to the said ports over the lines of the defendants, and whether the rates charged to the Gainsborough traders in respect of such consignments were not the rates now complained of. The Registrar had felt a difficulty about deciding the summons on account of the decision in the General Electric Company *v.* Great Western Railway, decided in the Court of Appeal on February 26, 1912.

Mr. Justice Lawrence said they could not distinguish the application from that in the General Electric Company case. The applicants could not put on the railway companies the duty to search their documents to find out a case for the applicants. The rest of the summons would be granted, but the interrogatories would not be allowed until the application had been amended to show the case the applicants relied on as showing undue preference.

NEWCASTLE ASSIZES.—November 8

Before Mr. Justice PICKFORD.

Herd v. The Weardale Steel, Coal and Coke Company Limited and Others.—At the West Riding Assizes, at Leeds, on Saturday, Mr. Justice Pickford delivered judgment in this case, in which John Thomas Herd, a hewer at Thornley Colliery, county Durham, sued the Weardale Steel, Coal and Coke Company Limited, the owners, or, alternatively, George Alexander Curry, the manager, and James Turner the overman, for damages for alleged wrongful imprisonment. There was no material dispute as to the facts. The question was raised by the Durham Miners' Association as a test question, as to whether or not colliery proprietors were entitled to keep men forcibly down the pit while the men, according to the masters, had broken their contracts. On May 30, 1911, the plaintiff descended the pit with the intention of working. He was one of a shift, and, according to the practice, received his lamp and directions as to working from the deputy overman. The plaintiff and two others were ordered to work under conditions which they contended were a breach of an agreement entered into between the lodge officials and the colliery manager. They refused to work, and left for the shaft bottom and asked to be allowed to ascend. This was at 11.15 a.m., and the shift was to end at 4 p.m. Other men left their work, in sympathy. The plaintiff was not allowed to ascend although a cage was available, and was detained in the mine for two hours, this detention constituting the alleged wrongful imprisonment. The defendants denied imprisonment, and alleged that the plaintiff had broken his contract. They said they provided a cage to take him to the surface at the proper time. The masters had, in a petty sessional court, obtained damages from the men for breach of contract.

His lordship, in delivering judgment, said there was no doubt that there was a *bona fide* dispute as to the conditions of the work and as to their being entitled to refuse to do the work. On several occasions the cage came down in circumstances in which the question was whether the plaintiff was entitled to use it for the purpose of going to the surface, and whether the defendants had a right to require him to remain in the mine. There was quite sufficient evidence technically to establish the charge of slight "imprisonment" if he had a right to go up. He (his lordship) had been inclined to think at first that the men had a claim to leave at any time if they wished to have the cage sent down for them. But he did not understand that to have been the argument, and he was not prepared to accept such a proposition. But these were not the circumstances in which the plaintiff on the day in question would have been entitled to use the cage and leave the mine. It was said the defendants were entitled to retain him in the mine to the end of the shift whether he wished to remain or not, practically to enforce his performance of the contract into which he had entered, and not to leave the mine until the contract had expired. He (his lordship) did not think that the defendants could maintain that proposition. He was not at all prepared to hold it was not correct to say, that if miners went down a pit for the purpose of working it and then they—even wrongfully—declined to work, the mineowner was entitled to retain them against their will until the end of the shift came, although the cage might have been in the mine and going to the surface under circumstances in which they were entitled to use it. He thought this detention could not be justified; it could only be justified if the defendants could maintain their large proposition, and this he thought they could not do. Some argument had been founded on the proceedings taken at petty sessions, and the defendants recovering damages from the plaintiff, and other men for breach of contract. He, however, did not see that could have any bearing upon the question which he was now to decide. Under the circumstances judgment must be for the plaintiff, but with only nominal damages. He must have 20s. and costs.

Judgment for plaintiff, with costs, was accordingly entered.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Rosy Prospects of Trade: Higher Prices and Lower Freights; "Boomlet" in Colliery Shares—Development in By-Products Manufacture: Motor-Spirit to Compete with Foreign Petrol "Ring" "Nursing" Tips: Renewed Controversy—Anthracite Colliers' Secession from Federation—"Moral Suasion" against Non-Unionists—Interesting Legal Point upon Rating of Coal Washeries—The Growing Cost of Pitwood—Pithead Baths: Active Propagandum—Best Steam Coal at 6s. 6d. per Ton.

The feature of the day—and it is most striking in its pronounced character—is the advance in coal prices, and the full agreement that prospects in every direction are of the most favourable nature. A double advantage has to be recorded. Whilst coal prices are higher, rates of freight are lower. In the share market a considerable advance in values commenced on Monday, and anticipations are general as to further material increases in quotations. Shares of all classes participated in the rise, the securities of companies in iron manufacture coming in for equal attention with those which deal in coal alone.

Special effort is being made by certain undertakings, as was pointed out last week, to develop the by-products trade, particularly in the way of producing benzol or some more refined form of motor spirit, the monopoly "squeeze" in the petrol market and the prospect of still further fleecing the consumer, having induced colliery proprietors to devote greater attention unrecoupable, and that was to the persons engaged in the collieries. It might be within the mark to put it twice as large, and that loss went on spreading itself all over the country. As to Blackhall Colliery, they hoped that in another year's time they would have it equipped and ready to draw coals, and so add to their revenue. They had spent £190,000 over the colliery, and in two more years they would spend another £100,000, thus almost fulfilling their estimate, which was £300,000. Such risks as they incurred in the sinking were now at an end, and they might look forward with some degree of certainty to the completion of their enterprise there without further drawbacks.

The rates of payment from the relief fund to the dependants of those who met their deaths in the Cadeby Colliery disaster on July 9 last, have been finally decided by the administrative committee. Over £9,000 was raised by public subscription, and it was hoped that the money due to the dependants under the Workmen's Compensation Act would also be handed over to the committee to be administered by them in conjunction with the fund, but the county court judge expressed a doubt as to whether he had power to make an order to this effect. The amount now stands at a little over £8,000. The committee are of opinion that a rate of interest of at least £3 12s. 6d. per cent. per annum can be readily obtained from investments in trustee securities. Further, the committee felt that a larger weekly payment for a limited period of years until the fund is exhausted would be more useful than a small life allowance. They have, therefore, decided that the respective amounts be 5s. per week for each widow, and 1s. per week for each child under 14 years of age. The new rates came into operation on Friday last. There are 60 widows and 132 children under 14 years to provide for.

At the annual meeting of the Wemyss Coal Company, Mr. John Gemmel, the chairman, said recent legislation had added considerably to the cost of production. During the past year considerable progress had been made in connection with the developments in the new field at Wellesley Colliery, and an additional Baum washer had been introduced. Extra hands would be required in connection with the new colliery, and to accommodate the influx new houses were to be built at Denbeath.

An interesting electrification scheme is shortly to be commenced at the Ryhope Colliery of the Ryhope Coal Company Limited, Sunderland. The contract includes the conversion of the north pit haulage from steam to electrical drive and the supply and fixing of a three-throw pump with motor. The power will be three-phase at a pressure of 2,750 and at a periodicity of 40 cycles per second. The British Westinghouse Electric and Manufacturing Company Limited have the whole contract, but the pump will be supplied by the Ueksida Engineering Company Limited. In addition to the foregoing, an order has just recently been placed for the west pit haulage, which is an exact duplicate of that of the north pit, and both these installations are to be completed by Easter. The north pit haulage will be a 250-horse power continuously-rated motor working up to 400-horse power on the gradients and driving through central reduction machine-cut helical gearing running through oil. The pump will be capable of delivering 300 gallons per minute against a head of 1,870 ft. The motor generator will be of 75 kw. and drive d.c. screens, motors and lighting. The current will be taken from the County of Durham Electrical Power Distribution Company, at 2,750 volts and used at that throughout. This installation will be one of the first in Durham and Northumberland coalfields to be carried out under the new Home Office rules. The cables and switches are of the Westinghouse cast iron draw-out type with switchgear. The haulage at the south pit at Ryhope is also to be converted at Whitsuntide, and tenders for this work are now being considered and the order is expected to be very shortly placed. This haulage will be of 350-horse power and worked up to 600-horse power on the gradients. All of the haulages at Ryhope are at present being worked by steam from underground boilers, for which it has been necessary to take coke down the shaft, and considerable economies in working costs are expected to result from the electrification. The scheme is being carried out to the designs and under the direction of Messrs. Hodgkin and Young, of Darlington, acting as the consulting electrical engineers of the Ryhope Coal Company.

Sir John Storey Barwick, the deputy chairman, not seeing his way to succeed the late Lord Furness as chairman of the Cargo Fleet Iron Company Limited, the directors have unanimously elected Mr. John Edwin Rogerson, of Mount Oswald, Durham, as chairman of the board of directors. Mr Rogerson, who has long taken a leading part in the affairs of the company, is eminently qualified for this position and will command the same cordial support of his colleagues as the late chairman. Mr. George Short Barwick, of Thimbleby Hall, Northallerton, has been elected to the board to fill the vacancy caused by the death of the late Lord Furness.

The works and assets of Messrs. Meldrum Brothers Limited (in liquidation), at Timperley, together with the goodwill, have been transferred to a new company, formed for the purpose, which will continue the business under the style of Meldrums Limited, of which company Mr. John W. Meldrum, who has been manager during the liquidation, will be the managing director.

Mr. J. T. Lowry, chief surveyor to the Whitehaven Colliery Company, has been appointed to a similar position under the Cramlington Colliery Company, Northumberland. Mr. Lowry, who is a son of Mr. R. Lowry, Cleator Moor, served his time under the Whitehaven Colliery Company, on the completion of which he was appointed assistant surveyor, and for the past two years he has held his present position.

Mr. Barber, who, for some time past has been the chief electrician at the Bentley Colliery, Doncaster, has been the recipient of a gold watch from the officials and employees of the colliery, upon his resignation of the position, in order to accept a post in India in connection with the construction of a railway in that country.

Mr. H J. Brennan, who for 15 years has been the manager of the Thirsk (Yorks) town station coal depots, upon leaving Thirsk to take up a position in Middlesbrough, has been the recipient of a mark of appreciation from his friends.

Important extensions are reported as being in preparation in the Cramlington district (Northumberland), where the Cramlington Coal Company Limited have obtained a renewal of their lease from Mr. Thomas Taylor, of Chipchase Castle. The company have commenced boring operations a short distance from the West Cramlington main road, and in connection with the Wrightson pit. It is hoped to prove the Brockwell and Beaumont seams here. If the operations prove successful the company propose to sink a new shaft at the spot, ultimately to take the place of the present Wrightson pit shaft, which is very old and inadequate to cope with any large increase in output.

Mr. Bacon, formerly United States Ambassador to France has been elected a director of the United States Steel Corporation, in succession to the late Mr. Griscom.

At the annual meeting of the Hull Chamber of Commerce and Shipping last week, Mr. T. R Ferens, M.P., in a letter apologising for absence, said the great scheme for the commerce of Hull was one for tunnelling the Humber, which he regarded as even more necessary than when it was broached 30 years ago, because of the development of the coal and iron industry. Mr. E. Bolton, who presided, said Hull had shared in the general prosperity of the kingdom, and in the last nine months the dock dues had been paid on over five million tons, an increase of nearly a quarter of a million tons on the corresponding period of last year. It was expected that the new joint dock would be opened shortly. The proposal for a direct line between Hull and South Africa was making good progress. Mr. Oswald Sanderson said that coastwise owners would raise their freights as a result of the increased charges through the Pilotage Bill.

Mr Stanley Soulsby, who served his apprenticeship and for the last three years has been assistant surveyor at the Brayton Domain Collieries under Mr. G H. Askew, has been appointed surveyor at the Douglas Bank Collieries, Wigan. On Friday evening, in the No. 4 pit office, Mr. Stoddart, engineer, on behalf of the staff and officials, presented Mr. Soulsby with a suit case.

COAL, IRON AND ENGINEERING COMPANIES.

Booth (F C.) and Co. Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of tin-plate workers, founders, &c. Registered office, 110, Edmund-street, Birmingham.

Bristol Carriage and Wagon Company Limited.—An interim dividend of 2 per cent., free of tax, has been declared.

Brown Brothers and Co. Limited.—The directors have decided to defer consideration of the payment of the half-year's dividend on the preference shares due on December 1 until after the company's accounts for the year have been made up and audited.

Carlton Main Colliery Company Limited.—The directors have declared an interim dividend of 5 per cent. on the ordinary shares.

Cory (William) and Son Limited.—The directors announce that the warrants in respect of the interim dividend of 4s. per share, less tax, on the ordinary shares payable December 2, have been posted.

D P. Y. Syndicate Limited.—This private company has been registered, with a capital of £500 in £1 shares, to carry on the business of dealers in coal, metals, minerals, &c. Registered office, 18, Grainger-street West, Newcastle-on-Tyne.

Durban Navigation Collieries Limited.—This company has been registered, with a capital of £200,000 in 4s shares, to carry on the business of coal and iron masters, smelters, &c., and to adopt an agreement with the Durban Navigation Collieries Limited (incorporated in 1903) and the liquidator thereof. Minimum cash subscription, seven shares. First directors, F. E Dixon, F. W. Lund and E. W. Janson. Qualification (except first directors), 250 shares. Remuneration, £100 each per annum (chairman £150) and a percentage of the profits

East Kent Light Railways Company Limited.—The first general meeting was held at Dover on the 27th ult., Mr. Arthur Burr presiding. The chairman stated that three orders had been obtained from the Commissioners for lines—from Shepherdswell to Sandwich, 9¾ miles, from Eastry to Wingham and Stodmarsh, 9½ miles, from Eythorne to Maydensole, *vià* Guilford, 4¾ miles; whilst one for a line from Tilmanstone to Mongeham and Ripple, 5¼ miles, was pending. There would also be a small branch from Eastry to Hammill, ¼ mile in length. He gave estimates showing a net profit of £70,000 on the capital of £30,000. Mr. Burr afterwards gave particulars in regard to the various sinkings. At Snowdown, he said, they were 54 ft. from the Beresford seam, the shafts being 1,391 ft. down. They now knew that these coals were of later formation than the coals at the Barfreston boring, and dipped to the west, in which direction most of their mining operations would take place. At Tilmanstone they hoped to find a good workable seam before Christmas. At Guilford they were down to the top of the greensands, and had found even less water than at Snowdown. At Wingham, the surface equipment was complete, and they expected to reach the coal at the end of next year. Goodnestone was about three months behind Wingham. He counted on having two collieries in full swing by the end of 1913, and a third colliery yielding 600 or 700 tons a day, and early in the following year two more collieries. Mr. Burr said he was now engaged in finding money for two more collieries.

Hall (J. and E.) Limited—Dividend of 7½ per cent. and a bonus of 2s. per share (together 3s. 6d. per share) on the ordinary shares, making 20 per cent. for the year, £7,500 to reserve, £5,000 to dividend equalisation fund, £15,000 written off goodwill and patents and £9,836 carried forward.

Hayhurst and Higginson Company Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to take over the business of engineers and machinery merchants, &c., carried on by J. H. Hayhurst and T. Higginson at Blackburn as Hayhurst and Higginson.

Hydorabad (Deccan) Company Limited.—The report states that the output for the first half of 1912 was 15,915 tons behind that of the corresponding period of 1911, but the output during the latter half of the year, up to the beginning of November, showed only a decrease of 1,492 tons. In Hyderabad City and neighbourhood the plague has been severe. This fact necessitated precautionary measures at Singareni to prevent the introduction of plague into the collieries, which has so far on the whole been successful, but have naturally resulted in a reduction in the output. Owing to the strikes in England earlier in the year, considerable delay has been experienced in getting delivery of plant, machinery and stores on order. Possibly this cause has also contributed to the decrease. The working costs per ton during 1912 so far show a slight reduction, but this may not be maintained The new incline, Rampaid No. 1, has been driven into the coal, and some 200 tons per week are now being raised. The colliery is being equipped with electrical plant which is driven from the central power plant. The whole of the output for 1913 has been sold forward. Boring is in operation at Allapully, a coalfield to the north of Singareni. An interim dividend of 1s. 6d. per share, free of income-tax, has been declared.

Power Gas Corporation Limited.—Dividend of 4 per cent., less tax, on the ordinary shares. A year ago the dividend was at the same rate.

Ross (Charles) Limited.—This private company has been registered, with a capital of £20,000 in £1 shares, to take over the business of engineers, &c., carried on by C. Ross and G. Ross at Heeley Bridge Foundry, Sheffield, and elsewhere, as Charles Ross. First directors, C. Ross and G. Ross (both permanent).

Skinner and Holford Limited.—Final dividend of 17s. per £7 share, making, with the interim dividend, 21s. per share for the year.

Spencer (John) and Sons Limited.—At a special meeting of shareholders on Friday, it was decided to create 40,000 new 6 per cent. cumulative preference shares of £10 each. The primary object of this, it was stated, is not to increase the share capital, but to pay off the £250,000 mortgage debentures as they fall due.

Storcophagus Pump and Engineering Company Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of engineers, contractors, &c., and to adopt an agreement with the Hon. Richard C. Parsons. Registered office, 39, Victoria-street, S.W.

Tredegar Iron and Coal Company Limited.—The directors have resolved to pay an interim dividend of 4 per cent. (free of income tax), being at the rate of 8 per cent. per annum on the A and B shares for the half-year ended September 30, 1912

Tyzack (Samuel) and Co. Limited—The report states that the sales amounted to £100,285, as compared with £78,060 in the previous year. The profits for the year amount to £7,526, from which has been written off the usual depreciation of £5 per cent. on motive power, plant, machinery and loose tools, amounting to £1,055, leaving £6,471. With £321 brought forward there is £6,793. The directors propose to pay a dividend of 10 per cent., leaving £2,293 to be carried forward.

United Wire Works Limited.—The accounts for the year ended September 30 show an available sum of £7,446, out of which the directors recommend a dividend of 3 per cent., leaving £837 to be carried forward.

Wemyss Coal Company Limited.—Dividend on the ordinary shares of 20 per cent.

Wheatman and Smith Limited—The report shows a net loss of £24 There is, therefore, no dividend, and the balance from last year, £278, is carried forward.

Whitehaven Hæmatite Iron and Steel Company Limited.—Mr. Justice Warrington, in the Chancery Division on Tuesday, sanctioned the reduction of the capital of the company from £140,000, divided into 100,000 ordinary shares of £1 and 40,000 preference shares of £1, to £89,050, divided into 40,000 preference shares of £1 and 98,100 ordinary shares of 10s. each. The reduction was to be effected by cancelling 1,900 ordinary shares of £1 which had not been issued, by cancelling paid-up capital which had been lost or was unrepresented by available assets to the extent of 10s. in respect of each of the remaining ordinary shares, and by reducing the nominal amount of the latter from £1 to 10s.

Wright (John and Edwin) Limited—The report for the year ended September states that the balance of the revenue account, after adding £4,793 brought forward and deducting the interim dividend (£1 177) paid on the preference shares for the half-year, is £12,024 The directors propose to pay a dividend on the ordinary shares of 10 per cent. per annum, free of income-tax, £5 000, to add to the reserve fund, £1,000; and carry forward, £4,817.

Young (Thos. E.) and Co. Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to take over the business of coal merchants, &c., carried on at Newcastle-on-Tyne and Monkseaton, as Thos. E. Young.

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ction with the fund, but the county
doubt as to whether he had power
effect. The amount now stands at
he committee are of opinion that a
st £3 12s. 6d. per cent. per annum
d from investments in trustee
committee felt that a larger weekly
period of years until the fund is
useful than a small life allowance.
ided that the respective amounts
widow, and 1s. per week for each
f age. The new rates came into
. There are 60 widows and 132
o provide for.

g of the Wemyss Coal Company,
chairman, said recent legislation
o the cost of production. During
ble progress had been made in
elopments in the new field at
an additional Bawn waseer had
hands would be required in
colliery, and to accommodate the
he built at Denbeath.

ication scheme is shortly to be
pe Colliery of the Ryhope Coal
land. The contract includes the
t haulage from steam to electrical
ixing of a three-throw pump with
be three-phase at a pressure of
y of 40 cycles per second. The
tric and Manufacturing Company
contract, but the pump will be
Engineering Company Limited.
ing, an order has just recently
pit haulage, which is an exact
orth pit, and both these installa-
d by Easter. The north pit
power continuously-rated motor
wer on the gradients and driving
n machine-cut helical gearing
pump will be capable of deliver-
against a head of 1,870 ft. The
f 75 kw. and drive d.c. screens,
current will be taken from the
al Power Distribution Company,
that throughout. This installa-
in Durham and Northumberland
under the new Home Office rules.
e of the Westinghouse cast iron
ear. The haulage at the south
e converted at Whitsuntide, and
now being considered and the
y shortly placed. This haulage
r and worked up to 600-horse
All of the haulages at Ryhope
d by steam from underground
en necessary to take coke down
economies in working costs are
electrification. The scheme is
igns and under the direction of
g, of Darlington, acting as the
rs of the Ryhope Coal Company.

k, the deputy chairman, not
e late Lord Furness as chairman
ompany Limited, the directors
Mr. John Edwin Rogerson, of
s chairman of the board of
o has long taken a leading part
, is eminently qualified for this
he same cordial support of his
an. Mr. George Short Barwick,
erton, has been elected to the
used by the death of the late

ssrs. Meldrum Brothers Limited
y, together with the goodwill,
new company, formed for the
the business under the style
hich company Mr. John W.
nager during the liquidation,
r.

Mr. J. T. Lowry, chief surveyor to the Whitehaven Colliery Company, has been appointed to a similar position under the Cramlington Colliery Company, Northumberland, Mr. Lowry, who is a son of Mr. R. Lowry, Cleator Moor, served his time under the Whitehaven Colliery Company, on the completion of which he was appointed assistant surveyor, and for the past two years he has held his present position.

Mr. Barber, who, for some time past has been the chief electrician at the Bentley Colliery, Doncaster, has been the recipient of a gold watch from the officials and employees of the colliery, upon his resignation of the position, in order to accept a post in India in connection with the construction of a railway in that country.

Mr. H J. Brennan, who for 15 years has been the manager of the Thirsk (Yorks) town station coal depots, upon leaving Thirsk to take up a position in Middlesbrough, has been the recipient of a mark of appreciation from his friends.

Important extensions are reported as being in preparation in the Cramlington district (Northumberland), where the Cramlington Coal Company Limited have obtained a renewal of their lease from Mr. Thomas Taylor, of Chipchase Castle. The company have commenced boring operations a short distance from the West Cramlington main road, and in connection with the Wrightson pit. It is hoped to prove the Brockwell and Beaumont seams here. If the operations prove successful the company propose to sink a new shaft at the spot, ultimately to take the place of the present Wrightson pit shaft, which is very old and inadequate to cope with any large increase in output.

Mr. Bacon, formerly United States Ambassador to France has been elected a director of the United States Steel Corporation, in succession to the late Mr. Griscom.

At the annual meeting of the Hull Chamber of Commerce and Shipping last week, Mr. T. R Ferens, M.P., in a letter apologising for absence, said the great scheme for the commerce of Hull was one for tunnelling the Humber, which he regarded as even more necessary than when it was broached 30 years ago, because of the development of the coal and iron industry. Mr. E. Bolton, who presided, said Hull had shared in the general prosperity of the kingdom, and in the last nine months the dock dues had been paid on over five million tons, an increase of nearly a quarter of a million tons on the corresponding period of last year. It was expected that the new joint dock would be opened shortly. The proposal for a direct line between Hull and South Africa was making good progress. Mr. Oswald Sanderson said that coastwise owners would raise their freights as a result of the increased charges through the Pilotage Bill.

Mr Stanley Soulsby, who served his apprenticeship and for the last three years has been assistant surveyor at the Brayton Domain Collieries under Mr. G H. Askew, has been appointed surveyor at the Douglas Bank Collieries, Wigan. On Friday evening, in the No. 4 pit office, Mr. Stoddart, engineer, on behalf of the staff and officials, presented Mr. Soulsby with a suit case.

COAL, IRON AND ENGINEERING COMPANIES.

Booth (F. C.) and Co. Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of tin-plate workers, founders, &c. Registered office, 110, Edmund-street, Birmingham.

Bristol Carriage and Wagon Company Limited.—An interim dividend of 2 per cent., free of tax, has been declared.

Brown Brothers and Co. Limited.—The directors have decided to defer consideration of the payment of the half-year's dividend on the preference shares due on December 1 until after the company's accounts for the year have been made up and audited.

Carlton Main Colliery Company Limited.—The directors have declared an interim dividend of 5 per cent. on the ordinary shares.

Cory (William) and Son Limited.—The directors announce that the warrants in respect of the interim dividend of 4s. per share, less tax, on the ordinary shares payable December 2, have been posted.

D P. Y. Syndicate Limited.—This private company has been registered, with a capital of £500 in £1 shares, to carry on the business of dealers in coal, metals, minerals, &c. Registered office, 18, Grainger-street West, Newcastle-on-Tyne.

Durban Navigation Collieries Limited.—This company has been registered, with a capital of £200,000 in 4s shares, to carry on the business of coal and iron masters, smelters, &c., and to adopt an agreement with the Durban Navigation Collieries Limited (incorporated in 1903) and the liquidator thereof. Minimum cash subscription, seven shares. First directors, F. E Dixon, F. W. Lund and E. W. Janson. Qualification (except first directors), 250 shares. Remuneration, £100 each per annum (chairman £150) and a percentage of the profits.

East Kent Light Railways Company Limited.—The first general meeting was held at Dover on the 27th ult., Mr. Arthur Burr presiding. The chairman stated that three orders had been obtained from the Commissioners for lines—from Shepherdswell to Sandwich, 9¾ miles, from Eastry to Wingham and Stodmarsh, 9¼ miles, from Eythorne to Maydensole, *via* Guilford, 4¾ miles; whilst one for a line from Tilmanstone to Mongeham and Ripple, 5¼ miles, was pending. There would also be a small branch from Eastry to Hammill, ½ mile in length. He gave estimates showing a net profit of £70,000 on the capital of £30,000. Mr. Burr afterwards gave particulars in regard to the various sinkings. At Snowdown, he said, they were 54 ft. from the Beresford seam, the shafts being 1,391 ft. down. They now knew that these coals were of later formation than the coals at the Barfreston boring, and dipped to the west, in which direction most of their mining operations would take place. At Tilmanstone they hoped to find a good workable seam before Christmas. At Guilford they were down to the top of the greensands, and had found even less water than at Snowdown. At Wingham, the surface equipment was complete, and they expected to reach the coal at the end of next year. Goodnestone was about three months behind Wingham. He counted on having two collieries in full swing by the end of 1913, and a third colliery yielding 600 or 700 tons a day, and early in the following year two more collieries. Mr. Burr said he was now engaged in finding money for two more collieries.

Hall (J. and E.) Limited.—Dividend of 7½ per cent. and a bonus of 2s. per share (together 3s. 6d. per share) on the ordinary shares, making 20 per cent. for the year, £7,500 to reserve, £5,000 to dividend equalisation fund, £15,000 written off goodwill and patents and £9,836 carried forward.

Hayhurst and Higginson Company Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to take over the business of engineers and machinery merchants, &c., carried on by J. H. Hayhurst and T. Higginson at Blackburn as Hayhurst and Higginson.

Hyderabad (Deccan) Company Limited.—The report states that the output for the first half of 1912 was 15,915 tons behind that of the corresponding period of 1911, but the output during the latter half of the year, up to the beginning of November, showed only a decrease of 1,492 tons. In Hyderabad City and neighbourhood the plague has been severe. This fact necessitated precautionary measures at Singareni to prevent the introduction of plague into the collieries, which has so far on the whole been successful, but have naturally resulted in a reduction in the output. Owing to the strikes in England earlier in the year, considerable delay has been experienced in getting delivery of plant, machinery and stores on order. Possibly this cause has also contributed to the decrease. The working costs per ton during 1912 so far show a slight reduction, but this may not be maintained. The new incline, Rampaid No. 1, has been driven into the coal, and some 200 tons per week are now being raised. The colliery is being equipped with electrical plant which is driven from the central power plant. The whole of the output for 1913 has been sold forward. Boring is in operation at Allapully, a coalfield to the north of Singareni. An interim dividend of 1s. 6d. per share, free of income-tax, has been declared.

Power Gas Corporation Limited.—Dividend of 4 per cent., less tax, on the ordinary shares. A year ago the dividend was at the same rate.

Ross (Charles) Limited.—This private company has been registered, with a capital of £20,000 in £1 shares, to take over the business of engineers, &c., carried on by C. Ross and G. Ross at Heeley Bridge Foundry, Sheffield, and elsewhere, as Charles Ross. First directors, C. Ross and G. Ross (both permanent).

Skinner and Holford Limited.—Final dividend of 17s. per £7 share, making, with the interim dividend, 21s. per share for the year.

Spencer (John) and Sons Limited.—At a special meeting of shareholders on Friday, it was decided to create 40,000 new 6 per cent. cumulative preference shares of £10 each. The primary object of this, it was stated, is not to increase the share capital, but to pay off the £250,000 mortgage debentures as they fall due.

Stereophagus Pump and Engineering Company Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of engineers, contractors, &c., and to adopt an agreement with the Hon. Richard C. Parsons. Registered office, 39, Victoria-street, S.W.

Tredegar Iron and Coal Company Limited.—The directors have resolved to pay an interim dividend of 4 per cent. (free of income tax), being at the rate of 8 per cent. per annum on the A and B shares for the half-year ended September 30, 1912.

Tyzack (Samuel) and Co. Limited.—The report states that the sales amounted to £100,285, as compared with £76,060 in the previous year. The profits for the year amount to £7,526, from which has been written off the usual depreciation of £5 per cent. on motive power, plant, machinery and loose tools, amounting to £1,055, leaving £6,471. With £321 brought forward there is £6,793. The directors propose to pay a dividend of 10 per cent., leaving £2,293 to be carried forward.

United Wire Works Limited.—The accounts for the year ended September 30 show an available sum of £7,446, out of which the directors recommend a dividend of 3 per cent., leaving £837 to be carried forward.

Wemyss Coal Company Limited.—Dividend on the ordinary shares of 20 per cent.

Wheatman and Smith Limited.—The report shows a net loss of £24. There is, therefore, no dividend, and the balance from last year, £278, is carried forward.

Whitehaven Hæmatite Iron and Steel Company Limited.—Mr. Justice Warrington, in the Chancery Division on Tuesday, sanctioned the reduction of the capital of the company from £140,000, divided into 100,000 ordinary shares of £1 and 40,000 preference shares of £1, to £89,050, divided into 40,000 preference shares of £1 and 98,100 ordinary shares of 10s. each. The reduction was to be effected by cancelling 1,900 ordinary shares of £1 which had not been issued, by cancelling paid-up capital which had been lost or was unrepresented by available assets to the extent of 10s. in respect of each of the remaining ordinary shares, and by reducing the nominal amount of the latter from £1 to 10s.

Wright (John and Edwin) Limited.—The report for the year ended September states that the balance of the revenue account, after adding £4,793 brought forward and deducting the interim dividend (£1 177) paid on the preference shares for the half-year, is £12,024. The directors propose to pay a dividend on the ordinary shares of 10 per cent. per annum, free of income-tax, £5,000; to add to the reserve fund, £1,000; and carry forward, £4,847.

Young (Thos. E.) and Co. Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to take over the business of coal merchants, &c., carried on at Newcastle-on-Tyne and Monkseaton, as Thos. E. Young.

No. 20.

THE COLLIERY GUARDIAN

MONTHLY LIST OF RECENT COAL LITERATURE

The following is a list of abbreviations used below:—

AEG Ztg. = AEG. Zeitung.
Am. Inst. Min. Engin. = American Institute of Mining Engineers
Ann. Mines Belgiq. = Annales des Mines de Belgique
Ann. Mines = Annales des Mines.
Bull. Soc. Min. St. Etienne = Bulletin de la Société de l'Industrie Minérale de St. Etienne.
Bull. U.S. Bur. Mines = Bulletin of the United States Bureau of Mines.
Bull. Wash. Geol. Survey = Bulletin of the Washington Geological Survey.
Canad. Min. Jl. = Canadian Mining Journal.
Chemiker Ztg. = Chemiker Zeitung.
Coal Merch. = Coal Merchant and Shipper.
Coal Tr. Bull. = Coal Trade Bulletin.
Colliery Guard. = Colliery Guardian.
Comp. Air Mag. = Compressed Air Magazine.
Corr.-Bl. Gewerksch. Deutschl. = Correspondenzblatt der General-Commission der Gewerkschaften Deutschlands.
D. Arbeitgeber Ztg. = Deutsche Arbeitgeber Zeitung.
El. Anz. = Electrotechnischer Anzeiger.
El. Jl. = Electric Journal.
El. Kraftbetriebe = Elektrische Kraftbetriebe und Bahnen
El. Masch. Bau = Electrotechnik- und Maschinen Bau.
El. Z. = Elektrotechnische Zeitschrift.
Engin. Min. Jl. = Engineering and Mining Journal.
Engin. Rev. = Engineering Review.
Iron Coal Trades Rev. = Iron and Coal Trades Review.
Jl. Four El. Electrolyse = Journal du Four Electrique et de l'Electrolyse
Jl. Soc. Arch. = Journal of the Society of Architects.
Kartell-Rdsch. = Kartell-Rundschau.
Locom. Mag. = Locomotive Magazine.
Manchester Geol. Min. Soc. = Manchester Geological and Mining Society.
Mem. Soc. Ing. Civ. = Mémoires et Comptes Rendus des Travaux de la Société des Ingénieurs Civils de France.
Metallurg. Chem. Engin. = Metallurgical and Chemical Engineering.
Mines Minerals = Mines and Minerals.
Min. Ind. = Mining Industry.
Min. Mag. = Mining Magazine.
Montan. Rdsch. = Montanistiche Rundschau.
N. Zeit = Neue Zeit.
Organ d. Bohrtechniker = Organ des Vereins der Bohrtechniker.
Proc. 8th Int. Congr. Appl. Chem. = Proceedings of the 8th International Congress of Applied Chemistry.
Railw. News = Railway News.
Rev. Noire = Revue Noire.
S. Afric. Inst. Engin. = South African Institute of Engineers.
S. Afric. Min. Jl. = South African Mining Journal.
Tekn. Ugeblad = Teknisk Ugeblad
Univ. Ill. Bull. = University of Illinois Bulletin.
Z. Angew. Chem. = Zeitschrift für Angewandte Chemie.
Z. Bergw. Preuss. = Zeitschrift für das Berg. Hütten- und Salinenwesen im Preussichen Staate.
Z. Schiesswes. = Zeitschrift für das Gesamte Schiess- und Sprengstoffwesen.

*** We shall be glad to obtain for readers, where possible, copies of the papers referred to at the prices named, which are inclusive of postage.

I.—General

Our Anthracite Coal Supply and its Conservation. Wm. Griffith und E. T. Connor. "Proc. 8th Int. Congr. Appl. Chem.," 1912, vol. 24, p. 79-113.

American Coals which are Suitable for Export. J. S. Burrows. "Black Diamond," 1912, p. 23.

Coal Finance Politics in Saxony. (Kohlenpolitik des saechsischen Fiskus.) "Kartell-Rdsch.," 1912, 7, p. 618-9.

International Miners' Congress (Proceedings). (Internationaler. Bergarbeiterkongress.) "Corr.Bl. Gewerksch. Deutschl.," 1912, 31, p. 464-7.

Coal Export of the Rhenish-Westphalian Coal Syndicate in 1911. (Kohlenausfuhr des Rheinisch-Westfaelischen Kohlensyndikats i. J. 1911.) "Kartell-Rdsch.," 1912, 7. p. 638-41.

Statistics of Output per Man per Shift in the Leading Coalfields of Prussia, 1888-1911. (Uebersicht ueber die in den Haupt-Steinkolenbezirken Preussens, 1881-1999 auf Arbeiter und auf 1 Schicht erzielte Foederung.) "Z. Bergw.-, Preuss.," vol. 60. Statistical No. 1, p. 46-8.

Index of Mining Engineering Literature W. R. Crane. Vol. 2. 8vo. Chapman and Hall. 12s. 6d.

Statistics of Fatal Accidents in Mining in Prussia in 1911. (Verunglueckungen mit toetlichem Ausgange beim Bergwerksbetriebe Preussens 1911.) "Z. Bergw.-, Preuss.," 1912, vol. 60. Statistical No. 1, p. 48-62.

Colonial and Foreign Mineral Statistics. "Colliery Guard.," vol. 104, 2706, p. 938. 6d.

Insurance of German Miners. "Colliery Guard.," vol. 104, 2706, p. 937. 6d.

Coalmining in the United States. "Colliery Guard.," vol. 104, 2706, p. 943. 6d. (Census Statistics.)

Workmen's Compensation in 1911. "Colliery Guard.," vol. 104, 2709, p. 1087. (Statistics relating to mines.) 6d.

Awards under the Minimum Wage Act. "Colliery Guard.," vol. 104. 2709, p. 1107. (Supplementary Award.) 6d.

III.—Geology.

Geology of the Five Major Coalfields of Prussia. (Geologie der fuenf grossen preussischen Steinkohlenablagerungen.) H. Willert. Leipzig, 1912.

The Appalachian Coalfield and its Fuel Products. A. Bement. "Black Diamond," 1912, p. 26.

The Coalfields of King County. G. W. Evans. "Bull. Wash. Geol. Survey," 1912, 3, 247 p.

Coalfields of the Consolidation Coal Company. "Black Diamond," 1912, p. 40-6.

Conservation of Nova Scotian Coalfields. N. A. Nicholson. "Canad. Min. Jl.," vol. 33, 19, p. 671-4.

Coal Discoveries in British Columbia. W. F. Robertson. "Colliery Guard.," vol. 104, 2705, p. 888. (The Groundhog Mountain coalfield.) 6d.

Cannel Coalfields in Kentucky. H. D. Easton. "Coal Age," vol. 2, 14, p. 454-6; 4 fig., 3 tab.

The Arkansas Semi-Anthracite Field. A. H. Shaw. "Coal Age," vol. 2, 15, p. 486-8; 3 fig.

Coal in the Vladivostock District, Siberia. A. F. Bordeaux. "Coal Merch.," vol. 25, 633, p. 489; 1 map.

The South-eastern Coalfield. W. Boyd Dawkins. "Colliery Guard.," vol. 104, 2706, p. 940. 6d. (Abst. paper read before Manchester Geol. Min. Soc.)

IV.—Mine Surveying.

Improved Map-making Methods and Equipment of the Coalseam and Topographic Charts of the Rhenish-Westphalian Coalfield. (Neue Floez- und topographische Ubersichtskarten des rechtsrheinisch-westfaelischen Steinkohlenbezirks. L. Mintrop. "Glückauf," 1912, p. 1225-95.

Notes on Mine Surveying. H. G. Henderson. "Mines Minerals," vol. 33, 3, p. 168-70; 2 fig.

V.—Mining Technology.

The Industrial Economy of Machinery in Coalmining. (Die Maschinenwirtschaft der Kohlengruben.) C. Ilgner. "Montan. Rdsch.," 1912, p. 939.

VI.—Working of Minerals.

Use of the Pick-quick Electric-driven Coal Puncher at Bascoup Colliery, Belgium. (Emploi de la haveuse a barre "Pick-quick," à commande electrique.) Vrancken and Mollinghen. "Ann. Mines," 1912, vol. 17, 3, p. 661-9.

Use of Pneumatic Hammer Drills, and Costs, in Coal Mines in France. (Note sur l'emploi des marteaux pneumatitiques dans l'exploitation dans les mines de houille.) Jacquelin. "Mem. Soc. Ing. Civ.," 1912, p. 673-723.

Rotary *v.* Puncher Coal-cutters. (Radschraemmaschine oder Stangenabbauschraemmaschine.) A. E. Liwehr. "Montan. Rdsch.," 1912, p. 929; p. 1200.

VII.—Boring, Shaft Sinking, and Tunnelling.

Raky Congelation System in Sinking Shafts 9 and 10, St. Vaast Mine, La Louvière and Sars-Longchamps Collieries, Belgium. (Creusement des puits Nos. 9 et 10, du siège de St. Vaast.) D'Haeneus. "Ann. Mines," 1912, vol. 17, 3, p. 639-72.

Shaft Sinking by the Congelation Process in the Nord Coalfield, Belgium. (Le bassin houiller du Nord de la Belgique.) V. Lechat "Ann. Mines," 1912. vol. 17, 3, p. 741-52.

The Stockfisch System of Shaft-sinking at the Diergardt Colliery. Krecke. "Colliery Guard.," vol. 104, 2705, p. 887; 7 fig. (Trans. from "Glückauf.") 6d.

Sinking Stage at a Belgian Colliery. "Colliery Guard.," vol. 104, 2706, p. 942; 1 fig. 6d.

VIII.—Explosives, Blasting.

Dangers in the Use of Explosives, and Precautionary Measures. (Die Gefahren beim Gebrauch von Sprengstoffen und deren Verminderung.) J. Rudeloff. "Z. Schiesswes.," 1912, p. 357.

Concrete Timbering of Mine Shafts. E. R. Jones. "Coal Age," vol. 2, 17, p. 574-6; 3 fig.

The Effect of Stemming on the Efficiency of Explosives. W. O. Snelling und C. Hall. "Colliery Guard.," vol. 104, 2707, p. 990. 6d.

Explosives in Coalmines. "Colliery Guard., vol. 104, 2706, p. 957. 6d. (Home Office Order.)

Storage of Explosives at Mines. "Colliery Guard.," vol. 104, 2707, p. 987. 6d. (Home Office Memorandum.)

IX.—Timbering, Packing, &c.

Preservation Treatment of Wood with Zinc Chloride-sodium Fluoride and Bellite. (Zur Holzimpraegnierung mit Chlorzink-Fluornatrium und Bellit.) B. Malenkovicz. "El. Masch. Bau.," 1912, p. 765-70.

Hydraulic Packing at Bruay Colliery No. 3, North France. (Le remblayage hydraulique au siege No. 3 des Mines de Bruay.) C. M. Doise. "Bull. Soc. Min. St. Etienne," 1912, p. 65-109.

Studies on the Theoretic Requirements for the Movement of Sand in Pipes in Stowing. (Bedingungen fuer die Bewegung des Schlaemmversatzes in den Rohrleitungen.) A. Rosenberger. "Zent. Verb. Bergbau. Betrbsl. Oestr.," 1912, p. 574.

Piping and its Selection in Hydraulic Packing. (Die Rohrleitungen im Spuehlversatzbetriebe.) H. Keckstein. "Montan. Rdsch.," 1912, p. 955.

Hydraulic Packing in the German State Mines. "Colliery Guard.," vol. 104, 2705, p. 903. 6d.

X.—Surface Arrangements

Economy in Tipple Construction. R. F. Powers. "Coal Age," vol. 2, 17, p. 563-4; 1 fig.

XI.—Winding and Haulage.

Determining the Weight of the Tailrope in Koepe-winding. (Zur Frage des Unterseilgewichtes bei Koepefoederung.) E. Oppenheimer. "Kali," 1912, p. 448.

The Factor of Safety in Man Haulage at Great Depths. T. Tregaskis. "S. Afric. Inst. Engin.," vol. 10, 11., p. 323-7; 11, 2, p. 43-5.

Some Safety Equipments in Haulage over Inclined Planes. (Einige Sicherheitsvorrichtungen bei der Foerderung auf geneigten Bahnstrassen.) G. Ryba. "Zts. Zentr. Bergb. Betrbsl. Oest.," 1912, p. 584.

Hauling Machines Driven by Three-phase Commutator Motors. (Foerdermaschinen mit Antrieb durch Drehstrom-Kommutatoren.) Janzen. "El. Kraftbetrieb.," 1912, 22, p. 169-76; 11 fig.; 23, p. 181-9; 8 fig., 6 ill.

HE COLLIERY GUARDIAN

NTHLY LIST OF RECENT COAL LITERATURE

list of abbreviations used below :—
Zeitung.
in. = American Institute of Mining
= Annales des Mines de Belgique.
les des Mines.
Etienne = Bulletin de la Société de
e St. Etienne.
nes = Bulletin of the United States
urvey = Bulletin of the Washington
anadian Mining Journal.
emiker Zeitung.
Merchant and Shipper.
l Trade Bulletin.
olliery Guardian.
ompressed Air Magazine.
Deutschl. = Correspondenzblatt der
er Gewerkschaften Deutschlands.
= Deutsche Arbeitgeber Zeitung.
echnischer Anzeiger.

El. Jl. = Electric Journal.

El. Kraftbetriebe = Elektrische Kraftbetriebe und Bahnen.

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Mines Minerals = Mines and Minerals.

Min. Ind. = Mining Industry.

Min. Mag. = Mining Magazine.

Montan. Rdsch. = Montanistiche Rundschau.

N. Zeit – Neue Zeit.

Organ d. Bohrtechniker = Organ des Vereins der Bohrtechniker.

Proc 8th Int. Congr. Appl. Chem. = Proceedings of the 8th International Congress of Applied Chemistry.

Railw. News = Railway News.

Rev. Noire = Revue Noire.

S Afric. Inst. Engin. = South African Institute of Engineers.

S. Afric. Min. Jl. = South African Mining Journal.

Tekn. Ugeblad = Teknisk Ugeblad

Univ. Ill. Bull. = University of Illinois Bulletin.

Z. Angew. Chem. = Zeitschrift für Angewandte Chemie.

Z. Bergw. Preuss. = Zeitschrift für das Berg. Hütten- und Salinenwesen im Preussichen Staate.

Z. Schiesswes. = Zeitschrift für das Gesamte Schiess- und Sprengstoffwesen.

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I.—General

Supply and its Conservation. Wm.
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VIII.—Explosives, Blasting.

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X.—Surface Arrangements

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Determining the Weight of the Tailrope in Koepe-winding. (Zur Frage des Unterseilgewichtes bei Koepefoederung.) E. Oppenheimer. "Kali," 1912, p. 448.

The Factor of Safety in Man Haulage at Great Depths. T. Tregaskis. "S. Afric. Inst. Engin.," vol. 10, 11., p. 323-7; 11, 2, p. 43-5.

Some Safety Equipments in Haulage over Inclined Planes. (Einige Sicherheitsvorrichtungen bei der Foerderung auf geneigten Bahnstrassen.) G. Ryba. "Zts. Zentr. Bergb. Betrbsl. Oest.," 1912, p. 584.

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¶ The seat is chamfered and the shape of the internal valve is such that steam is thrown clear of the face.

This prevents Erosion.

¶ The cylindrical part of the internal valve practically fits inside the seating ring, and the first turn of the handwheel allows but little steam to pass.

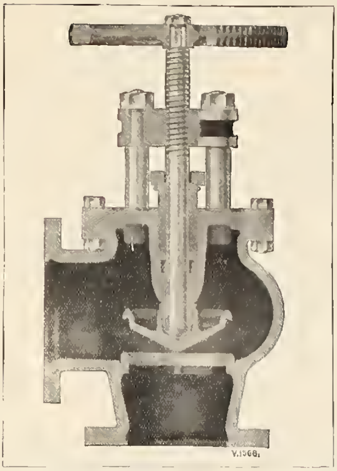
This avoids Water-hammer.

¶ The pressure of the spindle is exercised *below* the working face of the internal valve.

This eliminates Chattering.

¶ The internal valve rotates each time it is opened.

This keeps the faces level.



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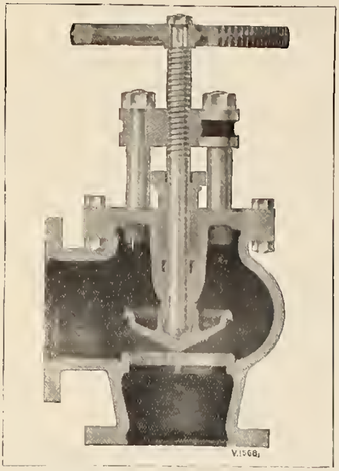
of its points of superiority over ordinary valves.



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H.O., 38	Form of Book for Daily Record of Damage to Safety Lamps—Section 34 (1) (ii)	1s. 6d. each do.
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H.O., 52	Form of Book for Daily Record of Shots Fired—Explosives in Coal Mines Order	9d. each do.

THE COLLIERY GUARDIAN COMPANY LIMITED,
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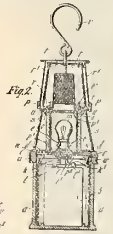
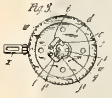
ATENT SPECIFICATIONS LY ACCEPTED.

ents Relating to Miners' Lamps. T.
t., Wigan, Lancs.—This invention
amps which are employed either as
: will and are provided with means
be switched out of, and the gas
circuit to detect the presence of
with the invention provision is
otection of both the lamp bulb and
sing them within a glass tube or
ission of air into the interior by
ith an ordinary miners' lamp top,
t of circuit either of the lamp or
switching of both out of circuit
the removal of the lamp top or
s affording safety against the risk
portion is provided which may
of aluminium, and having means
an accumulator in position. The
consists of a top plate or cap,
fitted into a loose collar which is
rtion, the whole being surmounted
mp top consisting of a wire gauze
ight glass cylinder. Within the

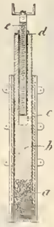




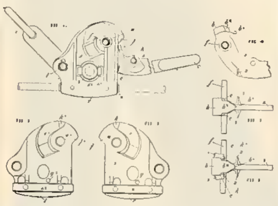
d an appropriate electric lamp and
a piece of platinum or other
o act as a gas detector for fire-
mstances two buffers in contact
nd passing into the lower portion
act with the terminals of the
ng so arranged that by partially
n of the lamp, which is done by
se collar, the two terminals con-
are brought into contact with
e, and the platinum bridge is
igniting any gas in the gas-tight
is lighted a quarter turn of the
he lamp contacts and extinguish
tact between the gas detector
lator; a further turn unscrews
he detector and lamp terminals
battery terminals, thus extin-
r and the light, which is effected
mp. Figs. 1 and 2 are elevation
pectively of a miner's lamp con-
the invention; and fig. 3 is a
the loose collar for enabling the
e in contact with the accumu-
ively the accumulator terminals
with either the lamp or tester
)

ts in or relating to Mining Props.
sse, Essen-Bredeney, Germany.—
a mining prop, which comprises
filling mass is compressed by a
of the prop, as described in
1909. The length of the prop is
of the filling mass inserted in
consists of peat, rubble stones,
le to compress the filling mass in
iven degree after the erection of
the elasticity of the prop and
e is effected, according to this
pindle screwed into the piston-
op and abutting against the roof
he prop has been erected, the
e lower tube by screwing this
the filling material can be com-
t, so that the degree of elasticity
The nut into which the spindle
on the end of the piston, and the

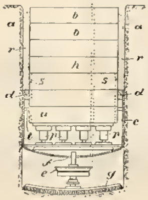
spindle is provided with a barring hole, so that a bar can be introduced in the hole and a great turning force exercised. A construction according to this invention is illustrated, by way of example, in the accompanying drawing. (Two claims.



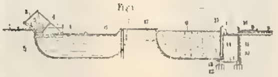
4362 (1912). *Improvements in the "Smallman" Haulage Clip.* J. W. Smallman, of Blackdown, near Leamington, Warwickshire.—This invention is a modification of the invention described in the Specification to Letters Patent No. 19533 of 1910. In a clip made in accordance with the present invention, the head of the lever has rounded shoulders and a wedge-like continuation with a reduced base; and there are two pairs of stops—a principal and a subsidiary pair. The principal stops extend laterally from the body of the lever; and the subsidiary stops are at the ends of the inclines on the shells. When the principal stops bed against the shells below the front projections, the rounded shoulders reach the subsidiary stops, greatly increasing the strength of the construction. The narrower the subsidiary stops are (and they may be very narrow), the wider the jaws of the shell open. Fig. 1 is a side elevation of the improved clip; fig. 2 shows the inner surface of the right-hand shell; fig. 3 is a similar view of the left-hand shell; fig. 4 is a side elevation of the head and body of the lever; fig. 5 is a corresponding plan; fig. 6 includes the subsidiary stops. (Four claims.)

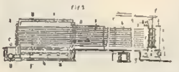


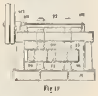
5306 (1912). *Improvements in or relating to a Process for Sinking Shafts or Driving Tunnels and the like.* Allgemeine Tiefbohr and Schachtbau Aktiengesellschaft, of Hansahaus, Düsseldorf 2, Germany.—This invention relates to the sinking of shafts and driving of tunnels and galleries by processes in which a protective bottom or shield is interposed between the boring tool or tools and the tubbed or lined portion of the shaft or tunnel, and this shield advanced by hydraulic pressure as the earth is removed by the boring gear. The invention consists in a process in which the rock boring gear is driven by a turbine operated by the ground water under high pressure sealed off under the protective bottom, only that portion of the water actually used in the turbine being discharged therefrom into the shaft above the protective bottom. The invention also consists in an arrangement for carrying out this process in which the turbine is mounted directly below or above the protective bottom, and governed by a valve by means of which the quantity of water admitted to the turbine can be diminished with increasing depth of shaft and constant increasing head of water. The earth or rock removed by the boring tool is carried away by the water used for driving the turbine, and brought with the same in the form of a slime into the shaft, whence it is pumped to the surface by means of suitable pumps or the like. A construction according to this invention is illustrated diagrammatically in the case of the sinking of a shaft, several dimensions being shown on an enlarged scale for the sake of greater clearness. Above the protective bottom are mounted several hydraulic presses *p p*, which drive the protective casing *c* as a boring tool *g* removes the earth or rock. When the protective bottom has been driven down to a certain distance—for instance, to the height of a lining segment—the hydraulic presses *p p* are removed one after another and suitable segments inserted, so as to produce a new ring of segments below those already put in. The hydraulic presses are then again introduced or mounted, and during the continued working of the turbine and of the boring tool drive the protective bottom further down in accordance with the quantities of the earth removed, whereupon the hydraulic presses are again removed, and new segments are introduced in order to form another lower ring of segments. The space *r* between the rock proper and the outer surface of the tubbing is preferably filled with cement, which can be effected by injecting it or by some other well-known process. The tubbing is preferably provided with suitable perforations *s* through which cement can be injected into the space *r*. Under certain circumstances, a certain torque is exerted due to the working of the turbine, and having the tendency to twist the protective bottom. In order to counteract the said torque, the protective bottom is provided with springs *t* or with projections or guides, and the tubular segments with corresponding grooves or the like. (Three claims.)

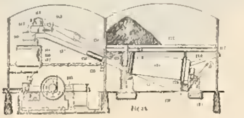


17610 (1911). *Improved Process for the Commercial Utilisation of Peat.* N. Testrup, 6, Broad-street-place, London, E.C., T. Rigby, Station Hotel, Dumfries, Scotland, and O. Söderlund, Fairlawn, Clarence-road, Clapham Park, London, S.W.—This invention relates to the commercial utilisation of peat and has for its object to provide an improved process which shall be wholly independent of the usual air drying and need of a large amount of labour necessarily of a cheap kind and which shall therefore allow of the utilisation of peat on a large scale and under adverse climatic conditions. A further object is to provide a process of great flexibility in being capable of adjustment of the form of its output without interruption or change of the process and in accordance with any particular demand. A process for artificially rendering the bound water of raw peat free and therefore of allowing drying to a low-moisture content has been proposed by Ekenberg (Patents Nos. 10834 and 20420 of 1903) and in the process according to the present Invention the former occurs as a step. Broadly speaking, this invention consists in a process of peat utilisation by production of ammonia and fuel therefrom in which the peat is wet carbonised by the Ekenberg process, the bulk of its liquid matter then removed by internally transmitted pressure as in a filter press, and a further quantity removed by externally applied pressure as in a band press or by a waste-heat drying method utilising products of combustion from the process, the partially dried residue being then in at least such quantity as is needed to supply the power and fuel for the process, gasified in an ammonia recovery gas producer, the remainder being, as desired, also gasified or converted into solid fuel. The invention also consists in apparatus suitable for carrying out the above processes. Fig. 1 shows in elevation the peat-gathering installation and peat store of such a plant. Fig. 3 shows in part sectional elevation a form of wet carbonising oven. Figs. 15 and 16 show one method of handling the peat after it leaves the carboniser and where a band press is used. Fig. 17 represents an end elevation of a preferred form of band press. Fig. 23 shows in part sectional elevation an improved installation for completing the drying, conveying the nearly dry material and briquetting the same. Fig. 27 indicates the combination of an ammonia recovery gas producer installation with a Schultz drier









(*Continued on page* 1166.)

THE RECORD

840

square feet in one shift with one "Siskol" Coal-Cutter.

INTERNATIONAL CHANNELLING MACHINES LD.,
SHEFFIELD.

e OFFICIAL figures
ently published by
M. Home Office show
t in the Manchester Dis=
t, for 1910, there were
Coal Cutters, of eleven
erent types, in use, of
ch 81, or more than half
he total number, were
SKOL" machines.

Is any further proof
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(shown in detail in fig. 28). Fig. 32 shows such an installation, in which the vapour passing to the producer is used to convey heat to material being briquetted. The following are examples of the application of the process:—Example 1: Peat excavated, put into disintegrator, pumped therefrom through pipe line to pulp reservoir, passed to disintegrator, thence to pressure pumps, through carboniser to pulp reservoir, thence to filter presses, effluent passing away, and cake (68 per cent. liquid more or less) passing to band press effluent from which passed away and cake (55 per cent. liquid about) divided one part to gas plant yielding tar, sulphate of ammonia and gas for heat and power, and the other part to a disintegrator, thence to Schultz driers (exhaust steam heated), vapours therefrom passing to producer grate and peat dust to briquetting press. Example 2: Same as example 1, but press cake (68 per cent. liquid) disintegrated, dried in combustion gases, dust (55 per cent. liquid) divided, one part consolidated to cakes and passed to producer, and other part sent to Schultz driers, vapours from latter passing to producer grate and dust to briquette press. Example 3: Same as example 1, but press cake (68 per cent. liquid) divided one part disintegrated, dried in combustion gases (say to 41 to 46 per cent. liquid contact) passed to Schultz driers, vapour from which passes to producer and dust from which briquetted portion of resultant briquettes being admixed with remainder of press cake and mixture supplied to producer. Example 4: Same as example 1, but material from band press (55 per cent. liquid contant) all gasified and excess gas over needs of the process employed in power plant to yield electrical energy. Example 5: Same as example 3, but peat dust (41 to 46 per cent. liquid content) consolidated in briquette press and resultant briquettes admixed with the press cake (68 per cent. liquid content), and whole gasified, giving sulphate of ammonia and tar with excess of gas to be converted into electrical energy. (Eleven claims.)

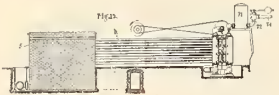
Fig. 13.

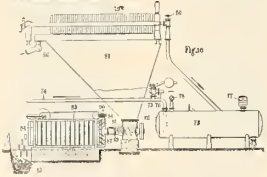
Fig. 30.

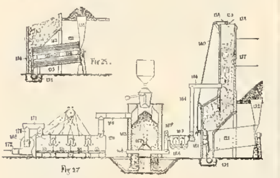
Fig. 25.

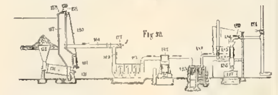
Fig. 27. Fig. 32.

28548 (1911). *Improvements in Coal-washing Plant.* R. Thomson, Lilybank, Reid-street, Burnbank, Hamilton, Lanarkshire, engineer.—This invention relates to coal or dross washing plant of the kind used to separate the gum or dust from the coal by the action of the water and comprising a plunger adapted, through the intermediary of fluid, to operate within a chamber in a tank including a grating on which the coal or dross rests, the actuated fluid being admitted and exhausted by means of a control valve operatively connected to the plunger. In the accompanying drawings fig. 1 is a part elevation, part longitudinal vertical section showing a general arrangement of coal-washing plant embodying the invention; fig. 2 is a longitudinal vertical section, on an enlarged scale, of the plunger and relative parts for displacing the water in the washing tank. Within a chamber in the tank A is a water-displacing plunger B comprising a buoyant body including a piston F forming part of the plunger and fitted within a cylindrical upward extension E of the chamber in which the plunger operates. Above the cylinder E is a valve G working in a casing H, having inlet and exhaust ports I and J respectively. The valve G is shown loosely mounted on a spindle extension K of the reciprocating piston F, and is so arranged that on admission of fluid by opening a cock on the fluid supply pipe the fluid admitted through the ports I in the valve casing H forces down the piston F and with it the plunger B, which displaces the water in the washing tank, forcing the water up through the grating L on which the coal or dross rests. An adjustable stop M on the spindle K connecting the piston F and the valve G contacts with the latter, as the piston F and the plunger B descend, and shifts the valve so as to close the fluid admission ports I and open the exhaust, the lower ports J being in register with ports N in the valve, whereupon the plunger B is slowly raised by its own buoyancy, and as it reaches its higher position it shifts the valve so as to close the exhaust ports J and open the admission ports I, as shown in fig. 2, the reciprocatory movements of the piston F and plunger B being repeated. As shown, a spring P acting in conjunction with a disc Q or the like serves to take up shock at the end of the downward movement of the valve G. By means of these devices a rapid downward movement of the plunger B is effected to force the water up through the coal for washing purposes, and a relatively slow return movement due to the flotation of the plunger takes place whereby the return flow of the water is retarded so that hammering of the coal on the grating L does not occur, and the gum or dust is not dragged down and discharged with the stones or dirt. If desired the return movement of the floating plunger may be regulated by throttling the exhaust pressure fluid, or by reducing the weight of the plunger, or ballasting the latter. The exhaust fluid passes by way of a branch R from the valve casing H to an ejector condenser S or like device located in proximity to the tank T in which the "gum" is removed from the washing water, the said device being designed to produce a partial vacuum in the said tank T, the effect of which is to draw off the maximum of moisture from the gum, and thus more or less dry it before removal from the apparatus. (One claim.)

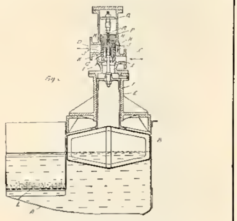
Fig. 2.

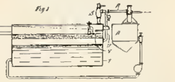
Fig 1

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PUBLICATIONS RECEIVED.

The "Mechanical World" Electrical Pocket Book," 1913. Manchester: Emmott and Co. Limited. Price 6d. net.

"Le Mois Scientifique et Industriel" (No. 158), Octobre, price 2fr.; "Cassier's Magazine" (Vol. 42, No. 5), November, price 1s.; "The Journal of the Chemical, Metallurgical and Mining Society of South Africa" (Vol. 8, No. 3), September, price 3s.; "Colorado School of Mines Magazine" (Vol. 2, No. 14), November: "The Mining Magazine" (Vol. 7, No. 5), November, price 1s.; "The Resources of Tennessee" (Vol. 2, No. 11), November; "Revue Universelle des Mines de la Métallurgie" (tome 40, No. 1), Octobre; "Bulletin of the American Institute of Mining Engineers" (No. 71), November, price 50 c.; "Peru To-day" (Vol. 4, No. 7), October, price 5d.; "The Journal of the Franklin Institute" (Vol. 174, No. 5), November, price 50 c.; "Bulletin et Comptes Rendus Mensuels Société de l'Industrie Minérale" (tome 2, No. 11), Novembre; "The Journal of the Western Society of Engineers" (Vol. 17, No. 6), October, price 50 c.; "'Financial News' Canadian Souvenir Number"; "Transactions of the North-east Coast Institution of Engineers and Shipbuilders."

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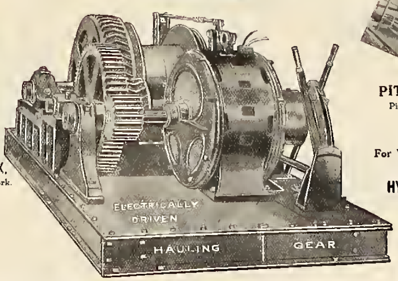

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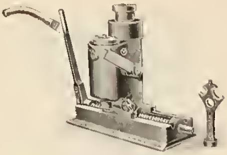

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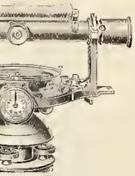

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Simon-Carves Ld., 20, Mount-street, Manchester

COKE OVEN STAMPING MACHINERY
Coke Oven Construction Co. Ld., Sheffield
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

COKE OVENS
Coke Oven Construction Co. Ld., Sheffield
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Lührig Coal and Ore-Dressing Appliances Ld., 32, Victoria-street, S.W.
Simon-Carves Ld., 20, Mount-street, Manchester

COKE RAMS OR PUSHERS
Coke Oven Construction Co. Ld., Sheffield
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport, Mon.

COKE SCREENS
Coke Oven Construction Co. Ld., Sheffield
Cousland, Alex., and Son, 3, Mitchell-st., Glasgow
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

COLLIERY PLANT
Allen, W. G., and Sons (Tipton) Ld., Tipton
Baker, John, and Son, Bilston, Staffs
Bever, Dorling and Co. Ld., Bradford
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, E., 2, Aire-street, Leeds
Davis, John and Son (Derby) Ld., Derby
Fraser & Chalmers Ld., 3, London Wall Bldgs, E.C.
Hardy Patent Pick Co. Ld. Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Haslam and Schontheil Ld., Cardiff
Hathorn, Davey and Co. Ld., Leeds
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester and Manchester
Hurd Coal-Cutter and Engineering Co. Ld., 188 St. Vincent-street, Glasgow
Improved Coal Mining Co., Sacriston, nr. Durham
Isca Foundry Co., Newport
Leech, Goodall & Co., Hunslet, Leeds
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, B. H., and Co. Ld., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld. 47, Broad-street, Glasgow
Mining Engineering Co. Ld., (The), Sheffield
Norton's (Tividale) Ld., Tipton
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Phillips, C. D., Newport, Mon.
Pillatt & Co. Ld., Stapleford, Nottingham
Plowright Bros. Ld., Chesterfield
Pulsometer Engineering Co. Ld., Reading
Railway and General Engineering Co. Ld., Notts
Reavell and Co. Ld., Ipswich.
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Waddle Patent Fan & Engineering Co., Llanelly
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton
Yeadon, Son and Co., Albion-place, Leeds
Yorkshire Engine Co. Ld., Sheffield

CONDENSERS & CONDENSING PLANT
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

CONSTRUCTIONAL STEEL AND IRON WORK
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Cantrell, W. E., and Co. Ld., Beeston, Notts
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Firth, William, Ld., Leeds

CONSTRUCTIONAL STEEL AND IRON WORK—*cont*
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Newton Heath, Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Longbotham, B. H., and Co. Ld., Wakefield
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Wood, John & Sons Ld. Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

CONVEYOR BELTS
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton Manchester
"Scandinavia" Belting Co. Ld., 59, Southwark-street, S.E.
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, H., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

CONVEYORS AND ELEVATORS
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Cantrell, W. E., and Co. Ld., Beeston, Notts
Chain Belt Engineering Co., Derby, England
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Diamond Coal-Cutter Co. Stennard Wks. Wakefield
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., and Co., Lewisham, London, S.E.
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Improved Coal Mining Co., Sacriston, nr. Durham
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Leech, Goodall & Co., Hunslet, Leeds
Mather and Platt Ld., Manchester
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Primus Patents Co., Falcon-street, Oldham
Reddaway, F., & Co. Ld., Pendleton, Manchester
Sheppard and Sons Ld., Bridgend, South Wales
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts.
Sutcliffe, H., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Yorkshire Engine Co. Ld., Sheffield
Wright, Joseph, and Co., Tipton

CORNER PLATES
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

COTTON WASTE, TWINE, AND SPUN-YARN
Mudford, J. H., & Sons, 55, Exchange-st., Sheffield

COUPLINGS
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

CRAB WINCHES
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Hyland-street Works, Birmingham

CRANE MAKERS
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Middleton, Robert, Sheepscar Foundry, Leeds
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

CRANES
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Appleby, E. G., and Co., 10, Victoria-street, Westminster
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Hyland-street Works, Birmingham

CREEPERS
Tickle Bros., Vulcan Ironworks, Wigan

CUT-OFF GEAR
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Thornewill and Warham Ld., Burton-on-Trent
Wood, John, and Sons Ld., Wigan

DETONATORS
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

DIES, EMBOSSING PRESSES, AND SEALS
Pryor, Edward, and Son, 68, West-st., Sheffield

DISINTEGRATORS
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Middleton, Robert, Sheepscar Foundry, Leeds
Simon-Carves Ld., 20, Mount-street, Manchester
Yeadon, Son and Co., Albion-place, Leeds

DIVING APPARATUS
Pulsometer Engineering Co. Ld., Reading
Siebe, Gorman and Co. Ld., Westminster S.W.

DOG SPIKES
Frost, Albert, and Co., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Renton, B. M., & Co., Midland Works, Sheffield

DOUBLE HELICAL GEAR (MACHINE CUT)
Brown, David, and Sons (H'fl'd) Ld., Huddersfield
Citroen, Andre, and Co., 27, Queen Victoria-street, London

DRAIN GOODS
Appleton and Howard, St. Helens, Lancs.
Hopkinson, J., and Co. Ld., Huddersfield

DRAWING INSTRUMENTS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

DRAWING OFFICE STATIONERY
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

DRILLS (ELECTRIC)
United States Metallic Packing Co. Ld., Soho Works, Bradford

DRIVING PULLEYS
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

DUPLEX PUMPING ENGINES
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Evans, Joseph, and Sons Ld., Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Pearn, F., and Co. Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

DUSTBINS (SANITARY)
Baker, John, and Son, Bilston, Staffs
Harvey, G. A., and Co., Lewisham, London, S.E.
Lewis, Wm., and Son, Bilston
Theedam, E. C., Ld., Dudley

DYNAMITE, &c.
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Nobel's Explosives Co. Ld., Glasgow

DYNAMOS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Sutcliffe, Richard, Horbury, near Wakefield

EBONITE AND VULCANITE
Cort, Arthur, & Co., 303½, Camberwell-rd., London

ELECTRIC DETONATORS AND FUSES
British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

ELECTRICAL EARTHING CLIPS
Ingle, Albert E., 13, Albert-place, Bridge street, Manchester

ELECTRICAL ENGINEERS
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Hurd Coal-Cutter and Engineering Co. Ld., 188, St. Vincent-street, Glasgow
Jardine, John, Deering-street, Nottingham
Mather and Platt Ld., Manchester
Theedam, E. C., Ld., Dudley

ELECTRICAL FAULT INDICATORS
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield

ELECTRIC HAULAGES
Avonside Engine Co. Ld., Bristol
Bridge, David, & Co. Ld., Castleton, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davis John, and Son (Derby) Ld., Derby
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Leech, Goodall & Co., Hunslet, Leeds
Longbotham, B. H., and Co. Ld., Wakefield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

ELECTRIC METERS
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

ELECTRICAL PLANT
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Ward, Thos. W., Limited, Albion Works, Sheffield

ELECTRICAL PUMPS
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

ELECTRICAL STORES
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C., Ld., Dudley

EMERY WHEELS

ENAMELLED PLATES FOR NOTICES FOR MINES
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Theedam, E.C., Ld., Dudley

ENAMEL MANUFACTURERS (FOR ALL METALS)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalbitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

ENGINEERS (CONSULTING)
Entreprise Générale de Fonçage de Puits, 5, Rue de Surène, Paris
Fell, C. A., Dronfield, near Sheffield
Radford, B. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

ENGINES (BLOWING)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

ENGINES (GAS-COMPRESSING)
British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

ENGINES (HAULING AND WINDING)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, B. H., and Co. Ld., Wakefield
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, H., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

ENGINES (LOCOMOTIVE)
Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

ENGINES (MARINE TYPE)
Mather and Platt Ld., Manchester

ENGINE MERCHANTS
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn

ENGINES (OIL)
Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

ENGINES PUMPING (See PUMPS)

ENGINES (ROLLING MILL)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.

ENGINES (STEAM)
Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

EXHAUST TURBINE REDUCING VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Boyles Ld., Irlam, Manchester

EXHAUST TURBINE SAFETY VALVES
Auld, D., and Sons, Whitevale Foundry, Glasgow

EXHIBITIONS

EXPANSION GEAR
Daglish, Robert, and Co, Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

EXPLOSIVES
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 103, Cannon-street, E.C.
Thompson and Co., Wigan

EXPLOSIVES (PERMITTED)
Curtis's and Harvey Ld., Cannon-st. House, E.C.

FANS (AIR PROPELLER)
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

FANS (EXHAUST)
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

FANS (VENTILATING)
Alldays & Onions Pneumatic Engineering Co. Ld, Birmingham
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

FEED-WATER FILTERS
Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

FEED-WATER HEATERS
Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Royles Ld., Irlam, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

FERRO-CONCRETE CONSTRUCTIONS
Yorkshire Hennebique Contracting Co. Ld., Leeds

FILES
Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

FILTERS (OIL)
Pulsometer Engineering Co. Ld., Reading
Royles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

FILTERS (WATER AND GREASE)
Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Royles Ld., Irlam, Manchester
Wright, Joseph, and Co., Tipton

FIRE APPLIANCES
Fell, C. A., Dronfield, near Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

FIRECLAY GOODS
Witton Firebrick Co. Ld., Darlington

FIREWOOD MACHINERY
Glover, M., and Co., Holbeck-lane, Leeds

FIRELIGHTER MACHINERY
Glover, M., and Co., Holbeck-lane, Leeds

FISHPLATES
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

FITTINGS (IRON AND STEEL)
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

FORCED DRAUGHT
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
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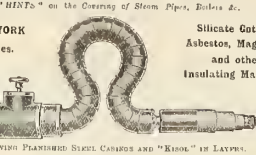

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BIRMINGHAM.

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d., Sheffield

ford
Co. Ld., Chorley
d., Sheffield
oor Ironworks, Bradford
Midland Works, Sheffield
Ld., Newport
., Wigan
Tipton
. Sheffield

Ld., Bradford, Yorks.
, Castleton, Manchester
Ld., St. Helens, Lancs.
London Wall Bldgs., E.C.
.d., Nailsworth, Glos.
Co. Ld., Wakefield
Tipton
rich
Pendleton, Manchester
dley
Ironworks, Wigan
Ld., Wigan
Brook Foundry, Wigan
Tipton

Chapel-en-le-Frith

r Sheffield
d Nottingham
Dept. 11, Blackburn
Bradford

ecar Foundry, Leeds
Ld., Newport
ion-place, Leeds

tic Engineering Co. Ld.,

Little Hulton, Bolton
nslet, Leeds
eford, Nottingham
ronworks, Wigan

tic Engineering Co. Ld.,

rcester and Manchester
nslet, Leeds
ronworks, Wigan
d., Wigan

Queen Victoria-st., E.C.
Cannon-st. House, E.C.
rby) Ld., Derby
us Co. Ld., Cinderford
., Glasgow

veston-st., Westminster
tric and Manufacturing

eck-lane, Leeds
neering Co. Ld., Notts
ln
orks, Birmingham

ic Engineering Co. Ld.,

and Bye-Product Co.,

tric and Manufacturin

and Bye-Product Co.,

nchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Tipton

Gas Valves
Haslam and Schontheil Ld., Bristol

Gauge Glasses
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Royles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Hopkinson, J., and Co. Ld., Huddersfield
Royles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gear (Special for Motor Lorries Cars &c.)
Brown, David, & Sons (Hudd.) Ld., Huddersfield

Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroën, André, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Leech, Goodall & Co., Hunslet, Leeds
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Rods Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Leech, Goodall & Co., Hunslet, Leeds
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, B., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Younge, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hoists
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Bleichert, A., and Co., 99-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Younge, Ryland-street Works, Birmingham

Hooks or Links (Safety)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Loampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds

Hoppers—continued
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Northern Rubber Co., The Wicker, Sheffield
Norton's (Tividale) Ld., Tipton
Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Hose (Coal-Cutter)
Northern Rubber Co., The Wicker, Sheffield

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Leech, Goodall & Co., Hunslet, Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Younge, Ryland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hydrometers
Davis, John, and Son (Derby) Ld., Derby

Incline Rollers
Bagnall, W. G., Ld., Stafford
Leech, Goodall & Co., Hunslet, Leeds
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Northern Rubber Co., The Wicker, Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
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Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Hardy Patent Pick Co. Ld., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwell Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Byland-street Works, Birmingham

Jointing Cement
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

Jointing (Sheet)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Joists (Rolled Steel)
Heenan and Froude Ld., Worcester
Renton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Keps (for Winding Cages)
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Lamp Cleaning Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Gauze Brushes
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Glasses
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Oil Filling Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Re-Lighting Apparatus (Underground)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Arc)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Heslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Lamps (Electric)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

Lamps (Electric Safety)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Pope, Ed., Ld., Belvedere Works, Belvedere, Kent
Photos Miner's Electric Lamp Ld., Queen's-road, Battersea
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Miners' Safety)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Outdoor)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

Lathes
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

Leather Appliances

Lessons by Post
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

Lifting and Hoisting Tackle
Renton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Byland-street Works, Birmingham

Lighting Conductors
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Shaw, John, Ld., Sheffield
Theedam, E. C., Ld., Dudley

Locknut Washers
Renton, B. M., and Co., Sheffield

Loose Collars
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster S.W.

Lubricators
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Boyles Ld., Irlam, Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Machinery (Second-hand)
Bute Works Supply Co. Ld., Cardiff
Foot, H. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Renton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

Machine Tools
Foot, H. G., & Co., 11, Queen Victoria-street, E.C.
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

Mathematical Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mechanical Stokers
Bennis, Ed., and Co. Ld., Little Hulton, Bolton

Metal Perforators
Barns, W., & Son, Queensland-road, Holloway, N
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

Metallic Packing
United States Metallic Packing Co. Ld., Soho Works, Bradford

Meteorological Instruments
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mills (Grinding)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

Mining Dials
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mining Machinery
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Hurd Coal-Cutter and Engineering Co. Ld., 168 St. Vincent-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Mining Tools
Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

Motors
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

Motor Starters
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Motor Vans and Wagons
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Alley and MacLellan Ld., Polmadie, Glasgow
Avonside Engine Co. Ld., Bristol
Foot, H. G., & Co., 11, Queen Victoria-street, E.C.

Nails, Spikes, &c.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Frost, Albert, and Co., Howard-street, Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Renton, B. M., and Co., Midland Works, Sheffield

Office Furniture and Appliances
Glover, M., and Co., Holbeck-lane, Leeds
Thornton, A. G., Ld., King-st. West, Manchester

Oil Bottles
Baker, John, and Son, Bilston, Staffs
Theedam E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Cabinets
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Switches
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Oils and Lubricants
Ackroyd and Best Ld., Morley, nr. Leeds
Asbestos and General Paint Co. Ld., Birmingham
Gaunt and Hickman, Oil Works, Wolverhampton
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., & Co. Ld., 23, Southwark-st., E.C.

Overhead Travellers
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Spencer and Co. Ld., Melksham, Wilts
Tangyes Ld., Cornwall Works, Birminpham
Youngs, Byland-street Works, Birmingham

Overwinding Gear
Barclay, Andrew, Sons and Co. Ld., Kilmarnock,
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Leech, Goodall & Co., Hunslet, Leeds
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Oxygen Manufacturers
British Oxygen Co. Ld., Elverton-st., Westminster
Knowles Oxygen Co. Ld., Wolverhampton

Packing (Engine)
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Green and Boulding Ld., London, E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Mudford, J. H., & Sons, 55, Exchange-st., Sheffield
Northern Rubber Co., The Wicker, Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Paint
Asbestos and General Paint Co. Ld., Birmingham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Kalbitum Paint Co. Ld., Belvedere, Kent
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

Paint (Fireproof)
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent

Patent Agents
Harris & Mills, 34 & 35, High Holborn, London
Radford, H. H., Son, and Squire, Sheffield

Pedestals
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.

Perforated Plates
Barns, W., & Son, Queensland-rd., Holloway, N.
Firth, William, Ld., Leeds
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Hodson, Thomas, Ld., Coatbridge, N.B.
Norton's (Tividale) Ld., Tipton
Theedam, E. C., Ld., Dudley

Picks and Shovels
Baker, John, and Son, Bilston, Staffs
Fell, C. A., Dronfield, near Sheffield
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Midland Works, Sheffield
Theedam, E. C., Ld., Dudley

Pinions
Cort, Arthur & Co., 303½, Camberwell-rd., London

Pinions (Raw Hide and Paper)
Bridge, David, & Co. Ld., Castleton, Manchester
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan

Pipe Joint Paste
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Pipes (Steam and Water)
British Mannesmann Tube Co. Ld., London Wall
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Isca Foundry Co., Newport, Mon.
Lewis, Edwin, and Sons, Wolverhampton
Pulsometer Engineering Co. Ld., Reading
Russell, John, & Co. Ld., Alma Tube Wks., Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Nile-st., Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

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Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

Piston Springs
Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

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Bute Works Supply Co. Ld., Bute Docks, Cardiff
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Heenan & Froude Ld., Worcester
Henderson and Glass, Liverpool
Lewis, Edwin, and Sons, Wolverhampton
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Spencer, John, Ld., Globe Tube Works, Wednesbury
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton

Pit Props (Wood)
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British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Osbeck and Co., Newcastle-on-Tyne

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Hardy Patent Pick Co. Ld., Sheffield

Pit Water Gauges.
John Davis & Son (Derby) Ld., Derby

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Theedam, E. C., Ld., Dudley

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Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Stewarts & Lloyds Ld., Birmingham & Glasgow
Stringer, John, and Son, Dept. 11, Blackburn

Points and Crossings
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Firth, William, Ld., Leeds
Heenan & Froude Ld., Worcester
Isca Foundry Co., Newport, Mon.
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Ld., Albion Works, Sheffield

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Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford
Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, and Sons Ld., Darlington

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Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Mining School, Porth, Glam.

Preservative (for Plant)
Kalbitum Paint Co. Ld., Belvedere Works, Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Publications
Colliery Guardian Co. Ld., 30 & 31, Furnival-st., Holborn, London, E.C.
Griffin, Charles, and Co. Ld., London, W.C.
Southern, T. A., Universal Mining School, Cardiff

Pulley Blocks
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Hardy Patent Pick Co. Ld., Sheffield
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Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Byland-street Works, Birmingham

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Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Frost, Albert, and Co., Sheffield
Humble, Stephen, 9, Victoria-st., London, S.W.
Jardine, John, Deering-street, Nottingham
Llewellyn and Cubitt Ld., Pentre, H.S.O. Glam.
Spencer and Co. Ld., Melksham, Wilts
Thompson and Southwick Ld., Tamworth
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

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Head, Wrightson and Co. Ld., Stockton-on-Tees
Llewellyn & Cubitt Ld., Pentre, H.S.O., Glam.
Spencer and Co. Ld., Melksham, Wilts
Thompson and Co., Wigan
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

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Daglish, Robert, and Co. Ld., St. Helens, Lancs

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Northern Rubber Co., The Wicker, Sheffield
United States Metallic Packing Co. Ld., Soho Works, Bradford
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Bailey, W. H., and Co. Ld., Salford, Manchester
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British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Cameron, John, Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, John, and Son (Derby) Ld., Derby
Evans, Joseph, & Sons (Wol. Ld.) Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Isca Foundry & Engineering Co., Newport, Mon.
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, H.S.O., Glam.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co. Ld., West Gorton, Manchester
Phillips, C. D., Newport, Mon.
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.
Wood, John, & Sons Ld., Brook Foundry, Wigan

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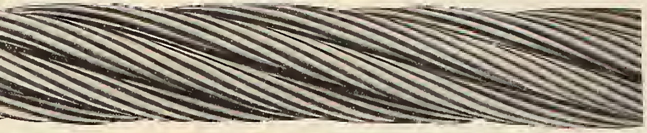

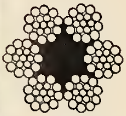

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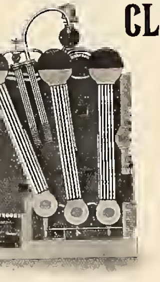

Boiler, "Woodeson" Patents,
atent Superheater and Stoker
the Underfeed Type.

CLARKE, CHAPMAN & CO. LTD.,

Victoria Works,

GATESHEAD.

GENERAL AND ELECTRICAL ENGINEERS

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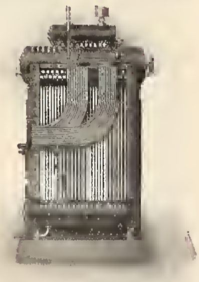

Sectional view of Boiler showing Superheater in position.

Purchasers' Guide to Advertisers' Specialities—(continued).

)
house Electric and Manufacturing
nchester
t Ld., Manchester
neering Co. Ld., Reading
Vulcan Ironworks, Wigan

Pneumatic Engineering Co. Ld.,

rnwall Works, Birmingham
street, Birmingham

Pneumatic Engineering Co. Ld.,

Ld., Leeds
ck Co. Ld., Sheffield
Koppel—Arthur Koppel (Amal-
, Clements-lane, London, E.C.
nd Co., Midland Works, Sheffield
rnwall Works, Birmingham
Ld., Dudley

CHINES

Koppel—Arthur Koppel, (Amal-
, Clements-lane, London, E.C.
street Works, Birmingham

STEEL)

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pply Co. Ld., Cardiff
Ld., Leeds
Ld., Coronation Bldgs., Sheffield
Koppel—Arthur Koppel (Amal-
, Clements-lane, London, E.C.
eral Engineering Co. Ld., Notts
nd Co., Midland Works, Sheffield
d., Leeds Steel Works, Leeds
eel and Coal Co. Ld., Stoke-on-
.
mas, and Sons Ld., Darlington
Limited, Albion Works, Sheffield

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nd Sons (Tipton) Ld., Tipton
ilway Carriage and Wagon Co.
ick, Birmingham
h Wales Railway Wagon Co. Ld.,

o. Ld., Rotherham
ply Co. Ld., Cardiff
Wagon Co. Ld., Chorley
ck Co. Ld., Sheffield
Ld., Worcester
orks, Wagon Co. Ld., Heywood
nd Engine Co. Ld., Lincoln
Ld., Coronation Bldgs., Sheffield
y Carriage and Wagon Co. Ld.
ks Birmingham
d., Railway Works, Peterboro'
Koppel—Arthur Koppel (Amal-
, Clements-lane, London, E.C.
lwell, Nottingham
., Darlington
. Ld., Springs Branch, Wigan

Co. Ld., Bristol
way Carriage and Wagon Co. Ld.,
Birmingham
o. Ld., Rotherham
ply Co. Ld., Bute Docks, Cardiff
Ld., Leeds
ck Co. Ld., Sheffield
and Co. Ld., Stockton-on-Tees
Ld., Worcester
Engineering Co., Newport, Mon.
Ld., Coronation Bldgs., Sheffield
Carriage and Wagon Co. Ld.
ks Birmingham
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, Clements-lane, London, E.C.
nd Co., Midland Works, Sheffield

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Thompson and Co., Wigan
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Youngs, Byland-street Works, Birmingham

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British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lincoln Wagon and Engine Co. Ld., Lincoln

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Chorley Railway Wagon Co. Ld., Chorley
Heenan & Froude Ld., Worcester
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Lincoln Wagon and Engine Co. Ld., Lincoln
Moy, Thomas, Ld., Railway Works, Peterboro'
Rigley, Wm., Bulwell, Nottingham

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Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Heenan & Froude Ld., Worcester
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Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield
Hoyles Ld., Irlam, Manchester

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Hoyles Ld., Irlam, Manchester

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Knowles Oxygen Co. Ld., Wolverhampton
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

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Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., Westminster

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Renton, S. M., and Co., Sheffield
Thoedam, E. C., Ld., Dudley
Ward, Thos. W., Limited, Albion Works, Sheffield

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Hardy Patent Pick Co. Ld., Sheffield
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Mining Engineering Co. Ld. (The), Sheffield
Stephens, H., and Son, Carn Brea, Cornwall

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Wood, John, and Sons Ld., Wigan

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Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton

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Kenyon, Wm., & Sons Ld., Dukinfield
Mudford, J. H., & Sons, 55, Exchange-st., Sheffield

ROPES (DRIVING)
Kenyon, W., & Sons Ld., Dukinfield Manchester

ROPES (HEMP AND MANILLA
Mudford, J. H., & Sons, 55, Exchange-st., Sheffield

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Wakefield, C. C., and Co., 27, Cannon-street, E.C.

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Cooke, William and Co. Ld., Tinsley, Sheffield
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Glover, Wm. Jas., and Co., St. Helens, Lancs.
Haggie Brothers Ld., Gateshead-on-Tyne
Latch and Batchelor Ld., Hay Mills, Birmingham
Shaw, John, Ld., Sheffield
Thompson and Co., Wigan

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Tickle Brothers, Vulcan Ironworks, Wigan

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Hopkinson, J., and Co. Ld., Huddersfield
Lancaster and Tonge Ld., Pendleton, Manchester
Royles Ld. Irlam, Manchester

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Appleby, E. G., and Co., 10, Victoria-street, Westminster
Glover, M., and Co., Holbeck-lane Leeds

SCOOPS FOR COAL AND COKE
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Hardy Patent Pick Co. Ld., Sheffield
Thoedam, E. C., Ld., Dudley

SCREENING
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Hardy Patent Pick Co. Ld., Sheffield
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Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

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Norton's (Tividale) Ld., Tipton
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Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

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Phillips, C. D., Newport, Mon.
Spencer and Co. Ld., Melksham, Wilts
Tickle Bros., Vulcan Ironworks, Wigan
Uskside Eng. Co. Ld., Newport Mon.
Wright, Joseph, and Co., Tipton

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Lewis, Wm., and Son, Bilston, Staffs.
Thoedam, E. C., Ld., Dudley

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Kenyon, Wm., & Sons, Ld., Dukinfield
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

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British Insulated and Helsby Cables Ld., Lancs.
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Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Haslam and Schontheil Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

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Fell, C. A., Dronfield, near Sheffield
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Sheffield
Thoedam, E. C., Ld., Dudley

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Fell, C. A., Dronfield, near Sheffield

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Bagnall, W. G., Ld., Stafford
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Summerson, Thomas, & Sons Ld., Darlington
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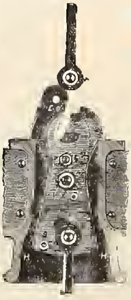
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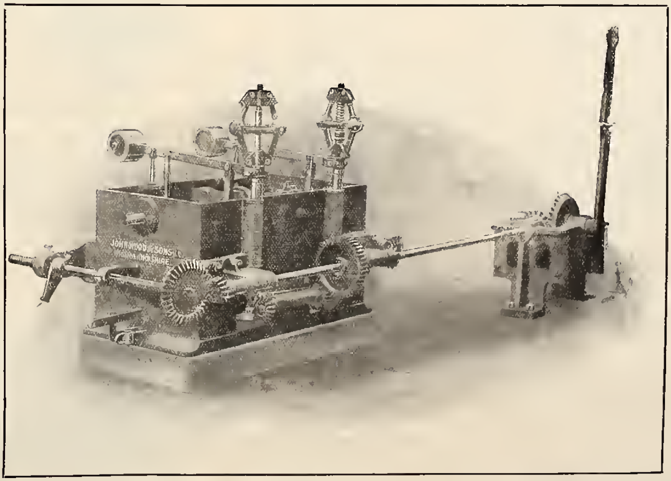

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For Sale, 16 in. cylinder Horizontal STEAM ENGINE, by Tangye, 8 ft. belt flywheel and high-speed governors; low price, room wanted.—**WILLIAMS & SONS**, South Bermondsey Station, London.

For Sale, 50-H.P. Diesel Oil Engine, by Diesel Engine Co., new 1911, for belt drive or direct coupling to dynamo; just dismantled, immediate delivery; low price for quick sale.—**WILLIAMS & SONS**, South Bermondsey Station, London.

For Sale, 7½ in. Plunger Vertical Three-throw PUMPS, direct driven by 9 in. cylinder Vertical Engine; set of 5½ in. ditto, motor driven, 100 volts 141 amps., by Hayward Tyler, suitable for boiler feed, low price.—**WILLIAMS & SONS**, South Bermondsey Station, London.

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50 ten-ton 25 eight-ton Railway Coal WAGONS for disposal; sale or hire; in smaller quantities if required; commission paid for introducing customers.—Write, **"C. M. C.,"** care of Gould's, 54, New Oxford-street, W.C.

For Sale at low price, one 250-kw. ELECTRIC GENERATING SET, 210 volts, one 175-kw. do., 250 volts, and one 52-kw. do., 210 volts; in excellent order.—Particulars on application to **Box 5016**, *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

Wanted, pair Hauling Engines, 18 in. to 20 in. diameter cylinders, with single drum about 4 to 5 ft. diameter on tread, fitted with strong brake gear.—**Box 5019**, *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

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One	ditto	26 ft. by 7 ft.,	,,	90 lb.	,,
Two	ditto	20 ft. by 6 ft.,	,,	80 lb.	,,
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Wanted, pair Horizontal Engines, 30 to 35 in. cylinders, 5 ft. stroke, with heavy flywheel.—**Box 5035**, *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

PROPERTIES.

BOARD OF EDUCATION.
(WELSH DEPARTMENT).
NOTICE.

In the Matter of the SWANSEA INTERMEDIATE AND TECHNICAL EDUCATION FUND in the County Borough of SWANSEA;
In the Matter of the Charitable Trusts Acts, 1853 to 1894, and
In the matter of the Board of Education Act, 1899, and the Board of Education (Powers) Orders in Council, 1900 to 1902.

By direction of the Board of Education, NOTICE is hereby given that the Council of the County Borough of Swansea being the Governing Body of the above-mentioned Foundation propose to grant a LEASE of the minerals underlying the Property mentioned in the Schedule hereto for a term of 60 years upon the following terms and conditions viz:—

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Further particulars may be ascertained from the Town Clerk, Swansea.

Any objection or suggestion relative to the proposed Lease may be transmitted to the Board in writing, within 15 days from the first publication of this Notice, addressed to "The Secretary, Welsh Department, Board of Education, Whitehall, London, S.W.

Dated 28th November, 1912. **ALFRED T. DAVIES,**
Permanent Secretary.

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The Farm and Lands known as Aber Farm situate in the Parishes of Llandyfodwg and Llangeinor in the County of Glamorgan and containing an area of 645 acres 3 roods 25 poles or thereabouts.

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Where possible, information will be given in these columns when appointments advertised have been filled up.

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Assistant Surveyor Wanted for large South Yorkshire Collieries, applicants must be certified under the Coal Mines Act, and have thorough knowledge of surface and underground surveying.—Applications, stating age, experience, and salary required, to be addressed **Box 5021**, *Colliery Guardian* Office, 30 & 31, Furnival-street, Holborn, London, E.C.

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Brattice Cloth.—Gentleman Wanted with influence amongst colliery managers and proprietors, to sell BRATTICE CLOTH on good commission only.—Address, **FAIRCLOUGH & SONS**, Bank-lane, Clayton, near Manchester.

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4, Mount Stuart-square, Cardiff,
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⁂ *For* **later Advertisements** *and* **Scale of Charges**, *see* **Page 1150 (Leader Page).**

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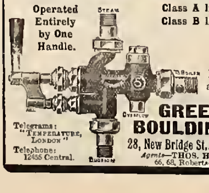

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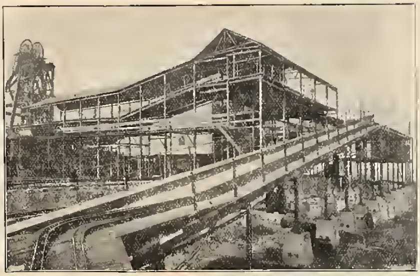

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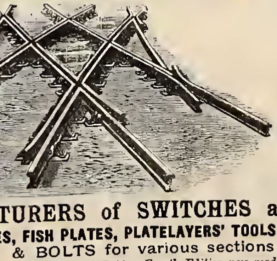

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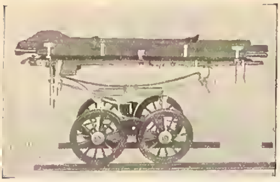

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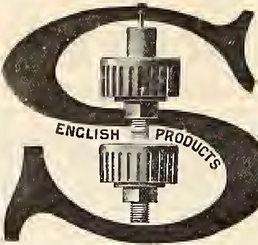

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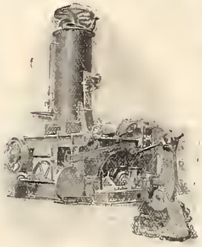

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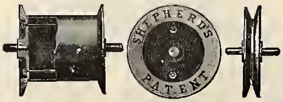

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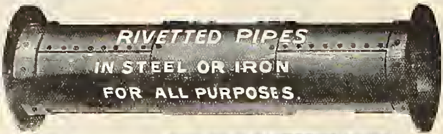

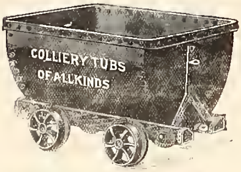

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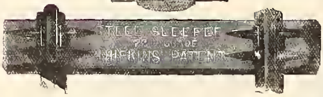

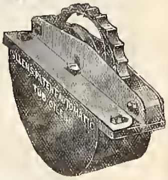

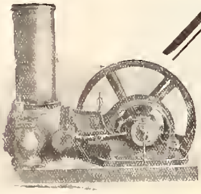
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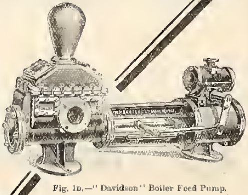
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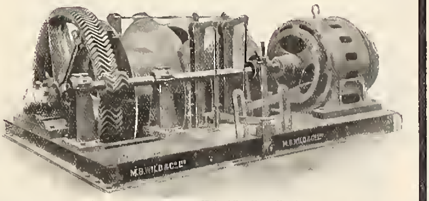

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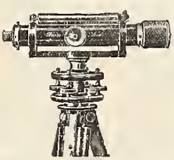

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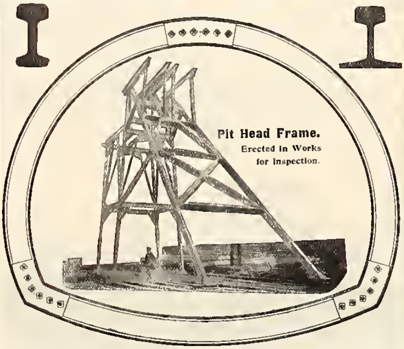

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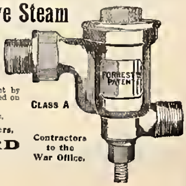

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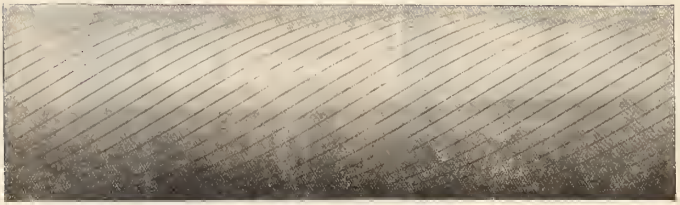
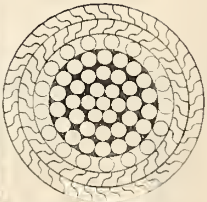
SECTION "A."





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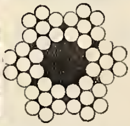

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THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

FRIDAY DECEMBER 13, 1912 No. 271 .

IPMENT OF THE SHELTON COAL COMPANY'S WORKS.

he Shelton Iron, Steel and Coal Stoke-on-Trent, are of considerable ines, collieries, coke ovens, blast- nills. The main works is situated xiliary works, including a forge, at of the size of the company's ered from the fact that the view corner of the Etruria works, the n of which is being gradually ost recent development in the rification of the plant will be t article, which has been compiled lied to us by Messrs. the British c and Manufacturing Company

contains a forge and four mills— a 16 in., a 12 in., and a 10 in. mill. r with much of the auxiliary nection with them, such as saws, were until recently steam-driven, rated by 14 Lancashire boilers used waste heat from the heating aining five were hand-fired. By boilers, and substituting electric smaller mills and the auxiliary ated that a considerable financial provided that the electricity could rime mover deriving its motive r source of waste heat. This was ust steam from the reversing Etruria.

nes driving the 32 in. mill at ylinder simple non-condensing g engine having 42 in. by 60 in., gine 50 in. by 60 in. cylinders. pplied with steam at about 120 lb. ure and 120 degs. superheat by rs, seven of which are hand-fired, the waste heat from the heating nes exhaust into a riveted steel ves the exhaust from four small e whole of the exhaust steam is use separator, and is thence con- tion by a 36 in. riveted steel pipe, banks and canal, as shown in erior view of the power station. pe leads to an accumulator con- of Mr. P. J. Mitchell, one end of it being visible in fig. 2. This accumulator is capable of supplying steam to the turbine when running at full load, for periods of one minute, during which there is a cessation in the supply of exhaust steam from the mill engines. Steam from the accumulator is supplied to a Wright's heater-softener through a control valve, which maintains a very slight pressure in the heater. Part of the boiler-feed water is taken from the circulating water system through the heater-softener, the remainder being discharged from the surface condenser as distilled water.

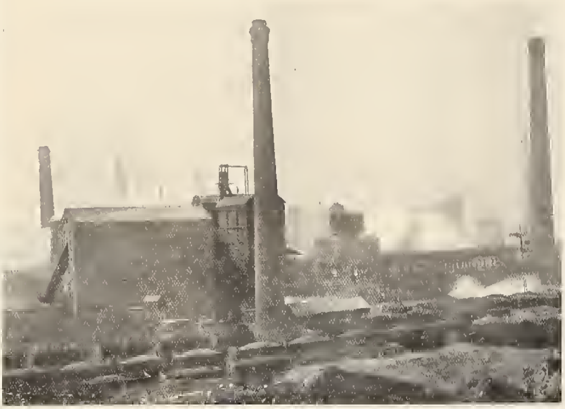
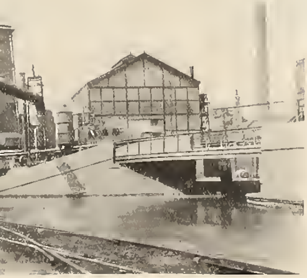


Fig. 1.—Part of the Shelton Property showing Coal Washery, Motor-Driven Aerial Ropeway, Coke Ovens, Blast Furnaces, &c.



—Exterior of Turbine Power House.

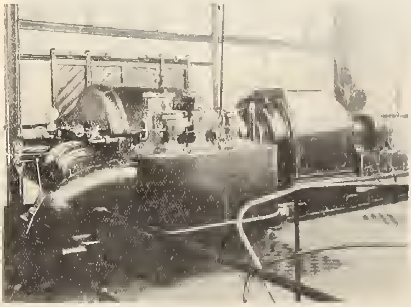


Fig. 3.—Mixed-Pressure Westinghouse Rateau Impulse Turbo-Alternator set in Power-House.

Since the continuity of the supply of exhaust steam from the mill engines is very erratic, it often happens that the full demand of the turbine and the capacity of the accumulator are exceeded, when much steam would blow to waste. As much use as possible has been made of these excesses in the plant under review, some of the surplus steam being utilised to heat the feed water. Two tanks (shown in fig. 2, with conical tops) are provided, each with a capacity of 650 gallons. The water for the boilers is taken from the condenser circulating water, and is passed through these tanks in series on its way to the heater softener. Into each of these tanks is taken a pipe from the accumulator, perforations being drilled in these pipes at such a level below the water in the tanks that the pressure due to the head of water above the perforations is just exceeded by that at which the relief valve on the accumulator itself is raised. Thus, the water in the tanks is thoroughly heated at each peak in the exhaust steam supply, whilst at the same time the call for live steam for heating purposes is much reduced. The actual temperature of the water at the feed pumps, maintained by these means, varies between 190 and 200 degrees Fahr.

STRIKES AND LOCK-OUTS IN THE MINING AND QUARRYING INDUSTRIES IN 1911.

Mr. G. S. Barnes, of the Labour Department of the Board of Trade, in the Twenty-fourth Report on Strikes and Lock-outs and on Conciliation and Arbitration Boards in the United Kingdom, says the year 1911, like its predecessor, was marked by considerable industrial disturbance. The total number of workpeople involved in disputes which commenced during the year was 961,980, the highest number recorded in any year during the period 1893-1911, and the aggregate duration (10,319,591 working days) of all the disputes in progress during the year has been exceeded only in 1893, 1897, 1898 and 1908. Of the aggregate duration of disputes in progress in 1911, the transport trades accounted for 2¾ million working days, and the textile trades for 1½ million working days, while a further 2 million working days were lost in 1911 by a coalmining dispute which commenced in 1910. The principal causes of disputes beginning in 1911 were questions of wages and of trade unionism, the former involving 46 per cent. of all the workpeople directly affected by disputes, and the latter 39 per cent. For the high proportion of workpeople involved in disputes in which the chief object was the assertion or defence of trade union principles, the general strike of railway servants and the lock-out in the cotton trade were mainly responsible. Settlements in the nature of a compromise were arranged in the case of 84 per cent. of the total number of workpeople directly affected by all disputes; less than 7 per cent. of the workpeople were wholly successful, and rather more than 9 per cent. were wholly unsuccessful. Conciliation or mediation entered very largely into the settlement of the big disputes of the year, the total number of workpeople directly involved in disputes in which settlements were effected in 1911 by conciliatory efforts under the Conciliation Act, 1896, and in other ways being 348,333. Settlements by arbitration affected only 7,435 workpeople. As in other recent years, many disputes were settled in 1911 by conciliation or arbitration without stoppage of work, the number of cases settled by voluntary permanent boards of conciliation and standing joint committees showing an increase for the fourth year in succession.

In the mining and quarrying industries the aggregate duration of disputes commencing in 1911 shows a considerable diminution when compared with the two previous years. Coalmining disputes, however, which began before 1911 and continued into that year accounted for a further 2½ million days, 2 millions of which were due to a prolonged dispute in the Rhondda Valley which began in September 1910, and, involving over 12,000 coalminers in November, continued until the end of August 1911.

Disputes arising on other questions affecting hours of labour were reduced to a normal level in 1911 as compared with 1909 and 1910, in which years many disputes arose out of the re-arrangements found to be necessary as a result of the introduction of the Coal Mines Regulation Act, 1908.

Table A shows the causes and results of disputes in 1911 in the mining and quarrying industries. Disputes involving less than 10 workpeople, and those which lasted less than one day, have been omitted, except when the aggregate duration exceeded 100 working days.

Taking coalmining only, we have the following:—

DISPUTES BEGINNING IN 1911.

Result.	No. of disputes.	No. of workpeople directly involved.	Aggregate duration in working days. Disputes beginning in 1910.	Disputes in progress.
In favour of workpeople	43	17,276	90,533	147,347
In favour of employers	59	22,351	510,525	38,420
Compromised	67	26,765	780,951	2,293,394
Indefinite or unsettled	1	270	860	202,953
Total	170	66,662*	1,382,869	2,682,114

Method of settlement.	No. of disputes.	No. of workpeople directly involved.
By direct arrangement or negotiation between the parties or their representatives	144	59,520
By arbitration	5	1,452
By conciliation or mediation	3	1,408
By return to work on employers' terms without negotiation	14	3,600
By replacement of workpeople	—	—
By closing of works	3	412
Indefinite	1	270
Total	170	66,207

* 72,550 persons were also indirectly involved.

The following shows the number of workpeople involved and the aggregate duration, in working days, of disputes in the mining and quarrying groups, classified according to district:—

District.	No. of workpeople directly and indirectly involved in disputes beginning in 1911.	Aggregate duration in working days. Disputes beginning in 1911.	Disputes in progress at beginning of 1911.
Northern counties	35,821	140,307	14,000
Yorkshire	28,044	322,655	7,839
Lancs. and Cheshire	14,355	195,308	149,052
N. and W. Midland counties	24 004	174,583	—
S. Midland and E counties	—	—	—
S. and W. counties	900	1,300	—
Wales & Monmouth	28,157	411,781	2,511,223
East Scotland	44	816	—
West Scotland	7,887	136 119	—
Ireland	—	—	—
Total	139,212	1,382 869	2,682,114

The next table shows the number of disputes in the mining and quarrying industries, together with the workpeople involved, and the aggregate duration in working days in each of the past ten years:—

Year.	No. of disputes beginning in year.	Total No. of workpeople involved.	Total No. of workpeople indirectly involved.	Aggregate duration in working days. Disputes beginning in 1911.	Disputes in progress at beginning of year.
1902	168	85,517	123,009	2,218,326	331,721
1903	125	49,995	13,583	692,178	705,720
1904	113	26,131	20,156	533,703	123,582
1905	106	34,069	10,722	1,167,340	88,174
1906	96	64,056	19,777	620 764	202,338
1907	112	35,629	16,938	466,526	102,535
1908	145	60,474	26,548	1,271,979	79,450
1909	207	149,576	123,178	2,056,170	173,317
1910	224	205,283	91,290	5,263,139	261,021
1911	179	68,207	72,601	1,419,162	2,682,114

Conciliation and Arbitration.

An outstanding feature of the disputes brought to an end by conciliatory agencies in 1911 was the great predominence in the number of cases settled by conciliation over those settled by arbitration. The number of disputes settled under the Conciliation Act, 1896, in 1911 was the highest recorded for any year since the Act came into force, while the number of workpeople directly affected by these cases was nearly double that involved in such disputes settled in 1910. Settlements by boards dealing with particular trades were less numerous than in 1909 and 1910, but the number of cases settled by other voluntary conciliation machinery and by individuals was greater in 1911 than in any of the preceding nine years, and the number of workpeople directly affected was larger than in any of the other years except 1908.

The number of voluntary permanent conciliation and arbitration boards and standing joint committees known to have taken action in 1911 was 126, and the number of cases considered by them was 4,543 as compared with 1,971 cases considered by 109 boards in 1910. Of the 4,543 cases considered in 1911, 3,259 were settled by the boards or their committees, and 289 by umpires or arbitrators appointed by them. Of the total number of disputes thus settled by the instrumentality of the boards, only 13 involved a stoppage of work, of which 6 occurred in the coalmining industry. In 789 cases the questions in dispute were withdrawn, ruled out of order, or settled independently, in 26 cases they were referred to higher boards, and the remaining 180 cases were still under consideration at the end of the year.

During 1911 a board of conciliation was formed for the coal trade of Derbyshire (exclusive of South Derbyshire). On the other hand, at the beginning of 1912 it was reported that the board for the coal trade of Northumberland had ceased to exist.

The agencies for voluntary conciliation and arbitration in the coalmining industry may be divided into three classes, viz., (1) boards which deal only with the general level of wages over a large area, (2) boards which not only settle general changes in wages but also deal with wages and other disputes of a general or local character, and (3) joint committees which deal only with disputes not involving a general rise or fall in wages. The first class now consists of two important boards, viz., one for the Federated districts of England and Wales and one for Scotland, neither of which was called upon to deal with general wages questions in 1911. The Board of Conciliation for the Coal Trade of Northumberland was also included in this class, but its existence terminated on August 15, 1911, at the expiration of six months' notice given by the workmen. Of the boards comprising the second class, 5 only considered cases in 1911, viz., those for Durham, Cumberland coal, Cumberland coke, Monmouthshire and South Wales, and Scotland (enginemen only), respectively. The most important of the joint committees

TABLE A.—CAUSES AND RESULTS OF DISPUTES IN 1911—MINING AND QUARRYING INDUSTRIES.

Principal cause or object.	Number of disputes.	Number of workpeople directly involved in disputes beginning in 1911, the results of which were— In favour of workpeople.	In favour of employers.	Compromised or partially successful	Indefinite.	Total directly involved.	Total indirectly involved.	Total aggregate duration* in working days.
Wages:—								
For increase	36	2,389	3,108	7,063	—	12,560	27,676	407,648 *78,566*
Against decrease	10	266	385	90	—	741	62	28 675 *7,839*
As to system of payment of wages	7	257	1,327	88	—	1,672	1,266	10,403
Readjustment of rates of payment on account of difficulties or ease in working, quality of materials, &c.	33	910	2,032	5,979	—	8,921	5,828	477 455 *2,435,857*
Other	20	554	2,684	1,988	—	5,226	12 287	77,692
Total	106	4,376	9,536	15,208	—	29,120	47,119	1,001,873 *2,522 262*
Hours of labour:—								
For decrease	2	—	156	—	—	156	—	942
Against increase	1	—	—	508	—	506	207	715
As to arrangement of hours	4	600	178	1,200	—	1,978	2,022	12,940
Total	7	600	334	1,708	—	2,642	2,229	14,597
Employment of particular classes or persons:—								
For reinstatement of discharged workpeople	13	1,186	3,331	3,590	—	8,107	8,048	44 463
Against employment of certain officials	4	—	1,031	1,580	—	2,611	1 671	62,298
Other	6	930	1,532	—	—	2,462	2,999	138 459
Total	23	2,116	5,894	5,170	—	13,160	12,718	245 220
Working arrangements, rules and discipline (other than above):—								
For change in existing arrangements	12	294	1,929	2,161	270	4,654	4,079	57,655 *138 092*
Against change in existing arrangements	8	2,460	247	540	—	3,247	2,104	31,083
Other	9	200	3,346	1,967	—	5,513	2,732	19,402
Total	29	2,954	5,522	4,668	270	13,414	6,915	108 140 *138,092*
Trade unionism	11	7,396	382	148	—	7,926	368	41,153 *21,760*
Sympathetic disputes	2	—	1,364	500	—	1,864	552	4,374
Miscellaneous	1	—	61	—	—	61	700	3,805
Grand total	179	17,442	23,093	27,402	270	68,207	72,601	1,419,162 *2,682 114*

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* The roman figures show the aggregate duration in 1911 of disputes which began in that year; those in italics show the aggregate duration in 1911 of disputes which began before that year but were still in progress in 1911. The aggregate duration is computed on the basis of the total number involved, directly or indirectly.

D LOCK-OUTS IN THE MINING RYING INDUSTRIES IN 1911.

es, of the Labour Department of the n the Twenty-fourth Report on Strikes nd on Conciliation and Arbitration ited Kingdom, says the year 1911, like vas marked by considerable industrial e total number of workpeople involved h commenced during the year was hest number recorded in any year 1893-1911, and the aggregate duration ng days) of all the disputes in progress has been exceeded only in 1893, 1897. Of the aggregate duration of disputes 1, the transport trades accounted for ng days, and the textile trades for ng days, while a further 2 million e lost in 1911 by a coalmining dispute d in 1910. The principal causes of g in 1911 were questions of wages and of he former involving 46 per cent. of all lirectly affected by disputes, and the t. For the high proportion of work- n disputes in which the chief object or defence of trade union principles, e of railway servants and the lock-out ade were mainly responsible. Settle- ture of a compromise were arranged in cent. of the total number of workpeople y all disputes; less than 7 per cent. of ere wholly successful, and rather more ere wholly unsuccessful. Conciliation ered very largely into the settlement tes of the year, the total number of tly involved in disputes in which effected in 1911 by conciliatory efforts iation Act, 1896, and in other ways ettlements by arbitration affected only . As in other recent years, many led in 1911 by conciliation or arbitra- page of work, the number of cases ary permanent boards of conciliation int committees showing an increase r in succession.

nd quarrying industries the aggregate utes commencing in 1911 shows a considerable diminution when compared with the two previous years. Coalmining disputes, however, which began before 1911 and continued into that year accounted for a further 2½ million days, 2 millions of which were due to a prolonged dispute in the Rhondda Valley which began in September 1910, and, involving over 12,000 coalminers in November, continued until the end of August 1911.

Disputes arising on other questions affecting hours of labour were reduced to a normal level in 1911 as compared with 1909 and 1910, in which years many disputes arose out of the re-arrangements found to be necessary as a result of the introduction of the Coal Mines Regulation Act, 1908.

Table A shows the causes and results of disputes in 1911 in the mining and quarrying industries. Disputes involving less than 10 workpeople, and those which lasted less than one day, have been omitted, except when the aggregate duration exceeded 100 working days.

Taking coalmining only, we have the following:—

Disputes Beginning in 1911.

Result.	No. of disputes.	No. of workpeople directly involved.	Aggregate duration in working days. Disputes beginning in 1910.	Disputes in progress.
In favour of workpeople	43	17,276	90,533	147,347
In favour of employers	59	22,351	510,525	38,420
Compromised	67	26,765	780,951	2,293,394
Indefinite or unsettled	1	270	860	202,953
Total	170	66,662*	1,382,869	2,682,114

Method of settlement.	No. of disputes.	No. of workpeople directly involved.
By direct arrangement or negotiation between the parties or their representatives.........	144	59,520
By arbitration	5	1,452
By conciliation or mediation...........	3	1,408
By return to work on employers' terms without negotiation...........	14	3,600
By replacement of workpeople	—	—
By closing of works................... ...	3	412
Indefinite	1	270
Total	170	66,207

* 72,550 persons were also indirectly involved.

The following shows the number of workpeople involved and the aggregate duration, in working days, of disputes in the mining and quarrying groups, classified according to district:—

District.	No. of workpeople directly and indirectly involved in disputes beginning in 1911.	Aggregate duration in working days. Disputes beginning in 1911.	Disputes in progress at beginning of 1911.
Northern counties ...	35,821	140,307	14,000
Yorkshire	28,044	322,655	7,839
Lancs. and Cheshire	14,355	195,308	149,052
N. and W. Midland counties	24 004	174,583	—
S. Midland and E counties	—	—	—
S. and W. counties...	900	1,300	—
Wales & Monmouth	28,157	411,781	2,511,223
East Scotland.........	44	816	—
West Scotland	7,887	136 119	—
Ireland..................	—	—	—
Total......... ...	139,212	1,382 869	2,682,114

The next table shows the number of disputes in the mining and quarrying industries, together with the workpeople involved, and the aggregate duration in working days in each of the past ten years:—

Year.	No. of disputes beginning in year.	Total No. of workpeople involved.	Total No. of workpeople indirectly involved.	Aggregate duration in working days. Disputes beginning in 1911.	Disputes in progress at beginning of year.
1902	168	85,517	123,009	2,218,326	331,721
1903	125	49,995	13,583	692,178	705,720
1904	113	26,131	20,156	593,703	123,582
1905	106	34,069	10,722	1,167,340	88,174
1906	96	64,056	19,777	629 764	292,338
1907	112	35,629	16,938	466,526	102,535
1908	145	60,474	26,548	1,271,979	79,450
1909	207	149,576	123,178	2,056,170	173,317
1910	224	205,283	91,290	5,263,139	261,021
1911	179	68,207	72,601	1,419,162	2,682,114

Conciliation and Arbitration.

An outstanding feature of the disputes brought to an end by conciliatory agencies in 1911 was the great predominence in the number of cases settled by conciliation over those settled by arbitration. The number of disputes settled under the Conciliation Act, 1896, in 1911 was the highest recorded for any year since the Act came into force, while the number of workpeople directly affected by these cases was nearly double that involved in such disputes settled in 1910. Settlements by boards dealing with particular trades were less numerous than in 1909 and 1910, but the number of cases settled by other voluntary conciliation machinery and by individuals was greater in 1911 than in any of the preceding nine years, and the number of workpeople directly affected was larger than in any of the other years except 1908.

The number of voluntary permanent conciliation and arbitration boards and standing joint committees known to have taken action in 1911 was 126, and the number of cases considered by them was 4,543 as compared with 1,971 cases considered by 109 boards in 1910. Of the 4,543 cases considered in 1911, 3,259 were settled by the boards or their committees, and 289 by umpires or arbitrators appointed by them. Of the total number of disputes thus settled by the instrumentality of the boards, only 13 involved a stoppage of work, of which 6 occurred in the coalmining industry. In 789 cases the questions in dispute were withdrawn, ruled out of order, or settled independently, in 26 cases they were referred to higher boards, and the remaining 180 cases were still under consideration at the end of the year.

During 1911 a board of conciliation was formed for the coal trade of Derbyshire (exclusive of South Derbyshire). On the other hand, at the beginning of 1912 it was reported that the board for the coal trade of Northumberland had ceased to exist.

The agencies for voluntary conciliation and arbitration in the coalmining industry may be divided into three classes, viz., (1) boards which deal only with the general level of wages over a large area, (2) boards which not only settle general changes in wages but also deal with wages and other disputes of a general or local character, and (3) joint committees which deal only with disputes not involving a general rise or fall in wages. The first class now consists of two important boards, viz., one for the Federated districts of England and Wales and one for Scotland, neither of which was called upon to deal with general wages questions in 1911. The Board of Conciliation for the Coal Trade of Northumberland was also included in this class, but its existence terminated on August 15, 1911, at the expiration of six months' notice given by the workmen. Of the boards comprising the second class, 5 only considered cases in 1911, viz., those for Durham, Cumberland coal, Cumberland coke, Monmouthshire and South Wales, and Scotland (enginemen only), respectively. The most important of the joint committees

A.—Causes and Results of Disputes in 1911—Mining and Quarrying Industries.

1 canse or object.	Number of disputes.	Number of workpeople directly involved in disputes beginning in 1911, the results of which were— In favour of workpeople.	In favour of employers.	Compromised or partially successful	Indefinite.	Total directly involved.	Total indirectly involved.	Total aggregate duration* in working days.
....	36	2,389	3,108	7,063	—	12,560	27,676	407,648 *78,566*
....	10	266	385	90	—	741	62	28,675 *7,839*
ayment of wages............	7	257	1,327	88	—	1,672	1,266	10,403
rates of payment on ulties or ease in working, rials, &c.	33	910	2,032	5,979	—	8,921	5,828	477 455 *2,435,857*
....	20	554	2,684	1,988	—	5,226	12 287	77,692
....	106	4,376	9,536	15,208	—	29,120	47,119	1,001,873 *2,522 262*
....	2	—	156	—	—	156	—	942
....	1	—	—	508	—	508	207	715
t of hours	4	600	178	1,200	—	1,978	2,022	12,940
....	7	600	334	1,708	—	2,642	2,229	14,597
ticular classes or persons:—								
nt of discharged work-	13	1,186	3,331	3,590	—	8,107	8,048	44 463
ent of certein officials ...	4	—	1,031	1,580	—	2,611	1 671	62,298
....	6	930	1,532	—	—	2,462	2,999	138 459
....	23	2,116	5,894	5,170	—	13,160	12,718	245 220
ents, rules and discipline ve):—								
sting arrangements	12	294	1,929	2,161	270	4,654	4,079	57,655 *138 092*
, existing arrangements...	8	2,460	247	540	—	3,247	2,104	31,083
....	9	200	3,346	1,967	—	5,513	2,732	19,402
....	29	2,954	5,522	4,668	270	13,414	8,915	108 140 *138,092*
....	11	7,396	382	148	—	7,926	368	41,153 *21,760*
s	2	—	1,364	500	—	1,864	552	4 374
....	1	—	61	—	—	61	700	3,805
totel	179	17,442	23,093	27,402	270	68,207	72,601	1,419,162 *2,682,114*

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a two or three years course, in which students were required to spend their whole time at the University, was not likely to meet with much success. Evidently a "sandwich" course may be drawn up on one of two systems, namely:—(1) Six months at the University, and six months at the mine for three or four sessions; (2) two days per week at the University for four sessions, the rest of the time being spent at the mine.

The former is the method adopted by the Engineering Department of the University of Sheffield, and it has been received with favour by some of the large engineering firms in the city. It did not appear that a similar course could be adopted advantageously for mining students, and consequently the course was drawn up for two days per week at the University for two sessions, and *either* three days per week for a third year, *or* two days per week for a third and a fourth year. Students spend the rest of their time at a mine, and a diploma is not granted, even to students otherwise qualified, unless satisfactory evidence as to their practical training is forthcoming. The subjects taught are applied mechanics, heat and heat engines, engineering laboratory, electrical engineering and laboratory, mining, mine surveying, machine drawing and construction, mining chemistry (with laboratory work), and geology.

It is evident that in a course of the kind indicated above there is no time for instruction in pure science; consequently diploma students must pass a preliminary examination in mathematics, mechanics, physics, chemistry and machine drawing, before being admitted. A special course for this purpose has been drawn up by the University, and can be taken in the "preliminary year." The course, although at first sight rather complicated, has worked well. It was introduced in 1902, and since then 116 students have been enrolled—an average of 12 per annum. It is a matter of regret that more students have not been entered for it, since most of those who have passed through appear to have derived benefit.

Lower-grade education in mining is generally provided—(1) by local mining classes in towns, villages, and at collieries in various parts of the coalfield; (2) by travelling lecturers, who visit different places in the coalfield in different winters and give courses of lectures of greater or less duration at such places; (3) by fixed centres to which the students are drawn from the neighbourhood. In each case the instruction will probably be of an elementary character only, and more advanced instruction will be given at certain selected centres.

(1) *Local Mining Classes.*—The system which the writer prefers is that of instruction in local mining classes. He has hoped, and not altogether in vain, to see such a class established at every large colliery in the West Riding of Yorkshire and in Derbyshire, and at all the towns and villages on the coalfield. Village classes may evidently be made to serve one, two or more collieries in their neighbourhood, and are particularly valuable where the neighbouring collieries are small, or where there is not sufficient interest at each colliery to establish a separate colliery class. Where such a class can be carried on under an official of one of the collieries in the immediate neighbourhood, who is competent to teach, is interested in his students, and thoroughly understands their needs, instruction can be given of a kind such as can be obtained nowhere else, and should be of the greatest interest and utility to the students. This system of local mining classes was commenced in Derbyshire in 1894, when 631 students were enrolled at 28 separate centres; in 1911, 864 students were enrolled at 28 centres, the highest figures being reached in 1910, when 902 students were enrolled at 29 centres. The average enrolment per annum taken over a period of 18 years has been 588 for 25 centres. Although the number of centres has remained fairly constant, yet the work at many of the centres has increased. Formerly the course at each centre was a single course; but many centres now take double courses. The attendance has varied during 18 years from 55 to 67 per cent. of the number of students enrolled, the average percentage probably being about 62.

The West Riding of Yorkshire did not adopt the system of local mining classes until 1898, when a commencement was made with 265 students enrolled at 10 centres in South Yorkshire. In 1911, 617 students were enrolled at 17 centres, the largest figures being in 1909, when 735 students entered at 16 centres. For 14 years the average enrolment has been 441 students, and the average number of centres 13; of late years, however, several courses have been taken at some of the centres, so that the figures given constitute a very inadequate guide to the increased activity which has taken place recently. The average attendance has been, as in Derbyshire, from 62 to 64 per cent. of the students enrolled.

The age of the students varies within wide limits, but it seems probable that on the whole it is lower than formerly. New classes generally show a larger proportion of men than classes which have been established for some years.

The writer, in his annual reports to the county education authorities, gives a statement of the occupations of the students in order to show to what extent the instruction is appreciated by those for whom it is intended. The numbers drawn from each class of workers vary from year to year; but as a rule the majority of students are drawn from those working at the coal face, on the haulage-roads, at repairing and bye-work, pony drivers, and deputies. Almost every kind of work underground and at the surface is represented, but generally the attendance of surface workers is lower in proportion to their numbers than that of underground workers, who form the majority of the students. Occasionally local schoolmasters, tradesmen, and others attend from interest in the subject.

The kind of instruction to be given in these classes is, of course, a matter of first importance. Originally the classes in Derbyshire were instructed under the old syllabus of the Science and Art Department, South Kensington. While recognising fully the great service rendered to technical education by the South Kensington authorities, the writer submits that the syllabus in mining was better suited for the instruction of young mining engineers than for the bulk of the students who attended the classes. The syllabus was too long for the time available, and there was a want of perspective—subjects of first importance to the students (ventilation and the gases, the working of coal, timbering, safety lamps, &c.) were put on the same plane as boring and sinking and other specialised subjects of less immediate importance to elementary students. Further, in the examination, questions were seldom or never set on the law relating to mining, not even on the General and Special Rules. When the introduction of local mining classes was first discovered in the West Riding, it was suggested that a new syllabus for elementary students should be drawn up to cover two years, instead of one year. The subjects selected for the first year elementary were:—Elementary ideas about geology applied to mining, the working of coal, timbering, the getting of coal, air and the gases, underground fires, ventilation, safety lamps, and winding. Those for the second year were:—Sinking, excavation of ground, underground water and pumping, haulage, and a further consideration of the following subjects taken in their first year—ventilation, systems of working coal, timbering, underground fires, and the phenomena of explosions, both those due to gas and those due to coaldust. The General and Special Rules were to be especially studied under each head. The underlying idea was to draw up a course which would be of interest to students in connection with their work underground.

It is, however, evident, and experience fully confirms this, that a subject like mining can be taught in a purely mechanical way. Students often seem to find it easier to commit facts to memory than to grasp them thoroughly, and, as it were, to absorb them, in place of merely remembering them. Now a subject like mining, in its elementary stages, has a tendency to lend itself to this mistreatment; consequently it was felt that if arithmetic and a little elementary science could be included in the syllabus, a greatly improved training would result. Accordingly, each year of the elementary course was divided into (*a*) mining and (*b*) arithmetic or science. In the first year elementary (*b*) was arithmetic and mensuration (applied as far as possible to mining); in the second year elementary (*b*) was elementary physics, mechanics and chemistry.

In spite of prophecies that students would be deterred from attending in consequence of the (*b*) portion of the syllabus, the classes carried on under it were very successful. Later on the syllabus was adopted optionally by the Derbyshire Education Committee, and recently it has been made compulsory in that county.

As years went on, the West Riding Education Committee became anxious to enlarge the syllabus, and to link the mining classes more effectively with the work of the elementary schools. Accordingly they have now organised their mining instruction in a six-years course. The first two years are taken in the "industrial" course, in which arithmetic, hand-sketching and drawing, English, and experimental science are taught. The mining student can then pass through the following courses of instruction:—Third year: (*a*) mining (with mining arithmetic); (*b*) hand-sketching and machine-drawing; (*c*) practical science: mechanics, heat and chemistry. Fourth year: (*a*) mining; (*b*) hand-sketching and machine-drawing; (*c*) practical science: applied mechanics. In each of these years of instruction four hours per week are required—namely, one hour in (*a*), one hour in (*b*), and two hours in (*c*). The fifth and sixth years comprise mining, steam, electricity and mine surveying, and are suitable rather for organised centres than for village classes.

The whole forms a very thorough course of instruction, in which not only mining, but other allied subjects, are taught. The only criticism that the writer can venture to make is that in the new syllabus the primary object of the older syllabus is somewhat obscured. The older syllabus aimed in the first instance at interesting the students in their calling, and, as far as can be done in classes, at making more efficient workmen and officials. The new syllabus, in which attendance at the practical science and drawing classes is compulsory, appears to go beyond this. A very good feature of the new course is the attempt to link the technical classes with the elementary school through the industrial course. Probably very few people realise how much knowledge is forgotten by boys in the interval between leaving school and joining a technical class.

An obvious difficulty in connection with these local mining classes is that, although the teacher may be a thoroughly practical man, he may have very vague notions of how to teach. In order to meet this, a Saturday afternoon course for mining teachers was instituted at the University of Sheffield in 1897. The course comprises two classes—(*a*) a criticism class, taken by a trained elementary schoolmaster, in which the students are taught how to arrange their subject-matter properly, and to make themselves understood—in fact, to teach; and (*b*) a demonstration class, in which instruction is given in the illustration of their teaching, and in simple experiments in chemistry, mechanics, and physics. The effect produced by attendance at this course has in many cases been surprising. On an average nine students per annum have attended the course in 15 sessions. The subjects, other than mining, included in these courses of instruction, are probably as a rule better taught by trained teachers than by those teachers best qualified to teach mining. A difficulty, however, arises in that such teachers are not acquainted with the bearing of these subjects on mining, and consequently they miss the direct practical application which is so important to the students. This could be avoided by close intercourse between the mining and the science teachers, but time and opportunity are sometimes lacking for this.

(2) *Extension Lectures.*—This was the system adopted in 1891 both in Derbyshire and in South Yorkshire. It was very soon given up in the former county, but has never been entirely abandoned in Yorkshire. It is undoubtedly the best system where the work of technical instruction in mining is entirely new, and where no teachers can be found to take local mining classes. The writer has had several years' experience of the system, and considers that the objections to it are—(*a*) there is a lack of continuity in the work; (*b*) unless the district is a small one, or the lecturer knows it very thoroughly, he never can have the same knowledge of local conditions as a local man; (*c*) at any rate, for some years the lecturer is not well known to the students, and, consequently, lacks somewhat of the influence with them that would be possessed by a person whom they know. In the West Riding, since 1892, 119 of these courses have been held, and 3,287 students have attended. The system has this advantage, that the teacher will be a man well trained in teaching, and is consequently able to give instruction better than some of the local teachers in their first year of teaching.

(3) *Fixed Centres for Elementary Students.*—This system does not differ materially from (1); it is suitable to areas in which the mining population is small, and would consequently be unable to support more than one class. The establishment of such a centre depends largely on the size of the area to be served, and facilities for communication. In any well-considered scheme of lower-grade mining education the best students in the elementary courses will be given facilities for going forward to a more advanced course, held in some place or places central to the adjacent portions of the coalfield. The University of Sheffield has two such courses, held on Saturday afternoons, one at the University, the other at Derby. The work is spread over two sessions, as follows:—First year: Mining chemistry, mechanics, mining, and machine-drawing. Second year: Mine surveying, mining, and heat and heat engines. So far these courses have been very successful, but the work is cramped for lack of time, and in the future it is to be hoped that a third year may be added.

A similar two-years course in electricity applied to mining is also held at the University on Saturday afternoons.

There can be no doubt that these Saturday courses are capable of considerable expansion, and that probably one for colliery enginewrights and mechanics would be appreciated.

The enrolment of students for these courses has been as follows:—

Centre.	Subject.	No. of sessions.	No. of students enrolled.
University of Sheffield...	Mining	21 ...	1,834
Derby	Mining	18 ...	657
University of Sheffield...	Mining electricity	13 ...	478

In recent years the enrolment of students for the Saturday mining course at the University has grown too large for the available accommodation and facilities, and steps have been taken to limit the numbers more strictly.

The total enrolment of students at organised courses carried on by the University (exclusive of extension lectures and local mining classes in the counties) since 1891 has been 3,318. The work of the Mining Department of the University of Sheffield includes not only the usual University work, but, by arrangement with the Education Committees of Derbyshire and of the West Riding of Yorkshire, embraces also the inspection, supervision, and examination of the local mining classes. In the West Riding this work is shared with the University of Leeds, which supervises the northern, or West Yorkshire part of the coalfield; while the University of Sheffield has the southern portion allotted to it as its sphere of influence. This arrangement has worked very well. In conjunction with the County Education Committee, the professor of mining has control over the whole of the mining education of the area in which he is interested, the work is all co-ordinated, and overlapping is prevented.

The great drawback to the educational scheme outlined above is the gap between lower and higher grade education. When drawing up the diploma course as a "sandwich" course, the writer hoped that the arrangement would enable a few at any rate of those students who must support a two or three years course, in which students were required to spend their whole time at the University, was not likely to meet with much success. Evidently a "sandwich" course may be drawn up on one of two systems, namely:—(1) Six months at the University, and six months at the mine for three or four sessions; (2) two days per week at the University for four sessions, the rest of the time being spent at the mine.

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The writer, in his annual reports to the county education authorities, gives a statement of the occupations of the students in order to show to what extent the instruction is appreciated by those for whom it is intended. The numbers drawn from each class of workers vary from year to year; but as a rule the majority of students are drawn from those working at the coal face, on the haulage-roads, at repairing and bye-work, pony drivers, and deputies. Almost every kind of work underground and at the surface is represented, but generally the attendance of surface workers is lower in proportion to their numbers than that of underground workers, who form the majority of the students. Occasionally local schoolmasters, tradesmen, and others attend from interest in the subject.

The kind of instruction to be given in these classes is, of course, a matter of first importance. Originally the classes in Derbyshire were instructed under the old syllabus of the Science and Art Department, South Kensington. While recognising fully the great service rendered to technical education by the South Kensington authorities, the writer submits that the syllabus in mining was better suited for the instruction of young mining engineers than for the bulk of the students who attended the classes. The syllabus was too long for the time available, and there was a want of perspective—subjects of first importance to the students (ventilation and the gases, the working of coal, timbering, safety lamps, &c.) were put on the same plane as boring and sinking and other specialised subjects of less immediate importance to elementary students. Further, in the examination, questions were seldom or never set on the law relating to mining, not even on the General and Special Rules. When the introduction of local mining classes was first discovered in the West Riding, it was suggested that a new syllabus for elementary students should be drawn up to cover two years, instead of one year. The subjects selected for the first year elementary were:—Elementary ideas about geology applied to mining, the working of coal, timbering, the getting of coal, air and the gases, underground fires, ventilation, safety lamps, and winding. Those for the second year were:—Sinking, excavation of ground, underground water and pumping, haulage, and a further consideration of the following subjects taken in their first year—ventilation, systems of working coal, timbering, underground fires, and the phenomena of explosions, both those due to gas and those due to coaldust. The General and Special Rules were to be especially studied under each head. The underlying idea was to draw up a course which would be of interest to students in connection with their work underground.

It is, however, evident, and experience fully confirms this, that a subject like mining can be taught in a purely mechanical way. Students often seem to find it easier to commit facts to memory than to grasp them thoroughly, and, as it were, to absorb them, in place of merely remembering them. Now a subject like mining, in its elementary stages, has a tendency to lend itself to this mistreatment; consequently it was felt that if arithmetic and a little elementary science could be included in the syllabus, a greatly improved training would result. Accordingly, each year of the elementary course was divided into (*a*) mining and (*b*) arithmetic or science. In the first year elementary (*b*) was arithmetic and mensuration (applied as far as possible to mining); in the second year elementary (*b*) was elementary physics, mechanics and chemistry.

In spite of prophecies that students would be deterred from attending in consequence of the (*b*) portion of the syllabus, the classes carried on under it were very successful. Later on the syllabus was adopted optionally by the Derbyshire Education Committee, and recently it has been made compulsory in that county.

As years went on, the West Riding Education Committee became anxious to enlarge the syllabus, and to link the mining classes more effectively with the work of the elementary schools. Accordingly they have now organised their mining instruction in a six-years course. The first two years are taken in the "industrial" course, in which arithmetic, hand-sketching and drawing, English, and experimental science are taught. The mining student can then pass through the following courses of instruction:—Third year: (*a*) mining (with mining arithmetic); (*b*) hand-sketching and machine-drawing; (*c*) practical science: mechanics, heat and chemistry. Fourth year: (*a*) mining; (*b*) hand-sketching and machine-drawing; (*c*) practical science: applied mechanics. In each of these years of instruction four hours per week are required—namely, one hour in (*a*), one hour in (*b*), and two hours in (*c*). The fifth and sixth years comprise mining, steam, electricity and mine surveying, and are suitable rather for organised centres than for village classes.

The whole forms a very thorough course of instruction, in which not only mining, but other allied subjects, are taught. The only criticism that the writer can venture to make is that in the new syllabus the primary object of the older syllabus is somewhat obscured. The older syllabus aimed in the first instance at interesting the students in their calling, and, as far as can be done in classes, at making more efficient workmen and officials. The new syllabus, in which attendance at the practical science and drawing classes is compulsory, appears to go beyond this. A very good feature of the new course is the attempt to link the technical classes with the elementary school through the industrial course. Probably very few people realise how much knowledge is forgotten by boys in the interval between leaving school and joining a technical class.

An obvious difficulty in connection with these local mining classes is that, although the teacher may be a thoroughly practical man, he may have very vague notions of how to teach. In order to meet this, a Saturday afternoon course for mining teachers was instituted at the University of Sheffield in 1897. The course comprises two classes—(*a*) a criticism class, taken by a trained elementary schoolmaster, in which the students are taught how to arrange their subject-matter properly, and to make themselves understood—in fact, to teach; and (*b*) a demonstration class, in which instruction is given in the illustration of their teaching, and in simple experiments in chemistry, mechanics, and physics. The effect produced by attendance at this course has in many cases been surprising. On an average nine students per annum have attended the course in 15 sessions. The subjects, other than mining, included in these courses of instruction, are probably as a rule better taught by trained teachers than by those teachers best qualified to teach mining. A difficulty, however, arises in that such teachers are not acquainted with the bearing of these subjects on mining, and consequently they miss the direct practical application which is so important to the students. This could be avoided by close intercourse between the mining and the science teachers, but time and opportunity are sometimes lacking for this.

(2) *Extension Lectures.*—This was the system adopted in 1891 both in Derbyshire and in South Yorkshire. It was very soon given up in the former county, but has never been entirely abandoned in Yorkshire. It is undoubtedly the best system where the work of technical instruction in mining is entirely new, and where no teachers can be found to take local mining classes. The writer has had several years' experience of the system, and considers that the objections to it are—(*a*) there is a lack of continuity in the work; (*b*) unless the district is a small one, or the lecturer knows it very thoroughly, he never can have the same knowledge of local conditions as a local man; (*c*) at any rate, for some years the lecturer is not well known to the students, and, consequently, lacks somewhat of the influence with them that would be possessed by a person whom they know. In the West Riding, since 1892, 119 of these courses have been held, and 3,287 students have attended. The system has this advantage, that the teacher will be a man well trained in teaching, and is consequently able to give instruction better than some of the local teachers in their first year of teaching.

(3) *Fixed Centres for Elementary Students.*—This system does not differ materially from (1); it is suitable to areas in which the mining population is small, and would consequently be unable to support more than one class. The establishment of such a centre depends largely on the size of the area to be served, and facilities for communication. In any well-considered scheme of lower-grade mining education the best students in the elementary courses will be given facilities for going forward to a more advanced course, held in some place or places central to the adjacent portions of the coalfield. The University of Sheffield has two such courses, held on Saturday afternoons, one at the University, the other at Derby. The work is spread over two sessions, as follows:—First year: Mining chemistry, mechanics, mining, and machine-drawing. Second year: Mine surveying, mining, and heat and heat engines. So far these courses have been very successful, but the work is cramped for lack of time, and in the future it is to be hoped that a third year may be added.

A similar two-years course in electricity applied to mining is also held at the University on Saturday afternoons.

There can be no doubt that these Saturday courses are capable of considerable expansion, and that probably one for colliery enginewrights and mechanics would be appreciated.

The enrolment of students for these courses has been as follows:—

Centre.	Subject.	No. of sessions.	No. of students enrolled.
University of Sheffield...	Mining	21	... 1,834
Derby	Mining	18	... 657
University of Sheffield...	Mining electricity	13	... 478

In recent years the enrolment of students for the Saturday mining course at the University has grown too large for the available accommodation and facilities, and steps have been taken to limit the numbers more strictly.

The total enrolment of students at organised courses carried on by the University (exclusive of extension lectures and local mining classes in the counties) since 1891 has been 3,318. The work of the Mining Department of the University of Sheffield includes not only the usual University work, but, by arrangement with the Education Committees of Derbyshire and of the West Riding of Yorkshire, embraces also the inspection, supervision, and examination of the local mining classes. In the West Riding this work is shared with the University of Leeds, which supervises the northern, or West Yorkshire part of the coalfield; while the University of Sheffield has the southern portion allotted to it as its sphere of influence. This arrangement has worked very well. In conjunction with the County Education Committee, the professor of mining has control over the whole of the mining education of the area in which he is interested, the work is all co-ordinated, and overlapping is prevented.

The great drawback to the educational scheme outlined above is the gap between lower and higher grade education. When drawing up the diploma course as a "sandwich" course, the writer hoped that the arrangement would enable a few at any rate of those students who must support themselves while pursuing their studies to attend. Only in one instance has this occurred. Some years ago a student attended who took the two days per week diploma course at the University, and worked four nights per week in the pit.

Comparisons are sometimes made between the system of technical education in mining practised in the United Kingdom and similar systems adopted in other countries, generally to the disadvantage of the former. The writer thinks, however, that such comparisons are impossible. On the Continent of Europe, as a rule, education as a whole is maintained and controlled by the State; in Great Britain, apart from elementary education, it is only partly aided by the State, which exercises a limited control over it. Abroad certain definite courses of instruction are alone recognised as the channels which lead to employment by the State, or to those positions which require qualifications recognised by the State. In Great Britain such qualifications are generally obtainable by examination, in which little or no importance is attached to the educational training which a candidate has previously undergone. In these circumstances it is hardly surprising if the results achieved in the higher branches of mining education in an institution such as the University of Sheffield will not bear comparison with the results obtained in universities and technical schools on the Continent.

Mr. J. R. R. Wilson, in proposing a vote of thanks to the president for his address, said a fact which often struck them was that mining men did not go in for degrees to the same extent as the members of other professions. He did not know whether the reason was that the emoluments connected with mining were not sufficient recompense for the time given to education. The subject required very serious thought from the point of view of colliery proprietors. They must admit, of course, that the profession was rising, that they were getting into it more degree men—men who had devoted more time to education—and he believed that Sheffield and the Yorkshire universities generally had given this great encouragement. He was rather in favour of a man getting some practical training before he went to the university. He thought no student could properly appreciate the lectures at the university, and take the advantage of them that he should, unless he knew, at any rate, something about mining before he went. He supposed that was very largely the reason why the "sandwich" system was so successful. He believed the same difficulties were happening all over the world with regard to higher education. He knew they had them in India. There they found it most difficult to get students to the university course, and the Government started a peripatetic course of mining in the various coalfields, appointing one lecturer. When that came to an end, a momentous decision had to be taken as to how the work was to be carried on in the future. That was just before he left India, and he drew up a minute to Government recommending that the system should be very much extended, and that instead of one lecturer there should be about six lecturers in the various coalfields. He was pleased to find that that had been abundantly successful. Students had gathered up from all parts of the coalfields, and he believed that very good work was being done; so much so that the question had now arisen as to whether the college should not be bodily moved from Calcutta to one of the coalfields, where the students could be on the spot and could get the practical training concurrently with the university education.

Mr. W. H. Chambers, in seconding, observed that there was a vast amount of education going on in all sorts of subjects nowadays, and very little learning was the result. What did they do at a colliery village school? Start the children painting tulips and making paper match-boxes. But he did know that the teacher of a local mining class was very greatly handicapped, because the first thing he had to teach his students was a little bit of arithmetic before he could work out his problems. The obvious difficulty about a local mining class was that, although the teacher might be a thoroughly practical man, he might have very vague notions how to teach. He quite agreed with Mr. Wilson with regard to a student having practical experience in the pit before going in for mining education, either at the local class or at the university. If they took a lad straight from the elementary school and put him in the mining class, they would find that he was very little interested—because he did not see what was the good of the tuition that was given. That was why the lads did not go to the local classes when they left school. It was only when they began to experience their shortcomings, at the age of about 19 or 20, that they started going to the classes.

The resolution was carried unanimously.

Prof. Hardwick, in reply, said he quite appreciated the point about the practical training preceding the study at the class. It no doubt gave the student more interest in his studies. At the same time, there were some little difficulties as far as the studies themselves were concerned. It was a little difficult for the parents of a boy, who themselves had no connection with the profession that he was going to take up, to find someone who would take him for a few months to give him an insight into the pit before he went to the university for his training, and then perhaps went somewhere else altogether for his final practical training. With regard to the results of elementary school education, he said he quite concurred with Mr. Chambers, but he always hesitated to criticise, because he knew many of the elementary schoolmasters and appreciated them very highly. They were men who did their best under somewhat adverse circumstances. He thought difficulties arose in some cases from the guidance that was given them by the authorities. They tried to take too many subjects, and did not do anything sufficiently thoroughly. If they took a few subjects and taught the children thoroughly it would be much better.

Experiences with Gob Fires.

Mr. Thomas Stubbs then read a paper entitled: "Notes on Gob Fires near Ashby-de-la-Zouch, Leicestershire."

The author said the mine in question was practically free from water, although a certain amount of moisture in the coal was noticed when shot-holes were being drilled. The roads were dry and dusty. The coal, which was a non-coking house and steam coal, varied in thickness from 7 to 8 feet. In most cases it was holed at the bottom of the seam. The fires took place in the Main Coal seam, which had an inclination of 1 in 14, the depth at which the face was worked being about 660 ft. The districts in which the fires occurred had roofs consisting of clunch or fireclay at the working face, and no trouble from spontaneous combustion occurred in any other part of the mine where the roof was composed of bind, with fireclay absent. The section of fireclay varied from 3 to 7 feet in thickness, and above it was a bed of coal about 4 ft. thick, known as the Four-feet seam.

From statements made in previous papers, varying data evidently had to be taken into consideration in regard to the effect of the roof in relation to gob fires; but where the roof is of fireclay, the bank faces more frequently fall in, with the result that the air becomes diverted more or less from the face into the waste or goaf. There is probably some truth in this explanation, as the falling-in of a stall face where there is a bind of stone roof would not affect the face current to the same extent. The system of working at the colliery to which the writer had already referred was longwall, everything being cleared away right from the pit bottom, and no pillars being left, except as barriers. As the coal was filled with forks, a percentage of small coal was consequently thrown back and left in the packs and goaf. As far as practicable, snecks, or cuttings, in advance were avoided, although in some cases one stall might be from 5 to 10 or even 20 yards in advance of the other; but, owing to various causes (difficulties with workmen, &c.), this was more or less unavoidable.

After the writer had taken charge of the colliery, he had to re-open a district which had been closed for five years on account of a gob fire, the engine-plane and return airway being entirely sealed off (in addition to the gateways in the vicinity of the fire). Some distance from the site of the fire a large quantity of blackdamp had accumulated, between the stoppings in the gateways and those in the main intake and return airways, and this had to be gradually and carefully cleared away before the district could be re-opened.

The gob fires originated in most cases in a stall which had fallen in, and had to be re-opened. In re-opening it, a rib of coal had to be left on account of the tender fireclay roof. This rib was taken out as the stall face was recovered; but occasionally a fall would take place and bury a portion of the rib, thus preventing the stallmen from getting it all out. The custom was to build packs at intervals of 4 to 5 yards, and when the fire broke out the intervals between the packs were built up and tightly stowed, so that with the continuous working of the face forward the danger of a fire was obviated. Great care was exercised by the officials to see that, as far as practicable, no timber was left back in the gob. The writer thinks that it is generally agreed that, in working mines liable to spontaneous combustion, if the air can be prevented from finding its way through the packs into the goaf or along a rib-side, there is less danger of a gradual heating of the goaf.

A source of danger, which is frequently the cause of gob fires, is when opening out alongside the solid rib. Difficulty is always experienced in preventing fires from breaking out where the cross-gate goes forward in advance of the face, and a certain amount of coal is left back in the goaf, being afterwards worked out by the cross-gate as it advances, thus cutting off the bank-gates which for a time have been packed across forming a temporary airway.

The old method of increasing the height (on the score of economy) by dinting the floor which had a tendency to lift, instead of taking down a second ripping where necessary, was abandoned, as this method at times, by partly undermining the gate-packs, caused the sides to slip down. A liberal second ripping was taken down instead, both in the main bank-gates and cross-gates. In the intervening gates, which had not so great a thickness taken down, the packs were buried in the main and cross-gateways. Owing to settlement in the goaf and gateways, the packs alongside were lowered and pressed down, which facilitated the raising of the roadway. This system of sealing an area between the main gates and cross-gates with about 2·4 acres of goaf was satisfactory.

It is good policy in mines liable to spontaneous combustion to set the main and cross gates nearer to each other than would be required in mines not so liable, even though it may be a source of extra expense. It can then be assumed that that particular area of goaf is more or less under control.

In former times in the Leicestershire coalfield there were mining authorities who held the opinion that the proper method of keeping gob fires in subjection was to allow only a minimum quantity of air to pass through the mine. Be that as it may, the writer's experience was that with a restricted ventilation fires were more numerous, but, after the airways had been enlarged and the ventilation increased, there was a decrease in the number. In dealing with gob fires it is reasonable to assume that the air passing within the immediate locality of the fire should be limited so as to restrict combustion, but this should not apply to the general ventilation of the mine, as the roadways and faces should be kept as cool as possible.

One point which strikes the writer in comparing the Leicestershire with the North Midland coalfield is the intersection of fireclay in the seams, and the influence it may or may not have on spontaneous combustion. The section of the coal worked in the Doncaster coalfield is similar to the section at the colliery previously mentioned, so far as the intersection of fireclay and the overlying coal above the Main seam is concerned. The fireclay in both cases forms the roof for the longwall face, and as the face is worked forward, the fireclay breaks down in the goaf, and eventually the section of the seam overlying it falls also. Similar conditions obtain in the goaf; and, if a current of air finds access to the place, it becomes a source of anxiety and danger, owing to the mixture of coal and fireclay present therein.

The economic element must at all times enter into this question. It has been suggested that collieries should, on reaching the coal, drive out to the boundary, and then work back towards the shafts. This theory has long been an ideal one; but, if such a practice were followed, the writer does not see how it would prevent the occurrence of gob fires under present conditions of working. Again, there is the difficulty of finding a capitalist who would agree to this course being pursued in the case of a large colliery.

The plan which presents itself most strongly to the writer's mind is a system of working that would practically resolve itself into a method of sealing the goaf. It would, of course, in some cases be difficult to carry this out, owing to the presence of faults, the nature of the roof, the gradients, and other circumstances, all of which would have to be taken into consideration. The system of burying the packs is one that has been in use for many years in districts suffering from gob fires, and on many occasions has been of great service in subduing them. Filling out gob fires, when discovered in time, has often been carried out satisfactorily, but in doing this in fiery mines there is always present the risk of an explosion taking place during operations. It has also been suggested that all the coal should be got and sent out of the pit, and where this is practicable the writer advocates it; but there are difficulties which arise in connection with this practice, as, for instance, where the roof is so tender that a section of inferior coal has to be left to support it. The writer remembers a colliery which worked the Barnsley bed under the following conditions:—The coal was riddled in the pit and the small thrown back into the waste, but there were no signs of heating. The depth at which the seam was worked varied from 900 to 1,200 feet, the temperature in the workings being between 70 degs. and 80 degs. Fahr. The roof consisted of blue bind, with only 3 to 4 inches of clod between the seam and the roof. The area of underground workings extended over 600 acres.

Dr. Harger has advanced a theory of importance to the mining world for the prevention of gob fires by reducing the proportion of oxygen contained in the air entering the mine. The writer suggests that, as the Government are so interested in the prevention of accidents, &c., in mines, they should arrange with some colliery proprietor to place a small colliery (subject to gob fires) at Dr. Harger's disposal for experimental purposes, so that the atmospheric and working conditions of his theory could be tested, provided that the men could be found to work under the conditions set out by it.

The President said the paper was very interesting and instructive. He suggested that the discussion on it should be to a certain extent combined with the adjourned discussion on Dr. Harger's paper on the prevention of explosions.

Mr. W. H. Chambers, in proposing a vote of thanks to Mr. Stubbs, said he thought most of them would agree with Mr. Stubbs' conclusion, that one way of preventing and subduing gob fires was by the exclusion of air. In order to get gob fires there must be two

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of *débris*. In order to do this, he had always on hand a number of settings, made of channel irons, which formed both the legs and the bar, and a fish together at the top, and over these iron piles were driven to maintain the roof. In most cases the object had been attained, and they had reached the fire by means of the small roads they had driven. He had in a small way tried to use the inert gas that was made by the gob fire itself. The roads driven had always been kept on the floor, while the products of combustion had been in the top of the roads and in the cavities, where gas, if any, would be present. In his opinion, if they had an atmosphere overhead where the gas would be of such a nature that it would put out a light, it was impossible that they should have a fire up there. Now, after the experience that he had had, wherever there was a suspicion that the coal was of such a nature that it might generate a gob fire, the precaution was taken of packing it solid, and never allowing an inch of it to come down. If they did that, it was obvious that when the pressure of the superincumbent roof came it would squeeze the pack so solid that it would be absolutely impossible for any air to enter, and therefore impossible that any combustion could take place. Nearly always, the first trace of smell that they got after ignition had taken place was the smell of burning wood. It was advisable to get the wood out of the goaves. Personally, he did not think that the wood was responsible for the fire. It was the other material that heated, but they got the smell of wood smoke, because the wood ignited at a lower temperature than the mineral matter around it. He seconded the vote of thanks.

Mr. G. H. ASHWIN said that in a neighbouring county to that dealt with by Mr. Stubbs he had to deal with gob fires pretty regularly for about 14 years. He thought Mr. Stubbs' reason for saying that the wood should be taken out was not because it was liable to combustion as that, being left in, it formed a sort of chimney, where the ground was not squeezed tight, into which the air was drawn, and this, he thought, very often originated a fire.

Dr. HARGER was inclined to agree with Mr. Ashwin with regard to timber, but at the same time, he said, timber did give off inflammable gases at a very low temperature indeed, and this constituted a danger, as they were apt to get flashes when there was practically no red hot coal or anything else to light the gas. There were many cases on record where they got those flashes—sometimes rather big ones. They had recently been doing some experiments in the laboratory, which showed that they got inflammable gas at as low a temperature as 200 degs. Cent. in ordinary pit props, such as were used in the Yorkshire district. If they took a temperature a little higher, and let air into the top, these gases would flash off at as low a temperature as 300 degs. Cent., or perhaps even a little less. The temperature of ignition of methane, hydrogen, and other ordinary gases, was about 500 or 600 degrees Cent., so that the gases given off by wood were really very much more dangerous, and much more likely to develop a fire. Nearly always in gob fires they found that wood had been left, and it caused a great deal of trouble. Very pungent gases were given off, and it was very difficult for men to work in them. Mr. Stubbs seemed to have the idea that by restricting the ventilation they would rather increase the number of fires, but he (the speaker) thought that the other alterations in the working of a mine which he mentioned had very much more to do with increasing the fires. In a prosecution for gas, which had been attracting a great deal of attention just lately, the evidence showed that those at the pit could have put twice or three times the amount of air round and taken the gas out. But they did not do it, because they knew that if they did anything of the sort they would have had fires all over the pit. He knew a case in the Barnsley district where, expecting the inspector and thinking that perhaps they had a little too much gas, they put the water-gauge up—only half-an-inch, he thought—and within a week they had five fresh fires in the pit. He thanked Mr. Stubbs for his kindly references to his (the speaker's) paper, but with regard to the suggestion that the Government should lend them a small mine, thought they had as much chance of getting that as they had of getting the moon.

Mr. M. W. WATERHOUSE said he could not criticise Mr. Stubbs' paper, because, although he had had seven years' experience of dealing with gob fires, none of them were in longwall mines; in fact, in the district in which he managed the mines, longwall working was thought to be an utter impossibility. In his time, there was no such thing as longwall in either the Warwickshire or Staffordshire spontaneous combustion mines. He meant advancing longwall. Most of the mines were retreating longwall, and with that system there seemed no great reason why the mines, if properly carried on, should not be worked without any serious fire. They might think that was rather contradictory, because he had admitted they were troubled with fires, but he found that in many cases there were extraordinary reasons for those fires. The reason mentioned by Mr. Ashwin was a very common one. Props were left in, and by holding the roof up, they prevented the goaf from crushing, as it otherwise would, and the fire was, therefore, given every chance to start. Other reasons were that they had an area of faulty or bad coal, which was difficult to deal with. They could neither take it out nor leave it in, as it were, and almost before they were clear of the place they had trouble with fire. What he wished to convey, however, was that if they managed their pit properly, even in spontaneous combustion mines, they should be able to run long periods without fires. What he meant by proper management was that the manager must really be the manager—he must not have men managing the mine for him; he must not have them playing and stopping the pit, or trade or holidays stopping it, but must have it going continually. Whether the engineers of Yorkshire would ever come round to the idea that it would be better to work the difficult Barnsley beds on the retreating system, he did not know, but certainly he was of opinion that many mines could be worked on the retreating system without much trouble.

Mr. J. R. R. WILSON said he had not intended to say anything on the subject, because there was a Departmental Committee sitting, but when Dr. Harger got up he thought he ought to say something. He was sorry Dr. Harger had introduced such a controversial subject as that of a prosecution which was not yet finished. Dr. Harger had not given evidence in the case. Unfortunately he (Mr. Wilson) had given evidence twice, and might have to do so again two or three times, and it was rather difficult to know just what to say. Dr. Harger said that if they speeded up their fan they would have a lot of fires. Of course they would. What they had been trying to tell people, and quietly insinuate, was that they should put splits into the mines, so as to get a volume of air and keep the mine cool, but not to get pressure. He thought that in that part of the paper where it was suggested that little ventilation increased the fires, it would be owing to the roads having become small, with the result that the pressure on them was considerably more than it would be under proper management, even where the roads were made a decent size, so that the volume of air could get through without a big water-gauge forcing it through the packs. He thought that was the secret of the whole thing. He had perhaps fairly pronounced views on gob fires, especially in the Barnsley seam. He was becoming more and more convinced that it was a question of methods of working, as regarded gob fires in that seam. As Mr. Chambers pithily put it, they must certainly have two things—the combustible material and the oxygen. In the Barnsley seam, especially on the eastern side, there was no doubt much combustible material. Up to 5 ft. of the most volatile part of the coal was left, and left in such a condition that the roof could not properly consolidate and cover the coal up, but could only cover it to the extent that it crushed and fissured it, so that the air got through the packs and heated it. To his mind the thing was perfectly plain. He knew it could be argued that pits had to be worked from a commercial point of view, and he granted that. Some people would say, "Remove the coal," but those who were working the seams said that commercially that was not practical politics at all. Very good. Then he said, "Leave the coal if you like, but so work it that you weight your goaf, bring your falls down at regular intervals, cover up this coal, and seal it off." He believed that if it was sealed off there would be no fires.

Mr. G. BLAKE WALKER said he had no experience of gob fires, and therefore he did not think that any words of his would add much to the value of the discussion. At the same time he should like to concur, with the fullest conviction, with the view which Mr. Wilson had just expressed with regard to the leaving of a large portion of the Barnsley seam being the most probable and the most dangerous cause of the extension of gob fires in the coalfield about Doncaster. It also occurred to him that there was a great loss of national wealth in leaving four or five feet of coal which was very rich in volatile matter. In these days of excellent coal washers, he should have thought that, in so far as impurities consisted of interstratified bands of shale, the coal might have been rendered comparatively free from earthy matter by washing, and might have been used either in coke ovens or in gas producers to produce a very valuable product which it was not in the interests of the nation to have wasted. He had not the least doubt that these gob fires were leading people to some such conclusion. There was one point about which he should like to say a word, although he did so in very great ignorance of how the application was made. He believed that in Germany and in Austria gobs where fires occurred were isolated by the use of hydraulic sluicing. In that way, a very much closer wall was produced than they could possibly attain even by the pressure of the roof upon the packs.

Mr. A. H. Barnard disagreed with the views of Mr. Wilson and Mr. Walker on top coal. He had had a good deal of experience of gob-fires, both at Denaby and Cadeby Main collieries, and—although he knew that at some of the collieries further east a much larger portion of the seam was left up, and that some of them were even more subject to gob fires than Denaby and Cadeby—he did not believe that the cause was the extra quantity of top coal that was left up. He had known fires occur, both at Denaby and Cadeby, in packs and in the airway, where there was not any coal. The fire had originated in the oily shale. At Cadeby, the method of working was the same throughout the pit, and approximately the same amount of coal was left up throughout. It had varied of late years, but broadly speaking some coal was left up all through. But they could divide the pit by a line, and half of the pit on one side of that line had never had a fire in it. All the fires had been on the other side of that dividing line. They could do the same at Denaby. That line was a fault, or nearly a fault. To the east of it there had only been one fire, at Cadeby Colliery, and that was a fire that arose from obstruction in an airway; west of that fault all the fires had arisen. The method of working the coal was the same, and the nature of the coal was the same. He believed it was the nature of the roof that caused gob fires.

Prof. L. T. O'Shea said all he had heard that afternoon had completely confirmed the views that had been impressing themselves upon him for a good many years—that it was to a large extent the amount of oxygen that got into the goaves which was responsible for the spontaneous ignition of the fuel that existed there. If they could pack the goaves so tight that the air could not get in, they would do away with the gob fires. The only other way, it seemed to him, was to restrict the amount of oxygen that went into the neighbourhood where the fire was. If they did that, it was natural that the fire would go out, because without the oxygen combustion was absolutely impossible. He was rather interested to hear Mr. Barnard's remarks about the nature of the roof, because the oily shales did undergo oxidation quite as easily, or even more easily than the coal itself. Therefore, in some instances he thought that very likely it was not the coal left behind that was so much responsible for the gob fires, as the nature or character of the roof that came down in the goaf. The same would happen to them if the goaf was not tightly packed, as would happen to the coal which was liable to spontaneous ignition. Doubtless it was up to the managers of the mines to see that their working was such that the goaf would pack itself as tightly as possible, so as to keep the air out. With regard to sand stowing, he might mention an incident that happened about three years ago, when he visited a district in Upper Silesia. The party went down a pit one Wednesday morning, and on the previous Saturday there had been an outbreak. But sand-stowing was used for putting it out, and the party hardly knew that there had been a fire until after they came up. The subject was of such importance that he suggested that the discussion should be adjourned.

The President thought the suggestion would commend itself to the meeting, and the adjournment was agreed to accordingly.

Mr. Stubbs, in replying to the vote of thanks, referred to his remark about restricted ventilation, and said Mr. Wilson had fully explained it. Where so many gob fires occurred in the olden times was where the highways were very restricted, and the water-gauge was naturally high. What he meant by the statement that if the highways were increased there were fewer fires was that there was more room for the volume of air passing along the main airways. He still believed that the proper thing was to have plenty of ventilation, provided that they had an adequate airway to take it, because it cooled the locality of the workings. His experience was that the increased air of the airways had a great deal to do with the reduction in the number of fires. Mr. Stokes, the late chief inspector of mines, was strongly against the restriction of airways, and he (Mr. Stubbs) followed very much on his lines in increasing the area of the ways.

Annual Dinner.

Prof. Hardwick presided at the annual dinner held at the Grand Hotel, Sheffield. The attendance was the largest on record, and included representatives from all parts of Yorkshire, and of all the mining associations and kindred societies.

After the President had submitted the loyal toasts,

Dr. W. E. Garforth, president of the Institution of Mining Engineers, proposed the "City and Trade of Sheffield" On behalf of the coalowners and mining engineers and colliery officials, he said, he was grateful to the people of Sheffield for the skill and ingenuity they had shown in giving to engineers a material which combined lightness and strength, by means of which they had been able to raise coal almost from any depth quite equal to the demand made upon them.

The Lord Mayor (Councillor Osborn), in response, heartily welcomed the institute to Sheffield, and particularly welcomed Dr. Garforth, because he knew that he was an expert on coaldust. "There is an immense scope," said the Lord Mayor, "for research above ground on this subject in the city of Sheffield. I can assure Dr. Garforth that if he would come and conduct some of his experiments here, all the city's horses and all the city's men will be at his service, especially if he can only make our industrious city a little less grimy."

The Master Cutler (Mr. J. Rossiter Hoyle), who also responded, said at the present time there was a great boom in trade, and some of them were perhaps a little anxious to know how long it would last. He thought he was right in stating that in the old days of Pharaoh there were seven fat years and seven lean years, but he was afraid the experience of to-day was that there were quite seven lean years, but generally only two or three fat ones. They had very little idea of what brought the boom. He knew there was a great deal of trade that had to be done to time, and he was aware that orders were now being booked for 1913 and even for 1914, but there was work which might very well be retained for the lean years, and he thought it would not be a bad idea if they could make some arrangement whereby provision would be made for the years when trade was slacker. He reminded the members of the institute that in Sheffield they had valuable organisations for the assistance and protection of their trade. He mentioned the Chamber of Commerce, which was presided over by a man of great power and of far-seeing ability, his senior warden, Mr. T. W. Ward Then there was the Cutlers' Company, a distinguished body of which he had the honour at the present time to be the head. They had a defence fund organised to defend the good name of Sheffield, because there had been a great deal of piracy and false marking, and they had built up a strong fund of about £12,000 to defend their trade from those who were trying to filch it away in this unfair and dishonest manner.

Mr. T. H. Mottram, his Majesty's chief inspector of mines for Yorkshire, proposed the "Midland Institute," remarking that it was an important part of the Institution of Mining Engineers. He believed the Midland Institute had something like 400 members, and among them were many of the chief colliery owners and officials of the district representing very large interests indeed. Yorkshire was now a great mining county with many difficult problems facing them, and in the Doncaster district particularly there were many problems which would need to be solved. It was an interesting fact that at the present time the Institution of Mining Engineers was practically being run by Yorkshiremen. He believed that the institute had still a great future before it, and that many of its members would give yet further valuable assistance in solving problems which presented themselves to-day to the mining profession.

Prof. Hardwick, who was received with applause on rising to respond, offered a hearty welcome on behalf of the institute to Mr. T. H. Mottram, the new mines inspector. He had a long and varied experience. He had succeeded to the inspectorate of that district at a time of great difficulty and they must not at present make unreasonable demands on his time. They hoped Mr. Mottram would become a member of their institute and give them the benefit of his ripe experience. He was not in any way lessening their welcome to Mr. Mottram when he said they were glad to see Mr. J. R. R. Wilson with them that evening. Although he had gone to Liverpool, he hoped he would not forget the many friends he had made in Yorkshire. The president went on to explain the constitution of the institute and of the Mining Institution, and of the helpfulness of one to the other. Union made strength and the combination of so many institutes was of great service to the mining industry of the kingdom. The financial position was good and the only point about which he had any trouble was probably that of papers for the immediate future. He hoped, however, that he should be able to leave a few over for his successor. The only criticism he could offer was that the attendance at the meetings had not been as large as he could have wished. He knew the year that was just closing had been a somewhat exceptional one. He alluded to the loss the institute had sustained by the deaths of Mr. Nevin and Mr. Pickering, both of whom rendered excellent service. Their institute, in conjunction with the Midland Counties Institute, were interested in a coalfield which represented something like one quarter of the output of the United Kingdom and one quarter of the labour employed in coal getting in this kingdom. Further than that, if they were to believe the geologists, they possessed the largest concealed coalfield existing in the kingdom. Parts of that coalfield would not be won without very great exertions and much difficulty—more, probably, than they yet had had to contend with in the shallower beds they had had to deal with. It behoved them, therefore, to see that the subjects which were brought before their institute were such as would bring efficiency and greater prosperity to their district. Looking through the *Transactions* of recent years, he had been struck with the increased amount of interest which science appeared to take in the coalmining industry. He had thought that this interest of science was of recent date, but he had seen a paper written in 1675 by Mr Thomas Jessop, of Broomhall, Sheffield, which appeared to have been communicated to the Royal Society. Mr. Jessop wrote an account of a subject which had been exciting a good deal of interest just now—gases in coalmines, which Mr. Jessop called damps. He said there were four damps then recognised by miners. First of all there was the "peas blue damp," so called on account of the delicious smell it had, resembling sweet peas. Then there was an unnamed damp which assumed the form of a globe about the size of a football, very destructive, and which, when broken accidentally, usually suffocated all near it. The method of dealing with this "football damp" was for miners to break it up from a distance by means of long poles Then Mr. Jessop mentioned a damp which went off just like a gun, and produced a like effect, or rather like lightning. The fourth was the ordinary or "smother damp," which the president supposed was only blackdamp. There was an extraordinary method of dealing with this Men overcome by smother damp were taken out of the pit and put face downwards into a hole dug in the earth, into which they breathed "Lay them on their bellies with their mouths in it." That was not always successful, and if that failed "then fill them full of good ale." If that failed the case was indeed desperate.

Mr. Maurice Deacon, in giving the toasts of "Leeds and Sheffield Universities," spoke of the many advantages young men desirous of entering the mining profession had as compared with the condition of things existing when he was young. They had to-day their education brought almost to their very doors. There was great wisdom in the system which existed of combining the theoretical with the practical, allowing the student to spend part of his time at the university, and part at the mine. He hoped the new Examination Board formed under the Coal Mines Act, 1911, would bear in mind the hope which had been expressed by more than one person that instead of five years the young man who had obtained his diploma should be allowed to sit for his examination after three years' practical service. He trusted, in view of what the universities were doing for the mining profession, that not only colliery proprietors, but also lessors of coalmines would help to provide the funds necessary for carrying on this important work.

Ald. H. R. Stephenson, pro-Chancellor of Sheffield University, replied, and alluded to the zeal and interest Mr. Deacon had evinced in the coalmining department of Sheffield University. He assured the gathering that although much had been heard of the jealousies between Leeds and Sheffield, these were on the surface only, and the two universities were working for one common end. He agreed with Lord Haldane that in these new civic universities there should be the closest possible alliance between the applied science department and the department of arts and pure science. In their president they had a man who, while he had graduated at a university, and become a distinguished professor, was on that account no worse a mining engineer. He closed by expressing the hope that in the new buildings, which were just about being completed at Sheffield University, there would be ample scope for the prosecution of those studies in which mining, civil and mechanical engineers were so closely concerned.

Mr. M. H. Habershon, past president of the Midland Institute, gave "Kindred Societies."

Mr. J. P. Houfton, mayor of Mansfield, and past-president of the Midland Counties Institute, responded. He congratulated the Midland Institute on having such a president as Prof. Hardwick, a man who so happily combined practical knowledge with exact science. He felt sure that the mining engineer of the future, if he would successfully deal with the great problems which were now coming to the front, must be not only a man of great practical knowledge, but also of deep knowledge of exact science. He hoped the good relations which had always existed between the Midland Institute and the Midland Counties Institute would long continue. They in Nottinghamshire and Derbyshire had mining problems to deal with, perhaps not quite so intricate or so severe as those which were being experienced in some parts of Yorkshire, particularly perhaps in the Doncaster coalfield, but difficulties, nevertheless, requiring just as much practical knowledge, just as much knowledge of exact science.

Remarkable progress was reported at the annual meeting of the Sheffield branch of the Coal Trade Benevolent Association, at King's-chambers, Angel-street, on the 6th inst. Under the presidency of Mr. T. K. Fox, the income of the branch has been raised in one year from £198 to £323. Mr. Fox was re-elected president.

R GEOLOGICAL AND MINING SOCIETY.

is society was held on Tuesday at the
5, John Dalton-street, Manchester.
AND (president) was in the chair.
ere elected as members—federated :—
ryer-Bower, jun., Darley, The Mall,
W.; Mr. Joseph Duncan, H.M.I.M.,
Accrington; Dr. John Harger, M.Sc.,
g), Grange Hollies, Gateacre, Liver-
' Dalby Hobson, Assoc.M.Inst.C.E.,
s, Tanybryn, Bangor; Mr. Charles
Mines, Alston, Cumberland; Mr.
ll, H.M.I.M., 18, Albert-road, Bolton;
Iorrison Templeton, colliery manager,
Iron and Railway Company, Sydney.
associated member—federated, Mr.
Banks, B.A., 7, Victoria-street, Cam-
ted; and Mr. James Shaw, mining
lining and Technical College, Wigan,
Booth, mining student, 8, Lime-street,
ected as students—federated.

draulic Stowing of Goaves.

vox, of the Wigan Mining School, read
vas illustrated by lantern slides) on
etween Subsidence and Packing, with
to the Hydraulic Stowing of Goaves."
In extracting coalseams there are two
pports to be considered, namely:—(a) The
ent support left in the mined area for
osidence of the overlying strata; and
upport between the permanent support
face for preventing any movement
nass from suddenly breaking off pieces of
ta. Attention has centred largely on the
tem for the latter type of support, and
erated importance was attached to the
ng of faces by the results recorded at
he death-rate from falls of ground was
atic timbering from 0·76 per 1,000 during
d of 1870-1879 to 0·15 per 1,000 in the
' 1890-1899. After a personal investiga-
ds adopted at the Courrières and other
ies where satisfactory results have been
pinion that the careful attention paid to
goaf, which accompanied the systematic
nite as much effect in reducing the
ould be directly attributed to timbering

tangible might be accomplished in the
ccident rate if a census of the accidents
ad were tabulated in relation to—(a) the
(b) the method of working adopted; (c)
ping in use; (d) the nature of overlying
mber and position of faults; and (f) the
packing, in relation to subsidence and
oof strata at the faces. The small loss of
d lower accident rate in thin seams (which
ntly packed), compared with the great
d mineral in thick seams (which usually
acked)—assuming that the same care is
; at the face—would appear to lead to the
he lack of permanent support is largely
latter case for the present deplorable
ner reason given for the continuing high
n falls of ground is the increased area
idual shafts—on account of the increased
ng long roadways being kept open through
, and for longer periods than was formerly
orking of the deeper mines is also accom-
rease in pressure on the roof strata, and
one render efficient packing an object of
ce.

vn by various writers within the past few
ow possible to determine approximately
to the strata overlying a coalseam when
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a layer of coal is being removed two
are liberated, one due to gravity acting
pressure of about 1 lb. per square inch per
nd the other acting horizontally (in a
to that of the workings). If the packing
downward weight acts suddenly and
ing the roof strata by a series of "slip"
ing a large amount of extra pressure on
solid coal at the face. The two forces
both acting towards the region of least
oaf), thus forming planes of strain pro-
solid coal. The maximum subsidence of
erefore, always greater in area than the
ill vary according to the rate of advance
ce, the nature of the overlying strata, the
, &c.; but the obliquity of the resultant of
ents forming these planes seems to be
ly by the efficiency of the packing.
surface subsidence is projected in advance
ce (that is, the amount of horizontal draw)
varies with the efficiency of packing adopted. In bord-and-pillar workings, where the roof is allowed to fall in as the props are withdrawn, the draw appears to be about a tenth to an eighth of the total depth; in longwall seams with good packing, a quarter to a third of the depth; and where hydraulic packing is used, to even greater distances. Where the draw is short, the downward force is allowed to act freely, breaking the roof strata along the line of face, and with a strong roof pieces are liable to be broken off suddenly between the props or between the props and the face. Where the draw is increased (by packing the goaf), the vertical force is partly arrested by the pressure of the horizontal force projecting against the subsiding zone, which throws a greater proportion of the weight forward on to the solid coal, allowing gradual settling, with the roof unbroken. The weight on the roof strata in the mined area acts in the form of a lever supported at both ends. As the lower strata are in a state of tension, they are thrust downwards, and break off in the form of an arch. Over the solid coal the horizontal force acts on the strata in the form of a cantilever, the lower strata being in compression and the upper strata in tension. In the former case the neutral line will be high, while in the latter it will be very low, owing to the difference in the ratio of strength of the strata to compression and tension. As the coal at the face is being undercut, and the roof strata above leaves the "solid" and enters the mined zone, a change of strain—from compression to tension—must take place in the rock particles. The nearer to the vertical the line of strain approaches, the more sudden and violent will the reactions become between these forces in the roof strata at the face. To minimise this, the plane of strain should be thrown as far back as possible, thereby increasing the horizontal pressure and allowing the reactions to take place slowly and evenly. This would be particularly advantageous in the case of strong roofs, where otherwise the tendency would be to suddenly thrust off pieces of the roof strata. In opening out the workings in a partly packed seam, the only evidence of strain as the workings advance beyond the shaft pillar is that of "thrusting," until a sufficiently large area has been mined to permit of the huge rock lever breaking through to the surface. When this great "first-weight" takes place, the strata will cut through at the face up to the surface. As each undercut is made, new fractures parallel to the first will be produced, and the roof, instead of subsiding solidly and evenly on the packs, will probably come down in a series of jerks between the fractures. If the seam is thick and the face advances slowly, the cost of timber and the upkeep of the gate-roads will be very great; and even where systematic timbering is in use, accidents are likely to occur frequently. In very thick seams, where the rate of advance at the face is slow and the packing is proportionately inefficient, as is usually the case, the cost for timber may be as much as 6d. to 9d. per ton of coal got, without affording to the workmen a very high degree of safety.

In the St. Etienne coalfield of Central France these difficulties were largely overcome in the 21 ft. seam by a system of complete hand-packing, at a cost of about 10d. per ton. The packing material was quarried on the surface, and sent into the mine in tubs. The coal was extracted in three layers of about 7 ft. thick from the bottom upwards, the goaf in each case being packed, so that the top of the pack become the floor for the succeeding layer.

If subsidence could be reduced from the maximum of 30 to 70 per cent. of the height of the seam (which is frequently the case with inefficient packing) to a minimum of 5 to 10 per cent. (frequently obtained by hydraulic stowing), and the roof strata allowed to subside gradually and evenly on the packs without fractures, better results might be expected from the application of systematic timbering than those obtained in present-day practice. With complete packing, the reduction of subsidence would also tend to prevent the drainage of large volumes of gas (and in many cases water) from the overlying strata into the mine workings. Where the goaf is completely packed, all the coal can, as a rule, be extracted; but even in cases where coal of a poor quality is left behind, it would be impossible for gob-fires to take place where hydraulic stowing is used. Seams up to 40 ft. thick, where gob fires frequently occurred, when only partial packing was in use, are now being worked and completely packed by hydraulic stowing without the slightest risk from gob fires. In fact, wherever this system of packing has been adopted, gob fires have been entirely got rid of.

Cases have come under my notice where large areas of coal have been lost through lack of attention to the cause of subsidence. I show an example where a series of pillars in a 9 ft. seam, covering an area measuring about 1,200 yards in length by 400 yards in width, was rendered unworkable through the extraction of the pillars on the rise sides of the basin, and allowing the strata to break to the surface, thus forming a huge rock-pyramid which rested directly on the coalseam. There is another example where a 6-ft. seam was being worked from two different shafts towards each other. When the faces approached within 200 yards, it was found impossible to keep the strata from cutting down along the faces and filling up the gate-roads. At the beginning of the present year the Wearmouth Coal Company Limited (Sunderland) were forced to stop working the Hutton seam (which employed 400 men) on account of the heavy charges for surface damage resulting from subsidence, which in one case (that of Messrs. Doxford and Co., shipbuilders) amounted to over £100,000.

The well-established fact that stowing material carried in by water and allowed to settle would completely fill the hollow spaces and become of such a density that it would safely carry the overlying strata, in place of the mined mineral, in the ratio of about 90 per cent., led to the application of hydraulic packing of goaves in mines. This system is practised extensively in Continental, American, and many colonial coal and metalliferous mines. The distrust with which this process was received when first introduced 20 years ago is now rapidly dying out, except in this country, owing to the successful results which have attended its application. It may now be safely claimed that it has passed beyond the experimental stage, and in many cases (to quote the words of Mr. G. A. Meyer, of the Shamrock Collieries, Herne, Westphalia), "it has resolved itself into a system of necessity."

In the writer's opinion the problem of safety in coal-getting is very largely the problem of regulating the subsidence of the strata, and the same may be said concerning the saving of our coal supplies. It is evident that the regulation of subsidence is largely determined by the efficiency of the packing used, and that the most complete system of packing known is the hydraulic system; it is justifiable, therefore, to assume that the application of this system—particularly in the thick seams of this country—would be equally as successful as the results achieved in other countries. The objections roughly resolve themselves under the following heading:—(1.) Cost of providing packing material. (2.) Difficulty of packing flat or unfavourably inclined workings. (3.) Difficulties due to the use of large volumes of water underground causing: (a) creep, (b) increased cost of pumping, (c) bad effect on the health of miners, and (d) stoppage of packing through freezing. (4.) Difficulty of packing very thin or very thick coalseams. (5.) Excessive cost of maintenance of pipe-line. (6.) Difficulty in adapting the system to mines now using hand-packing. The experience gained by engineers in other countries where this system has been tried shows that, while these are all very real difficulties, they are not insurmountable, and if an opportunity is afforded there need be no fear of failure on the part of mining engineers and colliery managers in Great Britain to cope with each difficulty as it arises quite as successfully as engineers in other countries have done.

Not only would it be possible to find a sufficient supply of packing material in this country, and at very small cost, but the other advantages incidental to the removal of such supplies would in themselves be a sufficient incentive to warrant the adoption of hydraulic stowing.

In flushing packing the primary cause of creep can be reduced to a minimum by the greater amount of support left in the mined area and the more even distribution of the total weight on the packs, as only a few gateroads are necessary. As this system is usually applied to the retreating method of working, the wet floor is always being left behind, and as the old gate-roads are usually fitted with rubbish dams, and the water from the packing area is turned into them, they act as filter-ponds and become silted up, thus completely packing all the mined area and consequently reducing the tendency to creep.

The increased cost of pumping would be a great disadvantage in many mines, particularly in Lancashire, where very little water is met with in the lower workings of the deep mines, as it would necessitate the erection of special pumping plant for pumping the water back to the surface. Pumping gritty water has a considerable wearing effect on the pumps, but this defect has been considerably reduced on the Continent by the Schubert pneumatic process of clarification, and the filtering of the flushing water in the old gateroads. The advantages already suggested, and the increased safety due to the damping of all coaldust in the vicinity of the working-faces, would more than counterbalance the extra cost for pumping.

It is frequently argued that to send large volumes of water into the deep warm mines of this country would so saturate the air-currents that the mines would become unhealthy; but one of the great advantages of hydraulic packing is the cooling effect produced by the method, and the consequent general reduction of temperature throughout the mine. In the first place, it does away with the heat caused by the grinding of coal in pillars (or coal left in the goaf), and the rapid oxidation and heating of the fine coal-dust produced by this crushing action of subsiding strata; secondly, by the cooling effect produced at the working face where packing is in operation; and thirdly, by the cooling effect produced by the increase in the amount of ventilation that reaches the working face. As the water is led to the goaf in pipes, and may, if necessary, be returned to the shaft in a similar manner, the only place where evaporation can take place to any large extent is at the working face where the goaf is being packed. In many cases the packing is done on the opposite shift to the coal-getting, so that the water has had time to drain off before the miners commence work. This and the general reduction of the mine temperature make it possible to use hydraulic packing in the deep and warm mines of Belgium and Germany, where the working day of the miner is longer than is legally permitted in this country.

There is no great difficulty in this country, even in the coldest weather, in providing a water supply sufficient to make up any slight loss due to evaporation. The only other difficulty met with is in intermittent packing, where the pipes near the surface are liable to become frozen when not in operation; but this can be avoided by lowering the water in the pipes to a point where the temperature is high enough to prevent freezing.

As to the difficulty of packing very thin or very thick seams, in Essen the Krupp firm are successfully extracting eight seams, varying from 20 in. to 5½ ft. in thickness, from underneath their engineering works, railways, and large public buildings, through completely packing them with flushed *débris*. In Silesia seams up to 40 ft. thick are being worked and completely packed, sometimes by panel-slicing the whole thickness of seam and sometimes by longwall layers. Working is commenced from the bottom upwards, and the goaf packed in each layer as it is extracted. The only disadvantage in thin seams, compared with thicker ones, is the frequency with which the flushing pipes have to be moved for a given amount of packing. In steep thin seams in Belgium the coal is passed down shoots the height of the seam; or, where the dip is too low for this, conveyors are put in to carry the coal to the loading levels, thus avoiding all ripping of the gateroads where hydraulic stowing is used.

The excessive cost of maintenance of the pipe-line was the greatest difficulty that had to be surmounted in hydraulic packing, and it has taken several years of experiment and practice to devise a suitable pipe-line capable of resisting the grinding action of the *débris* in the horizontal pipes. There are practically only four systems now in use, namely: (*a*) mild ungalvanised steel pipes; (*b*) mild steel (or cast iron pipes) lined with hard wood or steel; (*c*) steel pipes lined with porcelain; and (*d*) the Stephan system of oval steel pipes, with steel lining, or the Busch system with iron linings. In all new installations the third and fourth systems are adopted. The latter system would seem to be the most satisfactory method yet adopted, and the cost of lining is about 12s. per metre.

The difficulty of adapting the system to mines now using hand-packing would be greatest in mines where the working operations are already very far advanced, particularly in thin seams where the advancing system of longwall is in use and the shafts are sunk to the dip of the royalty. This objection would not apply to newly opened-out collieries, nor to most collieries where thick seams are worked either by retreating longwall or bord and pillar. The only difficulty in the latter case would be the cost of driving tunnels (or levels in the upper seams) to the rise of the coal, in order to get a sufficient fall for the *débris* in the pipes.

Hydraulic packing which shows so many advantages is neither bound to special kinds of minerals nor methods of working. While there is no doubt that in its application some difficulty or other may have to be overcome, these will gradually disappear with extended experience. From the technical point of view, there is nothing to prevent its successful application in many of our large collieries, particularly in thick seams.

A long discussion followed, which we must leave over for our next issue.

A New Mining Dial.

Mr. FREDERICK P. MILLS, of Oldham, read a paper describing a new mining dial. He said:—

The new mining dial comprises many improvements which remedy certain defects that have been for a number of years a considerable source of trouble in mine surveying. The dial has been specially designed for steep mines, and is capable of obtaining angles up to the vertical with ease, whilst ensuring, at the same time, that the sight is in the vertical plane. The chief feature in this instrument is that the plate carrying the trunnion revolves directly on the main cone centre. The main conical centre is made a part of the instrument, and is thus detached from the tripod and always remains within, and is protected by the body of the instrument. The needle is of improved design, and is balanced three-fifths of its total length from the north end, thus giving with a 5 in. needle the accuracy and ease of reading equal to the usual 6 in. needle pivoted in the centre. A needle with an engraved line upon its upper surface can be set against another engraved line much more accurately than can the usual pointed needle. A small electrum (or german-silver plate) is attached to the north end of the needle, with a fine engraved line above the point, thus giving a fine line for easy and accurate setting, and maintaining the magnetic advantages of the pointed needle. The covered plate of the compass-box is cut away at the north, and tapers towards a point to the south, so that when the needle appears in the centre of the V. it is being viewed from due south. A trough-needle is fitted to this instrument, and one is thus required to find the north point only.

The graduated circle is on the outside of the instrument, and the graduations are subdivided by two opposite verniers to 3 minutes. The verniers and circle are protected from dust and damp, being read through glass windows. The stage of the dial at the north is marked with an arrow, also the 360 deg. vernier, which is placed at the south-west of the instrument for convenience to the observer. The stage is of triangular girder design, and gives the most direct and rigid of connections between the sights and the trunnions. A special friction clutch is fitted, in order to prevent the sights from dropping when nearly vertical, and this friction is obtained without undue bear on the trunnions. The levels have been placed in the compass-box, whereas in most instruments they are placed on the movable stage. The levels with the trough compass are protected by a fixed cover of military pattern.

The graduated face of the semicircular arc, when vertical, and the vernier form surfaces in the same plane, and are easy to illuminate with a miner's lamp. The arc being divided by a vernier to 6 minutes, this allows of greater accuracy in taking angles of elevation or depression. Levels have been taken with this instrument amounting to a probable error of 3 ft. in a mile. The sights are so arranged that the back and the fore sights are of the same height, in order to simplify the process of levels and setting out.

The instrument is fitted with suitable clamps and tangents for the class of work it is required to do, and thus enables sights to be taken with precision. The tripod head is made with metal face-to-face joints, which give a perfect and steady fitting under all conditions. In steep workings it is often an advantage to have one of the legs of the dial shorter than the others, in order to have the plates horizontal. One leg is jointed for this purpose, and a point is fixed permanently on this short leg. A sleeve has been provided to screw down and completely cover the thread from dust or grit when using the short leg. This sleeve may also be tightened against the top of the screw of the lower leg so as to act as a lock-nut, thus steadying the joint when the full length of the legs is being used. An important addition, also, is the fixing of the points at an angle to the legs, which allows of firm setting when found necessary to spread the legs wide apart. The lamp cups are made of nickel-aluminium, and are easy to carry in the pocket. The surface on which the lamp stands has a curvature the radius of which is the average height of the lamp flame above the base of the lamp. This is of considerable advantage, for if the lamp is not placed in the lamp cup exactly vertical, the flame will still be approximately central; also, as only the base of the lamp touches on the curved surface of the lamp cup, the lamp will always stand steadily. A notch is cut away in the rim of the cups to accommodate the hinged projections of any lamps fastened with lead rivets or screw locks.

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Coalowners Establish Mining School—Dock Troubles of Coal Shippers at Cardiff: "Irritating and Costly Delays" Due to Congestion—Newport's New Dock Progresses Towards Completion—More Litigation Threatened Against Miners' Federation—Lack of Coal-Siding Accommodation at Swansea—"Slump" in Freights—Serious Change Proposed in Colliery Assessment: More than One-Eighth Increase.

A very important proposal of the coalowners in regard to the establishment of a mining school has at last reached practical form. Those taking the most prominent part are Sir Clifford Cory, M.P.; three representatives of the Ocean Coal Company—Messrs. D. Davies, M.P., W. Jenkins and T. Evans; two representatives of the Powell Duffryn—Mr. Joseph Shaw, K.C., and Mr. E. M. Hann; two from the Canadian Combine—Mr. D. A. Thomas and Mr. T. J. Callaghan. With these is co-operating Mr. W. W. Hood, formerly of the Glamorgan, and Mr. Hugh Ingledew is serving as secretary. Associated with the companies named are also the Ynyshir, Messrs. D. Davis and Sons (Ferndale) and others. Already an income of over £5,000 a year is anticipated from the levy of one-tenth of a penny per ton on the output of the associated companies producing 12½ million tons annually. There have been negotiations with the University College of Cardiff, but it has been found impracticable to agree.

The movement was initiated four years ago, whereby colliery proprietors should subscribe towards the development of the mining school which operates in connection with the college; and a committee was formed, the idea being to secure guarantee of a fixed sum per annum for five years. Some of the subscribers paid in contributions to this end, so that there is said to be about £8,500 invested, but certain other coalowners being wishful that there should be more direct control by practical men, and less of academic element, sought to modify the scheme. An advisory board was formed whereby this control could be exercised; but it turned out that these operations would be *ultra vires* of the college charter. After full discussion, a provisional committee of coalowners consulted with Professor Louis, who holds the chair of mining at Newcastle; and that gentleman recommended a school of mines of a character similar to that which is in operation at Bochum, Westphalia. The desire is that throughout South Wales and Monmouthshire the county council evening continuation classes should serve as preparatory schools and that the coalowners' central mining school should be established at Treforest, near Pontypridd.

The course of study in the lower division is intended for colliery officials and mechanical engineers, whilst the upper division will be for under managers, the higher colliery engineers, &c. There will be an experimental institution with a laboratory. Only about 12 students will be admitted at the beginning; and the deed of trust and constitution is now being settled by counsel. Forest House, which is to be taken for the purpose of the school, was at one time the residence of the late Ald. Walter Morgan.

As to the delays in shipping coal at Cardiff docks further correspondence has been published between the president of the Chamber of Commerce (Mr. North Lewis) and Col. Denniss, manager of the docks. The president reasserts his statements as to the "irritating and costly delays," and points to "the helpless position of the shipper" as justifying his insistence that it is high time the dock and railway interests should work in better harmony, so that shipper and shipowner should not be "put to serious cost and delay." The root of the whole trouble is the preference given to the larger shippers.

The chartering clerks, at their annual dinner on Saturday evening, dealt with the same subject. Mr. Walter Thomas, who was in the chair, declared that the present shipping facilities were inadequate. He was informed that during the last 10 years only 14 tips had been added to the facilities of the port, which (allowing for a quarter of a million tons per tip per annum) gave an increase of only 3½ millions of tons. But the figures of present trade showed an increase of 7,000,000 tons. The dock companies were not making the additions which were required to meet the great congestion existing, or to meet the increase in production which would come as the result of developing new collieries and increase of output in old undertakings. They were expecting in a short time an increase of 5,000,000 tons; and were they to allow Newport, Swansea, or Point Talbot to take that increase? A new dock was needed, to be taken in hand immediately. The president of the Chamber of Commerce, who was present, said they must have increased facilities and further docks in the near future.

Newport's new dock marked another stage in its progress on Friday, when the sluices of the extension were opened and the tide water allowed to flow in. As soon as the area is filled the contractors will commence to dredge the dam which separates it from the South Dock extension. The pumping machinery which is installed will enable 50 million gallons to be put into the dock in five hours. In the past the water level has been maintained by inflow from the River Ebbw, and partly by pumping, but the vast acreage of the deep water in this largest dock in the world held by gates has necessitated the erection of the great pumps.

A case of considerable importance is indicated by an enquiry which a firm of Derby solicitors has made to the South Wales Federation. They ask for permission for Mr. W. L. Jones, or a chartered accountant, to inspect the books and accounts of the Federation for 1911. Mr. Jones, being a member of one of the Rhondda lodges of miners, apparently objects to expenditure for Parliamentary purposes, believing that the general funds of the Federation have, contrary to the legal decision given a short time ago, been applied to Parliamentary purposes. Mr. Jones' solicitors wrote from Derby asking for an explanation of certain specific items in the Federation balance sheet, and whether any items "improperly expended since January 1910 in political payment" would be repaid by the trustees. Failing permission being granted for inspection of the books, the Derby solicitors' letter concluded, "Please give the name of your solicitor who will accept service on behalf of the Federation and the trustees." Apparently a certified copy of the accounts is to be supplied in place of permission to inspect, though if the Derby solicitors accept this copy it is upon the understanding that they are still to be free to press for inspection. Mr. Jones, upon whose initiation the action has been entered, states that information is being collected from all parts of South Wales, and that "startling disclosures" will be made if the case is tested.

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in Cardiff are at a very high figure;
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n was made on Saturday to Mr Arthur
nanager at No. 1 pit, Ebbw Vale, who
red to another part of that company's
great undertaking. He was for some years mining teacher at the Ebbw Vale Institute. The officials and others presented him with a case of cutlery, a gold watch and chain, with other gifts.

Merthyr Assessment Committee discussed on Saturday last the question of colliery rating, a motion being submitted that the overseers should apply the imperial ton for the purpose of assessment. It was stated by the mover that if this new principle were adopted the assessment of the parish alone would be increased by £10,000 a year, while another speaker said that in the whole Union it would raise the total by no less than £100,000. This motion was not carried, but a conference is likely to be called of representatives from all mining unions in Wales to consider the matter.

The present basis of assessment is the "long" ton of 21 cwt. of 120 lb. each, so that the proposed change would mean an addition of more than an eighth to the liability of collieries. Having been in vogue since the early sixties, the existing practice is well established, and, of course, any attempt to alter it would occasion determined opposition, with appeals, and probably even an endeavour to alter the law, for the burden of rates upon colliery property is already very heavy indeed. In Merthyr Union the assessment is from 6d. to 8d. per ton.

If all colliery concerns followed the practice of the International Company, and showed in their balance sheets the amount paid out for rates and taxes, some clear idea of this very heavy burden would be generally attained. It should not be too much for the practice of railway companies to be followed—the figures to be shown in full, and then to be stated also in the percentage upon the income. Facts of this sort are needed for successful resistance of undue impositions.

Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

COMPARISON OF RESCUE APPARATUS OF THE INJECTOR AND NON-INJECTOR TYPE.

Sir,—At the recent inquest relating to the Caeduke accident, where Mr. Ernest W. Painter succumbed whilst wearing rescue apparatus, Prof. Cadman, of Birmingham University, who was commissioned by the Home Office to test the apparatus, found the cartridge used with the apparatus slightly punctured in two places, and although it was conclusively proved that the deceased partly removed his mouthpiece twice during the operations, expressed it as his opinion that carbon monoxide gas may have been sucked through the small orifices in the cartridge, and thus caused the death of the deceased. In concluding his evidence, Prof. Cadman expressed the following opinion:—

> An apparatus of the injector type, possessing as it does a zone of negative pressure, is a source of considerable danger unless it is subjected to a most rigid and systematic examination before being used in an irrespirable atmosphere, particularly one containing an accumulative poison, carbon-monoxide. This examination can only be done by a second person, as the wearer is totally unable to ascertain for himself whether all his connections are gastight or not.
>
> An apparatus possessing such a zone of negative pressure is always liable to leakage, and it would be in the interests of safety if the apparatus was made to give positive pressure only, so that any small leaks which must inevitably occur will pass gas from the inside to the outside of the apparatus.

Prof. Cadman, when expressing this opinion on the injector apparatus, did not quite recognise that leakages in the non-injector type of apparatus giving positive pressure only are just as dangerous as in the injector apparatus, in so far as oxygen is lost, and the supply rapidly diminished, thus also causing fatal results.

Before putting on the apparatus, all the connections can be tested as to airtightness as far as the Draeger apparatus is concerned, and it is wrong to say a second person is necessary to do so. Why an apparatus possessing a zone of negative pressure should be always liable to leakages is quite incomprehensible, and it surely does not imply that leakages cannot occur in non-injector apparatus. On the other hand, if they occur, as stated before, they are just as fatal as in any other type.

As the above pronouncement of such an eminent authority as Prof. Cadman will no doubt lead mine-owners to think and weigh up the advantages and disadvantages of the non-injector type, may I be allowed to put the following facts before your readers, and then leave it to them to decide the points for themselves.

Up to the year 1901 all rescue or breathing apparatus invented and placed on the market were of the non-injector type. By the invention of the Draeger circulation nozzle (injector) a new era opened up for rescue apparatus, and from that year dates the progress which rescue apparatus have since made, and to go back to the construction of rescue apparatus without injectors would certainly mean a step backwards instead of forward. The reason for this assertion will be found in the following argument: As far as the writer is aware, and he will be glad to hear contradictions if wrong, there are only two advantages claimed for the non-injector type, *i.e.*:

(1) That on account of existing positive pressure, no gas such as CO, which is not absorbed by the alkali, may be sucked into the breathing circuit in cases where the connections may not be gastight, or a regenerator getting punctured.

(2) That the orifice in the injector is very small, and that there is a likelihood of the same getting choked by foreign bodies in the oxygen.

The advantages of the injector type are the following:—

(1) The circulation nozzle (injector) circulates the air and works the apparatus independent of the breathing action of the lungs, in consequence of which more work can be performed in this type of apparatus than in the non-injector type, in which the lungs operate the apparatus and circulation—conclusively testified by the report of the South Midland Coalowners' Experimental Committee at Birmingham.

(2) In the injector type of apparatus a helmet may be used in addition to the usual mouthpiece, if demanded by such circumstances where the face may be exposed to scalding steam, heat, etc. In the non-injector type no helmet can be used, as the dead space in the helmet would cause accumulation of CO^2, unless the air is sucked off by an injector.

(3) In the injector type, an absorbing cartridge (which makes for purer breathing air, and consequently higher efficiency, can be employed, which is not the case in the non-injector type.

(4) An efficient cooler can be employed in the injector type of apparatus, and consequently the air breathed is cooled down to an agreeable temperature. In the non-injector type the air becomes disagreeably hot—as mentioned in the South Midland Coalowners' Experimental Committee's report.

In comparing the advantages and disadvantages of the two types it will be seen that the advantages claimed for the non-injector type are based on the supposition that the injector type of apparatus is used carelessly, while on the other hand a non-injector apparatus used with equal carelessness will also cause fatal results. The clogging of the small orifice in the injector has never occurred, as far as the Draeger apparatus is concerned, which, no doubt, is due to a fine gauze being inserted inside the injector, and this prevents impurities finding their way to the orifice.

As to the small punctures in the cartridge found by Prof. Cadman on examining the apparatus, it must be observed that it is difficult to elucidate how these punctures were caused. There is, of course, a possibility that, at one time or other, nails may have been driven into the cartridge, but these punctures could have easily been detected if the cartridge had been examined before being inserted or tested under water, as is done at several rescue stations when the cartridges are received from the works. Every cartridge, after being made, is tested at the works, and the greatest care is taken in packing the same. Several hundreds of thousands of Draeger cartridges have been supplied, and no such punctures have been found before. There are, at the present moment, as far as it is within the knowledge of the writer, about 6,000 sets of the injector type of apparatus throughout the world, whilst of the non-injector type there are not more than about 500 to 600 sets in use.

In conclusion I may say that Messrs. Draeger also make a breathing apparatus without an injector, and giving positive pressure only; this is not recommended for work, but has been constructed to fill the need of a simple and cheap apparatus which may be used for entering places filled with smoke, fumes or gas, such as is required for ammonia plants, gas plants, etc., and which can also be used for self-rescue by walking through noxious atmosphere. Richard Jacobson.

70, Shoe-lane, Holborn, London, E.C.
December 9, 1912.

MINING AND OTHER NOTES.

The enquiry by Joint Committee of the two Houses, whether restrictions should be placed on gas companies in the manufacture and working up of residuary products, ended its deliberations on the 5th inst., and will report to Parliament in due course.

Mr. R. O. Lamb, of Hayton, How Mill, near Carlisle, has completed 50 years as a justice of the peace for the county of Durham, and has been presented with an illuminated address in honour of the occasion. Sir Alfred Palmer, Bart., who made the presentation, said it mattered not, whether as a magistrate sitting on that Bench tempering justice with mercy, as an employer of labour, or as chairman of the Northumberland Coalowners' Association, Mr. Lamb always showed a kind, sympathetic, tactful manner, and he could not be better described than as one of the best types of a fine English gentleman.

The miners of Auchenharvie Colliery, Stevenston, have lifted their graith in consequence of the flooding of the new pit on Ardeer foreshore. The water in the flooded pit has risen to within 45 fathoms from the top of the shaft, and is still gradually rising. Auchenharvie pits are in proximity to the Ardeer pits, and on a lower level, and the withdrawal of the miners has been considered advisable until the Ardeer pit has been pumped clear of the water. The pits are worked by the Glengarnock Iron and Steel Company, and about 700 miners are employed.

The Society of Motor Manufacturers and Traders are offering a 2,000 guineas prize for a home-produced fuel. It is laid down that the fuel must be produced entirely from materials available in this country, it must be marketable at a competitive commercial price, it must be a satisfactory and suitable fuel for the present day motor engine, and it must be obtainable in sufficient quantities to guarantee an unlimited and continual supply.

Mr. David Bowen continued his series of lectures at the Leeds University on the 16th inst. on mines in relation to the State. The phase of the subject under consideration related to conditions abroad. Having described and discussed company law outside the United Kingdom, and compared it with our own, the lecturer analysed the powers of the State as to the granting of concessions and the working of mines in foreign countries. In France, he said, the complaint was that the State had too much control over the granting of concessions, and he contrasted the freedom obtaining in the United Kingdom. An important French Commission had recently reported that the main object of legislation should be to assimilate mining property with ordinary property, adding that England and the United States were almost in complete possession of a law as wise in its simplicity as that which the Commission indicated as the perfection of mining law.

There was a large and influential gathering of Humber coal exporters at the second annual dinner of their cricket club last week. Ald. Larard, in proposing "The Society," said the coal trade was acknowledged to be in a healthy condition, and with the utmost confidence he prophesied that 1913 would be the best year ever known for the coal trade of this country. Mr. Erik Ohlson, president of the club, who replied, said he agreed with Ald. Lerard that they were on the verge of a coal boom. There would be more coal shipped from Hull next year than had ever been exported in a single year before, but he did not anticipate excessive prices. In 1907 he believed the North-Eastern Railway Company were caught napping, and had not sufficient siding accommodation to deal with their traffic. That had been altered, and he ventured to say that 90 per cent. of the people in Hull had no idea what the North-Eastern Railway were doing by the port. It was most gratifying to see the extensive sidings that were being put down between Hull and Hessle. Replying to the toast of the visitors, Mr. Wilcock said that so far as the North-Eastern Railway was concerned, 1912 was a boom year, for during the months of July, August, and September they shipped more coal on the North-Eastern Railway docks than were ever shipped in any three months in their history. Since the Immingham Dock was opened the North-Eastern Railway shipments had gone up by leaps and bounds. He did not think they had anything to fear from the competition on the other side of the river.

The second of a series of lectures on subjects connected with the gas industry was given in the Chemical Theatre of the Manchester University on Saturday afternoon by Mr. Franklin Thorp, of Whitefield. Mr. Thorp directed attention to the mixing of gas and air for lighting and heating. With the aid of his brother, Mr. Harvey Thorp, he conducted a number of experiments showing the effect of a due admixture of air and gas for lighting and heating purposes.

A new ambulance house, which has been built by the Seaton Delaval Coal Company at a cost of about £200, for the New Delaval Colliery workmen, was opened on Saturday. The building is of brick, and has been built and equipped by the company's own workmen from the design of Mr. K. Rennison, Seaton Delaval. It consists of a carriage-house and a reception room, and in the latter is kept the ambulance equipment. The building is lighted by gas, and heated by a hot water installation. The new carriage was provided by the workmen of the colliery, assisted by the coal company and others.

Messrs. David Bridge and Co. Limited, Castleton, Manchester, inform us that they have just been favoured with an order for a series of their well-known Heywood and Bridge's patent friction clutches for driving in a combined form, four large capacity three-throw pumps and haulage installations for mining work. The clutches have of necessity to run at about 6 revolutions per minute, but at 100 revolutions per minute they would be capable of giving out upwards of 6,000 brake horse-power. The order is undoubtedly one of the largest ever given out for friction clutches for this particular work.

On a charge of obtaining 6s. 8d. by false pretences from the North Walbottle Coal Company, two putters, named Wilfred Driver and George William Smith, were fined 30s. and costs at the Moot Hall Police Court on the 4th inst. Mr. Gilbert Hicks, outlining the case for the prosecution, said that Smith worked on the fore shift and Driver on the back shift, and they had resorted to an ingenious scheme which was very difficult of detection. By the substitution of tokens, one had been credited with coal which he had never "putted," and the other obtained consideration money in the nature of a minimum wage from the company. Cases of this kind were very serious from the point of view of the colliery owner. The amount of the fraud might be very small in a particular case, but where a large number of men were employed, it would be much more, and where the company owned several pits the loss might be enormous if these frauds were allowed to continue.

Messrs. William Atkins and Co. Limited, of Sheffield, have sent us a certificate of tests carried out by the Sheffield Testing Works with their "Waco" extra superior high speed steel. The specimen consisted of a 30 mm. square high-speed lathe roughing (round-nose) tool, and the test gave the following results:—Cutting speed, 50 ft. per minute, depth $\frac{3}{16}$ in.; traverse per revolution $\frac{1}{16}$ in. The test lasted 10 minutes, and 20·23 lb. of material were removed, no lubricant being used; the cutting edge was found to be in good condition after the test. The material operated upon was a steel bar of the following analysis:—Carbon, 0·89 per cent.; silicon, 0,085; sulphur, 0·040; phosphorus, 0·026; manganese, 0·75.

At the session of the Staffordshire Iron and Steel Institute held at Dudley on the 23rd ult., Mr. Herbert Pilkington, manager of the Sheepbridge Coal and Iron Company, Chesterfield, read an interesting paper on "The Manufacture of Wrought Iron and its Future." Mr. Pilkington, in the course of his paper, said the manufacture of wrought iron had for many years been considered a dying industry, and one scarcely worth while considering in any light. Puddling furnaces and iron mills had been dismantled wholesale, and until quite recently little or no attempt had been made to improve those plants which had so far survived in this country, and the attempts were of a half-hearted character. Of late a great change had come over the situation which justified the confidence of those who still had faith in wrought iron contrasted with steel. There was now an immense revival in the demand for wrought iron, because of the appreciation of its marked superiority over steel, based on practical experience. All considerations in regard to the manufacture of wrought iron were based on the puddling process—a weak spot. There had been very little change in the practice of puddling since the days of Joseph Hall, of Bloomfield Ironworks, who introduced the pig boiling system in 1839. Of late years there had been improvements to prevent waste of iron and to alter the character of the product. The process of piling and reheating wrought iron absolutely welded the fibres together, whereas any such shock on mild steel might fracture the whole section very quickly after the first surface crack occurred, as there was no resistent fibre in the structure. There had been grave mistakes in the application of steel. In the use of wrought iron for fireboxes for locomotives, experience proved that it was far better than steel. Other grave mistakes made in the substitution of steel for wrought iron were in the cases of crank shafts for engines, connecting rods, crank pins for locomotives, and also for bolts for pumps and water services. Steel nuts, bolts, and rivets were regarded as mistakes. For railway wagons the chief coupling links were made of wrought iron, though some people had dreams of steel links. In iron the fibrous nature resisted shocks far better than steel, while steel links would not weld properly and securely.

Further developments are anticipated in East Lothian with the object of working coal under the sea. The output at present of the Prestonlinks Colliery is about 1,000 tons per day, but fully 3,000 tons or more per day will likely be the quantity of coal sent up the shafts. Land has been reclaimed from the sea, thus permitting of extensions for pithead accommodation and wagon sidings. At present an immense cooling tank is nearing completion to aid the efficiency of the turbine engines. A fan of great size is being fitted up on the latest design to circulate air or withdraw gases. A new shaft of 18 ft. diameter has been sunk. This important colliery has a great area of coalfields under the Firth of Forth, as well as under the land, and the shafts are on the edge of the foreshore. The projected new Lothians railways will have the termination of the principal line at the Prestonlinks Colliery, thus affording direct communication with the coal-shipping hoists at Leith Docks.

In the House of Commons, on December 3, Mr William Archer Redmond asked the Secretary to the Treasury whether it is within the powers of the Development Commissioners to assist in the development of coalmines; if so, whether he will call their attention to the report made by the mineral expert to the Department of Agriculture in Ireland on the coalfields at Coalisland, County Tyrone, to the effect that workable coal is there in abundance, estimated at 63 million tons; and whether the Commissioners will take this report into consideration with the object of rendering assistance in the development of this important industry. In a written reply, Mr. Masterman stated that the development of coalmines did not fall under any of the heads enumerated in section 1 (1) of the Development and Road Improvement Funds Act, 1909, in respect of which advances from the Development Fund are specifically authorised, and the Commissioners have been advised that the general words at the end of section 1 (1) cannot be held to cover economic development that is not in *eodem genere* and cognate with the subjects specifically named.

In the King's Bench Division recently, Mr. Justice Bailhache gave judgment in an action brought by Williams Brothers, of Hull, against E. T. Agius Limited, of Hull, in which a special case had been stated by an umpire raising questions of law for the opinion of the Court. The point at issue was the basis for fixing the measure of damages in breach by the defendants of a coal contract between the parties. The contract price was 16s. 3d. per ton, the re-selling price 19s., and the market price 23s. 6d. Plaintiffs (Messrs. Williams) said they wanted the difference between 16s. 3d. and 23s. 6d., while the defendants said the damages were limited to the difference between 19s. and 23s. 6d. His lordship answered the questions raised by holding that plaintiffs' contention was right, and that they were entitled to the higher measure of damages, with costs. A stay of execution was refused.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.—November 29.

Town Planning in South Yorkshire.

Mr. E. F. L. Wood having asked the President of the Local Government Board if any steps were being taken under the Housing, Town-planning, &c., Act, 1909, by the local authorities concerned, in view of the contingent increase of population in connection with the development of the South Yorkshire coalfield in the neighbourhood of Doncaster,

Mr. Burns (President of the Local Government Board) replying in the Parliamentary Papers, says:—"The local authorities concerned have had this matter under consideration for a long time, and I have been pressing them to prepare town-planning schemes to cover the area in question. I believe that the Bolton-upon-Dearne Urban District Council have practically decided to proceed with a scheme, and that some progress in that direction has been made by the local authorities. I am happy to learn that the Mayor of Doncaster is taking an active interest in the matter.

December 5.

Internal Combustion Engines in Coalmines.

Mr. George Greenwood asked whether the Home Secretary would cause a thorough examination to be made by competent experts of the latest improved type of internal combustion engine, with the view of allowing the introduction of such engines into coalmines in this country where practicable, under section 58 of the Coal Mines Act, 1911, in substitution for animal haulage, seeing that such engines are now so employed in many gaseous mines in Belgium and other Continental countries?

Mr. McKenna replied: As my hon. friend is aware, the question of the use of internal combustion engines below ground in coalmines was considered on the Coal Mines Bill of last session, and the feeling of Parliament was against the use of present types of such engines. In the circumstances, I do not propose to institute such an enquiry as my hon. friend suggests, but if improved types should hereafter be produced and particulars are submitted to the Home Office, the question of allowing their use will of course be carefully considered.

Price of House Coal in South Wales.

Mr Keir Hardie asked the Prime Minister whether the South Wales mineowners had advanced the price of house coal by 2s. per ton, thereby bringing the price up to 26s. and 27s. per ton for best qualities; whether he could state the reasons for this increase in price; and whether, as the price of coal was inflicting hardship upon the poor and on the working class generally during the severity of the wintry weather, he proposed to introduce legislation to end this state of affairs, preferably by nationalising the mines and by empowering the municipal authorities to undertake the supply of coal to their citizens?

Mr. Robertson said the Prime Minister had asked the President of the Board of Trade to reply to this question. His right hon. friend could not hold out any prospect of legislation for the purpose of regulating the price of coal.

OAL AND IRON TRADES.

Thursday, December 12.

rland, Durham and Cleveland.

Tyne.

COAL.

ek 153,667 tons of coal and 1,179 tons of
obed from Tyne Dock, a decrease of 4,177
719 tons of coke when compared with the
e corresponding week of last year. The
aggregated 97,795 tons of coal and coke,
43 tons. It is calculated that the North-
Company's supplies for the northern division
ill cost from £50,000 to £75,000 more for
00 tons required than have the 600,000 tons
aken during the year now ending. Towards
eek the following coal sales were recorded:—
ne prime steams for delivery this month at
; Tyne steam smalls for like delivery at
m smalls for shipment over next year,
and holders at 9s. 9d.; 20,000 tons best
ng coal for similar shipment at 15s. 3d.;
inary Durham unscreened bunkers for 1913
d.; and two parcels of Whorlton partially-
r bunkering purposes within the next few
f.o.b. With Saturday came the North-
nen's strike, and complete disorganisation of
llowed in its train. At the time of writing,
despread over this district, although by no
or likely to success. Most of the collieries
land and Durham have had to suspend
g to the impossibility of getting their
from the pits to the shipping places. At
boats have been able to continue loading,
Blyth are absolutely idle. The Broomhill
shipping coals from Warkworth, by reason
t possesses a private railway. Other local
re still able to work owing to the possession
nes and staiths are:—Benwell, Cowpen,
Elswick, Felling, Harton, Hebburn and
n Burn, Townley, Walbottle, and Pelaw
the Durham collieries with coke ovens are
urn out coking coal to supply their ovens,
ssible to get the coke thus produced taken
aces where it is needed, there is a growing
cake at the ovens, which may result, after
ne fall in coke prices. For spot lots of coal,
20s. to 30s. per ton, irrespective of brand,
t, but as there is virtually no market, no
ould be served by endeavouring to give
ual. For delivery over next year, a quan-
coking coal has been sold at 15s. 3d. per

COAL.

from Sunderland last week amounted to
oal and 2,380 tons of coke, as compared with
coal and 750 tons of coke for the corre-
of 1911, being a decrease of 2,135 tons of
ease of 1,630 tons of coke. Practically all
ere suspended temporarily owing to the
rth-Eastern Railway, with both buyers and
off pending developments. Meanwhile any
al is difficult to secure; only those collieries
own lines to the shipping staiths can
and even in these fortunate cases most of
re booked up until the end of the year, so
carcely any surplus coal available. High
asked for spot coal, and as much as 20s. to
as having been paid for really spot coal for
s. Quotations this week are, therefore,
vious to the strike the market generally was
k feeling, and in view of good contract
look was very promising to holders of coal.
trong demand for gas coal, with a very full
kers and coking coals for export. In the
t market there is very little doing owing to
n obtaining cargo, and low rates are being
ate to London being called 3s. 3d. Recent
Coasting: Rotterdam 3s. 9d., Calais 5s. 3d.,
d., Havre 6s. Bay: Bilbao 7s. 3d. Baltic:
Pillau 7s. 6d., Mediterranean: [Genoa is
, Port Said 12s. 9d., Venice 13s. 6d., Algiers
. 3d. to the River Plate.

-on-Tees.

COAL.

d some rather heavy sales of fuel were
business is now in a state of suspension.
s in the north which own their own wagon-
aiths have shipped bunkers sold at prices
0s. to 30s. per ton, but in all other cases pits
n in consequence of the strike of North-
y employés. The position is very irritating,
iew of the record bookings for fuel for
the holidays. Under present conditions,
e nominal. The great difficulty in the
is causing very serious inconvenience. For
blastfurnace coke supplies have been inade-
they are cut off practically altogether.
It is impossible to quote prices, but any coke available for early delivery at Cleveland blast furnaces would command high rates.

IRON.

The strike of railwaymen has paralysed the iron and steel trades. The absence of fuel, due to the fact that the strike prevents its conveyance from the Durham coalfields to the various places of consumption, has caused blastfurnaces to be put out of operation, nearly all the Cleveland ironstone mines to be closed, and work to be partially suspended at many finished iron and steel works. Already what blastfurnaces have not been damped are, with few exceptions, running on slack blast. No. 3 g.m.b. Cleveland pig is 67s. 7½d. for early f.o.b., and that price is also named for No. 4 foundry and No. 4 forge, whilst mottled and white iron are each 67s.; and No. 1 Cleveland 70s. 6d. There is no east coast hæmatite pig to be had for this year, and mixed numbers delivered over periods next year run from 82s. 6d. to 82s. 9d. Foreign ore is weaker. Nominally market rates are still based on 23s. ex ship Tees for best rubio, but it is understood that purchases can be made at below that figure. As a rule 7s. is named as the freight Bilbao-Middlesbrough, but that price is said to be broken. Producers of manufactured iron and steel have more work than they can cope with. Many firms are behind with deliveries, and if the railway strike causes suspension of work to extend even over a few days, the greatest inconvenience will be experienced, and the loss both to employers and employed will be enormous. Not only have firms heavy order books, but they report continued good enquiries. Quotations are very strong. Common iron bars are £8 10s.; best bars, £8 17s. 6d., best best bars, £9 5s.; packing iron, £6 15s.; iron ship plates, £8; iron ship angles, £8 10s. to £8 12s. 6d.; iron ship rivets, £9 15s.; iron boiler plates, £8 17s. 6d.; steel ship plates, £8 5s.; steel ship angles, £7 17s. 6d.; steel boiler plates, £9; steel joists, £7 7s. 6d. to £7 10s.; cast iron railway chairs, £4 10s.; light iron rails, £7 to £7 5s.; heavy steel rails, £6 15s.; and steel railway sleepers, £7 to £7 2s. 6d.—railway material net and all other descriptions less 2½ per cent.

South-West Lancashire.

COAL.

There will probably be some little impetus given to the household trade by the customers in order to prepare for the stoppage that is likely to arise both at Christmas and New Year; otherwise, it cannot be said that a fuller winter average quantity of fuel is leaving the pits. Prices rule at 12s. 3d. for kitchen coals to 16s. 3d. for best coals, with good medium grades in between at 14s. 6d. to 14s. 9d., all per ton at the pit. With regard to shipping, the demand all round this week for bunkering fuel is heavier, contract requirements being practically at their maximum, and open sale enquiry also fairly active. There is not very much free coal available, and some collieries appear to be fully sold until after the holidays. Under the circumstances prices are hardening, and screened Lancashire steam coals range from 12s. 9d. f.o.b. to 13s. 6d. or 13s. 9d. f.o.b. according to quality, with a tendency to further advance. A much better demand is now coming forward for household coals for the coastwise and cross-Channel trade. Best coals rule at about 16s. 6d., with good medium grades at 15s. to 15s. 3d., both f.o.b. Garston and net. The pressure for slack for present delivery is continuous, and consumers are rapidly booking up on contract for the whole of next year. Prices are firmly held to, both for present delivery and for renewals of expiring contracts.

South Lancashire and Cheshire.

COAL.

House coal of the various descriptions is in improving demand, and prices are very firm at late rates: 16s. 6d. to 17s. for the best house grades, with good medium qualities at 15s. 3d. to 16s., and the commoner sorts from 12s. 6d. to 13s.—all into wagons at the pit. There is a steady enquiry for furnace coal, the price being unchanged from about 12s. 6d. per ton at the pit. Shipping coal also continues brisk, and prices are steady at about 14s. f.o.b. Partington. There is nothing new to report about the slack trade. It continues very cheerful, and prices are strong at about 9s. to 9s. 9d. for the best qualities, with commoner grades at from 8s. to 8s. 6d.—all into wagons at the pit. The demand of the miners for a further advance of 5 per cent. will no doubt have some effect on the trade generally.

IRON.

Makers of pig iron ought to be very satisfied with the prices ruling. Good common foundry commands 75s. delivered, and their deliveries are not all that the consumer requires. Forge iron, too, is in good demand, and the forges are now full of work, with crown bars at £8 15s., second quality £8 5s., hoops £8 12s. 6d., sheets £9 7s. 6d. The steelworks are also very busy, with bars at £8 7s. 6d. and billets £8 7s. 6d. Wagon-builders are also well booked forward, and traders' wagons are quoted at £81 to £85. Founders busier. Engineers report more enquiry, and new work coming forward. Boilermakers are not too well employed, and the prices obtainable are not remunerative.

Yorkshire and Derbyshire.

Leeds.

COAL.

There was a remarkably large attendance of traders at the Coal Exchange on Tuesday, and some amount of excitement. This arose through the strike on the North-Eastern Railway. It was reported that a good many vessels, unable to get cargoes or bunkers in the Tyne, had been sent to Hull. This resulted in a very prompt and heavy advance in the prices of steam coal for immediate shipment. It was stated that best hards had realised 17s. per ton f.o.b., and that if the strike continued further increases would take place. Apart from this, however, there was a very spirited enquiry for all descriptions of slacks, nuts, and coking smalls. Supplies of these qualities are becoming scarce, and prices firmer. It was stated that washed furnace coke changed hands during the afternoon at 21s. per ton at the ovens. The pits have worked practically full time this week, but the output has again suffered through the scarcity of empty wagons. Difficulties of transit become more acute with the approach of the holidays. The house coal trade continues unusually quiet for the time of the year. London merchants and factors are taking very little best coal. Pit prices remain as quoted last week:—Haigh Moor selected, 14s. to 14s. 6d.; Wallsend and London best, 13s. to 13s. 6d.; Silkstone best, 13s. to 13s. 6d.; Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. to 11s. 6d. In the coastwise trade there has been considerably more buying of local descriptions of house coal. Spot business has been done in Hull this week at the following f.o.b. prices:—Haigh Moor best, 16s. to 17s.; Silkstone best, 15s. 9d. to 16s. 9d.; Silkstone house, 14s. 6d. to 15s.; house nuts, 13s. 6d. to 14s. Business in the West Riding is a shade better at about the following figures:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 15s. 6d.; ordinary house coal, 14s. to 15s.; secondary sorts, 13s. to 14s. In manufacturing fuel some collieries have withdrawn price lists. Values are very irregular, with a strong upward tendency. Current quotations:—Large double-screened engine nuts, 10s. 9d. to 11s. 6d.; small nuts, 10s. to 10s. 6d.; washed samples, 6d. per ton extra; rough unscreened engine coal, 10s. 6d. to 11s.; best rough slacks, 8s. 6d. to 9s. 6d.; small slacks, 8s. to 8s. 6d.; coking smalls, 7s. 6d. to 8s. 6d. There is a good deal of forward buying of washed furnace coke, and contracts are not accepted at under 20s. per ton at the ovens. The demand from the Midlands and the Frodingham districts is very heavy, and likely to increase. Gas coal is also dearer on the week as regards open-market transactions. In some cases the cheaper qualities of Silkstone house coal are being sold for gas-making. Current pit prices:—Screened gas coal, 12s. to 13s.; gas nuts, 11s. to 12s.; unscreened gas coal, 10s. 6d. to 11s. 6d. For prompt shipment at Hull, the following f.o.b. prices are named:—Screened gas coal, 14s. to 14s. 6d.; gas nuts, 12s. 9d. to 13s. 6d.; unscreened gas coal, 12s. 9d. to 13s. 3d.

Barnsley.

COAL.

In every sense business has continued to be remarkably active during the past week, and the disturbed affairs in the north have added somewhat to the abnormal demand which has been experienced of late. Though there has not been, as yet, any great rush for steam coal for export *via* Hull owing to the North-Eastern Railway strike, the possible effect was shown at the local market by the firm position of prices. On the other hand, there is not a great deal of surplus fuel to be obtained, and coalowners are feeling exceptionally strong pressure for full contract deliveries, whilst the shortage in the supply of wagons does not assist in satisfying the requirements of customers. Under these conditions buyers of any special lots had therefore to pay rather inflated prices, but really there was not a great deal of business transacted under such difficulties. The best district hards are strong at 11s. 6d. per ton, and it was reported that on ordinary trade account an exceptional large amount of tonnage is being sent for export, and every effort is being made by buyers to obtain the largest possible quantities they can this side of the holidays. Secondary qualities are also making more money, prices being from 10s. 6d. to 10s. 9d. per ton. In regard to railway contracts, there has been no particular move since a week ago, and though the matter appears to be in abeyance, there does not seem to be any doubt but that the remainder of the companies will close at the coalowners' offer on the basis of 11s. 0d. per ton for the best qualities. The position in regard to small steam fuel is even more remarkable than a week ago, and buyers now find that it is absolutely impossible to cover their requirements for a considerable time ahead. Where contract deliveries need to be supplemented, it is a matter of very great difficulty to obtain tonnage at all, irrespective of paying a substantial increase on current prices. The demand is so completely in excess of the production that there is no alternative but for consumers to purchase other qualities of fuel, such as small house coal, and do the best they can under the circumstances, and there is also a very real difficulty in making satisfactory arrangements, having regard to prices for the earlier part of next year. The best washed nuts are selling from 11s. 6d. to 11s. 9d. per ton, seconds from 10s. 3d. to 10s. 9d. per ton, best slacks up to 9s. per ton, and secondary descriptions up to about 8s. The fact that it is not possible to obtain delivery in the disturbed area in the north has prevented a further rush for small fuel; and, for the same reason, should the strike be continued, the extra buying of coke for the furnaces in the north would be checked. However, for the present, the demand for slacks on coke-making account continues to be of a very extensive character, and there is not likely to be any reduction in this respect, owing to the fact that the stock of coke at the ovens is practically *nil*. The gas coal trade keeps very active, and business on foreign account continues to be of very large proportions. The business in the house coal trade continues to be of a very flat character. The prevalence of the mild weather keeps the demand down to a very low average, and apparently merchants are not disposed to indulge in much buying for the purpose of stocks. Coalowners are still adhering to the quoted lists, which are:—Best Silkstone, 14s. 6d. to 15s. per ton; best Barnsley softs, 14s. to 14s. 6d. per ton; seconds, 11s. 6d. to 13s. per ton; and best house nuts, up to 11s. 6d. per ton. The price for coke is firm as last quoted, about 18s. per ton at the ovens for ordinary qualities.

Hull

COAL.

The dislocation of the coal traffic on the Tyne has had the effect of causing the Humber market to be in an excited condition all the week and prices all round to advance sharply. What little free coal there was available chiefly in the hands of second holders was bought up eagerly at considerably enhanced figures. At the same time the general tone of the market hardened, and best South Yorkshire steams were advanced to 15s. 6d., which represents the market value to-day. All nuts and smalls, which have been very scarce for some time, have now reached the famine stage, many sorts being practically unobtainable. The demand for export and coastal shipment continues very brisk, and appears likely to continue so, this, of course, being an important factor which should have the effect of causing the South Yorkshires to re-establish a firmer tone. Under present conditions forward business is practically suspended. In the freight market there has been a very smart relapse in rates. Tonnage diverted from the north is plentiful, and in view of the approach of Christmas holidays charterers are by no means eager to engage vessels even at the easier rates. The Baltic rates are very much lower than a week ago, but the greatest decline is in the Mediterranean market, where as low as 10s. has been accepted for a large steamer from Genoa. Shipments at the docks are on a fairly liberal scale, but loading conditions are "prompt." The following are the approximate prices for prompt shipment f.o.b. Hull:—South Yorkshire: Best steam hards, 15s. 6d.; washed double-screened nuts, 14s. 6d. to 15s.; unwashed double-screened nuts, 13s. 6d. to 14s.; washed single-screened nuts, 13s. 9d. to 14s.; unwashed single-screened nuts, 13s.; washed smalls, 12s. 6d. to 13s.; unwashed smalls, 11s. 6d. to 12s. West Yorkshire: Hartleys, 13s. 3d. to 13s. 6d.; rough slack, 11s. to 11s. 6d.; pea slack, 10s.; best Silkstone screened gas coal, 15s.; best Silkstone unscreened gas coal, 13s. to 13s. 6d. Derbyshire and Notts: Best steam hards at Hull, 15s. 3d. to 15s. 6d.; best steam hards at Grimsby, 15s.; Derbyshire nuts (doubles) at Hull, 13s. 6d.; Derbyshire nuts (doubles) at Grimsby, 13s.; Derbyshire large nuts at Hull, 14s. 6d.; Derbyshire large nuts at Grimsby, 14s.; Nottinghamshire hards at Hull, 15s. 3d.; Nottinghamshire hards at Grimsby, 14s. 9d. to 15s.

Chesterfield.

COAL.

The mild weather delays the long-looked-for improvement in the house coal branch of the trade, and the demand at present is not by any means equal to the supply. Stocks in wagons in the colliery sidings are accumulating at a rather inconvenient rate, but, in view of the approaching Christmas holidays, the output of this class of coal is maintained at its normal tonnage. There is no change in prices, which are firmly held. Fuel for manufacturing purposes continues in strong demand, and consumers are eager to secure extra deliveries in order to accumulate a reserve stock to carry on their works during the period when the collieries are idle. Cobbles and nuts for gas-producers are in particularly active request, and buyers experience considerable difficulty in obtaining as much of these qualities as they require. Collieries are now sold to their utmost capacity, and it is quite impossible for them to add to their commitments. The same remarks apply equally to slack for steam-raising purposes, for which the demand is unprecedented. Prices are still advancing, but, even at the current high figures, buyers are unable to purchase sufficient to meet their requirements. Collieries are now entirely without stocks, and consumers are pretty much in the same position. There is a well-sustained demand for steam coal for locomotive use, and heavy deliveries are going forward daily. Extra supplies are asked for, in anticipation of the coming suspension of work at the pits. For the time of the year, the business that is being done in steam coal is distinctly good, shipments being on a substantial scale. Russia finds herself short of coal, and some extensive orders have recently found their way into North Derbyshire as well as South Yorkshire. This unexpected demand has caused prices to advance, and to-day's prices for best Top Hards are quoted from 14s. 6d. to 14s. 9d. per ton delivered free alongside steamers at Grimsby. There is now considerable enquiry for coal for shipment over the next shipping season, while prices are steadily hardening. There is an exceptionally heavy demand for the smaller classes of coal for delivery over 1913, to meet which the prospective supply is not by any means adequate. Many collieries are already fully sold over the whole of next year, both in respect of nuts and slack, and their order-books are closed. Coke continues in strong demand for all qualities, and prices remain at the highest figure that has been quoted for many years past. Coking fuel is more difficult to obtain than ever, and prices are dear. To-day's quoted prices are as follow:—Best 14s. 6d., seconds 12s. 6d., cobbles 12s., nuts 11s., and slack 8s. 6d.

IRON.

There is not the slightest abatement of the demand for pig iron and manufactured bars; indeed, orders are more plentiful as the year closes. The prospects for the new year in every branch of the trade are excellent.

◆

Nottingham.

COAL.

No material change has taken place in the state of the coal trade in Nottinghamshire in the past week, the tone generally being moderately satisfactory. Business in the domestic fuel section, however, is still on the low side considering the time of the year, but the position is showing signs of improvement. Owners are disposed to keep prices firm, notwithstanding that the demand for best qualities is affected more than the common qualities, the latter being more heavily drawn upon, probably owing to the heavy consumption of industrials. Merchants are ordering freely in view of the Christmas holidays, and a fair trade is being done at the local landsale depots. The ruling prices for best households are from 12s. to 13s. 6d. per ton, seconds 10s. 6d. to 11s., kitchens 7s. 6d. to 8s. 6d. There is a robust demand in the steam coal section, manufacturing fuel being the most active, and most of the hard coal pits in the county are making full time. Railway companies are taking heavy supplies. Best steams are making from 11s. to 11s. 6d. per ton, and seconds from 9s. 9d. to 10s. 6d. Slacks fully retain their activity, the supply being limited outside contract requirements. Gas coal is selling well, and coke is in a favourable position, increases being obtained on renewal of contracts.

◆

Leicestershire.

COAL.

Business in this district continues quite active, and a quite confident feeling is prevalent. The collieries generally are very well off for orders, and a brisk business is anticipated between now and the holidays. Practically a full week is being worked at the collieries, and stocks on hand do not total a very large amount—mostly of the best qualities of household coal. Local merchants are busier, and it is likely that before the holidays they will experience a fuller flow of business. The demand for household coal is generally good. The best qualities of these have shown further improvement. The middle qualities are quite actively in request, and there is also a strong demand for small household coals of all descriptions. There is a continued full demand for steam coals and slacks. In this department there is a very full amount of business being done. The outlook continues very favourable, and a busy time is anticipated. The market in these conditions rules firm, and the run of prices is generally, for best household coals 13s. to 14s., middle qualities 12s. to 12s. 6d., cobbles 11s. to 12s. Steam coals 10s., cobbles 9s., nuts 10s. 3d., small nuts 9s. 6d., nut slacks 6s. 6d. to 9s. 6d.

◆

South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL.

A fairly satisfactory business is being done throughout the Cannock Chase district in connection with the coal trade, and a very busy time is expected. Except for the best qualities of house coal, the collieries have been well supplied with orders, and will no doubt be kept busy up to Christmas. There is no material alteration in prices. There is a quantity of best house coal standing in stock on some of the colliery sidings, but a spell of cold weather would soon clear this away. For coal for manufacturing purposes the demand continues in much the same satisfactory condition as when last reported, and slack is in good request. Railway and canal sales are fairly brisk, and at the landsale depots a good business is being done.

Birmingham.

COAL.

For house coal a fair demand is registered, though it cannot be said to reach the volume usually experienced before Christmas. This is the inevitable result of the abnormal activity in the early autumn. Most collieries, however, have got rid of their stocks, and prices keep firm. For works fuel of all sorts heavy contracts are placed, and slacks are at a premium. To get a few trucks extra is practically an impossibility, and collieries will also want a lot for their own use during the Christmas holidays.

IRON.

An active, buoyant market produced quite a number of advances in the price of finished iron. The cost of pigs is the primary factor. A week ago it was thought finality had been reached, but on Thursday prices went still higher. Sales of Northamptonshire forge were made at 67s. 9d. and 68s., representing an extra 1s. on the week, and there was talk of people asking 70s., and even as high as 72s. 6d., though if it came to the test it would probably be found they had none to sell. Derbyshire iron was making 70s. 6d., and Staffordshire part mine 67s. 6d. Values all round are about 5s. higher than they were at the beginning of the quarter. The railway strike in the north has interfered to some extent with the supplies of coke. It was not surprising that bar makers were asking for money. No change in marked bars is anticipated before the new year, but merchant qualities were quoted £8 7s. 6d. and £8 10s. at works. Common iron, too, is firmer to the extent of about 2s. 6d., prices, delivered in the Darlaston and Wednesbury districts, ruling at £8 to £8 2s. 6d. There is little foreign material coming in, and even when offers are made it is conditional on delivery in about three months. The Gas Strip Makers' Association met during the afternoon, and decided to advance prices by 5s. a ton, the standard now being £8 10s. to £8 12s. 6d. This was quite in accordance with anticipations in view of the cost of raw material. Galvanised sheets have gained but little in strength, and though a good deal of business is moving, prices do not go above £12 10s. to £12 15s. Liverpool. For black sheets about 2s. 6d. more was asked, the price for 24-gauge being £8 12s. 6d., and for lattens £9 2s. 6d. to £9 5s. Prices for steel sections show no change, though indications point to a further rise soon. Sheet bars and billets are very firm at £6 2s. 6d. to £6 5s., and some of the largest works have booked orders until next midsummer. Consumers who postponed their orders in the hope of easier prices are finding great difficulty in getting their wants supplied. Ferro has gone up 10s. a ton, the price now being £12, the highest since 1907. The market for copper sheets is flat, and prices have dropped £1 a ton to £92.

◆

Forest of Dean.

Lydney.

COAL.

There has been little variation in the course of trade since last writing. Merchants, generally, are still ordering supplies very sparingly, despite the fact that the Christmas holidays are so near. The pits are not averaging more than five days in the week, and at this stocks are more than they should be. Shipments are slow again this week, stems being light with all the collieries. Railborne orders are coming in steadily. Prices continue on the basis of block 16s. 6d. at pit and 18s. 3d. f.o.b. Lydney or Sharpness, with the other qualities as given last week. Steam coals are in excellent demand, and all the pits are exceedingly busy.

◆

Gloucestershire, Somersetshire and Wilts.

Plymouth.

COAL.

Messrs. W. Wade and Son report that there is a good average demand for house and steam coal at the south coast ports, and importers are busy in keeping up their stocks for the Christmas demand. Gas coke is commanding a good price. Freight rates are firm, as the suspension of trade at the northern ports by the railway strike has caused a further demand for steamers at the other ports at which coal shipments can be made.

The Edward Medal.—The Edward Medal of the second class has been awarded Henry Saunders and Alexander Griffiths, both of Tredegar, for bravery in rescue work at Graham's Navigation Colliery, Sirhowy, on September 30, and they have been commanded to attend at Buckingham Palace next Monday, when the King will personally present the medals. For six and a-half hours they worked in rescuing a man who had been buried by a heavy fall. Owing to the dangerous state of the roof and sides the use of tools was impossible, and the *débris* had to be removed by scraping with the hands, the work being attended with great peril.

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, December 3, 1912, is as follows:—Alexandria, 9,271 tons; Amsterdam, 1,474; Antwerp, 700; Bremen, 3,119; Buenos Ayres, 8,673; Christiania, 1,119; Christiansand, 1,475; Drontheim, 153; Gothenburg, 694; Harlingen, 553; Husum, 175; Hamburg, 1,052; Kalmar, 1,127; Leghorn, 903; Libau, 411; Marseilles, 1,265; Malmo, 1,826; Nakskov, 627; Naples, 2,701; Ostend, 1,139; Pernau, 1,326; Port Said, 5,674; Riga, 9,999; Reval 399; Rouen, 9,140; Rotterdam, 9,923; Stockholm, 89; Savona, 3,632; Saxekjobing, 187; Trieste, 140; Venice, 814; Westervik, 687; total, 60,670 tons. Corresponding period last year, 71,303 tons.

H COAL AND IRON TRADES.

THURSDAY, DECEMBER 12.

North Wales.

COAL.

ble time since the coal trade was in such
teady condition, with an upward tendency
s the general opinion among coalowners
not yet reached the high water mark, but
w realised will be exceeded in the ensuing
ollieries are cautious as to the prices at
nake contracts for the new year's supplies,
ances excellent prices are being obtained.
oal trade is slightly easier than was the
, though by no means unsatisfactory. The
n account of locomotive and gas coal
despatched daily, and all collieries appear
ntain a full time working week, or, at any
o the week. Steam coal is in excellent
manufacturing purposes and for bunkers,
to the latter trade, it has been hampered of
tion of traffic at the Mersey ports. In many
f fuel and cargoes have been so delayed *en*
ad and other ports that they have missed the
the goods were intended, causing great
the shippers, the ship, and the customers
Wagons have been delayed under load,
nience at the collieries. The following
ling prices at the time of writing:—Best
coal, 16s. to 17s. per ton; second quality,
s. per ton less; steam coal for manufac-
13s. per ton, and for bunkers from 6d. to
nuts 11s. and 12s., when obtainable, and
y at varying prices from 6s. 6d. to 9s. 6d.
s being t.o.r. Gas coke is in good demand
. per ton at works.

◆

uthshire, South Wales, &c.

COAL

s set forth last week as governing the
s of the steam coal market have daily
gth, until now great difficulty is experienced
ugh even small transactions. Collieries are
h orders, and these pressing for delivery,
the great majority of cases quite unable to
ther commitments, despite the high values
hich in a very few cases have actually
small coals the position is one of even
ty, so scanty are the supplies available,
to consider nuts and other near varieties.
trade also feels the incursion of unwonted
g a strong stimulus to values, while coke,
the small coal market, rules very firm and
demand is better than ever. Pitwood, the
alue of which seldom synchronise with those
ntputs, is now rather weaker in tone, and
be purchased at a price very near 24s. per
the freight market there is now tonnage in
ntity, but the extreme congestion of stems
ult to arrange fixtures, rates in consequence
er tendency in every direction. Latest
ling prices, so far as can be ascertained in a
, may be taken as follow, coal quotations cash
½ per cent.:—Coal: Very best Newport Black
. 9d. to 17s.; western-valleys, ordinaries,
6d.; eastern-valleys, 15s. 9d. to 16s.; other
15s. 6d.; colliery smalls, best, 12s. 6d. to
ls, 11s. 6d. to 12s.; inferiors, 10s. to 11s.;
to 14s.; through coals, 13s. 3d. to 13s. 6d.;
ed, 14s. to 15s.; house coal, best, 18s. 6d. to
17s. 6d. to 18s. Patent fuel, 19s. to 20s.
, 22s. 6d. to 23s. 6d.; foundry, 25s. 6d.

IRON.

ment in the local iron and steel trades noted
een fully maintained, the present tendency
nts being towards higher figures. Enquiry
hat better and there is more inclination on
uyers to meet the increased demands of
With the curtailing of output in the north,
railway troubles there, values have received
us which reacts on our local trade. Work is
rters and the Christmas stoppage is likely to
r than customary. At local bar-producing
reat pressure for delivery of orders in hand,
ng greatly behindhand in their deliveries.
£5 17s. 6d. is named for Bessemer and £6
Rails show little alteration, heavy sections
6 10s. to £6 15s. with the usual extras. The
t is again stronger, it now being impossible
ne for current delivery. Local furnaces are
siderably in arrears with their deliveries,
-maintained output. Present values range
s. 6d. for delivery to works in the district for
e. All tinplate works are fully engaged, and
ked into the new year, there is not a large
iness to be done. In sympathy with the
the trend of prices is upwards, but as yet
remain based upon 15s. 6d. Bessemer and
9d. Siemens for I C 20 × 14.

COAL.

s at length reached South Wales. Arrivals
the week-end were very heavy, the number
rt when work commenced on Monday being
247. This naturally brought down freight
than 9s. to 10s. being obtainable for Genoa,
4s. paid in November, whilst on other
ports there was a similar decline. For
n ports also, from 17s. to 18s. was accepted,
6d. to 24s. paid the previous month. With
age available there was extreme pressure for
3d. was paid for best steam large for prompt
artering transactions last week, although not
as in the previous six days, were nevertheless
ory, the registered tonnage taken up being
tone. There is every prospect, therefore, of
active trade right up to the end of the year.
k's loading 18s. 6d. is quoted for best, whilst for superior Admiralty seconds, sellers ask from 17s. 9d. to 18s. and for ordinary seconds 17s. to 17s. 3d. per ton. The rush of tonnage to the port has caused a renewal of complaints as to the want of more tipping accommodation. At the chartering clerks' annual dinner the other evening special emphasis was laid on the fact that during the last 10 years only 14 additional tips had been erected. On the basis of a quarter of a million tons per tip per annum this was equivalent to an increase of 3½ million tons, whereas there had been an increase of 7 million tons in the actual trade done. Nobody, of course, is so unreasonable as to expect the dock authorities to provide a sufficient number of tips to deal with occasional rushes of tonnage to the port, but it is contended that the facilities for loading are not sufficient to deal with even a normal state of things. When the anticipation is that in a comparatively short space of time the development of new colliery workings will probably lead to a further addition to the trade of the port of something like 5 million tons per annum, the apathy of the dock companies is incomprehensible. Even if a new dock were started now, some six or eight years would in all probability elapse before full arrangements could be made for tipping, and in the meantime there is a danger that the trade of the port would be diverted to other districts. This week quite a large number of shippers have been under demurrage owing to the impossibility of getting the vessels beneath loading berths. What will happen if the strike just commenced on the North-Eastern Railway spreads to other systems it is difficult to say. Already several vessels which were ready to leave the foreign discharging ports for Newcastle have been ordered to make their way to the Bristol Channel, and should the diversion of tonnage continue to any large extent it is feared that there will be a glut both at Cardiff and Newport. As it is, collieries with full stems, owing to their inability to obtain berths, have been obliged to sell their coals to merchants who are in a position to tip. The situation has become so acute that many buyers are freely offering 18s. 6d. for delivery of best coals over the first three months of next year. For delivery over the whole year coalowners are disinclined to accept even this figure. The French Admiralty are in the market for the supply of about 50,000 tons of best steam coals for delivery at Toulon from the end of December to the 1st of May next. The coals are to be of the quality of Ferndale, Nixon's Navigation, Cambrian Navigation, Ocean Merthyr, Hood's Merthyr, Penrhiwceiber, Ynisfaio Merthyr or Hill's Plymouth. Tenders are to be either f.o.b. or c.i.f. and to be sent to the French Consulate in Cardiff on the 17th inst., and are to remain open for acceptance until the 20th. Invitations are also issued for tenders for the carriage of the coal to Toulon over the same period. As regards the small coal market, prices seem to be quite a matter of arrangement as between seller and buyer. Bunkerings fetch from 14s. 6d. to 15s., ordinaries 14s. to 14s. 6d., and cargo qualities 13s. to 13s. 3d. per ton. Washed nuts are 16s. to 16s. 3d., and washed peas 15s. 6d. to 15s. 9d. Similar pressure exists for Monmouthshire coals. Buyers experience great difficulty in securing supplies, and sellers are very independent. Black Veins command from 17s. to 17s. 3d. or 6d. more than last week, western-valleys are 16s. 9d. to 17s., or 1s. per ton more, whilst best eastern-valleys have gone up to 16s. 3d. and second qualities to 15s. 9d., all f.o.b. Cardiff. An attempt has been made to obtain a similar advance for Rhondda bituminous coals, but though No. 3 large is quoted at 18s., the nearer market value is 17s. 6d. Through-and-through coals are 16s., and small 14s. 6d.; No. 2 large is almost unobtainable, and commands close upon 16s. per ton. Through-and-through is 14s. 6d., and small 13s. Most of the patent fuel manufacturers are working on old contracts; when, owing to the dearness of small coal and pitch, makers find it impossible to accept less than 23s. for best brands, it is not surprising that they find very little new business coming along. Fortunately many of them have large contracts unexecuted, as is evident from the fact that the shipments last week amounted to nearly 35,000 tons. The Crown Company despatched 16,660 tons, and other local makers 1,200 tons, whilst Swansea shipped 15,734 tons and Newport 1,450 tons. Coke is firmer, special foundry qualities being quoted at 32s., and ordinary at 30s. per ton. Furnace coke is 24s. to 25s. Pitwood has receded to 25s. 6d., or 2s. less than last week.

IRON.

Either through more pressure for tin-plates in anticipation of the holiday season, or through the better arrival of tonnage, the shipments last week amounted to 105,882 boxes, or 1,477 boxes in excess of receipts from works. Stocks are now 197,816 boxes. Still the volume of trade doing is far below that of the corresponding week of last month. The look-out of the spelter men, the compulsory closing down of 16 tin-plate mills owing to the Balkan war, and the stoppage of the bar mill at the Duffryn works, Morriston, all militate against trade. Quite 2,000 hands have been rendered idle through these unfortunate circumstances. Specifications for tin-plates are still very difficult to get, but owing to the high price of raw materials manufacturers are disinclined to lower their quotations. 14 × 20 cokes are quoted at from 14s. 10½d. to 15s. 1½d., and oil sizes—14 × 18¾—at 15s. 3d. to 15s. 6d. per box. For black-plates the demand is very insignificant, and prices are nominal at about £10 10s. for P. and C. A. rectangles. There is no change in steel bars. Foreign imports of billets, blooms and ingots for the week amounted to about 10,000 tons. The Welsh bars mills are all running full time, and prices keep very steady, Siemens being £6 and Bessemer £5 17s. 6d. per ton. The galvanised sheet trade is a little more active, up to £12 7s. 6d. having been paid for 24-gauge corrugateds for contracts. Welsh pig iron is firm at 87s. 6d. f.o.t. With a more favourable freight market, there is a better enquiry for iron ore. Best rubio is 22s. and seconds 20s. 6d. to 20s. 9d. per ton. Steel scrap is in strong demand, and new crop ends command 72s. 6d. and heavy steel 62s. 6d. per ton.

Swansea.

COAL

Exceptional activity characterised the trade of the port during the past week. There was a much better supply of tonnage, and the coal and patent fuel shipments were much improved, making a total of 117,081 tons. There was a capital attendance on 'Change this morning, and the anthracite market continued to display a very firm tone, whilst the general demand remained good for all descriptions. Enquiries for Swansea Valley large and Red Vein large were exceptionally good, but collieries were fully booked up with orders for some time forward. Both French and German machine-made nuts were very firm; beans, however, were rather slow. Rubbly culm and duff quotations were slightly advanced. In the steam coal market there was a very brisk demand. Bunkers were very firm, and prices were once more advanced. The following were approximately the closing quotations:—Anthracite: Best malting large (hand-picked), 23s. to 25s. 6d. net; second quality ditto, 22s. to 23s. net; Big Vein large, 19s. to 21s. 6d., less 2½ per cent.; Red Vein large, 15s. 9d. to 16s. 6d., less 2½ per cent.; machine-made cobbles, 21s. 9d. to 23s. 9d.; Paris nuts, 23s. 6d. to 26s. 9d.; French nuts, 23s. 6d. to 27s.; German nuts, 23s. 6d. to 26s. 9d.; beans, 21s. to 23s.; machine-made large peas, 12s. to 14s.; ditto fine peas, 10s. 6d. to 12s., all net; rubbly culm, 6s. 9d. to 7s. 3d., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 17s. 6d. to 19s.; seconds, 14s. 9d. to 17s. 6d.; bunkers, 13s. 6d. to 17s.; small, 10s. 6d. to 11s. 9d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 19s.; through-and-through, 15s. to 15s. 6d.; smalls, 12s. 6d. to 13s. 9d., all less 2½ per cent. Patent fuel, 17s. to 17s. 9d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

The general trade of the district was not so good during the past week. This was mainly due to the closing down of 16 tin-plate mills, owing to the eastern trouble. Apart from these, trade at other places compared very favourably with any other similar period of the year. The shipments of tin-plates last week were 105,882 boxes, receipts from works 104,406 boxes, stocks in the dock warehouses and vans 197,816 boxes.

Llanelly.

COAL.

The position of the coal trade is getting firmer week by week, and prices continue their upward movement. Not for many years has there been such a demand for all coals, with the outlook so satisfactory. It is doubtful if steam and bituminous coals have ever been better, and there is no reason why the market should not hold good for at least the first half of next year. Several collieries and manufacturing works are heavily booked over the whole of next year. Bunkers are reaching very high figures, and are quite 4s. per ton more than they were some weeks back. There is also a very big demand for rubbly culm and duff, and sellers are not prepared to book over next year. Prices this week are:—Best malting large, 23s. 6d. to 24s. 6d.; Big Vein large, 18s. 6d. to 21s.; Red Vein large, 15s. to 15s. 6d.; machine-made cobbles, 21s. to 22s. 6d.; German nuts, 24s. 6d. to 26s. 6d.; French nuts, 24s. 6d. to 26s. 6d.; Paris nuts, 26s.; machine-made beans, 22s. 6d.; ditto second quality 20s. 6d. to 21s.; machine-made peas, 12s. 6d. to 13s.; rubbly culm, 6s. to 6s. 6d.; duff, 4s. 6d. to 5s. 6d.; large steam, 16s. 6d. to 17s.; through-and-through, 14s. 3d. to 14s. 9d.; small steam, 10s. 6d. to 11s.; bituminous small, 11s. 6d. to 12s.—all f.o.b.

THE IRISH COAL TRADE.

THURSDAY, DECEMBER 12.

Dublin.

Business continues to be fairly good in most branches of the coal trade, the approach of Christmas imparting a busier tone, although there is no great pressure in any way. Prices of all classes remain unchanged up to the present, quotations in the city being as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; steam coals from 20s. per ton upwards; best coke 23s. per ton, or 18s. per chaldron. Irish coals, at Wolfhill, from 5s. to 20s. per ton at the pit mouth. The import trade has been less active as compared with last week, the quantity of coal discharged upon the quays being 21,208 tons, as against 25,154 tons. The coaling vessels arriving during the week were chiefly from Glasgow, Girvan, Newport, Liverpool, Garston, Ayr, Preston, Partington, Manchester, Workington, Point of Aire, Whitehaven, Maryport and Widnes.

Belfast.

A seasonable activity is apparent in the local coal trade, but no advances have been made in any class of coal, although some qualities of Scotch steam are now dearer at the other side. City prices of house coals are from 22s. 6d. to 26s. 6d. per ton; best Orrell slack, 22s. 6d. Quotations ex-quay are as follow:—Arley house coal, 22s. 8d. per ton; Scotch house coal, 19s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d.; navigation steam, 16s. 6d. to 17s. 6d; Welsh steam 17s. to 18s. per ton. There is a slight improvement in the cross-channel trade, cargoes arriving during the week being chiefly from Campbeltown, Garston, Ardrossan, Ayr, Girvan, Maryport, Burryport, Troon, Glasgow, Preston, Neath Abbey, Swansea, Irvine and Lydney. The total number of coaling vessels entering this port from November 17 to 30 amounted to 106.

Partnerships Dissolved.—The *London Gazette* announces the dissolution of the following partnerships:—S. Shawcross and J. Shawcross, carrying on business as coal merchants and furniture removers, at Louisa-street, Higher Openshaw, Manchester, under the style of Robert Buckley; D. Anderson, W. S. Parsons, and F. W. Gepp, carrying on business as engineers at Farringdon-road, London, E.C., under the style of D. Anderson and Co.

Hull Coal Imports.—According to the official returns, the coal imports into Hull during November amounted to 644,316 tons—597,259 tons by rail, and 47,057 tons by river. The corresponding figures for 1911 were 521,184 tons. The aggregate quantity imported during the first 11 months of the year was 6,448,784 tons, as against 5,871,584 tons in 1911. The chief contributors to the above figures were the Denaby and Cadeby Main Collieries, the Carlton Main, Grimethorpe and Frickley Collieries, the Dalton Main Collieries, Bentley Colliery, and the Glass Houghton Colliery.

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(A Classified List appears on page 1216.)

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⁂ *For other Miscellaneous Advertisements see Last White Page.*

The Colliery Guardian.

LONDON, FRIDAY, DECEMBER 13, 1912.

Last month the quantity of coal, coke and manufactured fuel exported was 6,465,071 tons, valued at £4,181,008, as compared with 5,793,231 tons, valued at £3,362,129, in November 1911, and 5,197,729 tons, valued at £3,001,754, in November 1910.

During the first eleven months of the present year the aggregate quantity exported 61,070 280 tons, valued at £38,642,909, as against 61,236,067 tons, valued at £34,918,385, and 59,136,779 tons, valued at £34,712,582, in the corresponding periods, respectively, of 1911 and 1910.

A meeting of the Manchester Geological and Mining Society was held on Tuesday, when Mr. George Knox read an exhaustive paper on the hydraulic stowing system.

Further progress is being made with the proposal to establish a mining school for the South Wales coalfield.

The investigation into the cause of the Cadeby explosion was concluded by the Chief Inspector of Mines this week.

eeting of the South Stafford-
'l be held, when Dr. Cadman
sidential address.

f the agents and others of
ud Miners' Association held
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l Trade Offices, Newcastle, on
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of the men's union, and other
workers' grievances were
liscussed at length, and a
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Northumberland and Durham
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mittee appointed to enquire
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analysis of mine air is a
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brought into special prominence
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fore, have done useful work in
he South Wales Institute the
bservations on the composition
he Lewis Merthyr steam coal
d.

discuss certain points of special
ection with this paper, and
relating to the influence of the
rometer upon the quantity of
in the air of the mine. This
portant questions with regard
entilation and other standards,
tility, as drafted in the Act,
aling with the provision and utilisation of meteorological instruments in coalmines.

Let us first call attention to the very clear way in which the authors of this investigation have proved, we think for the first time in connection with the steam coal seams of South Wales, that the methane content varies inversely as the atmospheric pressure. It is not often that opportunities have been afforded of carrying out, under such especially favourable conditions, a series of analyses proving that a falling barometer has the effect of increasing the proportion of firedamp, even when the fan is working at fixed speed and the water-gauge is constant. The effect is apparently most marked after an extended period of high barometric pressure, and it is calculated, in one of the cases coming under the authors' notice, that a rate of fall of only 0·01 in. of mercury per hour caused an ultimate evolution of 325 cubic feet of methane per minute from the old workings. In the course of the daily analyses of mine air, also, the authors found that a fall in the barometer of 0·5 in. accompanied an increase of 0·32 per cent. of methane in the return air of the mine. The observed rate of increase is not of course constant, as other factors contribute in part to the effect.

These results are not contrary to expectation, for it has long been held, both upon theoretical grounds, and also as the result of experience, that diminished pressure must tend to an increase of firedamp, especially in mines possessing large areas of old workings. But enough actual quantitative tests have not hitherto been available to place this conclusion beyond the reach of scepticism, and there has been unfortunately a certain amount of confusion of thought owing to vain attempts to adapt rather crude statistics to the stern logic of facts. Thus, efforts have been frequently made to trace the coincidence of colliery explosions with barometric phenomena, with the result that there has been no agreement as to any law connecting atmospheric influences and firedamp ignitions. We shall show that all such efforts have been a pure waste of time, for the simple reason that data have only existed occasionally, and more or less by accident, for determining accurately the actual barometric conditions under which explosions have taken place. To correlate all explosions with the barometer readings at distant stations, such as Kew or Glasgow, as has, on more than one occasion, been attempted, is of no practical use at all, and was probably only done as a *pis aller* in the absence of any other trustworthy data.

We can, in fact, dismiss as not worthy of serious consideration, all curves of barometric coincidence of explosions in which the path of the barometer in the actual *locality* of the explosion is not accurately known. By path is not meant only the reading on the day of the accident, but the curve for several days on either side of it.

Even then it is doubtful how far the reading of an ordinary mercury barometer is of any practical utility for statistical purposes; for the ordinary barometer is a crude and untrustworthy instrument, even when properly constructed, unless both care and skill are used in reading its indications. It was found by Messrs. HUTCHINSON and EVANS that the methane variation was far more sensitive as an index of atmospheric changes than the barometer. The same thing has been frequently noted by practical mining men, and the value of barometer readings has been directly impugned solely on that account.

It is possible to offer an explanation of the apparent anomaly of the lagging of the barometer as an air-pressure index. Methane variation would necessarily be an extremely delicate indicator, for the equilibrium balance between diffusing gases is probably one of the most sensitive physical conditions that exist. The common barometer, on the other hand, is a relatively clumsy means of ascertaining changes in the weight of the atmosphere by measuring the height of a column of mercury in a tube. To read a barometer correctly is not an easy matter. It is necessary to avoid parallax, to adjust the vernier and to make proper corrections for temperature, reservoir capacity and capillarity. We may here omit such corrections as reduction to sea-level, as relative variations only are under consideration. Under quite possible conditions they may collectively make up a total of 0·1 in. of mercury, which, as shown above, may correspond to an increase of 0·64 per cent. of methane in the return airway. Thus a slight fall in the atmospheric pressure might be completely masked by ignoring the corrections. Again, some mercurial barometers are sluggish in their movement owing to an imperfect vacuum, or to impure mercury clinging to the sides of the tube. Even under the best conditions the beginning of movement is marked only by a change in the meniscus curve (or surface curvature), and with a low pressure gradient much methane would be liberated before the mercurial column would visibly respond. Attempts have been made in delicate experiments to increase the sensitiveness of barometer readings by directing a beam of light on to the surface of the meniscus, and observing its reflection on a graduated scale; but such refinements would be obviously out of the question in mining practice.

It is not surprising, therefore, that the curve of methane content may show points of flexure an hour or so in advance of the corresponding barometric variation. It is well that this point should be carefully considered, for it has a practical bearing upon the working of the Coal Mines Act. The extent to which the barometer readings will be forestalled will, of course, depend upon the *rate* of change in the atmospheric gradient, which will be a continually varying quantity. But as there is reason to believe that the most marked increase in methane content occurs when a fall begins to take place after a prolonged period of high-pressure readings, it is clear that the occurrence of such a fall constitutes a critical time in all fiery mines working near the limiting conditions imposed by the Act. Especially is this the case in regard to section 67, dealing with the withdrawal of men if the proportion of inflammable gas reaches 2·5 per cent. in a safety lamp pit, or 1·25 per cent. in a naked light pit. A similar argument applies in the case of the restrictions on the use of electricity (section 60, subsection 2), requiring the current to be cut off whenever the inflammable gas exceeds 1·25 per cent.

The bearing of the question upon ventilation is no less important from the point of view of safety, but is perhaps less urgent from the mere legal aspect, for section 29 requires the methane limit of 0·25 per cent. to be adjudged by an average of six samples of air taken at intervals of 14 days, during which any effect due to variations in barometric pressure might be expected to balance more or less.

It is possible that the Press Association's weather expert, whose conclusions we criticised on a former occasion in these columns,* may seek to claim the above facts as justifying the contention that colliery explosions usually occur under conditions of high pressure. To this it may be replied that while the high-pressure conditions endure, the methane content in mine air may be expected to be a minimum. It is only when the pressure *begins* to fall that gas is evolved in increased amount. The fact that this increase begins before the barometer *appears* to fall is only an argument against the use of so sluggish an instrument as the mercury barometer, and does not affect the general principle that low pressure is favourable to the presence of an increased volume of gas in the mine. We have still to discuss the barometer clause in the Mines Act, but this we must defer to another article.

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* *See Colliery Guardian*, November 22, 1907, p. 962.

Trade Summary.

The London coal trade for the past week has been very irregular. The return to milder weather has limited the number of wholesale orders, and the market conditions have been very slow. The depot and the trolley trade are reported as fairly brisk, but public orders have fallen off considerably. The export trade continues brisk, and all classes of small coal are selling freely. Contract coals are coming forward in greater abundance, and the bulk of the metropolitan centres are becoming congested with loaded trucks. The coke trade is unusually brisk, and prices rule high. Manufacturing qualities also remain firm. Small nuts and slacks continue in strong demand and are eagerly bought up.

The trade at Newcastle is completely disorganised by the railway strike, and most of the collieries have been compelled to cease operations. Prices are unquotable.

The Durham coal trade has also been paralysed by the dispute. High prices are given for the small supply on offer.

There has so far been no rush for Lancashire house coal. There is a heavy demand for bunkering. Pressure for slack is continuous.

The West Yorkshire house coal trade remains unusually quiet, but all other departments are benefiting from a spirited demand.

In South Yorkshire the position is one of great firmness, especially as regards hard coals. House coal is flat. The demand for coking slacks is exceptionally heavy.

The mild weather delays improvement in the Derbyshire house coal trade. Fuel for manufacturing purposes is scarce, and steam coal meets with a ready sale.

The market at Cardiff is booming, there being great pressure for coals. Congestion at the docks, however, is a perpetual source of complaint. Small steam coals are extremely scarce. Monmouthshire coals are likewise in strong demand, as are Rhondda bituminous coals. Patent fuel is very dear, and this acts as an impediment to new business.

The Scottish coal trade is more active, and prices are firm all round.

LABOUR AND WAGES.

North of England.

At a meeting on Saturday between the Northumberland coalowners and representatives of the Miners' Association, in Newcastle, respecting the requests remitted from the council meetings of the men's union, and other matters, good progress was made in the discussion of the several questions at issue. The night workers' grievances were dealt with at length, and the employers will communicate their reply to the association later. The proposed re-starting of the joint committee was not gone into fully, the consideration of this subject being adjourned until Saturday, the 28th inst.

A meeting of the wages committee of the Northumberland Miners' Association was held on the 6th inst. at Newcastle, when a letter was read from the Coalowners' Association, containing a scheme for a proposed sliding scale for the regulation of wages. The proposals were carefully noted, and the question was adjourned for further consideration.

The working of the weekly pay system is not by any means proving an unmixed blessing to the miners of Northumberland. At many collieries since the adoption of the scheme the managements have declined to allow any offtakes to be made at the colliery office other than those directly concerned with the working of the respective collieries. As a result the miners' permanent relief fund, local ambulance and nursing funds, and the many local miners' institutes are being very hard hit, for it is found that while many miners do not object to the deductions from their pay on behalf of these institutions, yet having received their full pay, they do not willingly subscribe in the ordinary way. In most cases it is found that the result is a reduction of from 40 to 60 per cent. in income to the beneficent institutions named.

The surfacemen and lads employed at the Cleveland mines recently presented claims for increases in their base rates of wages. A meeting to consider the question was held between the Cleveland Ironstone Mineowners and the miners' representatives, at Middlesbrough this week. After a lengthy discussion the owners made certain proposals, which it was understood would be considered by the men's side, and a further meeting was fixed for December 23.

A special council meeting of the Cumberland Miners' Association was held Maryport on Monday afternoon. Mr. Andrew Sharp, secretary, who presided, reported that he had had a visit from an organiser of one of the associations that were taking surface hands into their union, and he (Mr. Sharp) intimated to the meeting that he had told this gentleman that as far as they (the Cumberland Miners' Association) were concerned, and as far as the coalowners of the county were concerned, it had been decided that both sides would stand to the agreement of November 27, 1910, which said "That all surface workers other than winding enginemen and coke men, who were employed at the by-product coke ovens, must belong to the Cumberland Miners' Association." Mr. Sharp also told the gentleman that whatever the consequences might be, their association intended to fight this matter out. The delegates unanimously confirmed the action of Mr. Sharp; and they also stated that at every lodge meeting during the last two or three weeks a large number of the surface hands had re-joined the association. Mr. Sharp reported the result of the meeting of the Minimum Wage Board for the Cumberland district, and stated that the Board had unanimously agreed to advance all minimums 8¾ per cent. This had raised the district minimum of 6s. up to 6s. 4½d., and all other minimums in proportion. This was unanimously accepted by the meeting.

The effect of a resolution passed at a meeting of the Cumberland Joint District Board of Conciliation for the coal trade, at Workington this week, is to raise the general minimum wage rate for hewers from 6s. to 6s. 4·3d. a day. The resolution reads as follows :—" That the minimum rates for hewers, as fixed by the Board, or any committee thereof, be advanced by 8¾ (eight and three-quarters) per cent. The advanced rates to apply as on and from Monday, the 25th day of November, 1912." In applying this advance, it is understood that the present rates for hewers include 46¼ per cent. After ascertaining the standards in each case, the gross percentage now being paid on hewers' standards, namely 55 per cent., must be added to such standard.

Federated Area.

The executive committee of the Yorkshire Miners' Association met at Barnsley on the 9th inst. It was agreed to recommend to the council the payment of lock-out allowance to men under notice at Low Laithes Colliery, as the vote of the district was in favour of the remaining employees at this colliery, and also the men at Wrenthorpe, taking a ballot on the question of tendering notice to cease work. A large number of cases of alleged victimisation were dealt with. Out-of-work pay was granted to men at Harborough Hill Colliery and Low Main, Siddall, unemployed through stoppages for repairs. The annual meeting was fixed for the 21st inst.

On the eve of the expiration of the notices of the men employed at the New Hucknall and Bentinck Collieries, Notts, which had been tendered by about 3,000 men and boys with a view to reducing the hours and increasing the wages of surfacemen engaged at the two pits, a conference between representatives of the owners and men was held at Sutton-in-Ashfield on Monday night. After a sitting which lasted five hours, terms of agreement were drawn up and signed. The exact terms of the agreement were not disclosed, but they were such that the men's representatives were strongly in favour of recommending the men to accept.

At the last monthly council meeting of the Leicestershire Miners' Association, an agent reported having written to the secretary of the Coalowners' Association on the 5 per cent. advance, in addition to the minimum wage, pointing out that, in his opinion, the method adopted by the coalowners as to the application of the 5 per cent. on the minimum wage was a wrong method. He had also seen Mr. T. Y. Hay on the matter, and afterwards received a letter from him, in which he stated that the owners considered they had adopted the right method. The agent was instructed to ask Mr. Hay to convene a meeting between representatives of owners and workmen to fully consider the question, and also the cost of explosives.

There is likely to be more trouble in the Lilleshall Company's coalfield. It appears that most of the enginemen belong to the Amalgamated Society of Colliery Enginemen, Firemen, and Stokers, and others joined the Shropshire Enginemen's Society, which is affiliated to the Miners' Federation. There has recently been a secession of members from the Miners' Society, who have transferred to the Amalagamated Society. This action appears to have been resented by the Miners' Federation, and Mr. W. Latham (miners' agent) intervened on their behalf. A communication was forwarded to the manager of the Lilleshall Company, asking him to take such action as would compel the members who had left to rejoin the Shropshire Society, and thus retain their connection with the Miners' Federation. It was stated that unless such action was taken notices would be handed in by the other men. Ald. Arthur Parker, organising secretary to the Midland Counties National Enginemen's Union, addressed a meeting on Saturday, and severely criticised the action of the miners' agent. Whatever had been done by men handing in notices, he hoped the members of the union would go on with their work.

Forest of Dean.

The ballot of the miners of the Forest of Dean for the election of a miners' agent and other officials has resulted in the re-election of Mr. G. H. Rowlinson as agent. Mr. M. H. Perkins, of Cinderford, has been elected president, and Mr. William Taylor, of Cinderford, vice-president. Mr. Rowlinson, who had been in office for a quarter of a century, resigned some months ago, but consented to stand again. Mr. W. H. Smith, a Coleford working collier, and for some few years the president of the association, was put forward by the Socialist element in opposition to Mr. Rowlinson's policy. A third candidate was Mr. Sims Banks Jenkins, of Bream, a Conservative in politics. The executive council of the association ruled that Mr. Jenkins was not eligible. Mr. Jenkins thereupon joined in the formation of the new union, and he was elected honorary agent, despite the reminder of the officials of the Miners' Federation of Great Britain that no such association could be recognised.

Scotland.

A special conference of the Scottish Miners' Federation was held on the 9th inst., at Glasgow, Mr. John Robertson, vice-president, in the chair. The recommendation of the executive committee in favour of contesting six seats in Scotland at the next General Election was agreed to by a large majority. The chairman submitted a report of the negotiations with the employers, and with the Medical Council for Scotland, on the question of attendance on the dependants of the workmen after the benefits of the Insurance Act came into operation. The executive were authorised to conclude the negotiations on the lines indicated. Following the conference, a meeting of the executive committee was held, and the general wages question was under consideration. The secretary was instructed to communicate with the secretary of the Scottish Coalowners' Association requesting that a meeting should be held at an early date to consider the basis of the proposed new agreement in terms of the understanding previously arrived at. Mr. Hugh Murnin, Stirlingshire, reported that trouble had arisen at a large colliery in that district on the question as to whether firemen and shot-firers should be members of the Miners' Union. The executive strongly expressed the opinion that there should be no split in the various grades of underground workers, and appointed the chairman and secretary to act along with the Stirlingshire officials in giving effect to that view.

At the last monthly meeting of the executive board of the Fife and Kinross Miners' Association, the question of weekly pays, which has been before the members since their representatives met the coalowners on November 15, was one of the principal items of business. It was intimated that by an overwhelming majority the members had agreed to reject the proposals of the coalowners. Briefly put, these proposals were that the men should be paid on the Friday of one week and the Saturday of the other week in single-shift pits, and in double-shift pits that they should be paid every Saturday, commencing not later than 10 a.m. The men, on the other hand, desire that they be paid weekly on Friday the one week and Saturday the other, at all the collieries in the county, with four lay days. The secretary was instructed to write to the coalowners intimating to them the decision of the members. It was unanimously agreed that one of the secretaries be nominated to visit the locus of accidents in the various districts throughout the county under the Coal Mines Regulation Act, 1911.

Shipment of Bunker Coals.—During last month the quantity of coal, &c., shipped for the use of steamers engaged in the foreign trade was 1,714,064 tons, as compared with 1,679,141 tons in November 1911 and 1,617,519 tons in November 1910. The aggregate so shipped in the first eleven months of the year was 16,734,586 tons, as compared with 17,696,757 tons and 17,877,686 tons in the corresponding periods of 1911 and 1910 respectively.

CONTINENTAL MINING NOTES.

Belgium.

All varieties of fuel are scarce, notably steam and coking sorts. It is stated that an understanding has been arrived at between the Railways Administration and the collieries as to the prices of the coal required for locomotive use. It is stated by the *Times* correspondent that nearly all orders for coal for the year 1913 will be confined to home collieries at prices showing an advance of 1 fr. 50 c. and 2 fr. per ton respectively for ordinary qualities and for briquettes as compared with those previously quoted. Exception will only be made for special descriptions, of which there is a scarcity in Belgium, and in this connection it is stated that orders for only 95,000 tons of bituminous coal are to be placed with Belgian collieries at the price of 18 fr. per ton out of the nearly 250,000 tons required by the State railways during next year. The balance will be obtained from two English firms at a price of 20 fr. per ton. Current quotations may be given as follow:—Small coals: lean 14 fr. 50 c.; *quart-gras*, 15 fr. 50 c.; *demi-gras*, 16 fr. 50 c. Furnace coals: Flénu dust, 15 fr.; ditto *fines*, 16 fr. 50 c.; ditto unscreened, 18 fr. 50 c.; unscreened bituminous coals, 19 fr. 50 c. House coals: unscreened, 22 fr. to 26 fr.; cobbles and various screened sizes, 27 fr. to 37 fr.; coking smalls, 15 fr. 50 c. Coke: ordinary, 25 fr.; half-washed, 28 fr. 50 c.; washed 33 fr. Briquettes: locomotive, type 1, 22 fr.; ditto type 2, 24 fr.; marine type, 26 fr. As compared with a year ago the advances are, broadly, as follow: small coals and furnace coals, 3 fr.; house coals, 4 fr. to 7 fr.; coking coal, 2½ fr.; coke, 3 fr. to 3 fr.; briquettes, 4 fr.

France.

The British Chamber of Commerce, 17, Boulevard de la Madeleine, Paris, draws attention to the fact that the French Fiscal authorities have in one or two recent instances claimed a special *patente* tax of ¼ per cent. on contracts passed by French Government departments with foreign suppliers. The matter is, at present, the subject of correspondence, but if these claims are persisted in, it will be necessary for British suppliers of coal, machinery, &c., to French Government departments to make allowance for this fairly onerous tax in calculating prices.

The following shows the imports and exports of coal in the first ten months of the present year:—

	Imports.		Exports.	
	1911. Tons.	1912. Tons.	1911. Tons.	1912. Tons.
Coal	13,483,100	13,010,200	1,062,101	1,601,977
Coke	2,932,200	2,276,900	134,054	163,644
Briquettes	943,500	927,500	101,878	166,948

In the ten months 7,207,500 tons of coal were imported from the United Kingdom, as against 7,559,700 tons in the corresponding period of last year, 3,873,000 tons from Belgium (3,228,200 tons), and 2,713,200 tons from Germany (2,498,200 tons). For the month of October the imports were as follow:—Coal, 1,493,400 tons (1,393,900 tons); coke, 245,600 tons (180,400 tons); briquettes, 89,500 tons (97,400 tons). From Great Britain 858,100 tons of coal were imported, as against 749,700 tons; from Belgium 342,400 tons, as against 358,700 tons; and from Germany 263,600 tons, as against 264,300 tons. Exports in October amounted to:—Coal, 142,088 tons (113,773 tons); coke, 22,569 tons (20,098 tons); briquettes, 11,124 tons (10,554 tons).

The Accident in the Gard Coalfield.—More ample particulars are to hand now of the accident which occurred on the night of December 3 at the St. Martin de Valgalgues mine, owned by the Nord d'Alais Colliery Company in the Gard coalfield. It appears that the accident, which involved the greater portion of the night shift, was due, not to firedamp or coaldust, but to an irruption of carbon dioxide. This is a danger to which the mines in the Gard and Central coalfields are exceptionally liable; and rescue chambers have been constructed at the Singles and other collieries for providing security under such circumstances. There is, moreover, a further precaution taken, no hewing being permitted, but all the coal is blasted down from the surface, no persons being allowed to be underground at such times. According to the *Echo des Mines*, the facts of the accident were as follow:—The night shift, comprising 40 workmen, were about to ascend the shaft, when a violent irruption of gas occurred, which overcame 24 of the men, only those in the vicinity of the No. 1 shaft being saved. The ventilation was not otherwise affected, the Rateau fan speedily clearing the atmosphere. These irruptions are usually accompanied by the projection of large quantities of small coal, which at times extend to the shafts, but this was less noticeable in the present case. The experience gained at Fontanes and other mines shows that these outbreaks are never spontaneous, but are due to some disturbance of the strata by blasting or otherwise, and it has been found that very slight blows are liable to stimulate the imprisoned gas to activity. The opinion hazarded is that, on this occasion, the operations preparatory to shot-firing had proved sufficient to release the gas. An investigation, however, is being carried out by MM. Valkanaer and Weiss. The accident occurred in the Mi seam at a depth of 261 m., in a district of the mine in which the workings were apparently quite normal in character.

Germany.

Ruhr Coal Market.—In spite of the losses of business and profits as the result of the continued shortage of railway wagons, and the consequent necessity for stocking part of the output which would otherwise have passed direct into consumption, the general situation can be regarded as satisfactory. The demands of the home market, and especially of the iron industry, are very considerable. It is found hardly possible to supply coking coals fast enough, and business in house coal is growing, whilst for export, gas and flaming coals are in high request. In South Germany things are a little easier now that the most pressing demands have been met, but there are still numerous complaints of unpunctual delivery. The coke market is also satisfactory.

Coal Market in South Germany.—The scarcity of wagons and disorganisation of traffic form the principal feature in the situation. Even though the position has somewhat improved in this respect, the supply of wagons is still insufficient for the daily requirements, so that any replenishing of exhausted stocks, in the case of both merchants and consumers, remains out of the question. Consumers who generally receive their supplies direct from the pits are clamouring for delivery from the Rhine harbours, with the result that many of the stockyards are quite cleared out of certain grades. The waterborne supplies are insignificantly small owing to the difficulty of getting the coal from the pits to the river, and unless there is some change for the better soon, matters will assume a serious aspect, more especially in view of the fact that shipping traffic will be further restricted as the winter draws on. The difficulty in obtaining Westphalian coals has stimulated enquiries for lignite briquettes; but here again the transport difficulties come into operation. An average delay of about three weeks is now required in filling orders. Contracts for Saar coal have all been placed without much competition, but whilst the administration will be able to supply all the large coal, through-and-through kinds and large nuts required, difficulty will certainly be encountered in the case of small nuts.

Coal Market in Upper Silesia.—The state of business shows no change in itself, the demand being very large, but impossible to satisfy fully, owing to the lack of transport facilities. Industrial consumers, especially the ironworks and cokeries, are complaining of insufficient supplies of fuel and other industries are naturally also involved. The railway authorities are doing their best in the circumstances, but the shortage of wagons amounts to nearly 50 per cent. Consequently, much of the output has had to be stocked, and, in addition, short time has had to be introduced, which is unfortunate for the miners just before Christmas. In Russian Poland, things are still worse, only about 30 per cent. of the normal number of railway wagons being available, and no coal can be obtained from Upper Silesia. Everything possible is being done to keep up the deliveries to Austria-Hungary, which is a valued customer. In the north German market it is expected that permanent injury will result, inasmuch as customers will again begin to take English coals. Apart from traffic difficulties, the coke market presents a satisfactory picture.

THE BY-PRODUCTS TRADE.

Tar products:—The market is steady, and prices generally are firm. There is not much change in pitch. The chief feature of benzols is the rising value of 50/90's over 90's. Naphthas are steady, though some grades of solvent are inclined to be easier. Crude carbolic is firm, and on the advance. Nearest values are:—

Benzols, 90's, 10d. to 10½d.; ditto 50's, 10½d. to 11d.; toluol, 11½d.; carbolic acid, crude (60 per cent.), 1s. 11d. to 2s. 4d.; solvent naphtha, 1s. 0½d., as in quality and package; crude ditto, 5d. in bulk; creosote, 3½d. for ordinary qualities; pitch, 42s. 6d. to 43s. f.o.b. east coast; ditto, 40s. 6d. to 42s. f.a.s. west coast; ditto, 47s. 6d. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.*]

Sulphate of ammonia:—Business is very quiet, but the market remains firm and healthy. There is a marked atmosphere of stability about producers, Continental complications notwithstanding; and small wonder either, when the whole situation and outlook are properly focussed. American price is 3·15 dols. per 100 lb. Closing prompt prices are:—

London (ordinary makes), £13 6s. 3d.; Beckton, £13 12s. 6d.; Liverpool, £13 18s. 9d. to £13 17s. 6d.; Hull, £13 16s. 3d.; Scotch ports, £14 to £14 2s. 6d.; nitrate of soda (ordinary), 11s. 7½d. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

South Wales Institute of Engineers.—A special general meeting will be held on Tuesday, December 17, 1912, at 4 30 p.m., at the Royal Institution of South Wales, Swansea. Further discussion will take place on the papers on:—"Certain Features in the Design of the Modern Blast Furnace," and "A New and Successful Form of Mechanical Puddling Furnace," by Mr. David E. Roberts, M.Inst.C.E., and "The Construction of the Severn Tunnel," by Mr. A. O. Schenk, M.Inst.C.E. A further special general meeting will be held on Thursday, December 19, 1912, at 6 p.m., at the Institute, Cardiff, when further discussion will take place on the paper on "Electric Winding Engines," by Mr. A. E. du Pasquier.

THE LONDON COAL TRADE.

THURSDAY, DECEMBER 12.

The London coal trade during the past week has been dull and lifeless; the stocks at the collieries and at the various re-labelling stations are unfortunately increasing, and the mild weather has considerably checked the flow of orders. The market at the beginning of the week opened firm and solid and the attendance was good, but it was felt that every merchant and factor had a quantity of coal in hand above the normal, and when once the selling began the open market became somewhat restricted and many of the merchants began taking the opportunity of working stocks down before entering into any fresh contracts. Unfortunately, too, the normal selling prices were in some cases below the contract figure, and a good deal of severe comment was the result. The retail trade at the depots is reported as being fairly busy, and although the weather has been very mild and damp, yet undoubtedly a large amount of household fuel has been consumed, and orders for Christmas clubs and other charitable institutions are becoming more pronounced. The mid-weekly meeting on the Exchange was very thinly attended and the general tone of the market was somewhat gloomy, as so many of the large buyers have coal on siding rent, which is beginning to cause a good deal of anxiety. Contractors generally have ordered more freely lately, but the principal coal centres are becoming congested with loaded wagons. Collieries for the most part have, since the beginning of the month, maintained a firmer attitude as regards prices, but little has been done at current rates, nearly all the orders being for either contract coal or coal bought at the low figures current in November. The feature of the market has been the firm demand for all classes of small coal, and with the strong tone everywhere evidenced, the full list price for all classes of double-screened nuts, peas and nutty slack have been firmly maintained. Plenty of buyers are to be found eager to buy up every available parcel which can be promised for immediate delivery. The continual fog hanging over the Metropolis has undoubtedly stimulated the demand for this special class of fuel for electric lighting purposes, &c. In the coke trade the scarcity is making itself felt in a remarkable manner and prices are rising very acutely, especially for foundry and furnace coke. Gas coke, also, has been very freely changing hands lately. Some contracts for the best qualities of coke have been renewed at 4s. to 5s. per ton above last year. The outlook generally appears good. The seaborne market, so far as London is concerned, remains very slow, and all quotations remain nominally the same, viz., 21s. 6d. for best and 20s. 6d. for seconds; but it has been remarkable that so little has been available for the market, and so few cargoes are offering. The wholesale market has been very irregular, and subject to a variety of conditions. List prices are in very few cases obtainable, but collieries are exceedingly loth to make any reduction, especially in view of the near approach of the Christmas holidays, and the colder weather usually associated with that period. Fifty vessels are reported as arriving in the Thames on Monday's market, and seven on Wednesday. The trouble in the north is causing a large number of enquiries to come in for other ports, and the vessels delayed are more than likely to be moved on to the Humber ports, in order to secure South Yorkshire and other qualities of coal. This in its turn affects the London market very considerably, as it withdraws nearly the whole of the Yorkshire coals from the River Thames, and makes London more than ever dependent on the railborne qualities. For a long time past wharf smalls have been fetching unusually good prices, and the export trade also continues very brisk.

From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, December 6.—There was no alteration in the seaborne house coal market to-day, which remained quiet. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston (W.E. Yorks) 21s. 6d. Cargoes 16.

Monday, December 9.—There was again no seaborne house coal on offer at to-day's market, which remained quiet. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston (W.E. Yorks) 21s. 6d. Cargoes 50.

Wednesday, December 11.—There was a steady demand and no alteration in the seaborne house coal market to-day. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d. Cargoes 7.

THE TIN-PLATE TRADE.

Liverpool.

The state of the tin-plate trade is very unsatisfactory just now. Several works are short of orders, and are taking low figures to keep their mills going. Others are standing to their quotations, stating that current costs of raw materials will not enable them to reduce, and that they prefer to close down. Buyers are all holding off all they can, and practically the only business being done is in second-hand parcels. Quotations are unreliable, and range about as follow:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 15s. 1½d. to 15s. 3d. per box; I C 28 × 20 (112 sh. 216 lb.), 30s. to 30s. 3d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 6d. to 15s. 7½d. per box; I C 14 × 16¾ (124 sh. 110 lb.), 15s. 6d. to 15s. 9d. per box; I C 14 × 19¼ (120 sh. 110 lb.), 15s. 6d. to 15s. 9d. per box; I C 20 × 10 (225 sh. 156 lb.), 22s. 3d. to 22s. 6d. per box; I C squares and odd sizes, 15s. 3d. to 15s. 6d. basis. Ternes are quiet at round 26s. for I C 28 × 20 112 sheets, and charcoal tins are in moderate demand at 17s. 6d. basis and upwards, according to tinning. Black-plate is in poor request; works are quoting £10 15s. for usual specifications in finished quality. Coke wasters are quoted:—C W 14 × 20, 14s. 1½d. to 14s. 3d. per box; C W 14 × 18¾, 14s. 1½d. to 14s. 3d. per box; C W 28 × 20, 26s. to 28s. 3d. per box; C W 20 × 10, 19s. 9d. to 20s. per box—all f.o.b. Wales, less 4 per cent.

A correspondent learns that boring operations are about to be commenced in the neighbourhood of Culcheth, four or five miles from Warrington, with a view to locating coal measures in that neighbourhood. The work, it is understood, is being undertaken by a Liverpool syndicate, but considerable secrecy is being observed concerning the project.

THE SCOTCH COAL AND IRON TRADES.

Thursday, December 12.

Glasgow and Lanarkshire.

COAL.

There has been a rather better feeling in the coal trade this week, and shipments show an increase at most of the ports. The aggregate clearances in the past week amounted to 325,813 tons, showing an increase of 59,013 compared with the preceding week, but there was a decrease of 16,581 from the quantity despatched from the various ports in the corresponding week of last year. Many vessels which had been detained by stormy weather have now got away with cargoes, and the current demand has still further improved, there being an evident desire to obtain supplies in anticipation of the holidays. The Glasgow shipments show an increase of 13,000 tons, being 74,338 tons, against 61,080 in the preceding week, and 65,582 in the corresponding week of 1911. The recent upward movement in the price of coal during frosty weather has had a firming effect all round on the inland department of the trade. Coalmasters have been raising prices gradually until for good quality of house coal they are now about 2s. per ton higher than they were a month ago. Merchants are paying as much as 18s. a ton at the pits for the better sorts of house coal, which is regarded as a comparatively high rate considering the present circumstances of the trade. No such advance has taken place in shipping coal, which has, however, a firmer tendency. At Glasgow steam coal is quoted f.o.b. 12s. 6d. to 13s., ell 12s. 6d. to 13s., splint 14s. to 14s. 6d., treble nuts 13s. to 13s. 6d., doubles 12s. 6d. to 13s., and singles 12s. to 12s. 6d. per ton. The better qualities of house coal have been in good demand for shipment. The foreign and coastwise shipments at Glasgow were pretty evenly balanced, 36,967 tons being sent abroad, and 37,371 coastwise. The supply of railway wagons is still inadequate, and causing much inconvenience to all concerned. Small hard coal and dross are in excellent demand at firm prices.

IRON.

The demand for pig iron has been somewhat quieter, but a good business took place in the early part of the week, after the favourable Board of Trade returns had been reported. American advices, on the other hand, came less satisfactory than for a long time past. The railway strike in the north of England and the consequent difficulty in obtaining supplies of Cleveland iron was a disturbing feature of the market. Since last report Cleveland warrants have sold at 67s. 1½d. to 67s. 8½d. cash, 67s. 6d. to 68s. 0½d. one month, and 68s. to 68s. 6d. three months, 67s. 7½d. being also paid for January 10 delivery. The arrivals at Grangemouth, in the past week, of pig iron from Middlesbrough and district amount to 11,557 tons, being 1,074 tons less than in the corresponding week of last year. There are 89 furnaces in blast in Scotland, compared with 84 12 months ago. Large deliveries of Scotch pig iron are being made and prices are firm. Govan and Monkland are quoted f.a.s. at Glasgow, Nos. 1, 76s. 6d., Nos. 3, 75s.; Carnbroe, No. 1, 80s., No. 3, 76s.; Clyde, Calder, and Summerlee, Nos. 1, 82s., Nos. 3, 77s.; Gartsherrie, No. 1, 82s. 6d., No. 3, 77s. 6d.; Langloan, No. 1, 83s. 6d., No. 3, 78s. 6d.; Coltness, No. 1, 99s., No. 3, 81s.; Eglinton, at Ardrossan or Troon, No. 1, 76s., No. 3, 75s.; Glengarnock, at Ardrossan, No. 1, 83s. 6d., No. 3, 78s. 6d.; Dalmellington, at Ayr, No. 1, 78s. 6d., No. 3, 76s. 6d.; Shotts at Leith, and Carron at Grangemouth, Nos. 1, 82s., Nos. 3, 77s. per ton. Business has been quiet in hæmatite pig iron and Scotch hæmatite is quoted 87s. 6d. for delivery at west of Scotland steelworks. The shipments of Scotch pig iron in the past week were 3,126 tons foreign and 2,202 coastwise, the total of 5,328 being 1,204 more than in the corresponding week of last year. The finished iron and steel works are very busy, and there appears to be a fair amount of fresh business on offer.

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Renfrew, Ayr and Dumbarton.

COAL.

The coal shipments in this district have improved very materially since last report. In the past week they embraced 5,800 tons foreign and 26,216 tons coastwise. At Bowling 115 tons were despatched, Greenock 1,758, Irvine 455, Ardrossan 2,881, Troon 8,701, and Ayr 18,186—total 32,096 tons, compared with 26,132 in the preceding week, and 27,125 in the corresponding week of 1911. There has been a somewhat firmer tendency in shipping prices. House coal for home use has been in active demand at increased prices, and the business in coal for manufacturing purposes is very active.

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Stirling, the Lothians and Fife.

COAL.

The business in shipping coal has been much inconvenienced at Grangemouth owing to inadequate supply of railway wagons and poor loading facilities, and the trade has addressed a remonstrance to the Caledonian Railway directors on the subject. But while shipments are poor at Grangemouth and also at Leith, increased business at other Firth of Forth ports led to an aggregate of 11,000 tons over the quantity despatched in the preceding week. The clearances were, at Granton 12,397 tons, Bo'ness 16,884, Leith 35,327, and Grangemouth 36,906—total 101,514 tons, compared with 90,129 in the preceding week, and 119,839 in the corresponding week of last year. Best screened steam coal is quoted at Leith 13s., secondary qualities 12s. to 12s. 3d., treble nuts 13s. 6d. to 14s., doubles 12s. 9d. to 13s., and singles 11s. 6d. to 12s. per ton. There has been an increase of about 28,000 tons in the coal shipments at Fife ports. At Burntisland 58,550 tons were despatched, Methil 54,862, Alloa 1,656, Wemyss 1,351, Dysart 707, Tayport 554, Charleston 185—total 117,865 tons, against 89,459 in the preceding week, and 128,848 in the corresponding week of 1911. First-class screened navigation coal is quoted f.o.b. at Methil and Burntisland 16s. 6d. to 17s., unscreened 13s. 6d. to 14s., first class steam coal 13s. 3d., treble nuts 13s. to 13s. 3d., doubles 12s. 3d. to 12s. 6d., and singles 11s. 6d. to 12s. per ton. Inland demand has been active at higher prices.

COLLIERY ACCIDENTS.

Cadeby.

At the Guild Hall, Doncaster, on December 5, Mr. R. A. S. Redmayne, H.M. Chief Inspector of Mines, resumed and concluded the Home Office enquiry into the explosions at Cadeby Colliery on July 9 last, as a result of which 87 lives were lost.

Mr. Redmayne, at the outset, remarked that they had reached a point which was rather important to the enquiry. The evidence that day might be of such a nature that it would enable him to close the enquiry or it might not. If they could get into that part of the workings not yet penetrated within reasonable time it would be an advantage, but if it was going to be a very long time then probably the evidence one would desire to see might be obscured by the lapse of time.

Mr. W. H. Chambers, managing director of the Denaby and Cadeby Main Colliery Company, said that after careful consideration of the position, and the safest way of extracting this coal, which he did not like leaving in its present position because of the effect that was likely to arise by working the contiguous coal, he was unable to state when, in his judgment, would be the safest time to begin operations—months, and possibly a year. They knew that every day was making the conditions safer. Subsidence was going on continually, and the fire, if there was any, would be squashed out in time by these subsidences. They were pumping gas into the workings, and should continue to do so.

Mr. Redmayne: The subsidences will also squash out all the evidence.

Mr. Chambers: Well, I suppose they will, but I think the safety of the pit, and of anybody working in it, is of paramount importance.

Nurse Steele, of the Fullerton Hospital, Denaby, was then called to clear up a point remaining over from the previous enquiry. She said a miner named Birch was admitted after the explosion, "gassed," and with a slight burn on his back. It was the size of a two-shilling piece.—Birch was also called, but stated he could not remember what caused the burn; and another witness, a member of the rescue party, named Goulding, who brought Birch out of the mine, was also unable to account for the injury. Goulding stated that 16 or 17 bodies were found together at 19 crossing, including the body of the late Mr. W. H. Pickering. Birch was the furthest man in in No. 19.

Mr. C. L. Robinson, senior inspector for the district, stated that he visited Cadeby Colliery on August 22, and he visited it on an average about twice a week to the end of September. On August 22 there was a cement stopping on the outer bye-side of the 33 level, and that was intact. There was also a stopping in 14 levels. They had taken the first step in recovery when he arrived. They were then building the stopping on 14 levels, some 70 yards on the inbye side of 19 crossgate. That was built and work was proceeding with the doors on 19 crossgate. When these were finished two doors were built in on the 19 level out by the 16 crossgate. The two doors were finished on September 3, that was the two doors on the 19 level, and the 19 crossgate was then cleaned up as far as the old 121 level and a stopping built in it, and the stopping plastered up in the old 7 level and the smokehold. The stopping at the outbye end of 33 level was broached at a later date, and fresh air was taken into the 14 level, up 19 crossgate and down 33 level. A stopping was then built in the 64 crossgate just above the 64 level, inert gas was pumped in, and the 12 ft. pack stall carried from the pack of 64 level into the face. This was finished on October 20, and to let the weight settle and give the fire time to die out the district was allowed to stand. This was the present situation, except that all the doors behind 19 crossgate, 14 levels and the stoppings at the end of 33 levels were all closed. On the inbye side of the steel doors, as they were advancing the stoppings, the percentage of oxygen was about 8, being as high as 9·62, and as low as 6·67 (CH_4 from 10 to 25 per cent., CO_2 on an average 5·7, 6·08, 3·61, 4·31.) Very little air would render that a highly explosive atmosphere. This meant that the very greatest possible care would have to be exercised in advancing these stoppings, and pointed to the necessity of pumping in inert gas. That was why they could not advance always to the door when they wanted, because their percentages of oxygen were used up.

It showed, said witness in answer to Mr. Redmayne, the great value of being able to draw upon a breathing apparatus, and he did not think this district could safely have been opened without it. As a matter of fact there was one life lost, but he did not think that was due to the apparatus. Witness himself was in before the doors were put in at 19 level, and was up into 7's and 64 before the stoppings were put in in 64 crossgate and above 64, so that he was enabled, by means of breathing apparatus, to be one of the first in advance and note the conditions of affairs before anything was touched. Describing what was found during these explorations, witness said he found three bodies lying in the road on their faces. The men appeared to have been trying to get out in the dark, as their lamps were hanging on the prop. They were apparently having food when the first explosion occurred, and after the lamps went out set out down to 19's. Their food was not covered with coaldust. Witness said there was evidence a pony had run away, and been suddenly checked. The cap of Mr. Hewitt, inspector of mines, was on the right-hand side of 19 crossgate above the level of 19; Mr. Hewitt's body was 100 yards below the 19 level. His cap must have been carried by a back blast or rebound. On the 64 crossing, about 10 yards below 64 level, there was a tub, a pony sideways, and another tub above it. Two men seemed to have been sitting on a tub, and thrown themselves upon their faces on seeing the flame. Between 64 and 19 level the props were burnt, but not so much burned as those above 64. Some men had apparently been sitting down, and turned over on their faces. They came across the bodies of Evans, Bury, Storm, Humphreys, Foxall, and Cusworth. Cusworth, the under-manager, was found on a stretcher, and was being brought out by a rescue party. They found and brought out Cusworth's notebook, and the position of bodies from 19 level down to 153 level, marked on a plan shown were put in from the sketches and descriptions found in this notebook.

Asked to give his conclusions, Mr. Robinson stated the first explosion apparently originated above 64 gate, and travelled down the face to 12 gate with very little force and great heat. There were signs of force downwards on the 121 crossgate between 143 and 12 gate. From 121 crossgate into 12 gate the two fires seemed to have met, it being a *cul-de-sac*. A man was blown over a water trough, inwards towards the 12 gate, and the men facing 12 gate were very badly burned. From 12 to 14 there was nothing much to indicate force, one man being found sitting at the junction of 14 level, but in 14 level on the out-bye corner of 121 crossgate, with his water-bottle in his hand. On reaching 14 level the explosion seemed to have developed its greatest force, which was possibly owing to the accumulated dust in the landing, or more probably to additional air, and it seemed to have expended itself on the level out by the 19 crossgate. The flame did not seem to have come much past 19 crossgate, but there were six tubs by the out-bye end of 14 level, and they were blown into the south plane. The force and flame continued out of 19 level, down 19 crossgate some 50 yards below the level. It turned two tubs up one on top of the other, and pinned them tight against the roof. It blew the separation door down, but did not damage it, and burned two men there who were just on the in-bye side of this door.

In regard to the second explosion, witness said they must take it that the flame came from the stopping the men were building. The force there was only sufficient to blow a bit of the top off. This explosion seemed to have travelled wholly down the face. There was no sign of violence above 19 level. There was not much indication of the direction this explosion took, except that it went up and down to 64's gate and 19 level. The great proportion of stonedust in 14 level lessened the force of it, and so probably saved the pit.

Mr. Redmayne. We have taken analyses of this dust. I had these made with a view to tell me exactly. Continuing, Mr. Redmayne said the position seemed to be that there was a latent fire creeping for months along the fault in the coal face. As they knew from the evidence, there was a very heavy fault, and there was the probability of air drawing from the workings in that direction. Considerable quantities of gas generated, and generation would be rather hastened than otherwise by the heat. They did not know definitely to what extent these roads were stoned, but they did know there was a considerable area for gas to accumulate from the fault. At the time of the first explosion men were engaged in stopping on the out-bye side, and the intake was probably open. As a practical mining engineer, he asked Mr. Robinson if he did not think the proper method would have been first to shut off the intake, to prevent the air getting at the fire, during which process the possibility of an explosive mixture forming had been presented, instead of reversing the process. Anything generating would naturally pass through the return.

Mr. Robinson: I think the reverse process is wrong. Where not possible to do both together in the case of a gob fire or gas, always take the intake side first. They were taking the intake by stoning, but the process was too slow.

Mr. Hartshorn (who appeared for the Miners' Federation): Had you been inspector of the district at the time, and the position was reported to you, would you have advised that all the men in the district should be withdrawn until the stoppings had been completed and sealed up?

Witness said he could not answer that, as he did not know what the conditions were. He was not prepared to say that all men should be withdrawn because there happened to be a fire. In certain cases they ought, in other cases not.

Mr. Hartshorn: I think it is in evidence that the last gob stink was not reported?

Mr. Gichard. The evidence was that no report had been received, but Mr. Bury had been told to send one.

Mr. Redmayne. Do you not think that there is great necessity, after an explosion, that only competent persons should be allowed to engage in rescue operations, and that there should be some system of control with regard to the admittance of men to a mine after an explosion?

Mr. Robinson: I do. I think that only men with written permission should be allowed down the pit after an explosion. One cannot always say one should only allow rescue men down, because if you have only rescue men who do not know the district you must have men down who do know it, whether they be rescue men or not.

Coming to this particular case, do you think a sufficient control was exercised as regards the admittance of men?—I cannot say there was; undoubtedly far too many men were sent down.

There were a great number of men in the pit at the time?—Yes, and they went into that district. A lot of men in the pit in the other districts immediately turned round and went straight into it. It was a natural thing to do, and it would have been very bad to check, but they could have stopped the men from being sent down the pit.

Are you satisfied both explosions occurred somewhere in the neighbourhood of 7's, and not between 64's and 12's?—As far as we can be without actually seeing, I am confident they both happened about 7's.

Mr. Robinson said Mr. Redmayne had asked him to have a copy made of the contents of Mr. Cusworth's book, and he would do so.

Mr. Robinson: You were going to ask me about two matches found in between the leaves of Mr. Cusworth's pocket-book. When we were getting the book open we found two burned matches in between the leaves of the book. They looked like old burned matches. We were bound to get to the bottom of that. When we gave this book to the chemist to disinfect (it was found sticking to Cusworth's body), he cut the leaves open and put match sticks in between them while he dried them. In closing up the book he had not taken them all out.

Having ascertained that neither the colliery management nor the Yorkshire Miners' Association wished to call any witnesses, Mr. Redmayne said the point was whether he should close his enquiry that day, or wait months or longer, always with the probability of its being closed by pressure. Personally he was satisfied, from the evidence he had heard, as to what took place. It was unfortunate that Mr. Chambers could not give them something more definite that morning as to the intention of the company or the probable duration of this portion of the pit being kept sealed. All he had said was it might be a month or a year. "Can you, Mr. Chambers, give us any definite time?" asked Mr. Redmayne.

Mr. Chambers said it was his desire to get this coal in the affected area from other directions, so as not to go along these abandoned roads any more. They would thus approach the area where the fire was from another direction altogether, and leave that quite at the extreme, take the ventilation up into the coal and back again instead of into this course where it might percolate into the fire area.

Mr. Redmayne: That means, gentlemen, I do not suppose we shall ever get in. It will be "Hobson's choice," I am afraid. I agree with you it is very desirable to see the place, but, short of seeing it, I do not see what other evidence I can call. With that explanation, I do not think any useful end will be served by continuing the enquiry. I think, on the evidence we have had, one can form a pretty good idea—almost a positive idea—of what took place. Before closing the enquiry, one of the very few pleasant duties one has in connection with this enquiry is to express one's admiration for the very self-sacrificing efforts of the rescue men. They have had a most unpleasant duty to perform in recovering the bodies of these men—unfortunately, there was no life to save! But the men ran considerable risks and performed their painful duty with satisfaction to everybody around. I thank the management for the way in which they have allowed us to have plans, and also the representatives of the men for the assistance they have given me in trying to clear up this somewhat difficult and obscure explosion. All colliery disasters are sad, but this was sadder than usual, because it was a sort of double explosion, and the heaviest loss was in those who were attempting to recover the bodies lost in the first explosion. I only hope the result of our deliberations and enquiry will be such as to tend to the prevention of these explosions. He thanked Mr. Beale, who was ever at his right hand, for his assistance.

Mr. Gichard thanked the Inspector, and remarked that nobody would accept more readily than the management of the colliery any preventive methods which could be afforded.

Loughor.

The inquest on D. W. Painter, superintendent of the Swansea Miners' Rescue Station, who met his death at the Caeduke Colliery, Loughor, on October 27, was conducted by Mr. Glyn Price, the county coroner, at the Town Hall, Loughor, last week.

Dr. Thompson said he was called to the Caeduke Colliery on October 28. He viewed the body of the deceased, which was covered with a general rosy tint. He (witness) came to the conclusion that deceased had died from poison by carbon monoxide gas. There were bruises on the legs and nose. Witness said that the instrument deceased had been wearing had been slightly misplaced. This might have been caused after the body was placed on the stretcher; some thought it had been interfered with and others held the contrary view.

Mr. Matthews, manager of the pit, produced plans of the colliery, and indicated the place where deceased was employed. A dam had been placed in a level of the East Pit. This dam was a temporary one until a larger one could be fixed outside. He appealed to the rescue station to send down deceased to superintend the work, which they did. Witness said that he accompanied deceased and two of the men who had been appointed assistants into the pit. On reaching a certain point they placed the apparatus on, and again proceeded forward. They had not gone far, however, before they decided to return to the fresh air region, deceased having complained of feeling unwell. They had not proceeded far in this direction when they rested for a quarter of an hour, and then resumed their journey until they came within 4 yards of the dam. Witness pointed out to deceased what was required, after which they returned to the fresh air. Subsequently deceased and the two assistants returned to the dam. It must have been about twenty minutes later when the two men—Davies and Lowther—came back in a very excited condition and stated that Painter had fallen into the water dead. Deceased, when he fell, was holding two electric lamps. Witness said that when there was spontaneous combustion in the old workings, damming operations had been resorted to. But that was in May last. Witness, continuing, said he had told Painter that it was dangerous to go into the spot on account of the blackdamp.

Prof. Cadman, who was present on behalf of the Home Office, said the apparatus deceased wore was sent to him by Dr. Atkinson. It was of a Draeger pattern, of modern mouthpiece design, with a single gas cylinder and absorbent cartridge, and with arrangements for readily removing and charging the same when exhausted. He described in detail the method he adopted in conducting the examination, and said he found the external mouthpiece revealed that the mouthpiece and nose clip were in good order, that tubes leading from the mouthpiece to the breathing bag were flexible and in good order, with the exception of the left-hand connection to the mouthpiece, which was loose and not so tight. The valves were dirty but otherwise in order. The breathing bag was in a dirty condition inside, and did not appear to have been cleaned for some time. The relief valve was very dirty and sticking. The gas cylinder was empty when received, but in good order. The injector and reducing valve appeared in good order. The absorbent cartridge was firmly held in position, and the joints were gastight. Two small punctures were discovered at the bottom right-hand corner, at a point near the back, apparently produced by some sharp instrument or nail. Around them was a quantity of the absorbent, which had evidently percolated or oozed out of the cartridge when hot. He charged the gas cylinder with oxygen up to 1,900 lb. per square inch, and fixed it on the apparatus and then tested the apparatus for leakage, when leaks were detected in the left-hand connection near the mouthpiece, the connection between the breathing bag and the tube leading to the absorbent cartridge, and two holes in the cartridge. He tested the apparatus with all the connections made gastight but having the two punctured holes open. In normal atmospheres the apparatus was quite comfortable. He then went into an irrespirable atmosphere composed of sulphur dioxide fumes, and after remaining inside for five minutes he was compelled to come out, as by this time a considerable quantity of the sulphurous fumes had leaked into the apparatus sufficient to cause great irritation of the lungs. His assistant then tried the same experiment and experienced similar symptoms. From this experiment it was quite evident that gas from the outside could readily get inside the apparatus. Witness detailed other experiments, and said it was evident that the punctures found in the cartridge and the leaky joints referred to were under a negative pressure. This would permit the poisonous atmosphere in which the deceased was working to get inside the apparatus. Punctures of this nature might be caused by careless packing or unpacking of the cartridges in the wooden case in which they were transported. It was, however, extraordinary that these punctures were not observed when the cartridges were put on to the apparatus. An apparatus of the injector type possessing as it did a zone of negative pressure, was a source of considerable danger unless it was subjected to a most rigid and systematic examination before being used in an irrespirable atmosphere, particularly one containing an accumulative poison such as carbon monoxide. This examination could only be done by a second person, as the wearer was totally unable to ascertain for himself whether all his connections were gastight or not. An apparatus possessing such a zone of negative pressure was always liable to leakage, and it would be in the interests of safety if all apparatus were made to give positive pressure only, so that any small leaks which must inevitably occur would pass gas from the inside to the outside of the apparatus.

The coroner, in summing up, said it was quite possible that owing to a defect in the apparatus deceased might have breathed a high percentage of vitiated atmosphere thereby bringing about death.

A verdict to the effect that death was due to carbon-monoxide poisoning owing to the defective nature of the particular apparatus which the deceased was wearing, was returned.

On Saturday Mr. A. H. Hiorns, for 40 years metallurgical instructor at the Midland Institute and the City Technical School, received from past and present students a solid silver salver as a memento to mark his retirement.

COAL, IRON AND ENGINEERING COMPANIES.

Addie (Robert) and Sons' Collieries Company Limited.—The shareholders have sanctioned the reduction of capital from £205,000 to £190,000, divided into 10,000 cumulative 6 per cent. preference shares of £5 10s. each, and 15,000 ordinary shares of £9 each, by returning £1 10s. per share on each of the preference shares.

Airdrie Iron Company Limited.—At an extraordinary general meeting of the shareholders at Coatbridge, the following resolution was passed:—"That it has been proved to the satisfaction of this meeting that the company cannot, by reason of its liabilities, continue its business, and that it is advisable to wind up the same, and accordingly that the company be wound up voluntarily." At the same meeting, Mr. William Mackinnon, 34, West George-street, Glasgow, was appointed liquidator.

Australian Coking and By-products Company Limited.—The report for the year ended September 30, 1912, states that the total of the shares issued was 105,510 shares, upon which 15s. per share has been called up. The directors were fortunate in securing the services as works manager of Mr. M. de Soldenhoff, who has long been identified with the erection of coking and by-product plant in England and Wales and on the Continent similar to that which the company is erecting in Australia. Purchases have been made upon very favourable terms, and a considerable proportion of this material has already been assembled on the selected site at Islington, Newcastle, New South Wales, and the remainder is in course of shipment.

Bengal Iron and Steel Company Limited.—The directors have decided to pay a portion of the accumulated arrears of the preference dividend and have declared a dividend of 6 per cent. for the year ended September 30, 1909, on the preference shares.

Blaenavon Company Limited.—The report for the year ended September 30 last states that the balance of profit and loss account unappropriated at September 30, 1911, was £17,208. Dividends have been paid thereout as follow:—One year's dividend to June 30, 1912, on preference shares at 5 per cent., £3,000, leaving a sum of £14,208. The net profits for the year amount to £55,531. Deduct: Depreciation of works and property £15,000, discount on issue of debenture stock £12,000, expenses of issue of debenture stock £13,053, experimental expenditure on steelworks, mills, &c., £13,694, amounting in all to £53,747, leaving a credit balance of £15,992, which the directors recommend should be carried forward. The new by-product coke ovens are nearly completed, and it is hoped to make coke therein a few weeks hence and to be recovering the by-products early in 1913. To the plants for the recovery of sulphate of ammonia and crude tar, the board has decided to add plants for the recovery of refined benzol and refined tar.

Carnbeath Coal Company Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to acquire and carry on the business of the Carnbeath Coal Company and Chas. Christie and Co., Aberdeen. Subscribers:—W. Donald, colliery agent, Kirkcaldy; Jas. Buchan, manager, Eastern Coal Company, Peterhead; W. Jamieson, wine merchant, 130, George-street, Aberdeen; R. W. Smith, colliery agent, Wallace-street, Stirling; Alex. Cunningham, colliery agent, Glencairn, Larbert; W. S. Irvine, commercial traveller, Dysart; and Margaret S. Arnott, typist, Cardenden. Registered office, 153, High-street, Kirkcaldy.

Coventry Chain Company Limited.—The accounts for the year to August 31 show that the net profit, after providing for depreciations, bad and doubtful debts, bonuses due to employees, and all charges, amounts to £13,423, to which is added the balance brought forward, £1,943. It is proposed to deal with the available balance of £15,375 by paying directors' fees, £300; a dividend on the share capital at the rate of 7½ per cent. per annum, free of income tax, £5,296; transfer to the general reserve fund £7,000, and to carry forward £2,778.

Foreign Still Tube Company Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of manufacturers of and dealers in tubes, boilers, condensers, geysers, &c., and to adopt an agreement with Still's Tube Syndicate Limited, W. J. Still and E. L. Pease. Registered office, Skerne Works, Darlington.

Great Northern Iron Ore Properties Company Limited.—The trustees have declared a dividend of 50c. per share.

Great Western Colliery Company Limited.—In order to provide the further necessary capital for the completion and equipment of the new sinkings at Llantwit Fardre, the directors have resolved to issue the remaining 30,000 ordinary shares of class B at par to the shareholders upon the register on November 28, 1912. The sum of £1 per share deposit on each £5 share is payable on or before January 1 next, and the balance will be called up as required by the company in sums of not more than £1 per share, with a fortnight's notice of each call, and at intervals of not less than three months, and dividends will accrue from the respective dates at which the calls are paid.

Gregory Locomotive Patent Limited.—This company has been registered, with a capital of £55,000 in £1 shares, to carry on the business of mechanical engineers, machinery manufacturers, metal-workers, boilermakers, iron and steel converters, electrical engineers, manufacturers of rolling stock and hardware, constructors of railway, marine or stationary engines, boilers and furnaces, &c. First directors, C. Buller and Sir T. Salter Payne.

Keyser, Ellison and Co. Limited.—The directors have declared an interim dividend on the ordinary shares of 5s. per share, free from income-tax, for the six months ending December 31.

Lauriston Coal Company Limited.—This private company has been registered in Edinburgh, with a capital of £500 in £1 shares, to carry on the business of coalmasters, colliery proprietors, &c. First directors, R. Snedden and Mrs. A. M. Snedden.

Manor-Powis Coal Company Limited.—The directors recommend payment of the 6 per cent. cumulative preference dividend due upon the amounts paid up on these shares for the two years to October 31, which covers the period since the formation of the company.

Mills Furnace Syndicate Limited.—This private company has been registered, with a capital of £3,000 in £1 shares,

EXPORTS OF COAL, COKE, AND MANUFACTURED FUEL FROM THE UNITED KINGDOM

During November, and the first eleven months of 1910, 1911 and 1912

To	November, 1912.						November.					
	Coal—Small.		Coal—Through-and-through (unscreened).		Coal—Large.		All coal. Quantity (tons).			All coal. Value (£).		
	Tons.	£	Tons.	£	Tons.	£	1910.	1911.	1912.	1910.	1911.	1912.
Russia	21,455	11,436	300	202	208,789	135,465	167,613	192,752	230,544	87,778	104,849	147,103
Sweden	105,826	57,516	21,646	13,744	293,959	188,937	334,801	356,048	421,431	180,199	185,961	260,197
Norway	56,341	25,749	23,127	14,361	171,153	110,803	161,401	190,718	250,621	78,170	89,266	150,913
Denmark	71,450	42,892	61,458	40,599	150,429	90,946	253,124	270,348	286,328	130,825	136,239	171,437
Germany	286,364	145,014	251,287	127,945	247,435	150,750	756,410	858,625	785,086	366,102	399,108	423,709
Netherlands	105,463	57,501	64,456	38,605	65,766	43,407	181,749	182,410	235,685	93,679	89,651	139,513
Belgium	68,753	30,708	28,582	14,942	52,585	32,700	136,515	135,524	149,920	59,176	61,279	78,350
France	387,268	189,950	267,222	149,079	432,213	311,460	761,861	862,612	1,086,703	415,363	474,547	650,489
Portugal, Azores, and Madeira	24,665	12,658	21,845	11,867	100,420	74,467	116,697	90,852	146,930	71,734	57,182	98,992
Spain and Canaries	38,968	22,407	103,625	60,847	208,083	157,515	206,652	254,174	350,676	197,306	155,507	240,769
Italy	160,273	75,218	207,902	121,382	505,692	377,399	644,505	776,070	873,867	370,960	488,937	573,999
Austria-Hungary	12,840	6,467	4,775	2,844	23,459	14,270	84,398	69,122	41,074	46,378	34,827	23,581
Greece	3,023	1,477	2,250	1,785	74,195	62,358	40,776	55,883	79,468	23,169	30,411	65,620
Turkey	—	—	2,908	2,169	3,075	1,883	30,468	28,631	5,983	20,834	19,303	4,052
Egypt	22,427	12,049	54,773	31,618	184,739	136,646	141,013	257,181	261,939	82,067	162,018	180,313
Algeria	33,875	18,708	49,293	27,448	42,794	30,802	55,606	91,200	125,962	30,369	49,464	76,958
United States of America	—	—	—	—	1,311	866	835	699	1,311	583	517	866
Chile	155	151	—	—	30,296	24,468	55,569	33,122	30,451	33,596	24,757	24,619
Brazil	3,791	3,184	4,017	2,823	174,627	142,584	138,416	152,710	182,435	108,955	116,297	148,591
Uruguay	2,716	2,120	—	—	59,358	47,236	74,591	109,844	62,074	58,936	84,257	49,356
Argentine Republic	12,052	9,856	1,373	858	330,169	257,493	246,609	232,541	343,594	183,336	221,210	268,207
Gibraltar	4,138	1,907	5,284	2,919	22,393	16,866	15,572	16,889	31,815	9,310	8,872	21,692
Malta	8,074	3,878	11,577	7,441	44,809	34,693	43,805	44,123	64,460	26,882	28,297	46,012
British South Africa	917	760	1,577	1,065	3,617	2,526	5,477	3,371	6,111	3,608	2,622	4,351
,, India	461	365	—	—	1,021	681	17,353	32,756	1,482	10,966	20,952	1,046
Straits Settlements	497	741	—	—	—	—	2,915	6,520	497	2,461	5,666	741
Ceylon	—	—	—	—	18,299	14,646	39,813	29,540	18,299	31,113	21,915	14,646
Other countries	24,628	14,478	2,902	1,765	95,169	73,585	165,358	153,631	122,699	120,757	111,648	89,828
Total: Anthracite	104,532	73,982	10	18	163,556	148,296	190,018	248,684	268,098	154,712	196,535	227,296
Total: Steam	1,114,877	536,953	252,015	142,989	3,162,518	2,246,000	3,613,271	4,032,485	4,529,410	2,099,578	2,366,440	2,925,942
Total: Gas	61,028	29,181	798,496	450,206	98,737	63,394	814,735	921,458	958,261	411,600	452,852	542,781
Total: Household	51,136	28,159	—	—	105,265	67,582	143,675	115,461	156,401	75,080	62,508	95,741
Total: Other sorts	124,847	73,915	144,658	83,095	15,770	10,180	211,200	229,817	285,275	103,702	107,224	167,190
Total	1,456,420	747,190	1,195,179	676,308	3,545,846	2,535,452	4,972,902	5,547,905	6,197,445	2,844,672	3,185,559	3,958,950
Total (November 1911)	*1,235,904*	*540,120*	*1,149,982*	*559,381*	*3,162,019*	*2,086,058*	—	—	—	—	—	—
Total (November 1910)	*1,159,149*	*518,130*	*916,954*	*457,361*	*2,896,529*	*1,869,181*	—	—	—	—	—	—
Coke	—	—	—	—	—	—	107,597	110,992	125,601	76,004	80,335	107,693
Manufactured fuel	—	—	—	—	—	—	117,230	134,334	142,025	81,078	96,235	114,365
Total of coal, coke & manufactured fuel	—	—	—	—	—	—	5,197,729	5,793,231	6,465,071	3,001,754	3,362,129	4,181,008
	First eleven months of 1912.						First eleven months.					
Total: Anthracite	1,055,478	768,016	462	266	1,260,969	1,097,090	2,230,095	2,233,164	2,316,909	1,776,050	1,692,806	1,865,372
Total: Steam	10,022,816	4,683,682	2,598,515	1,430,076	29,707,732	21,153,102	41,367,851	42,863,716	42,329,063	24,520,252	24,773,484	27,266,860
Total: Gas	627,238	304,915	8,181,137	4,314,046	922,035	578,323	9,384,284	9,594,122	9,730,410	4,829,355	4,671,454	5,197,284
Total: Household	453,425	245,379	2,816	2,973	1,041,567	644,059	1,404,126	1,374,219	1,497,808	747,138	721,390	892,411
Total: Other sorts	1,361,655	732,020	1,370,419	736,842	141,372	87,870	2,509,641	2,740,134	2,873,446	1,270,769	1,307,848	1,556,732
Total	13,520,612	6,734,012	12,153,349	6,484,203	33,073,675	23,560,444	56,895,997	58,805,355	58,747,636	33,134,564	33,167,022	36,778,659
Total for eleven months of 1911	*13,262,763*	*5,849,281*	*11,963,483*	*5,758,559*	*33,579,109*	*21,559,182*	—	—	—	—	—	—
Total for eleven months of 1910	*13,027,714*	*5,836,225*	*10,356,628*	*5,242,151*	*33,511,655*	*22,056,188*	—	—	—	—	—	—
Coke	—	—	—	—	—	—	863,892	948,883	928,612	635,499	711,291	771,090
Manufactured fuel	—	—	—	—	—	—	1,376,890	1,481,829	1,394,032	942,519	1,040,162	1,093,160
Total of coal, coke & manufactured fuel	—	—	—	—	—	—	59,136,779	61,236,067	61,070,280	34,712,582	34,918,385	38,642,909

to acquire certain patents relating to furnaces for steam boilers, and to adopt an agreement between A. Fielding and others and E. C. Mills. First directors include J. W. Nasmith, 33, Barton Arcade, Manchester, and J. W. Porter, Vernon Lodge, Leamington.

North Lonsdale Iron and Steel Company Limited.—The net profits for the year ended October 31, after writing off £10,000 for depreciation, were £27,054, and £3,374 was brought forward. The directors recommend that £10,000 be added to the reserve (increasing that fund to £25,000), and that a dividend of 10 per cent. be paid, leaving £3,428 to carry forward. Mr. J. Walker and Mr. A. E. Sadler have been appointed to fill vacancies on the board.

Pekin Syndicate Limited.—The report for the 12 months ended June 30 states that the year under review brought many changes in China resulting in the establishment of a Republic. The output of coal, and particularly the sales, were greatly hampered by the difficulties of providing labour and by the falling off of trade. The receipts during the year amounted to £65,115. The expenditure during the same period on salaries and expenses of management in London was £22,295, in China £11,307, and in Paris £549. The balance carried to profit and loss account is £28,168. This amount, together with the amount standing at the credit of profit and loss account from last year's account, brings out a credit at that account of £440,444. The directors propose that this amount should be dealt with in the same manner as last year, and carried forward. There is an increase in the value of the company's properties in China. Offers have been received for the purchase of some of them at prices representing a substantial profit on the cost prices. The directors, however, decided to retain them, at least for the present. The exploitation of the mines is still in its development stage owing to the continuance of the work of unwatering. In accordance, therefore, with the usual practice, the expenditure at the mines this year, which, after deducting receipts in respect of coal sales, leaves a balance of £52,222, has been charged to development. The comparative figures are as follow:—Output in 1912, 462,400 tons; in 1911, 428,850 tons; sales in 1912, 374,750 tons; in 1911, 388,300 tons. The directors are now contemplating the advisability of extending the sphere of the company's activities. The directors have appointed Mr. Charles Victor, Mr. André Berthelot, and Lord Carrick to seats on the board.

Power-Gas Corporation Limited.—The annual report states that the works of Ashmore, Benson, Pease and Co. Limited have been maintained in a condition of efficiency and repair, and all expenditure for this purpose has been charged to revenue. The result of the year's trading of Ashmore, Benson, Pease and Co. Limited show a total profit of £6,751 18s. 3d., to which has been added the balance brought forward from last year's account £3,609 13s. 8d., making altogether £10,361 11s. 11d. Of this £1,500 has been transferred to reserve, £7,500 to the accounts of the Power-Gas Corporation Limited for dividend, and the balance £1,361 11s. 11d. carried forward to the next account. The results of the year's trading of the Power-Gas Corporation Limited show a total profit of £11,852 4s. 3d., to which has been added £3,264 4s. 2d. brought forward from last year's account, making altogether £15,116 8s. 5d., which the directors propose to apply as follows:—To reserve fund created in terms of Article 111, £2,000; dividend at 4 per cent. per annum upon the ordinary shares, to be paid less income-tax, £9,984 16s.; balance to be carried forward to next account, £3,131 12s. 5d.

Prior (S. J. Burrell) Limited.—This private company has been registered, with a capital of £50,000 in £1 shares, to take over the business of a metal merchant carried on as S. J. Burrell Prior at 5, Laurence Pountney-hill, E.C.

Pumpherston Oil Company Limited.—The directors recommend that the share capital be raised from £230,000 to £450,000 by the creation of 50,000 6 per cent. cumulative second preference, and 170,000 ordinary shares of £1 each. It is proposed to allot 130,000 of the new ordinary shares to holders of similar shares, thus doubling their holdings. Payment will be met partly by the capitalisation of the reserves, which amount to £110,000, and partly out of profits. The balance of the shares will be reserved for the purchase of the undertaking of the Tarbrax Oil Company, which it is proposed to acquire. In order to enable the shareholders to take up the new shares and to pay the uncalled 3s. per share on the existing ordinary shares, a bonus will be declared of 23s. per share. It is further proposed to subdivide the £10 preference shares into shares £1 each. Shareholders in the Tarbrax Company are to receive three ordinary shares in the Pumpherston Company for every 10 of their present ordinary shares. The paid-up share capital of the Tarbrax Oil Company consists of 50,000 6 per cent. cumulative preference and 85,000 ordinary shares of £1 each, all fully paid up. The company was registered in 1904, and own oil lands in the counties of Lanark and Midlothian. The Pumpherston Company was formed in 1883, and the present share capital of £230,000 is divided into 10,000 fully paid 6 per cent. cumulative preference shares of £10 each, and 130,000 ordinary shares of £1 each, with 17s. per share paid up.

Rubel Bronze Limited.—This company has been registered, with a capital of £200,000 in £1 shares, to carry on the business of manufacturers, exporters and importers of, agents for and dealers in bronze ingots, castings, forgings, tubes, sections and like manufactures, &c. Registered office, 82, Victoria-street, S.W.

Stephenson and Co. (Oxford) Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to take over the business of a coal, &c., merchant, carried on by J. Wooldridge at Juxon-street, Oxford, as Stephenson and Co. Permanent governing director, J. Wooldridge (subject to holding £1,000 shares). Registered office, 30, Juxon-street, Oxford.

Tubbs and Farey Limited.—This private company has been registered, with a capital of £12,500 in £1 shares (6,250 preference), to carry on the business of brass and iron founders, metal and tool manufacturers, &c., and to acquire the business of Tubbs, Son and Farey, carried on by E. H. Tubbs at 19, Goodge-street, London, W., and 23, Barr-street, Birmingham, as "Tubbs, Son and Farey." First directors, E. H. Tubbs and G. N. Frankau. Registered office, 19, Goodge-street, W.

Tuke and Bell Limited.—This company has been registered, with a capital of £21,000 (20,000 participating preference shares of £1 each and 20,000 deferred shares of 1s. each), to carry on the business of engineers, founders, metal workers, smiths, &c. First directors: C. W. Bell, J. E. Tuke, E. M. Robson, C. R. B. Brown, T. M. Dalziel, and E. B. Boothby. Registered office, 69, Leadenhall-street, E.C.

United Collieries Limited.—The Collieries Trustee Company Limited, as the trustee of the deed of declaration of trust, securing the first debentures "A" and first debentures "B," gives notice that the sum of £12,050 is available for the redemption of the said debentures as to four-fifths thereof in the redemption of first debentures "A" and as to one-fifth thereof in the redemption of first debentures "B," and calls for tenders for the redemption at any price not exceeding £115 per cent.

Vulcan Motor and Engineering Company Limited.—The report for the year ended September 30 last shows a net profit of £12,875, making, with £2,298 brought forward, an available total of £15,173. After payment of preference interest the directors recommend writing of £2,500 balance to goodwill asset, and payment of a final dividend at the rate of 10 per cent. on the ordinary shares, making, with interim payment, 7½ per cent. for the year, carrying forward £8,004.

Wath Main Colliery Company Limited.—The directors have declared a further interim dividend of 1s. per share on the ordinary shares of the company.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see Leader *and* Last White *pages.*

Abstracts of Contracts Open.

Berwick-on-Tweed, December 18.—For coal, coke and firewood, for the Education Committee.

Birmingham, December 16.—For about 90 tons of coke, for the Guardians.

Chester, December 16.—For house coal, slack and coke, for the Guardians.

Exeter, December 16.—For steam (washed bean or pea) coal, for the Corporation.

Hendon, January 6.—For best nutty slack coal, for the Hendon Urban District Council.

Stoke-on-Trent, December 17.—For coal and slack, for the Guardians.

Wilmington (Hull).—For 30,000 tons dry slack. Tenders to G. and T. Earle Limited, Wilmington, Hull.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

Belfast, January 1.—*Electric Derrick Crane.*—For an electric derrick crane, capable of lifting 120 tons, for the Harbour Commissioners.

Blackpool, December 17.—*Motor Tower Wagon.*—For a motor tower wagon, for the Corporation.

Bristol.—*Floating Crane.*—The Bristol Docks Committee invite preliminary proposals for a floating steam crane, either new or second-hand. Further particulars obtainable at the office of Mr. W. W. Squire, engineer, Bristol Docks, Engineer's Office, Cumberland-road, Bristol.

Caterham (Surrey), December 18.—*Engine, &c.*—For a new steam engine and mechanical appliances, for the Metropolitan Asylums Board.

Dewsbury, December 17.—*Water-tube Boilers.*—For two water-tube boilers, superheaters, brickwork and mechanical stokers, complete, for the Corporation.

Durban (Natal), December 16.—*Tram Rails.*—For eight miles of steel girder tramrails of British standard section No. 2, 95 lb. per yard, with fishplates, bolts and nuts, tiebars, and copper bonds, for the Corporation. Forms from Messrs. Webster Steel and Co., agents to the Durban Corporation, 5, East India-avenue, Leadenhall-street, London, E.C.

Harrogate, December 17.—*Cast Iron Pipes.*—For about 85 tons of 3 in. diameter cast iron pipes and special castings, for the Corporation.

Johannesburg (South Africa), January 10.—*Motor Ambulance.*—Tenders are invited by the Johannesburg Municipal Council for a four-cylinder, 22-28 horse-power motor ambulance, complete, or, alternatively, a motor ambulance chassis only. Copy of the specification and form of tender can be seen by British makers at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

London, December 17.—*Tram Rails, &c.*—For 3,000 pairs of tramway rail fishplates, for the London County Council.

London, January 9.—*Dynamo, &c.*—For a steam dynamo, switchboard, and connections, for the Fulham Guardians.

Melbourne and Hobart (Australia), January 28—January 13.—*Cable.*—Tenders will be received at the office of the Deputy Postmaster-General, Melbourne, for about 33 miles of paper-insulated lead-covered cable (Schedule No. 799). Forms may be got from the High Commissioner in London for the Commonwealth of Australia, 72, Victoria-street, S.W. Copies of the specifications can be seen by British makers at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

Melbourne (Australia), February 21.—*Rotary Converters.*—For four 1,500 kw. three-phase 50-period rotary converters, for the Corporation.

New Monckton.—*Shaft Sinking.*—For the sinking of shaft, 16 ft. diameter, 600 yards deep, contractor to find labour only. Tenders must be sent in addressed to Mr. C. C. Ellison, New Monckton Collieries, near Barnsley.

Stratfield Mortimer, December 21.—*Oil Engines, &c.*—For engines, pumps, &c., for the Bradfield Rural District Council.

Swansea, December 18.—*Slant.*—For driving a slant through hard ground for a distance of 100 yards and a cross-measure drift of 100 yards, more or less, for the directors of the New Lynch Colliery, Llanmorlais.

Swansea, January 9.—*Structural Steelwork.*—For the following, for the Harbour Trustees: (1) One framed and braced steel double-storied extension of the grain shed at the Prince of Wales Dock; the extension to be 70 ft. long by 63 ft. wide. (2) Two framed and braced steel single-storied extensions of the transit shed at No. 1 Quay, King's Dock, with sides and roofs covered with galvanised corrugated sheeting; the extensions to be 192 ft. long by 60 ft. wide and 96 ft. long by 60 ft. wide respectively.

COAL AND COKE EXPORTED FROM PORTS IN ENGLAND, SCOTLAND AND WALES

During the month of November 1912, compared with the corresponding month of 1911.*

Port.	November 1912.		November 1911.		Coals.		Coke	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons
Newcastle	892,307	20,600	851,000	19,750	11,307	—	850	—
North Shields	72,379	—	111,238	1,801	—	38,859	—	1,801
South Shields	147,879	932	111,795	2,502	36,084	—	430	—
Sunderland	267,826	4,822	275,187	6,009	—	7,361	—	1,187
West Hartlepool	101,473	1,669	122,284	1,220	—	20,811	449	—
Goole	102,083	2,778	93,003	2,085	9,080	—	693	—
Blyth	294,145	509	305,540	1,059	—	11,395	—	550
Newport	410,081	1,611	349,036	1,176	61,045	—	435	—
Liverpool	42,045	461	44,125	1,304	—	2,080	—	843
Methil	194,287	2,175	206,215	2,688	—	11,928	—	513
Glasgow	156,096	4,587	138,644	4,723	17,452	—	—	136
Kirkcaldy	11,481	—	9,048	30	2,433	—	—	30
Burntisland	146,379	1,603	166,131	2,266	—	19,752	—	663
Cardiff	1,706,844	5,688	1,520,664	5,695	186,180	—	—	7
Borrowstoness	42,602	1,570	43,392	1,084	—	790	486	—
Llanelly	16,989	—	10,218	—	6,771	—	—	—
Middlesbrough	971	3,389	929	3,531	42	—	—	142
Seaham	80,956	—	56,896	52	24,060	—	—	52
Swansea	292,250	1,837	294,793	487	—	2,543	1,350	—
Granton	12,108	2,627	10,762	1,708	1,346	—	919	—
Port Talbot	172,273	—	97,887	1,273	74,386	—	—	1,273
Alloa	13,360	—	17,293	18	—	3,933	—	18
Grangemouth	113,603	10,649	113,974	10,290	—	371	359	—
Neath	14,908	—	10,555	—	4,353	—	—	—
Hull	331,259	7,025	281,546	6,961	49,713	—	64	—
Amble	4,330	—	39,203	—	4,127	—	—	—
Troon	9,023	—	2,519	—	6,504	—	—	—
Grimsby	101,314	274	103,279	1,128	—	1,965	—	854
Ayr	7,959	—	927	—	7,032	—	—	—
Greenock	—	—	—	—	—	—	—	—
Leith	169,929	—	136,136	15	33,793	—	—	15
Ardrossan	5,399	—	4,104	—	1,295	—	—	—
Stockton	—	—	—	—	—	—	—	—

COAL AND COKE SHIPPED FOR LONDON AND OTHER PORTS IN THE UNITED KINGDOM.*

Port.	November 1911.		November 1912.		Port.	November 1911.		November 1912.	
	Coals.	Coke.	Coals.	Coke.		Coals.	Coke.	Coals.	Coke.
	Tons.	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.	Tons.
Newcastle	496,479	825	455,596	790	Ayr	77,732	20	62,884	—
North Shields	43	—	2,837	—	Irvine	9,582	—	5,068	30
South Shields	2,560	—	5,282	—	Alloa	1,185	—	630	—
Blyth	49,883	—	32,099	—	Whitehaven	21,402	—	19,317	—
Amble	9,275	—	6,453	—	Liverpool	177,499	243	161,166	—
Sunderland	250,468	—	136,441	—	Grimsby	7,018	—	2,937	—
Seaham	96,460	—	83,536	—	Granton	14,021	—	18,602	—
Hartlepool	47,931	—	64,209	15	Borrowstoness	11,207	—	13,265	—
Stockton	—	—	—	—	Burntisland	42,542	—	50,015	—
Middlesbro'	206	173	6	130	Kirkcaldy	2,583	—	643	—
Hull	81,493	—	126,537	—	Methil	23,792	—	20,390	—
Goole	121,948	—	130,982	—	Port Talbot	14,411	185c 600 pf	18,510	100 pf
Swansea	28,559	485 c 1 pf	23,795	350	Glasgow	39,820	706	32,831	726
Cardiff	208,693	126	233,227	2,350	Grangemouth	16,180	—	13,004	—
Llanelly	6,367	—	3,342	—	Greenock	833	—	1,004	360
Newport	70,897	550	63,489	29	Neath	13,892	—	8,180	—
Troon	26,015	—	17,189	—	Leith	6,070	1	4,204	—
Ardrossan	8,553	—	2,153	—					

* From *Browne's Export List.*

Sydney (Australia), January 8, &c.—*Motors, &c.*—Tenders will be received at the office of the Chief Commissioner, New South Wales Government Railways, Sydney, for (1) 50 induction motors (Specification No. 386); (2) two turbine-driven centrifugal pumps (Specification No. 390); and (3) 1,000 telescopic screw jack (Specification No. 392). Forms can be obtained from the Chief Commissioner, New South Wales Government Railways, Sydney, N.S.W.

Walbottle, December 27.—*Bridge Steelwork.*—For steelwork, for the directors of the North-Eastern Railway Company.

Formal notice has been given of the Provisional Order for the Lothians Railways to connect the Mid and East Lothian Collieries with the docks at Leith. In the early part of the year a Provisional Order with the same object in view was dismissed by the Parliamentary committee. One reason was that the projected railways would be a private concern and not in the interests of the public. Under this new Order now drafted, the scope of the application is widened, and powers are sought, not only to carry coal, but also to convey passengers and general goods. There are to be in all seven lines—one main line and six offshoots. A notable departure from the first Bill sought is that no clause is now incorporated giving power to work the railway by electricity. Care is taken also to tap every available colliery. The main line runs from the docks at Leith to the Prestonlinks Colliery at Prestonpans. The six short lines go off the main line—one to connect the new railway with the Caledonian Railway Company's lines at Leith, and the other five lines branch off, one for Tranent, three in the Inveresk district, and one in the Newbattle coalfield district. The total output of the collieries so covered is an exceedingly large one, and the proposed railways scheme is backed by leading Lothian coalmasters and others. It is understood that the capital outlay will be very considerable, as land is valuable along the route, and various bridges and tunnels will have to be constructed, including a long tunnel, taking the main line under the North British Railway Company's east coast and Midland route to England. Extensive sidings are to be laid out near Leith. No time will be lost in getting a hearing for the Bill, and the petition and draft order will be lodged in London on an early date.

THE FREIGHT MARKET.

At the time of writing, the coal freight market on the north-east coast is practically suspended, owing to the strike of railwaymen. Such fixtures as have been reported during the week show a declining tendency. At South Wales chartering is fairly brisk, but rates are drooping through the better supply of tonnage and the difficulty experienced in arranging loading turns. The enquiry at the Clyde is quiet. The Humber is very dull. Homewards, a fair amount of business has been done. New York advices report an easy tone in the market, tonnage offering in ample quantities and orders being scarce. The Eastern markets are very quiet, and the tone is weak. Australia is enquiring for tonnage. The Black Sea and Mediterranean trades are slack. The Baltic is quiet and unaltered. There is an improving tone at the River Plate.

Tyne to Algiers, 1,600, 9s. 6d.; Bilbao, 1,400, 7s. 3d.; Boulogne, 1,000 6s.; Calais, 1,600, 5s. 3d.; Christiania, 800, 8s. 3d.; Genoa, 2,600, 11s. 6d.; 3,700, 10s. 6d.; Hamburg, 3,000, 4s. 9d., from Dunston; Karrabekamindo, 900, 8s.; Norresundby, 1,700, 6s. 9d.; Rotterdam, 1,100, 3s. 9d.; Randers, 1,200, 7s. 9d., January loading; Stockholm, 1,100, 11s. 6d., coke.

Cardiff to Antwerp, 3,000, 4s. 6d., December 16; 3,000, 5s. 3d., ppt.; Algiers, 3,500, 11¼ fr.; 2,500, 11⅜ fr., 000, ppt.; 3,000, 12¾ fr., fuel; Alexandria, 3,700, 10s.; Bayonne, 1,600, 8¼ fr.; Buenos Ayres, 4,000, 17s.; Campana, 19s. 6d., December; Corunna, 1,500, 7s. 3d., ppt.; Colombo, 13s. 3d.; Calais, 2,000, 5s. 3d.; Chatham, 2,200, 3s.; Chantenay, 1,200, 8 fr., ppt.; Devonport, 1,800, 3s. 6d., ppt.; Dieppe, 975, 6s. 3d.; Genoa, 3,200, 10s. 9d., December 18; 4,000, 16s. 9d.; 5,800, 10s. 6d.; 6,000, 9s., December 28; Gibraltar, 1,400, 9s.; Havre (Canal), 1,200, 6s. 6d.; Honfleur, 680, 6s. 6d.; Havre, 1,400, 5s., December 16; Iquique, sail, 22s. 6d.; Islands, 3,000, 10s.; Lisbon, 3,900, 7s. 6d., 500, ppt.; Libau, 1,400, 8s., spot; Monte Video, 5,400, 16s. 3d.; Marseilles, 4,000, 12½ fr., December 14; 2,800, 12½ fr., December 10; Nantes, 1,200, 8 fr., ppt.; Oporto, 9s. 6d., reported; Port Said, 5,400, 10s. 6d., December 28; 4,500, 11s., ppt.; Philippeville, 9,000, 14½ fr. and 15¾ fr.; Passages, 1,750, 6s. 9d., December 16; Pembroke, 200, 3s. 6d., Admiralty; Portland, 3s. 7½d., Admiralty; Rio de Janeiro, 4,900, 16s. 9d., December 16; Revel, 1,400, 8s., spot; Rosario, 20s., December 20; River Plate, 18s. 3d., 1s., December 28; 5,000, 17s. 6d., first half January; 5,400, 17s. 3d.; 4,700, 17s. 6d., January; 4,000, 18s. 6d., with option; 4,600, 17s., end December; 5,000, 16s. 9d., end December; Savona, 3,200, 10s. 9d., December 16; 3,800, 10s. 9d., ppt.; 6,000, 9s., December 28; Syra, 4,100, 12s.; St. Malo, 1,000, 6s. 6d., ppt.; Villa Constitucion, 19s. 6d., December; Valencia, 1,800, 10s. 6d., ppt.; 950, 11s. 6d.; Venice, 3,800, 12s. 6d., ppt.; 3,000, 11s. 3d., 400, December 21.

Swansea to Tampico, 3,000, 13s.; Monte Video, 20s., fuel, December; sail, 18s. 3d., mid-December; Civita Vecchia,

COLLIERY REPORT BOOKS & FORMS.

New Forms, &c., recently issued under the Coal Mines Acts.

This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c., as issued.

NEW FORMS, &c., RECENTLY ISSUED.

Registered No. Please quote when ordering.		
	Statutory Rules and Orders, &c.	
H.O., 511	Explosives in Coal Mines Order of 21st May, 1912 (revoking all previous "Explosives" Orders). Pamphlet Form ...	4d. each. By post 5d.
C.G., 69	The same (without Schedules). Pamphlet Form	4d. each. By post 5d.
H.O., 34	The same (without Schedules). In Sheet Form for posting ...	1d. each. By post 1½d.
H.O., 1540	Explosives in Coal Mines Order dated October 15, 1912 ...	Price 1d. By post 1½d.
C.G., E.	Special Rules for the Installation and Use of Electricity in Mines. Sheet Form (H.O., 12)	3d. each. By post 3½d.
C.G., K.	Pamphlet Form (H.O., 11)	2d. each. By post 3d.
	Orders of Secretary of State—	
H.O., 1628	Dated October 24, 1912, under Coal Mines Act. Section 35 (i) The Relighting Electrically of Safety Lamps	1d. each. By post 1½d.
H.O., 1537	Dated October 12, 1912, under Section 9 (5) of Coal Mines Act, 1911. Fees to be Paid by Applicants for Certificates of Competency	1d. By post 1½d.
H O, 1538	Dated October 12, 1912, under Section 13 of Coal Mines Act, 1911. Fees to be Paid for Copies of Lost Certificates of Competency	1d. By post 1½d.
H.O., 1539	Dated October 17, 1912, under Section 116 of Coal Mines Act, 1911. Time and Manner of Serving Notices under that Section	1d. By post 1½d.
C.G., L.	Coal Mines Act, 1911. Pamphlet Form	9d. By post 11d.
C.G., L. (Abs)	Coal Mines Act, 1911, Abstract. Sheet (26 in. by 34 in.) (H.O., 2) .	3d. each. By post 4d.
C.G., M.	Coal Mines (Minimum Wage) Act, 1912. Pamphlet Form ...	1½d. By post 2d.
Cd. 6460	Mines and Quarries: General Reports, &c., for 1910. Part 4. Foreign and Colonial Statistics	1s. 6d. By post 1s. 10d.
Cd. 6340	Mines and Quarries: General Reports, &c., for 1911. Part I. District Statistics	6½d. By post 8d.
	List of Mines in the United Kingdom for 1911	4s. each. By post 4s. 4d.
	List of Quarries in the United Kingdom for 1911	5s each. By post 5s. 6d.
C.G., F.	Directions as to the Restoration of Persons suffering from Electric Shock (Silvester or Schäfer). Sheets (20 in. by 30 in., and 10 in. by 15 in.)	4d. each. 3s. per doz.
	Mounted on Cardboard	6d. each, carriage extra.
	Do. and Varnished	1s. each, do.
	On Enamelled Iron Plates (10 in. by 15 in.)	3s. 2d. each do. (Reduction on a quantity.)

PRESCRIBED FORMS.

H.O., 11A	Electricity Rules: Daily Log Sheet	1s. 6d. per 100
H.O., 11B	Do. Do. Book	4s. each. By post 4s. 8d.
H.O., 11C	Do. Notice to Inspector of the District under Rule 2 (ii.) ..	1d. each. By post 1½d.
H.O., 11D	Do. Notice to Inspector of the District under Rule 2 (iii.) ..	1d. each. By post 1½d.
H.O., 15C	Do. Notice to Inspector of Intention to Introduce Electricity ..	1d. each. By post 1½d.
H.O., 20	Form of Register of Boys, Girls and Women Employed—Section 94 .. .	4d. each, postage extra
H.O, 36	Form of Report Book for Inspection on behalf of Workmen—Section 16 ..	9d. each do.
H.O., 37	Form of Book for Record of Measurements of Air Currents—Section 29 (2) ..	7d. each, do.
H.O., 38	Form of Book for Daily Record of Damage to Safety Lamps—Section 34 (1) (ii)	1s. 6d. each do.
H.O., 39	Form of Report of Thorough Examination of Steam Boiler—Section 56 ..	1d. each do.
H.O., 40	Form of Book for Report on Quarterly Internal Examination of Steam Boilers—Section 56 (1) (c) and (3)	6d. each do.
H.O., 41	Form of Book for Daily Report on Condition of Roads as to Coal Dust—Section 62 (5)	1s. 3d. each do.
H.O., 42	Form of Report Book for Firemen, Examiners or Deputies—Sections 64 and 65 ..	1s. each do.
H.O., 42A	Similar to H.O. 42. Suitable for use in large collieries, 2 Forms on a page, about 400 pages. To be issued as soon as possible.	
H.O., 43	Form of Book for Daily Report of Examination of External Parts of Winding Machinery, Guides, &c.—Section 66 (a)	1s. 6d. each do.
H.O., 44	Form of Book for Weekly Report of Machinery, Gear and other Appliances (other than Winding Machinery, Gear, &c.)—Section 66 (b)	1s. 3d. each do.
H.O., 45	Form of Book for Weekly Report on State of Shafts in which Persons are Lowered or Raised—Section 66 (c)	1s. 3d. each do.
H.O., 46	Form of Book for Weekly Report on State of Airways—Section 66 (d) ..	1s. 3d. each do.
H.O., 47	Form of Book for Reports on Places from which Workmen have been Withdrawn Section 67	9d. each do.
H.O., 48	Form of Notice of Accident Causing Loss of Life or Serious Personal Injury to be sent to Representative of Persons Employed—Section 80 (1)	1d. each do.
H.O, 49	Form of Notice Specifying the Period of Employment and Times Allowed for Meals of Boys, Girls and Women—Section 93	1d. each do.
H.O., 50	Form of Book for Horsekeeper's Record and Daily Report of Horses under his care—Schedule III. (13)	2s. 6d. each, do.
H.O, 51	Form of Annual Return of Horses Used Underground in the Mine—Schedule III. (16)	1d. each do.
H.O., 52	Form of Book for Daily Record of Shots Fired—Explosives in Coal Mines Order	9d. each do.

Continued on Page 1211.

THE COLLIERY GUARDIAN COMPANY LIMITED,
30 & 31, Furnival Street, Holborn, London, E.C.

enoa, 4,300, 11s., December 23; Savona 6½d.; 4,300, 11s., December 23; Spezzia ber 23; Palamos, 1,100, 12s. 6d.; Havre ulogne, 2,200, 9s. 9d.; La Pallice, 1,800 Catania, 4,500, 11s. coal, 11s. 9d. fuel oal, 12s. 9d. fuel; Rouen, 1,600, 9s. 9d. d., ppt.; Dieppe, 1,100, 6s. 9d.; Algiers ember 19; St. Nazaire, 2,200, 8 fr., ppt.; 11s. 3d. coal; 12s. fuel, December 19; 11s. 9d; Carthagena. 2,300, 10s., ppt.; r; Calais, 1,400, 5s. 9d.

l to Naples, 11s. 9d., 700.

nos Ayres and Rosario, 27s., ppt.; Buenos ecember; Rosario, 27s. 9d., end December.

La Pallice, 2,100, 7·87½ fr., December 19.

Coast South America, about 22s.

r to Civita Vecchia, 2,400, 12s. 6d.

utb, 600, 7s. 3d.; Karrabeksminde, 700, 8s. enoa, 11s. 1½d.; 11s.; 3,000, 11s. 4½d.; ; 11s.; 3,000, 11s. 4½d.; Leghorn, 3,000,

. Nazaire, 3,400, 9s.; Venice, 4,500, 13s. 3d. e; Porto Vecchio, 3,200, 12s.; Bordeaux, n, 4 300, 11s. 9d.

Norway, 750, 8s.; Kiel, 1,800, 7s. 6d.

ce, 3,500, 13s. 8d.

rkoping, 1,500, 7s. 9d.; Karrabeksminde,

Messina, 1,500, 11s. 3d.; Alexandria, ember 19.

, 1,900, 11s.; Genoa, 5 000, 10s. 9d.

Plate, 4,500, 18s. 3d, January 5.

lao, sail, 30s., March; Santos, sail, 24s. 6d., y; Liverpool, 2,500, 7s., sugar.

les, 4,700, 10s., 800, December 18; Antwerp, iers, 3,000, 12¾ fr., fuel, 500, December 18; 0, 9s. 9d.

000, 7s. 3d.; Reval, 2,500, 7s. 8d.; 2,000, 200, 10s.; Ystedt, 1,000, 9s. 9d.

Rotterdam, 1,750, 3s. 9d.

rters:—Novorossisk, 18,000 qrs., 10 per . or any, 12s. 6d. Hamburg, December; 8s. one port, 18s. 4½d. two ports, 19s. 9d. e, option grain 2s. less, spot; Novorossisk 0, Naples and or Torre Annunziata, 18¼ fr. one port, 16½ fr. both ports; Bombay, 23s. 8d. two ports United Kingdom-Continent, ex France, on d.w., January; 2,209 net, 23s. 6d. on d.w., December; San Lorenzo, 5,200, United Kingdom-Continent, 23s. 8d. o.c., less 8d., half seed 6d. extra, balance 1s. extra, January 5-February 5; 4,500, 10 per cent., 23s. o.c., less 9d, February 25-March 31; 5,300, 10 per cent, 23s. 6d. o.c., less 6d., seed 6d. extra, option Bahia Blanca same rate, February-March; 4,200, 10 per cent., 23s. o.c., less 6d., seed 1s. extra, January 1-31; 4,100, 10 per cent., 23s. 9d. o.c., less 6d., half seed 6d. extra, balance 1s. extra, Colastine 1s. extra, January 1-31; Santa Fe, Colastine, 4,400, 10 per cent, United Kingdom-Continent, 32s., quebracho, March; Bahia Blanca, 5,600, 10 per cent, L.H.A.R., Leith, Liverpool or Glasgow, 25s., no reduction, oats, end December; 9,500, 10 per cent., United Kingdom-Continent, 23s. o.c, less 6d., February 20-March 20; 3,800, 10 per cent., 22s. 8d. o.c., no reduction, with Mediterranean options, December 20-January 31; Northern Range, 3s. 1½d. barley, 2s. 7½d. oats, United Kingdom-Continent, January; 5s. 9d., two ports Mediterranean, January; 25,000 qrs, 10 per cent., Avonmouth, Leith, Rotterdam or Amsterdam, 3s. 8d. heavy grain, 10,000 qrs. barley 3s. 3d., Hamburg 1½d. extra, January; Buenos Ayres, 4,800, 10 per cent, Barcelona, 23s., December 10-31; 5,300, 10 per cent., Rotterdam, 18s. 10½d., ppt.; Buenos Ayres or La Plata, 9,200, 10 per cent., United Kingdom-Continent, 21s. 9d. o.c., less 6d., February 15-March 15; 5,500, 10 per cent., 21s. 6d. o.c., less 8d., January 10-February 10; Garrucha, 3,600, Rotterdam, 9s. 9d., 800-800, December; Carthagena, 4,200, Middlesbrough, 6s. 9d., end December; 5,500, Dunkirk, 7s. 6d., December; 9,000, Rotterdam, 6s. 9d, f.d, December; Algiers, 8,000, Rotterdam, 5s 7½d, 1,200-1200, December; 3,100, Tyne Dock, 8s. 6d., December 20; South Australia, sail, 37s., United Kingdom-Continent, February-March; 36s.; Christmas Island, 31s. 9d., Fiume; New South Wales, 7s. 9d., Bombay, option Java; time charter, States and West Indies, 7s. 3d., one round trip, delivery North of Hatteras; 4s. 9d, three years, delivery and redelivery United Kingdom-Continent; 6s. 6d., trip up and round trip, delivery Cuba, redelivery States; 7s., one round trip, delivery and redelivery States; Kherson, Nicolaieff or Odessa, 5,500, London or Rotterdam 10s. 9d., Hamburg or Weser 11s., with 3d. extra two loading ports, 3d. less barley, ppt.; Nicolaieff, 7,000, Rotterdam, 9s. 9d. 2,500-2,500, ore, ppt.; 7,000, 8s. 3d., ore, 2,500-2,500, ppt.; Madras Coast, 2,320 net, Marseilles, 35s. 9d, option Marseilles, Dunkirk, Havre, Antwerp, Hamburg, 36s. one port, 37s. two ports discharge, January-February; Calcutta, Rs. 5, Colombo, December-January; Mobile, 1 250 stds., 10 per cent., Buenos Ayres, 180s., February; New York, 3,320 net, four ports Australia, 46s. 3d., January; Galveston, 2,464 net, 160 ft., Liverpool or Bremen 63s. 6d, Havre 66s., December-January; Hornillo Bay, 9,200, Heysham, 6s. 9d., end December; La Goulette, 3,000, Rotterdam, 8s. 7½d, f.t., December; 1,662 net, 8s. 7½d., f.t., December; San Juan, 3,000, Rotterdam, 8s. 3d., December; 1,250, 9s., December; 2,800, 8s, December; Barreiro, 1,600, Calais, 8s. 3d., ppt.; Bilbao, 753 net, Newport, 5s. 9d., ppt.; 4,400, Calais, 7s., ppt.; Porman, 1,130, Rotterdam, 8s. 6d., f.t., December; 1,900, Maryport, 5s., December; time charter, Transatlantic trade, 9s. 3d., one round trip, delivery and redelivery United Kingdom-Continent; 5s., two years, delivery and redelivery United Kingdom-Continent; Australia, 7,800, United Kingdom-Continent, 42s. 6d., with Mediterranean options, December-January; Kohsichang, 2,802 net, United Kingdom-Continent, 33s 9d., February; Gulf timber port, 900 stds., 10 per cent., Holland, one port, and Fleetwood, 132s. 6d, January; Larnes, 2,368 net, Rotterdam, 8s., December; Aden, 2,163 net, Calcutta, Rs. 6, option Chittagong, Rs 8, January-February; Santa Fé, sail, 32s. 6d., United Kingdom-Continent, option Baltic ports, quebracho; Gulf, 21s. 6d, United Kingdom-Continent; 2,350 net, Denmark, basis 22s. one port, net form, December; Sulina, 4,700, Rotterdam 10s. 9d, Antwerp 10s. 6d., option Sulina and Kustendje loading 3d. more, ppt.; Japan, 2,700, Bombay, 11s. 9d, December; Baltimore, 24,000 qrs, 10 per cent, Rotterdam, 3s. 4½d., January 1-25; Limiona, 5,000, Glasgow, 8s. 6d., ppt.; Greece, 5,500, Middlesbrough, 8s. 3d., ppt.; Huelva, 5,000, Rotterdam, 5s. 10½d., Tinto terms, January; North Pacific, sail, 85s, Valparaiso, f.o.

Grimsby Coal Exports.—The exports of coal from Grimsby during the week ended December 6 were:—Nexo, 1,490 tons; Hamburg, 2,056; Dieppe, 1,338; Allinge, 225; Ronne, 970; Malmo, 3,953; Halmstadt, 644; Fredrikshald, 1,278; Drammen, 4,130; Esbjerg, 401; Rotterdam, 752; Antwerp, 483; Christiania, 1,368; Gefle, 1,522; Stockholm, 1,835; Gothenburg, 620; Helsingborg, 1,334; Landscrona, 1,512; Copenhagen, 1,413; Helsingfor, 824; and Solvesborg, 1,246; total, 30,448 tons. In the coastwise traffic, London and Lowestoft took a total of 548 tons.

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Continued from Page 1210.

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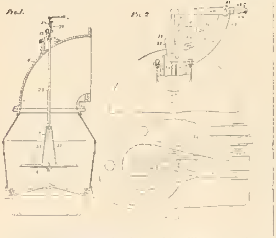
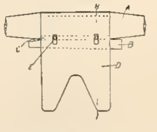
ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

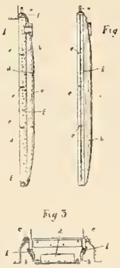
1496 (1912). *Improvements in and relating to Governors for Centrifugal Air-compressors.* The British Thomson-Houston Company Limited, 83, Cannon-street, London, E.C. (A communication from the General Electric Company of Schenectady, Schenectady County, New York, U.S.A.)—This invention relates to mechanism for governing the volume, as distinguished from the pressure, of fluid discharged by a centrifugal air-compressor, and is intended more especially for use where the compressor is employed in blastfurnace work. Mechanism for this purpose is shown in the Patent No. 22447 of 1908, and the present invention relates to the type of float which is disclosed in said patent. The invention has for its object to provide a governing mechanism which is effective not only throughout the so-called normal range of operation of the compressor, but also effective when it is working below said normal range. For this purpose there is provided what may be termed an expanding disc float, having means whereby the effective area of the disc can be enlarged or decreased at will by the attendant. Various means for doing this will suggest themselves, but it is preferable to use two or more sector plates forming an auxiliary disc of larger diameter than the main disc, and provided with mechanism for folding up or opening out said sectors to offer a smaller or greater area of surface to the volume of air flowing through the part of the apparatus where said float is located. The mechanism is so arranged that it can be operated while the machine is running. Fig. 1 is a vertical section of the intake pipe of the air-compressor showing the main and auxiliary disc floats, the latter being expanded to its fullest extent; fig. 2 is an end elevation of the upper portion of the intake shown in fig. 1, illustrating on a larger scale the mechanism for opening and shutting the expanding disc float; fig. 3 is a plan view on a still larger scale of this adjusting mechanism. (Seven claims.)



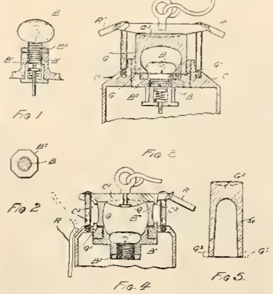
16575 (1912). *A Pick for Mining Purposes.* J. Johnson, 12, Warsop Vale, Mansfield, Notts, and G. Morris, 116, Langwith-road, Shirebrook, Derbyshire.—This invention refers to the class of miners' picks in which the blade is made capable of attachment to and detachment from a holder or socket, in which the handle is so fixed that the blade can be readily removed and replaced by a fresh one by the user of the pit in his ordinary course of working. An arrangement is made by which the blade, after being used and detached from the holder or socket, can be turned over and reattached for use before being replaced by a fresh one. The blade A is recessed along the middle portion of the upper and lower sides, corresponding to the width of the holder D, to a depth the same as the thickness of the material forming the holder D. The blade is also of uniform taper along the upper and lower sides from the ends of the recesses towards the points of the blade. A piece of cast steel or like metal C, corresponding in length, width and thickness to the length, width and depth respectively of the recesses of the blade A, with or without two small projections E on each of its edges which fit into corresponding slots in the sides of the holder, thus allowing an upward or downward motion to the piece C in the holder. The blade A, piece C, and holder D are secured together by means of the wedge B. (One claim.)



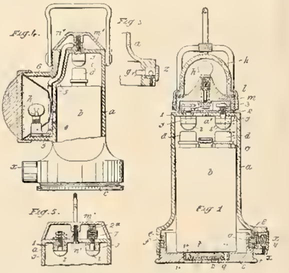
17748 (1912). *Improvements in and relating to Coke-oven Doors.* H. Koppers, of 29, Moltkestrasse, Essen-Ruhr, Germany.—The iron frames of coke-oven doors lined with firebrick are subjected to particularly severe usage, owing to the fact that the part which abuts against the coke chamber and is usually prevented from cooling by the clay seal, is heated to a high degree by conduction and radiation, whereas that side remote from the oven is more or less cooled by the circulating air. These heating effects are rendered more irregular by the door having to be removed from time to time from the oven, so that the whole of it is cooled. According to this invention these deleterious effects are obviated by providing expansion slots in the door frame at suitable intervals apart at those places which are most exposed to the varying effects of the heat—namely, at the side facing the oven chamber, said slots extending into the frame to a certain depth. The arrangement of these slots provides room for the material to expand, thereby preventing warping of the door, and, on the other hand, prevents the occurrence of annular stresses giving rise to fracture at the front part of the frame. The systematic arrangement of regular expansion slots provides a most efficient method of preventing the formation of irregular and consequently unforeseen cracks. The arrangement has the further advantage that the strains set up in casting, when the door is being made, are equalised. By setting back the known wrought iron protectors from the front edge of the door, so that they lie over the inner ends of the expansion slots, the latter are prevented from extending, and the protector itself is prevented from being burnt. One form of the arrangement described is shown in the accompanying drawings, in which fig. 1 is a longitudinal section of the door, fig. 2 a side elevation, and fig. 3 a cross section, the latter being drawn to a larger scale. (Two claims.)



24305 (1911). *Improvements in connection with Miners' Electric Lamps.* E. A. Hailwood, 7, Gladstone-terrace, Morley, near Leeds, Yorkshire.—This invention relates to improvements primarily connected with miners' safety electric lamps, the object being to arrange improved securing and protecting means for electric lamps or bulbs and improved means for projecting the rays of light by outer reflecting surfaces. Fig. 1 shows an electric bulb of the screw type and means for attaching same firmly in its socket. Fig. 2 shows a section with a lock-nut. Fig. 3 shows an electric bulb seated in an improved form of glass protector and lamp frame. Fig. 4 shows a modified form of bulb-protecting means. Fig. 5 represents a detail of a glass. The bulb B is seated in a socket of a glass-holding ring G¹, which is in turn connected to one pole of the accumulator terminal. The glass-holding ring is so arranged that the bulb B is hidden and shielded on all sides by the frame of the lamp so that it is a difficult matter for the bulb to be injured either by a crushing-down force on the lamp or by a pick or other implement, this construction being shown in figs. 3 and 4. The light may be transmitted in any desired direction by convex or concave lenses and fixed and/or movable reflectors such as R. These reflectors may be adjustable as to their angle. The sides C of the lamp case are by preference shaped or sloped off as shown to allow of the maximum rays being directed in any desired direction, and these sloped sides may be silvered or otherwise treated to act as reflecting surfaces. The outer protecting glass G (figs. 3 and 5) is preferably formed like an inverted tumbler having thick tube-like sides and a solid top G² having an externally square edge or flat surface to form a good bed against the upper portion of the lamp flame, the glass at this point being of much thicker section than the side walls, and where openings are provided in the top of the lamp frame, the glass will act as a self-contained lens, and if desired such glass may be shaped as shown by dotted lines in figs. 3 and 5. The glass may, if desired, be flanged as shown at G³ (fig. 5). The glass may be arranged to surround one or more bulbs. When the upper part of the glass is made convex or concave, such glass may be silvered to any convenient extent in order to further assist in throwing out the rays of light. In order to still further reduce the possibility of the glass encountering blows from a pick or other implement, and to give increased strength to the glass, the glass is so reduced as only just to pass over the electric bulb and make same of very stout section. To prevent a crushing force from injuring the bulb the aforesaid improved glass or stout side glasses G (fig. 4) of the cylindrical type may be employed, and the bulb B seated very low in a preferably shaped casing and form the top of the frame somewhat bowed as shown at C¹, and the arrangement being such that, should the outer glass be crushed and the top pressed down, the top portion will not reach the electric bulb when the same rests on the lower glass-holding ring. Flanges C² may be provided to assist in this purpose or the bowed portion C¹ may be reversed or domed as shown by dotted lines in fig. 4. This bowed or domed portion may be silvered or otherwise treated to act as a reflector. (Nine claims.)



24787 (1911). *Improvements in Miners' Electric Safety Lamps.* O. Oldham, of Hyde-road, Denton, near Manchester, Lancashire.—This invention relates to miners' electric safety lamps. The object is to provide a lamp in which a screwed bottom cap of improved construction is provided for raising a battery into contact with the terminals of the lamp bulb or to withdraw it therefrom at will; in which improved locking means are provided for preventing the cap being totally removed without interfering with its turning movements; in which means are provided whereby tampering with the lamp bulb and contacts is prevented; and in which the lamp is of improved general construction. Fig. 1 shows a sectional elevational view of a miners' safety hand lamp constructed according to the invention; fig. 3 is a sectional detail view of a modification; fig. 4 is a partly sectional elevational view showing the invention applied to another form of hand lamp; and fig. 5 is a detail sectional view on a plane at right angles to fig. 4. Contact between the battery terminals *d d* and those projecting inwardly through the top of the casing is made or broken by screwing or unscrewing the cap *c*. The annular screwed flange of the cap *c* terminates in an annular rim or thickening *e e* of buttress section, behind which is an annular groove *f* for the reception of a magnetic or other lock bolt *g* arranged in the lower end of the casing *a* so that, although the cap is free to be screwed up or lowered to light the lamp *h* or to put it out at will, yet it cannot be removed from the casing in an unauthorised manner. The terminal *i* is insulated from the casing by being passed through an insulating bush 1, and the terminal *i*¹ is provided at its upper end with a spring 2. When the cap *c* is screwed up and the terminals of the battery pressed against the terminals *i i*¹, the top 3 of the terminal *i*¹ is pressed against the inside face of the threaded extension or cover *m* and electric contact made between the terminal, the spring 2, the cover *m* and the lamp *h*. The glass or dome *k* is fixed in position in a self-contained frame or cage *l* which screws upon the threaded extension or cover *m* secured on top of the lamp case *a* by means of screws *a*¹, and it is adapted to be locked in position by means of the enlarged end *n* of a screw bolt screwing through the lamp case, which bolt can only be operated from the inside of said lamp case. The bottom of the cage *l* is formed with one or more holes or recesses in which the end *n* may engage. The screwed bolt is of such a length and size that when the lampman has occasion to renew a bulb *h* or glass *k*, should he forget to lock the frame or cage *l*, the fact will be brought to his notice when putting in the accumulator *b*, because the



BRUSSELS EXHIBITION: "GRAND PRIX." ALLAHABAD, 1910.
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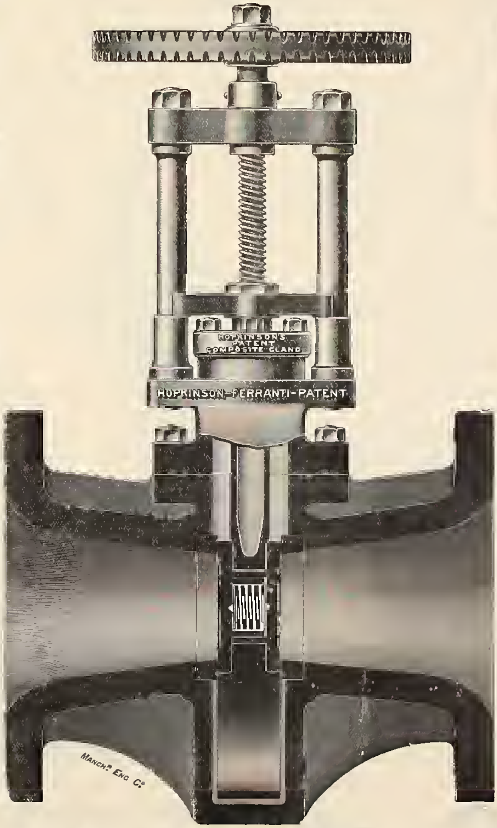

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head *o* of the screwed bolt, not being in the locking position and low down as shown by dotted lines in fig. 1, will not allow the accumulator to be properly inserted in the case to make contact to light the lamp. The threaded extension *m* on the top of the lamp case is arranged to carry the electric incandescent lamp *h*, and is adapted to enclose the top ends of the aforesaid terminals *i* i^1 on the top of the lamp case and the necessary connections to the said lamp, and is so fixed that even if the outer glass *k* surrounding the lamp be broken or completely shattered, the connections are still enclosed and cannot be tampered with. The gas which is generated by the accumulator *b* may be allowed to escape to the outside of the lamp case through one or more holes *p* in the bottom or sides of the case, such holes being covered by standard safety lamp gauze *q*. A pad *t* is provided on the bottom of the cap *c*, the function of which is to absorb any moisture which may come out with the gas from the accumulator *b*, and this is secured in place within an annular metal ring *u* which retains the sheet of gauze *q* in position. The ring *u* is perforated at *v v* and undercut at *w* on its inner or lower face to provide a free passage for the gas through the gauze *q* and hole *p* to the atmosphere. The bolt proper *g* of the magnetic lock shown in fig. 1 is recessed on the inner face of its enlarged head, as is also the cover *x* closing the recess in which it works. The object of this is to enable a strong and long spring *y* to be used in the confined space, and yet have the inner face of the bolt *g* and the inner face of the cover *x* only the distance apart of the travel of the bolt, and of large area, thus enabling the long strong spring to be used and so making the locking bolt more certain in its action. The cover *x* is secured in position by means of a set pin or screw x^1. If desired, and as shown in fig. 3, a simple non-magnetic bolt g^1 may be used so that when it is in the locked position it can be kept there by passing a lead plug through holes *s* in it and in the portion of the lamp case *a* in which it moves. (Five claims.)

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19330. Wet carbonising of peat and the like. Rigby and Testrup.
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23360. Turbine pumps. Kilburn.

PUBLICATIONS RECEIVED.

ELECTRICAL ENGINEERING FOR MECHANICAL AND MINING ENGINEERS. By H. J. S. Heather. 1912. London: "Electrician" Printing and Publishing Company Limited. Price 9s. net.

GOB FIRES, &c., MET WITH IN COALMINES. By Arthur Brealey. Doncaster: Chronicle Printing and Publishing Company Limited. Price 1s.

"The Geological Magazine" (Vol. 9, No. 12), December, price 2s.; "The Journal of the Chemical, Metallurgical and Mining Society of South Africa" (Vol. 13, No. 4), October, price 3s.; "Bulletin of the British Chamber of Commerce for Italy" (Vol. 3, No. 6), November; "Printers' Ink" (Vol. 4, No. 118), December, price 6d.; "Transactions of the Mining Institute of Scotland" (Vol. 35, Part 1); "The I. C. S. Student" (Vol. 4, No. 12), December, price 2d.

South Staffordshire and Warwickshire Institute of Mining Engineers.—A meeting will be held at the University, Edmund-street, Birmingham, on Monday afternoon, December 16, at 3 p.m., when Prof. J. Cadman, D.Sc., will deliver his presidential address.

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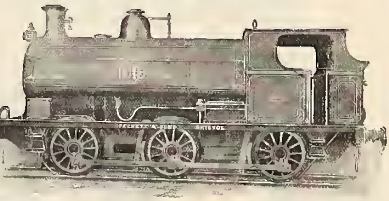

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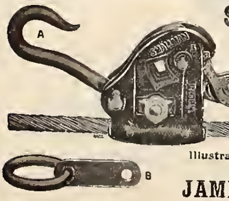

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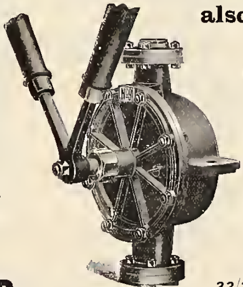

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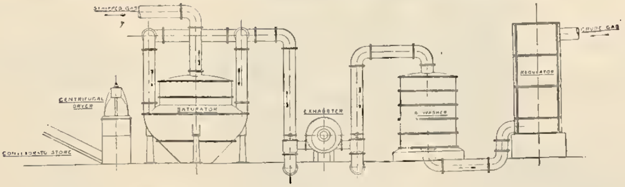

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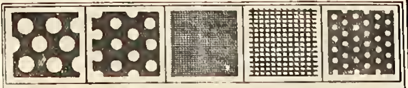

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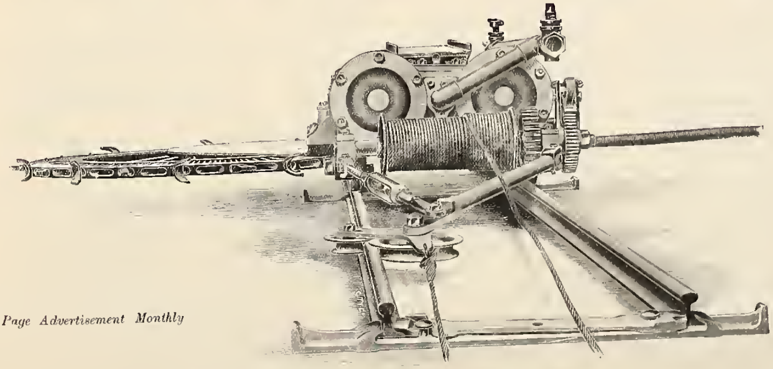

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Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Improved Coal Mining Co., Sacriston, nr. Durham
Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
Leech, Goodall & Co., Hunslet, Leeds
Mather and Platt Ld., Manchester
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Primus Patents Co., Falcon-street, Oldham
Reddaway, F., & Co. Ld., Pendleton, Manchester
Sheppard and Sons Ld., Bridgend, South Wales
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts.
Sutcliffe, H., Horbury, near Wakefield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, near Leicester
Yorkshire Engine Co. Ld., Sheffield
Wright, Joseph, and Co., Tipton

Corner Plates
Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lewis, Wm., and Son, Bilston, Staffs.
Thoedam, E. C., Ld., Dudley

Cotton Waste, Twine, and Spun-yarn
Mudford, J. H., & Sons, 55, Exchange-st., Sheffield

Couplings
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Jardine, John, Deering-street, Nottingham
Thoedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton

Crab Winches
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Hyland-street Works, Birmingham

Crane Makers
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Middleton, Robert, Sheepscar Foundry, Leeds
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

Cranes
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Appleby, E. G., and Co., 10, Victoria-street, Westminster
Bleichert, Adolf, & Co., 99-100, Palmerston House, Bishopsgate-street Within, London, 60, E.C.
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Hyland-street Works, Birmingham

Creepers
Tickle Bros., Vulcan Ironworks, Wigan

Cut-off Gear
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Thornewill and Warham Ld., Burton-on-Trent
Wood, John, and Sons Ld., Wigan

Detonators
British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Dies, Embossing Presses, and Seals
Pryor, Edward, and Son, 68, West-st., Sheffield

Disintegrators
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Middleton, Robert, Sheepscar Foundry, Leeds
Simon-Carves Ld., 20, Mount-street, Manchester
Yeadon, Son and Co., Albion-place, Leeds

Diving Apparatus
Pulsometer Engineering Co. Ld., Reading
Siebe, Gorman and Co. Ld., Westminster S.W.

Dog Spikes
Frost, Albert, and Co., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Renton, D. M., & Co., Midland Works, Sheffield

Double Helical Gear (Machine Cut)
Brown, David, and Sons (H'fi'd) Ld., Huddersfield
Citroen, Andre, and Co., 27 Queen Victoria-street, London

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Appleton and Howard, St. Helens, Lancs.
Hopkinson, J., and Co. Ld., Huddersfield

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Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

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Davis, John, and Son (Derby) Ld., Derby
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Bridge, David, & Co. Ld., Castleton, Manchester
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Bailey, W. H., and Co. Ld., Salford, Manchester
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Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Evans, Joseph, and Sons Ld., Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Pearn, F., and Co. Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

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Baker, John, and Son, Bilston, Staffs
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Lewis, Wm., and Son, Bilston
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Wood, John, & Sons Ld., Brook Foundry, Wigan
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Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
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Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

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Thoedam, E. C., Ld., Dudley

Emery Wheels

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Engineers (Consulting)
Entreprise Générale de Fonçage de Puits, 5, Rue de Surêne, Paris
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Radford, H. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

Engines (Blowing)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Gas-Compressing)
British Oxygen Co. Ld., Elverton-st., Westminster
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Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Hauling and Winding)
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Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
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Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
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Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Longbotham, H. H., and Co. Ld., Wakefield
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Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

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Lancaster and Tonge Ld., Pendleton, Manchester
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Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)
Mather and Platt Ld., Manchester

Engine Merchants
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Stringer, John, and Son, Blackburn

Engines (Oil)
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Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping) (See Pumps)

Engines (Rolling Mill)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.

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Belliss and Morcom Ld., Birmingham
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Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
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Fans (Air Propeller)
Alldays & Onions Pneumatic Engineering Co. Ld. Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
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Fans (Exhaust)
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Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating)
Alldays & Onions Pneumatic Engineering Co. Ld, Birmingham
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., and Co., Lewisham, London, S.E.
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
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Royles Ld., Irlam, Manchester
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Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Ferro-Concrete Constructions
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Thoedam, E. C., Ld., Dudley
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Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
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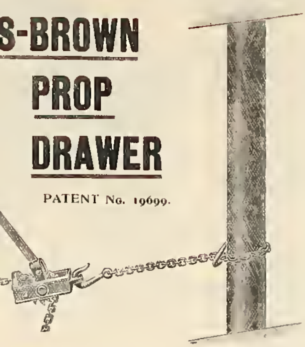

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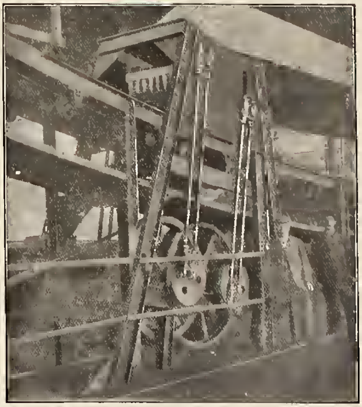

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gan) Ld., Wigan
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Co., Tipton

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Royles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley
Treasure, J. S., & Co., 8 & 12, Vauxhall-rd., L'pool

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Theedam, E. C., Ld., Dudley

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Lancaster and Tonge Ld., Pendleton, Manchester
Leech, Goodall & Co., Hunslet, Leeds
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

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Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
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Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

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Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon-st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 303½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Leech, Goodall & Co., Hunslet, Leeds
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, R., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Younge, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Heading Machines
Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield

Heapsteads
Coulson, M., & Co. Ld., Spennymoor, Co. Durham
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Longbotham, R. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Plowright Bros. Ld., Chesterfield
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hoists
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Bleichert, A., and Co., 89-100, Palmerston House, Bishopsgate-street Within, 60, E.C.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Younge, Ryland-street Works, Birmingham

Hooks or Links (Safety)
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-street, S.W.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Ormerod, Edward, Atherton, near Manchester
Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton, Staffs.

Hoppers
Baker, John, and Son, Bilston, Staffs
Coulson, M., and Co. Ld., Spennymoor
Harvey, G. A., and Co., Leampit Vale, Lewisham
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds

Hoppers—continued
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Theedam, E. C., Ld., Dudley
Wright, Joseph, and Co., Tipton
Yorkshire Hennebique Contracting Co. Ld., Leeds

Hose
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld., Sheffield
Northern Rubber Co., The Wicker, Sheffield
Norton's (Tividale) Ld., Tipton
Roddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Hose (Coal-Cutter)
Northern Rubber Co., The Wicker, Sheffield

Humidifiers
Heenan & Froude Ld., Worcester and Manchester
Mather and Platt Ld., Manchester

Hydro Electric Plants
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Hydraulic Machinery
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hathorn, Davey and Co. Ld., Leeds
Leech, Goodall & Co., Hunslet, Leeds
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co., Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
Younge, Ryland-street Works, Birmingham

Hydraulic Reducing Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow

Hydrometers
Davis, John, and Son (Derby) Ld., Derby

Incline Rollers
Bagnall, W. G., Ld., Stafford
Leech, Goodall & Co., Hunslet, Leeds
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

Indiarubber Goods
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Northern Rubber Co., The Wicker, Sheffield
Roddaway, F., & Co. Ld., Pendleton, Manchester

Indicators (Steam Engine)
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Green and Boulding Ld., 28, New Bridge-st., E.C.
Yorkshire Boiler Co. Ld., Bradford, Yorks

Induced Draught Fans
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan & Froude Ld., Worcester and Manchester
Yorkshire Boiler Co. Ld., Bradford, Yorks

Injectors and Ejectors
Bailey, W. H., and Co. Ld., Salford, Manchester
Green & Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Pulsometer Engineering Co. Ld., Reading
Willcox, W. H., & Co. Ld., Southwark-st., S.E.

Instruction (Postal)
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

Instruments
Davis, John, and Son (Derby) Ld., Derby
Thornton, A. G., Ld., King-st. West, Manchester

Iron and Brass Founders
Bridge, David, & Co. Ld., Castleton, Manchester
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
Royles Ld., Irlam, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

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BIRMINGHAM	Saltley Works.
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MANCHESTER	Great Marlborough Street.
SHEFFIELD	Celtic Works, Savile Street.
NEWCASTLE-ON-TYNE...	Boyd Street.
GLASGOW ..	Rosehill Works, Polmadie.

Purchasers' Guide to Advertisers' Specialities—(continued).

Iron and Steel
Chorley Railway Wagon Co. Ld., Chorley Lancs.
Farnley Iron Co. Ld., Leeds
Firth, Wm., Ld., Water-lane, Leeds
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Bradford, Yorks.
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Henry, Market Place-buildings, Sheffield

Jacks (Hydraulic)
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Jigs
Ormerod, Edward, Atherton, near Manchester

Jim Crows
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Hardy Patent Pick Co. Ld., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Benton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley
Youngs, Ryland-street Works, Birmingham

Jointing Cement
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent
Theedam, E. C., Ld., Dudley

Jointing (Sheet)
Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Joists (Rolled Steel)
Heenan and Froude Ld., Worcester
Benton, B. M., & Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

Keps (for Winding Cages)
Tickle Bros., Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Lamp Cleaning Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Gauze Brushes
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Glasses
Ackroyd and Best Ld., Morley, near Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Oil Filling Machines
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamp Re-Lighting Apparatus (Underground)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Arc)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Haslam and Schontheil Ld., Cardiff
Theedam, E. C., Ld., Dudley

Lamps (Electric)
Ackroyd and Best Ld., Morley, nr. Leeds
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Jardine, John, Deering-street, Nottingham
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Thomas, E., and Williams Ld., Aberdare

Lamps (Electric Safety)
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Jacobson, Richard, 70, Shoe-lane, E.C.
Mining Engineering Co. Ld. (The), Sheffield
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Miners' Safety)
Ackroyd and Best Ld., Morley, nr. Leeds
Davis, John, and Son (Derby) Ld., Derby
Theedam, E. C., Ld., Dudley
Thomas, E., and Williams Ld., Aberdare
Wolf Safety Lamp Co. Ld., 37, York-place, Leeds

Lamps (Outdoor)
Ackroyd and Best Ld., Morley, nr. Leeds
Theedam, E. C., Ld., Dudley

Lathes
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tangyes Ld., Cornwall Works, Birmingham

Leather Appliances

Lessons by Post
Southern, T. A., Universal Mining School, Cardiff
Thomas, Wm., Cambrian Mining School, Glanffrwd, Porth, Glam.

Lifting and Hoisting Tackle
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Benton, B. M., and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

Lightning Conductors
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
Davis, John, and Son (Derby) Ld., Derby
Furse, W. J., Traffic-street, Nottingham
Shaw, John, Ld., Sheffield
Theedam, E. C., Ld., Dudley

Locknut Washers
Benton, B. M., and Co., Sheffield

Loose Collars
Bridge, David, & Co. Ld., Castleton, Manchester
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Trier Bros., Caxton House, Westminster S.W.

Lubricators
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Royles Ld., Irlam, Manchester
Tangyes Ld., Cornwall Works, Birmingham
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., Liverpool
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Machinery (Second-hand)
Bute Works Supply Co. Ld., Cardiff
Foot, H. G., & Co., 11, Queen Victoria-st., E.C.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Phillips, C. D., Newport, Mon
Benton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

Machine Tools
Foot, H. G., & Co., 11, Queen Victoria-street, E.C
Phillips, C. D., Newport, Mon.
Stringer, John, and Son, Blackburn
Tangyes Ld., Cornwall Works, Birmingham

Mathematical Instruments
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavem't, London, E.C.
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C
Thornton, A. G., Ld., King-st. West, Manchester

Mechanical Stokers
Bennis, Ed., and Co. Ld., Little Hulton, Bolton

Metal Perforators
Barns, W., & Son, Queensland-road, Holloway, N
Harvey, G. A., and Co., Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Lührig Coal and Ore-dressing Appliances Ld., 32, Victoria-street, S.W.

Metallic Packing
United States Metallic Packing Co. Ld., Soho Works, Bradford

Meteorological Instruments
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Mills (Grinding)
Bradley & Craven Ld., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Stringer, John, and Son, Dept. 11, Blackburn
Thompson and Southwick Ld., Tamworth
Wootton Bros. Ld., Coalville, near Leicester

Mining Dials
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C
Thornton, A. G., Ld., King-st. West, Manchester

Mining Machinery
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Hardy Patent Pick Co. Ld., Sheffield
Hurd Coal-Cutter and Engineering Co. Ld., 188 St. Vincent-street, Glasgow
Mining Engineering Co. Ld. (The), Sheffield
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Sutcliffe, Richard, Horbury, near Wakefield
Davis, John, and Son (Derby) Ld., Derby
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Wright, Joseph, and Co., Tipton

Mining Tools
Davis, John, and Son (Derby) Ld., Derby
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

Motors
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Sutcliffe, Richard, Horbury, near Wakefield
Talbot Clement Ld., Barlby-rd., Ladbroke Grove, London, W.
Theedam, E. C., Ld., Dudley

Motor Starters
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Motor Vans and Wagons
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Alley and MacLellan Ld., Polmadie, Glasgow
Avonside Engine Co. Ld., Bristol
Foot, H. G., & Co., 11, Queen Victoria-street, E.C.

Nails, Spikes, &c.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Firth, William, Ld., Leeds
Frost, Albert, and Co., Howard-street, Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Benton, B. M., and Co., Midland Works, Sheffield

Office Furniture and Appliances
Glover, M., and Co., Holbeck-lane, Leeds
Thornton, A. G., Ld., King-st. West, Manchester

Oil Bottles
Baker, John, and Son, Bilston, Staffs
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Cabinets
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Oil Switches
British Westinghouse Electric and Manufacturing Co. Ld., Manchester

Oils and Lubricants
Ackroyd and Best Ld., Morley, nr. Leeds
Asbestos and General Paint Co. Ld., Birmingham
Gaunt and Hickman, Oil Works, Wolverhampton
Trier Bros., Caxton House, Westminster, S.W.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.
Willcox, W. H., & Co. Ld., 23, Southwark-st., E.C.

Overhead Travellers
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Spencer and Co. Ld., Melksham, Wilts
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Overwinding Gear
Barclay, Andrew, Sons and Co. Ld., Kilmarnock,
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Heenan & Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W.
King, H. J. H., and Co. Ld., Nailsworth, Glos.
Leech, Goodall & Co., Hunslet, Leeds
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Oxygen Manufacturers
British Oxygen Co. Ld., Elverton-st., Westminster
Knowles Oxygen Co. Ld., Wolverhampton

Packing (Engine)
Cort, Arthur, & Co., 303½, Camberwell-rd., London
Green and Boulding Ld., London, E.C.
Lancaster and Tonge Ld., Pendleton, Manchester
Mudford, J. H., & Sons, 55, Exchange-st., Sheffield
Northern Rubber Co., The Wicker, Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
United States Metallic Packing Co. Ld., Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E

Paint
Asbestos and General Paint Co. Ld., Birmingham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Kalbitum Paint Co. Ld., Belvedere, Kent
Wailes, Dove, & Co. Ld., Newcastle-on-Tyne

Paint (Fireproof)
Asbestos and General Paint Co. Ld., Birmingham
Kalbitum Paint Co. Ld., Belvedere, Kent

Patent Agents
Harris & Mills, 34 & 35, High Holborn, London
Radford, H. H., Son, and Squire, Sheffield

Pedestals
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.

Perforated Plates
Barns, W., & Son, Queensland-rd., Holloway, N.
Firth, William, Ld., Leeds
Harvey, G. A., & Co., Loampit Vale, Lewisham, S.E.
Hudson, Thomas, Ld., Coatbridge, N.B.
Norton's (Tividale) Ld., Tipton
Theedam, E. C., Ld., Dudley

Picks and Shovels
Baker, John, and Son, Bilston, Staffs
Fell, C. A., Dronfield, near Sheffield
Frost, Albert, and Co., Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Benton, B. M., and Co., Midland Works, Sheffield
Theedam, E. C., Ld., Dudley

Pinions
Cort, Arthur & Co., 303½, Camberwell-rd., London

Pinions (Raw Hide and Paper)
Bridge, David, & Co. Ld., Castleton, Manchester
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan

Pipe Joint Paste
Hopkinson, J., and Co. Ld., Huddersfield
Theedam, E. C., Ld., Dudley

Pipes (Steam and Water)
British Mannesmann Tube Co. Ld., London Wall
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Isca Foundry Co., Newport, Mon.
Lewis, Edwin, and Sons, Wolverhampton
Pulsometer Engineering Co. Ld., Reading
Russell, John, & Co. Ld., Alma Tube Wks., Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Nile-st., Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

Pistons
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

Piston Springs
Mather and Platt Ld., Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

Pit Props (Steel)
British Mannesmann Tube Co. Ld., Salisbury House, London Wall, E.C.
Bute Works Supply Co. Ld., Bute Docks, Cardiff
Firth, William, Ld., Leeds
Heenan & Froude Ld., Worcester
Henderson and Glass, Liverpool
Lewis, Edwin, and Sons, Wolverhampton
Benton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Spencer, John, Ld., Globe Tube Works, Wednesbury
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
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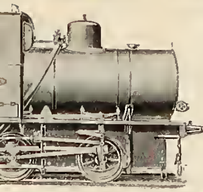

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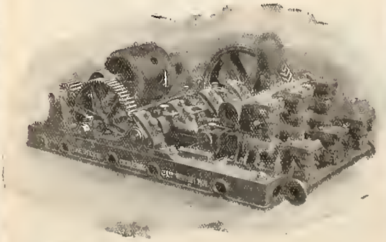

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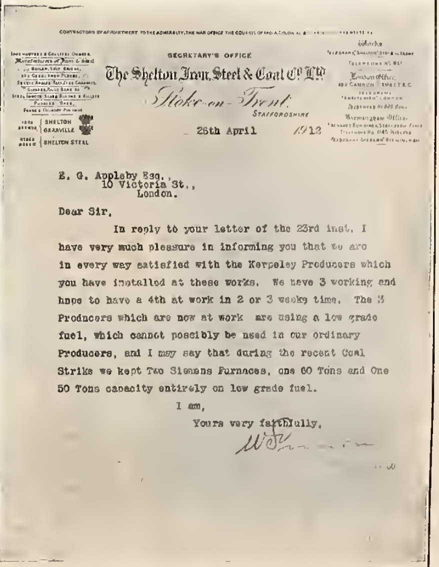

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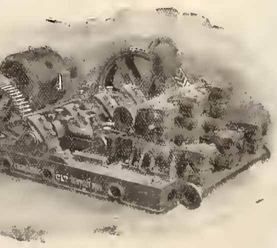

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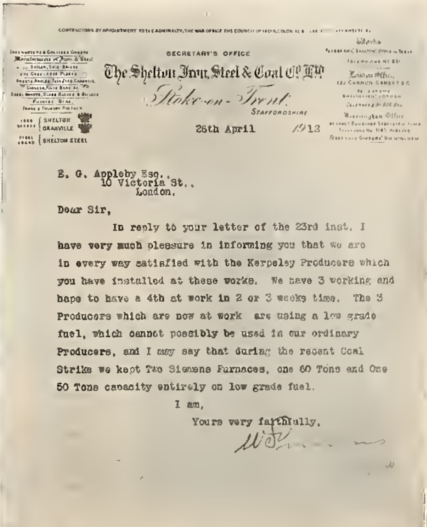

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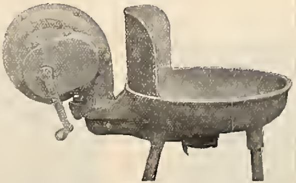

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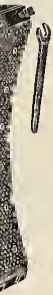

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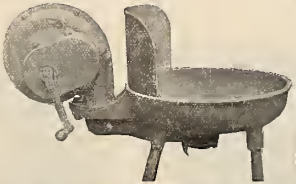

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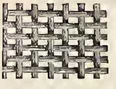

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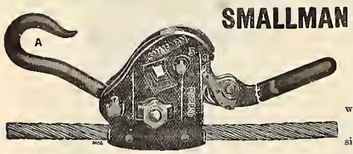

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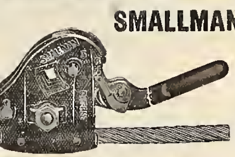

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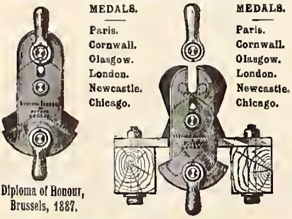
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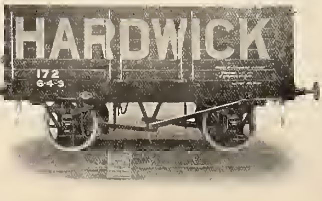

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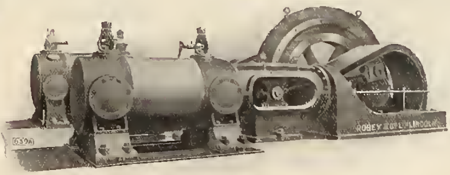

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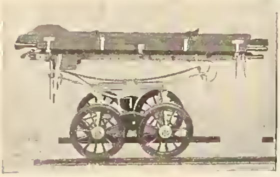

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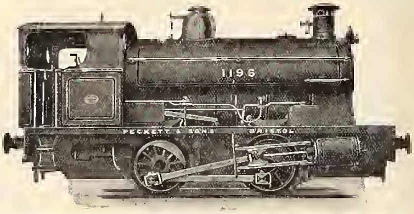

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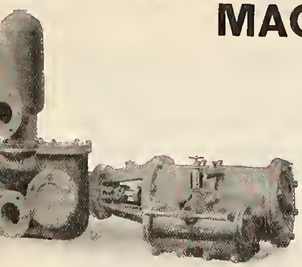

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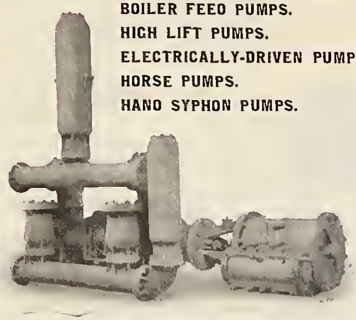

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ITS CAUSES AND PREVENTION,
3y T. LISTER LLEWELLYN, M.D., B.S.(Lond.), &c., &c.
With a Preface by Professor J. S. HALDANE, F.R.S., M.D.,
egal Appendix by DOUGLAS KNOCKER, M.B. (Lond.), M.R.C.S., L.R.C.P., D.P.H., Barrister-at-Law.

CONTENTS.

Introduction — Description of the Eye — Anatomy: Physiology.
Chapter 1.—General Description of the Disease.
Chapter 2.—Frequency and Resulting Incapacity.
Chapter 3.—Historical Account of the Disease and Theories of its Causation.
Chapters 4, 5 and 6.—Conditions Determining the Occurrence of Nystagmus.
Chapter 7.—Diagnosis and Prognosis.
Chapter 8.—The Etiology of Nystagmus.
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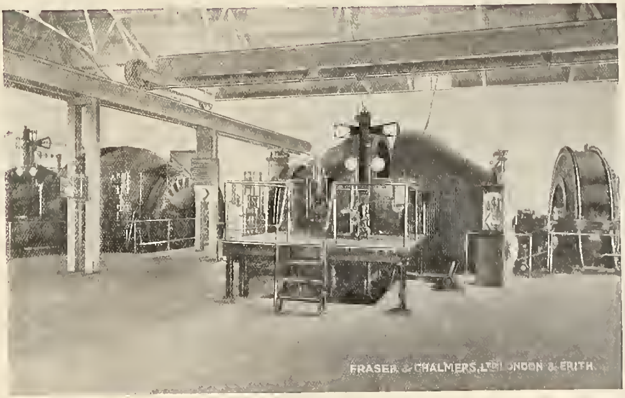

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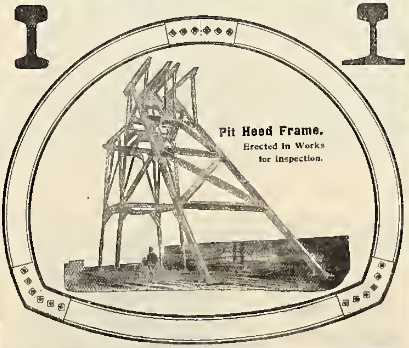
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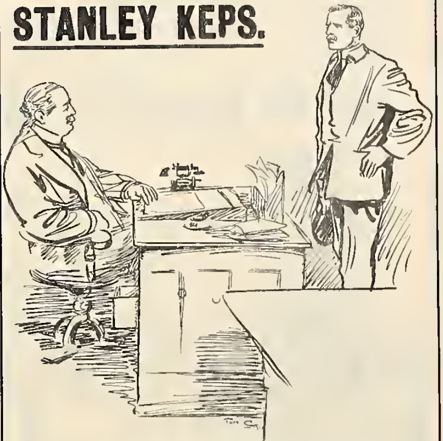

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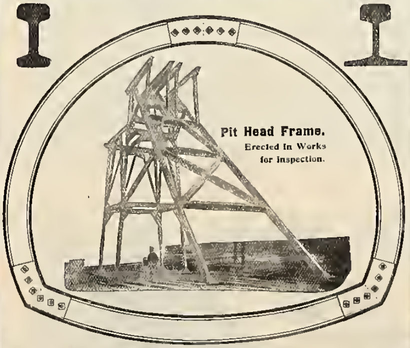
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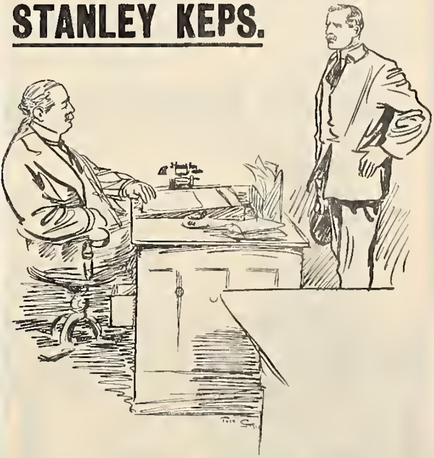

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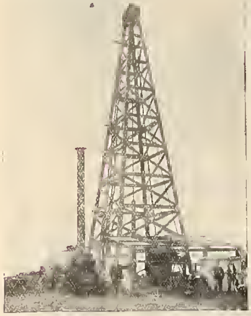

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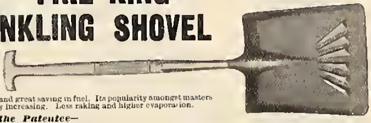

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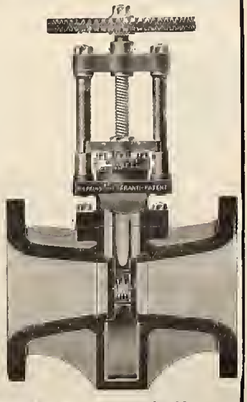

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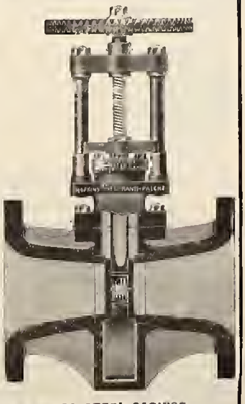

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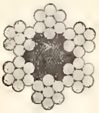
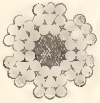
Fig. 2. HAULING.



Lang's Lay Ropes.

Fig. 20. WINDING.

Fig. 1. HAULING.



Patent Flattened Strand Ropes.

Fig. 4. WINDING.

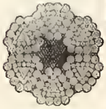
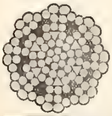


Fig. 13a. SINKING.



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3. Spliced easily and more effectively.
4. Less tendency to twist and stretch in working.

Fig. 13a for Sinking and Fig. 11b for Cranes, &c., are non-twisting.

Fig. 11b. CRANE, &c

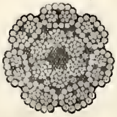

Fig. 15a.

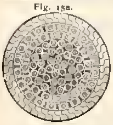

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Fig. 20.

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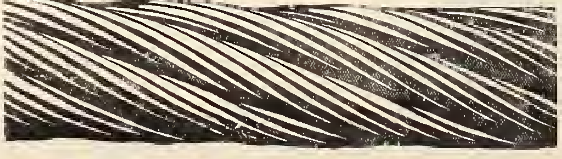

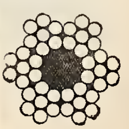

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s John Bowen Cooke, M.Inst.C.E.

and North-Western Railway Company
ected, at their large locomotive running-
, a plant that bids fair to inaugurate a
ransfer of coal from railway wagon to
er. By means of the new plant the coal
omatically from the wagon, conveyed to
overhead bunkers, and measured and
nder without spadework of any descrip-
t was made by Messrs. Babcock and
he joint design of the author and that

which careful consideration had to be

rate at which coal is now dealt with by

sibility of obtaining reliable statistics of
for British requirements.
size of coal mined in England.
nd size of coal wagons in use.
cted area available in most steam shed

r and adequate supply of coal between
am shed.
ost of land for extensions and alterations

cticability of one plant capable of dealing
th coal between—(i.) wagon and tender;
stack; (iii.) stack and wagon or tender.
local conditions existing at steam sheds

outlay necessary for installing a plant.
working various plants.
kage of coal.
e sixth point it is found that, in those
long distances separate collieries from
ôts, it is absolutely necessary to keep
coal on hand, to carry over delays or
stacks really represent a combination
stock coal, and the conditions render it
tal mechanical means of readily taking
down the coal. It is, therefore, not
United States to see huge conical heaps
lt up or removed by Dodge conveyors. In
ver, such appliances are not necessary.
oximity of the coalfields to places where
nd the facilities for rapid and regular
pit and steam shed. The coal in England
its way direct from the colliery wagon to
tender, at a cost for handling of, say,
ton, and with consequently diminished
s customary in England also for large
ies to put into stock considerable quanti-
"emergency rations," to render them
immune from the disastrous possible
some sudden upheaval in the coal trade;
the same necessity for taking up and
ontinually, and it is no uncommon thing
ks once down, remaining untouched for
ars.
conditions it will readily be seen that.
echanical handling of stock coal is of
and it is safe to say that there are very
ich coal is stored in one stack so close to
e as to permit of a plant dealing with
current coal. All coal as it arrives from
ht certainly be put into stock, and all
e coaled therefrom; but examination of
ends to the conclusion that this is not a
position.
to point No. 8, the various known existing
of dealing economically with all the
tioned will limit the choice to one or two types, where the stock is not required to exceed, say, 3,000 tons. In cases where this tonnage is exceeded there is also a choice of two, and where storage space is a consideration, only one. In case (i.) the two types are—

(*a*) One adopted by certain railways abroad, in which the handling of stock and current coal by gravity bucket, or conveyor, is combined.

(*b*) Some form of power-driven crane and grab bucket.

With plants of type (*a*) the stock rarely exceeds 3,000 tons, and is stored in bunkers, either underground and immediately under the coaling stage, or above ground and forming part of the coaling stage. In the latter case the coal is delivered from the wagons into storage bunkers, and, when required for use, is transferred thence to the coal pocket for supply by gravitation to the locomotive. The coal placed in stock is thus handled no less than six times between the colliery and locomotive tender, with consequent breakage at each stage. It has been argued that, owing to coal deteriorating when left in stock out of doors for several years, it is more economical to handle it in this manner; but actual experiments have shown that a hard Yorkshire coal, after being in stock out of doors for 11 years, had only deteriorated 2·5 per cent.—equivalent to a loss in value of 4·8d. per ton, or, in the case of a 30,000-ton stack, £54 10s. per annum. With a soft Blaenavon coal the deterioration after seven years was 2 per cent.—equivalent to a loss in value of 3·6d. per ton, or, in the case of a 30,000-ton stack, £64 5s. per annum. Further, at nearly all depôts in England where the annual consumption is sufficient to warrant the installation of mechanical handling, the stock coal greatly exceeds 3,000 tons; so that this type of plant appears to be undesirable.

Regarding type (*b*), a grab bucket is limited in size by the receptacle from which it picks its load. The maximum size which can be usefully worked is about 44 cubic feet, or 1 ton, and even this leaves little margin for steering between the sides of the wagon. Again, much of the efficiency of a grab bucket depends on the drop it gets into the material; and when this material frequently consists of large lumps of coal carried in a wooden truck which is particularly liable to damage, the efficiency of the grab is reduced in an excessive degree.

In case (ii.), where the stock exceeds 30,000 tons choice can be made between the bowstring-girder type of conveyor and the crane and grab bucket. In the former a bowstring girder is set up at an angle corresponding with the angle of repose of the coal. It carries a conveyor, and the lower end of the girder swivels round the upper. By this means the coal is raised and deposited in the form of a large conical heap, sometimes 200 ft. in diameter. Where this arrangement is installed, it is apparently used only for handling coal much smaller than that generally mined in Great Britain, and therefore, in the author's opinion, it is not suitable for British conditions. It would entail considerable alterations in most yards to obtain sufficient space in which to work.

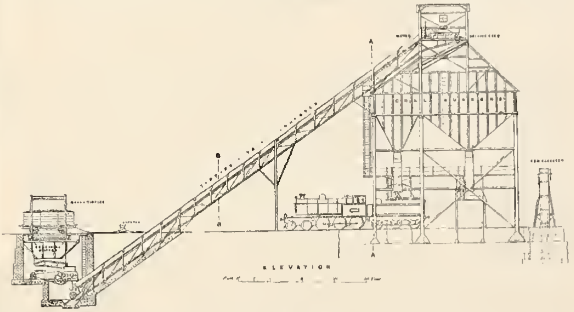
To the crane and grab-bucket type the remarks made in the last case apply equally, save that, when lifting from stock, that type proves more efficient by reason of the bucket obtaining a better load at each grab.

In case (iii.) the crane and grab-bucket type appears to be the only one available, and further comment is unnecessary.

The foregoing consideration leads to the conclusion that, so far as Great Britain is concerned, the existing types of apparatus, capable of putting coal from wagon to stock, stock to wagon or tender, and wagon to tender are not suitable, owing to the peculiar conditions.

With regard to point No. 10, consideration of seven different types of plant shows that a suitable one could not be erected for less than £5,000 to £6,000 capital expenditure. Further, that where electric current is available at about 1d. per unit, the total cost per ton of coal when handling 140,000 tons per annum would be about 2d. per ton, including interest on capital, depreciation, maintenance, and working charges. The following powerful inducements, however, should be considered:—A mechanical plant occupying less ground than an old-fashioned coaling stage can deal with about double the quantity of coal per annum. There is an economical advantage in coaling as many engines as possible at a point adjacent to the collieries, and in the shortest possible time. The question of rapidity of coaling is also important. A mechanical plant will empty and release wagons in probably less than half the time required at present, thereby increasing their earning capacity, and at the same time tending to a reduction in shunting in the shed yard.

It has been stated, on the authority of results of actual experiments in America, that "each per cent. added to the slack means a reduction in earning capacity of the locomotive of about 1d. per ton of coal fired, besides an average loss of unburned fuel itself of another ½d. per ton for every 1 per cent. of slack." This should emphasise the desirability of handling coal in such a manner that the minimum quantity of slack will be formed. Mechanical plants should therefore be designed with a view of dropping the coal as few times as possible between wagon and tender, minimising the



Elevation of Coal Handling Plant at Crewe.

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paper read before the Institution of Civil
mber 26, 1912.

height of fall, sliding the coal where possible, and delivering it in such a size that no additional breaking by the fireman is required.

The plant at Crewe, which is shown in the accompanying figure, consists of a wagon-tipper, an underground hopper, a coal-breaker, a tipping-tray conveyor, an elevated bunker, and shoots—including calibrating chambers—for discharging the coal on to the tenders.

The tippler is constructed of mild-steel rolled sections, the rings being 12 ft. in internal diameter and well braced. Sufficient balance weights are provided to enable it to be revolved easily with an empty or full wagon. It is driven by a 660-volt, direct current electric motor of 5-horse power, which, acting through a train of wheels, drives two friction wheels and so revolves the tippler. It is capable of emptying a wagon in about 5 minutes, inclusive of the time taken to cramp down and release the wagon, when attended by two men. To enable various sizes to be dealt with as rapidly as possible, short lengths of chain are provided, with suitable links engaging with the shackle hooks of the tippler cramping bars in order to save time in screwing up and down when securing and releasing the wagon. The cramping bars are provided with feet, to keep the bars clear of the heaped-up coal and save "trimming." An inclined baffle plate fixed to the tippler rings, in conjunction with the fixed plate of the hopper, serves to retain the bulk of the coal in the wagon until it is nearly in its lowest position, and thus tends to minimise breakage.

The hopper—of mild steel plates and angles—holds about 20 tons, and is carried by cross girders in a brick-lined pit. The coal is fed from this hopper by a jigging tray through an adjustable door—worked from ground level—into a two-roll breaker, where the large lumps are reduced to 8 in. cube. This breaker is belt-driven by an independent direct-current electric motor of 10-horse power, which also operates the jigging tray. The coal passes, with the large lumps broken, through the breaker to the conveyor trays, which carry it to the overhead storage. At the back of the jigging tray is fitted a shoot which delivers any powdered coal that tends to work out between the bottom of the hopper and the jigging tray. This is collected in a sack fixed to the shoot, and is used for foundry purposes.

The conveyor is of the well-known Babcock-Wilcox "tipping tray" type, running at a speed of 70 ft. per minute and capable of lifting about 60 tons per hour. All coal is delivered over the end of the conveyor track; but in order to prevent any breakage at this point a special form of balance plate retains it on the trays until the return journey, when it has only a fall of about 1 ft. on to the inclined shoot which delivers it to the requisite division of the bunker.

The bunkers were designed to hold 300 tons. The bunker is divided into two main parts, so as to store 100 tons of Welsh and 200 tons of "hard" coal, with the floors, of course, built to suit. Working on the large-bunker principle necessitates special arrangements to break the fall from the delivery shoot to the bottom of the bunker, when the latter is fairly empty in the mornings. This is done by special baffle-plates in the case of the "hard" coal, and by spiral shoots in the case of the Welsh coal. There is an outlet on each side of each division of the bunker, or four outlets in all, so that tenders can be coaled on both sides at the same time. By opening one of the doors coal is permitted to flow into a calibrating chamber formed in the shoot between bunker and tender. The bottom end of this chamber is closed by a door, worked by a lever conveniently situated, and it is so arranged that the contents of the calibrating chamber are equal to 10 cwt. The lower doors have adjustable hinges, which allow the capacity of the calibrating chamber to be varied until the best average is arrived at.

In conjuction with the coaling plant, an ash conveyor has been installed close to the coal bunkers for dealing with the firebox ashes of locomotives.

At present between 140 and 150 engines are coaled per 24 hours, and the coal can be placed on the tenders at the rate of 2 tons per minute; but the rate at which engines pass through the coaling plant is governed by factors other than the rate at which coal can actually be put on the tenders, and, so far as speed of coaling is concerned, there is a large margin of time in reserve.

Grimsby Coal Exports.—The amount of coal exported from Grimsby during the week ended December 12 showed a considerable reduction on the previous week, a total of not more than 16,480 tons being shipped, in comparison with 30,996. The official returns showed the ports and shipments to be:—Christiania, 3,547 tons; Genoa, 2,323; Helsingborg, 2,260; Hamburg, 1,181; Aalborg, 1,676; Malmo, 1,203; Gothenburg, 375; Landscrona, 149; Dieppe, 912; Rotterdam 889; Skien, 580; Antwerp, 339; and Esbjerg, 422; total, 15,856 foreign. London, 113; Whitstable, 262; Yarmouth, 195; Brancaster, 60; total, 630 tons coastal.

MANCHESTER GEOLOGICAL AND MINING SOCIETY.

The Hydraulic Stowing of Goaves.

The following is a report of the discussion on the paper on "The Relation between Subsidence and Packing, with Special Reference to the Hydraulic Stowing of Goaves" read by Mr. George Knox, at the meeting of the above society, held at Manchester on December 10, 1912. (*Colliery Guardian*, December 13, 1912, p. 1195).

The President (Sir Thomas Holland), after expressing the society's thanks to Mr. Knox, said the subject was one for practical miners to consider. Next to the saving of the men's lives nothing was so important as the conservation of the mineral resources—a question that one had often heard discussed, which had been preached about many a time, but it all came down to the commercial problem as to whether in present circumstances it was worth while to do it or not. For they naturally had to consider that the present shareholders were not those who were likely to follow in the distant future. The question was always rubbed into them—he thought quite rightly—that the minerals underlying us, once destroyed, were destroyed for ever, and that there was no fertiliser in the world for a worn-out mine. Two very interesting abstracts recently appeared in the society's *Transactions* from papers referring to sand filling in metalliferous mines. One was by Mr. Sturm, in which he referred to various parts of the world and pointed out that in Western Australia sand filling had been in operation for 14 years; that it had passed the experimental stage and had shown its great advantage in underground work generally. Mr. Pam also had written on this subject of sand filling, and had summarised the points enumerated by Mr. Knox, as to the increased safety of the miners, the greater security of the mine workings, and the improved ventilation, and the removal of dumpy heaps from the surface, which was a very important matter in dry countries, where they were a danger to health as well as unsightly. No doubt the conclusion would be the usual British one, that the system was doubtless all that was claimed for it, but that they would like others to try it first.

Mr. Leonard Fletcher (Leigh), said if he had any fault to find it would be that he thought Mr. Knox had hardly gone into sufficient detail, for the method was one that had not been tried in this country as yet, and therefore he thought Mr. Knox might have given them some of the details which had been omitted. In considering this subject, they had to look at it, first of all, as a matter of feasibility, and put the cost on one side. No doubt working costs were in their minds. There was a good deal of doubt about its being a practicable scheme. Then Mr. Knox referred to "thick" seams. It was desirable to know what was meant by a thick seam. Some seams were 5 or 7 feet in thickness. Some people would call them thick, others would call them rather thin. In the ordinary rendering of the term, he supposed that seams of 20 ft. or over would be meant. There was another thing Mr. Knox dealt with, and that was the question of surface subsidences. He took it that if they were stowing their mines in that way, packing them very well, the better the mine was packed the larger the pillars they would have to leave under large and important buildings, in respect of which they would not care to have the responsibility for any "draw" at all. For it would seem that with the best hydraulic packing there was some subsidence, and the "draw" from the packing extended to a greater distance than from inferior packing, or no packing at all. He desired also to ask Mr. Knox what his opinion would be in regard to hydraulic packing in mines with seams 4 or 5 feet thick. Of course, there were many points one wanted to have cleared up, and amongst them was this—what about the high workings of a mine, for they wanted packing as well as the deep ones? As a rule, in Lancashire, where they had royalties, they looked for cheapness of haulage and tried to use the force of gravity as much as possible. As regards the cost he must take the figures Mr. Knox had given them. Mr. Knox quoted the cost of packing material as from 6d. to 1s. a ton, but there was one little detail he would like to have explained, where he said "the cost may become as high as 10d. to 1s. per ton—about 3d. per ton higher than for hand packing, but the difference is made up in the saving effected in the timber required." It sounded very nice, but it seemed to him the difference must be more than 3d. between hand packing and hydraulic stowing, for they had this dirt to deal with. They would have to send it to the surface and that would cost money.

Mr. Percy Lee Wood said it seemed to him most important to know the system in detail. Personally, he had thought a good deal about hydraulic packing lately, but must say the experience he had had of injecting sand and cement, and cement alone, in cavities behind cast iron tubing, in shafts and other cavities, had made him and others think there was a very considerable difficulty in getting this sand along pipes, and he would like to know how these difficulties were got over. In the experience they had had of trying to inject sand into pipes, they found that where there was a right angle bend they got the pipe closed up in a very short time. They had to clean the pipes each time or the experiment was a failure. Afterwards they injected pure cement into those spaces and that was quite successful. He could not help thinking that Mr. Knox was rather optimistic as to this system of hydraulic packing. He (Mr. Wood) had not the slightest doubt that it was an admirable thing where it could be carried out. As to subsidences he took it there was nothing that could keep a roof up as much as this hydraulic stowing. With regard to the presence of water, he thought it was a most serious thing to introduce a considerable quantity of water into their hot mines. Mr. Knox was understood to say that the water would lower the temperature of the mine. How could that be? The water, one presumed, would go into the mine at something like 60 degrees, and that would cool the atmosphere, it was said. Well, he very much doubted it, for if you took the pipes a considerable distance into the workings, by the time the water came out in the hot atmosphere it would be practically of the same heat as the mine itself. They all knew of many hot mines and of men who could work quite comfortably for a time in a hot atmosphere; but once introduce moisture, apart from the bad effect on the roof and main roads, and they added to the burden of the men.

Mr. J. D. Paton (Manchester), after mentioning some things associated with packing, said that, in the matter of sand and material, he would suggest that they have a trial of this thing. At some pits there were quantities of sand which the owners would be glad to see taken away, and even to pay men for so doing. There was sand also which made excellent bricks, being mixed with iron refuse and slag. It was very sad to see the effect of subsidences in the neighbourhood of Wigan, where great tracts of land were now under water on that account. When he remembered the amount of money spent by the Government on investigations of causes of explosions which were very often the direct result of inefficient packing, he desired to propose that the Government should appoint a Commission to investigate this process commended by Mr. Knox.

Mr. John Livesey (Bolton), said they were not going to prevent subsidence, in his opinion, by pumping or passing down some slimy substance from an old pit mound that was like puddle after it had been lying decomposing for years. They would have to put something underground to prevent subsidence that would have a bit of grit and some strength in it. No doubt where there was good hand packing they could extract a large amount of coal.

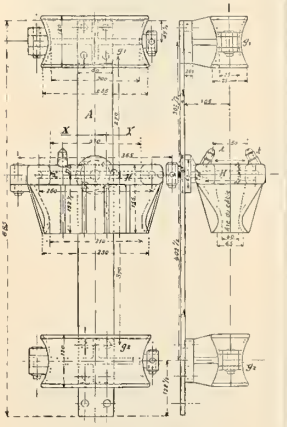
Mr. Geo. B. Harrison, H.M.I.M., said he saw that Mr. Knox called attention to his presidential address, and said he had to confess, in that address, that even with systematic timbering the number of accidents from this cause—falls of roof—for the period which had elapsed since the special rules were established was practically identical with those in force at the time when the rules came into operation. If they took five or ten years before systematic timbering came into force they got no difference in the number of accidents from this one cause, but at the same time, he gave tables showing that there had been a great deal of improvement in the death-rate from falls of roof. So that the statement that there had been practically no improvement in the periods mentioned needed a little qualification. They might be getting down to the time when an owner might be standing to be shot at for surface damage. He saw that in one case a north of England firm of coalowners had had to pay £100,000 at one shot. That sort of thing was going to cause a great deal of difficulty, and if stowing would prevent the trouble it would be an acceptable thing. More money was often spent in repairing the effects of gob fires than was involved in this system of hydraulic stowing. If, then, one saw some practical way of stowing, even in cases where surface subsidence did not matter much, there was no doubt it would be well considered, and probably tried on an experimental scale.

Mr. Noah Williams (lecturer in mining at the Manchester University) said he did not think the use of water in packing processes at great depths would cause trouble, for they were being carried on in mines in South Africa at a great depth.

Mr. Knox, in his reply, said he had thought a description of a plant or principle involved in hydraulic packing unnecessary, because, in the course of the last nine or ten years they had had from ten to twelve papers describing them. The principle was simple enough, and he had thought it was well understood. The difficulty was to get rid of the prejudice which people had in their minds, because it was some Continental thing. The plan had been tried at a colliery in Scotland, and it worked satisfactorily. He recognised the difficulty of defining a thick seam. It was a very loose term, but when the longwall method could be applied to a seam the chances of getting at all the coal became more remote as the thickness of the seam increased. As to the question of subsidence and draw, and leaving in of large pillars, he might say that in Germany and Belgium, where this system was very largely adopted, they never thought of leaving the pillars in at all; that was a great advantage of the system. The system was in vogue at Essen, where Krupp's great engineering works were situated, and the coal was got under heavy works, factories, and a railway station. The pillars were taken out, and no harm was done, although at Krupp's works they had the heaviest machinery in the world.

THE CLEANING AND GREASING OF WINDING ROPES.

A Belgian inspector of mines describes an appliance for the cleaning and greasing of winding ropes at the Monceau-Fontaine collieries. It is mounted on a carriage which runs on a platform erected at the top of the shaft for this purpose when the rope is to be greased. The chief parts of the appliance are: a receptacle for holding the rope grease, and adapted to be heated by a steam coil; and a pillar A, on which are secured two rope guides g^1, g^2, and a small greaser H, fitted with 12 pipes *t*, through which the lubricant is projected in thin jets against the rope. The grease is forced from the main receptacle into H by compressed air, which expels it through the pipes *t*. Before coming within the sphere of action of the greaser, the rope is cleaned by the scrubbing action of two short lengths of steel rope clamped between jaws secured to the carriage, the ends of these ropes being frayed out. To ensure proper cleaning, the rope should be passed between the brushes about four times, and is then lubricated by two passes through the greaser. The lubricant used is a mixture of vegetable tar and cylinder oil. Good results are obtained, provided the greaser be kept clean, particular attention being needed to see that none of the pipes gets clogged up.



Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, December 10, 1912, is as follows:—Amsterdam, 742 tons; Antwerp, 911; Alexandria, 4,199; Buenos Ayres, 1,254; Burgstaaken, 309; Bremen, 1,521; Christiania, 1,233; Copenhagen, 617; Drontheim, 99; Guernsey, 462; Ghent, 996; Hamburg, 7,803; Harlingen, 1,421; Harburg, 4,490; Konigsberg, 3,020; Langesund, 120; Libau, 1,769; Malmo, 1,303; Naples, 335; Rouen, 3,181; Rotterdam, 9,368; Reval, 996; Riga, 6,249; Stettin, 1,103; Victoria, 50; Ymuiden, 3,202; Ystad, 979; total, 57,732 tons. Corresponding period last year, 62,924 tons.

MINING INSTITUTE OF SCOTLAND.

A general meeting of the Mining Institute of Scotland was held on Saturday last in the rooms of the Institution of Engineers and Shipbuilders, 39, Elmbank-crescent, Glasgow. Mr. James Hamilton, Glasgow, the president of the institute, was in the chair. The chairman at the outset apologised for the absence of the secretary, Mr. James Barrowman, Hamilton. He explained that the latter gentleman had been ill for some little time, and his medical adviser had refused to allow him to attend the meeting.

The following gentlemen were thereafter admitted to the membership of the institute:—Messrs. Isaac Young, under-manager, Earl Wemyss; Robert Gibb, mine manager, Mid Calder; Alex. Hamilton, junior, deputy general manager, the Bacares Iron Ore Company Limited, Seron, Province de Almeria, Spain; Wm. Barr, coalmaster, Machanhill, Larkhall; Henry H. Potts, mining engineer, Edinburgh; and Jas. L. Webster, assistant mining engineer, 31, Camphill-street, Queen's Park, Glasgow.

Facts and Theories Relating to Fans.

Mr. D. M. Mowat having briefly replied to the points raised by certain of the members on his paper "Facts and Theories Relating to Fans," the discussion was closed and the author thanked for his contribution.

The Use of Old Wire Ropes in Timbering Roadways.

Discussion was thereafter resumed on the paper contributed by Mr. John McLuckie, Dalserf, on "The Use of Old Wire Ropes in Timbering Roadways."

Mr. John Gibson, Musselburgh, in the course of a written communication, said that as he had experimented extensively with old ropes he looked forward with great interest to the production of Mr. McLuckie's paper, and he regretted to have to express his disappointment with it. He quite agreed that roads in very shallow workings were difficult to maintain, and that, therefore, the author had a most suitable subject for his experiments. He also agreed that this system of timbering, applied with intelligence and close supervision, was profitable, but with the exception of the notching of the crown, which he also discovered to be advantageous, no practical hint was given in the paper with regard to the application and use of the system.

The discussion, which was taken part in by Messrs. Brand (Twechar), Kirkpatrick (Uddingston), Dron (Glasgow), and the Author, was ultimately closed.

Testing for Firedamp and Blackdamp by Means of a Safety Lamp.

The President said it had been the intention of the committee who had been appointed by the institute to make investigations and experiment as to the utility of the appliance described by Mr. Henry Briggs, Heriot-Watt College, Edinburgh, in his paper "Testing for Firedamp and Blackdamp by Means of a Safety Lamp," to have submitted their report to the members that afternoon. The committee, however, had come to the conclusion that it would be desirable for various reasons to continue their examination of the question and report at a later stage.

Mr. George Hunter, Tinto View, Lanark, in a communicated statement, said that in the Brigg's loop they had a wonderful rediscovery of an ancient method of testing for firedamp. While the older arrangement might be more crude, it was to all intents and purposes the same. For many years it had been the recognised method of testing for firedamp in many mining districts, but it had been discarded some time ago. It seemed to him that the reason for discarding it must have been that they found in the mine there were so many factors which crept in rendering the results obtained unreliable, and this was exactly the conclusion which Prof. Latham, of Glasgow University, and himself (Mr. Hunter) had come to after their experiments. It seemed to him that in order to get satisfactory results with the loop they required a standard lamp filled with standard oil, fitted with a standard loop, and operated by a standard operator in a standard atmosphere. Hitherto neither Prof. Latham nor himself had said anything about the results obtained with higher percentages. At the higher percentages they certainly did get elongated caps, but when compared with those obtained on the lower flame, the intensity of luminosity was considerably diminished—so much so, that a fireman who could see 2 per cent. on a 2½ per cent. cap with the lowered flame, might miss it altogether when the method advocated by Mr. Briggs was adopted.

Prof. Latham, Glasgow, said he observed a statement in the *Transactions* where Mr. Briggs said that he (the professor) had fallen into a very grave error in using impure colza oil in his experiments. He denied that he had used impure colza oil, because he knew, as a matter of fact, that it was pure colza oil. Then, again, Mr. Briggs further said that "the members of the institute had had an opportunity prior to the meeting of seeing the loop used with the oil as supplied to Glasgow University." He might in this connection just say that Mr. Briggs never wrote to him, or to anyone connected with the University of Glasgow, asking what oil they used or from whom they purchased it. He (the speaker) was prepared to submit a sample of the oil used in Glasgow University, provided Mr. Briggs would likewise produce a sample of the oil purchased from the merchant said to be supplying Glasgow University. If the oil tendered by Mr. Briggs was found to be the same as his (Prof. Latham's) he would forfeit a sum to any charity that the president might name provided the author of the paper, if proved to be wrong, would do the same.

Mr. Robert McLaren, H.M. inspector of mines, said he had recently an opportunity of seeing some experiments with the appliance described by Mr. Briggs, carried through by Prof. Burns in the Royal Technical College, Glasgow. He was not just prepared to say what his views were at this stage, because he thought there would be time enough to do so when the committee appointed by the institute submitted the results of their enquiries and experiments. One remark, however, which he did wish to make was that it was one thing to carry through an experiment in a laboratory, but it was quite a different thing to conduct the same experiment in a mine. They would certainly find that there was a difference in the gas caps found in the laboratory as compared with those got in the mine. In the whole circumstances, he thought it would be well if they as experts would endeavour to ascertain how far they were justified in accepting caps on the surface as compared with caps underground. The controversy which had been carried on by Prof. Latham and Mr. Briggs might now quite well cease. A great deal that had been stated might have been left unsaid until at least the committee appointed by the institute had presented their report.

Mr. R. W. Dron, Glasgow, said he would like to endorse the remarks made by Mr. McLaren.

At this stage further discussion on the paper was adjourned pending the report of the committee appointed by the institute.

Annual Dinner.

The first annual dinner under the auspices of the institute was held on Saturday evening, December 7, in the Windsor Hotel, Glasgow. Mr. James Hamilton, president, occupied the chair, and the croupiers were Messrs. James Bain, Wm. McCreath, Wm. Smith, and W. Thorneycroft. Upwards of 150 gentlemen were present, the company including the Right Hon. the Lord Provost of Glasgow (Mr. D. M. Stevenson), Mr. George A. Mitchell, Mr. J. T. Forgie, Mr. E. Hall Brown, president of the Institution of Engineers and Shipbuilders, Mr. Walter Dixon, president of the West of Scotland Iron and Steel Institute, Mr. Wm. McWhirter, president of the Institution of Electrical Engineers, Dr. R. T. Moore, Prof. Gregory, Prof. Latham, Mr. Edward H. Parker, secretary of the Institution of Engineers and Shipbuilders, Mr. Robert McLaren, H.M. inspector of mines, Mr. D. M. Mowat, and Mr. J. Balfour Sneddon.

The usual loyal toasts were given from the chair and duly honoured. Thereafter Mr. G. A. Mitchell proposed "The City of Glasgow," coupled with the name of Lord Provost Stevenson. The latter, in the course of his reply, said that the Scottish coalfields were now known all over Europe and South America. These coalfields took a very high rank indeed, and the exports to these countries was one of the great assets of the industry. In acknowledging the toast of "The Mining Institute of Scotland," proposed by Mr. E. Hall Brown, the chairman referred to the origin of the institute, and reminded the company that they had a long list of eminent men as presidents. Reference had been made to the dangers of mining, but it was significant that the history of the institute coincided with a very marked improvement in that respect. The loss of life in 1877 per million tons of coal raised was about eight per annum. At the present time the rate was only about 4·6. It was very creditable, he thought, to the scientific institutes of this country that they had devoted their attention to such an extent to educational affairs.

Other toasts were "Kindred Institutions," proposed by Dr. R. T. Moore and acknowledged by Mr. Walter Dixon, and "The Mineral Industries of Scotland," submitted by Prof. Gregory and replied to by Mr. J. T. Forgie.

Before the Common Sergeant, at the Central Criminal Court, on the 12th inst., the trial was concluded of Andrew Lincoln Jackson, 53, described as an engineer, of South-place, Finsbury, E.C., who had pleaded not guilty to an indictment charging him with obtaining money by false pretences. The accused promoted the Kent Outcrop Coal Syndicate, and Mr. W. T. Fremlin, of Maidstone, guaranteed a banking account of £1,500. The prosecution alleged that the defendant drew on that account for his private purposes. Prisoner was found guilty, and sentenced to eighteen months' hard labour.

WILLCOX-PENBERTHY DRAINER.

A simple but efficient apparatus has just been placed on the market by Messrs. W. H. Willcox and Co. Limited, of Southwark-street, London, S.E., which is particularly adapted for use in pits, sumps, tanks, settling ponds, and other receptacles in which it is desired to keep water from rising above a certain level. The appliance, which is shown in fig. 1—fig. 2 being a section—comprises a water-pressure ejector of high capacity, automatically operated by a float-controlled, quick-opening and closing valve. This valve is never partially opened, and allows the ejector to give its greatest efficiency by working at full pressure. The float arms are slotted where they connect to the valve lever, thus preventing the ejector from operating until the water has raised the float up to the highest point, and, as the water is ejected, they travel down the length of these slots before the weight of the float affects the valve.

The drainer is very compact. The float, instead of being round, is flat on the top, and pace has been economised by building the float around the suction pipe. This feature has the added advantage of rigidity, and overcomes all the trouble of the common loose float. The balance of the drainer is built directly above the float. This not only keeps the whole machine in as small a space as possible, but also keeps all working parts, with the exception of strainer and float, above the water, thus preventing corrosion or the exterior parts becoming clogged up by deposits of slime, dirt, or sediment. The interior parts are prevented from coming into contact with any foreign particles by a strainer, which is so constructed that instead of the water being drawn directly upward, it is taken in at the sides, allowing all sediment to collect under the strainer without being disturbed by the force of the suction. A foot valve is also provided inside the strainer, which closes the instant the drainer ceases operating, holding all water in the pipes, all primed for starting instantly at the next filling of the sump.

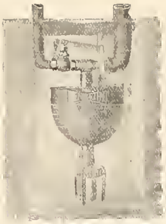


Fig. 1.—Willcox-Penberthy Drainer.

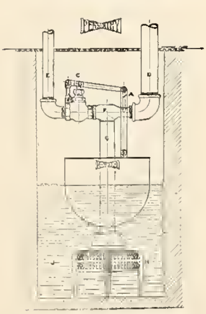


Fig. 2.—Section of Drainer.

These drainers, which are constructed of bronze metal, with the exception of the copper float, are made in six sizes, and operate at pressures of from 15 lb. to 80 lb. The largest size will discharge, at the last-named pressure, 1,500 gallons of water per hour to a height of 3 ft., or 520 gallons per hour to a height of 18 ft. The firm, however, will supply to order drainers for higher pressures and lifts.

The Penberthy ejector, which has been largely employed for gas and air exhausting and charging centrifugal pumps, &c., is used in connection with these drainers.

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A general meeting of the members of this institute was held at the University, Birmingham, on December 16, the President (Dr. J. Cadman) in the chair. There was a large attendance of members.

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Presidential Address.

The President then read his presidential address, of which the following is an abstract:—

I propose to create a somewhat unusual precedent in refraining from adopting the time-honoured custom of reviewing generally the progress of the science of mining during the past year, and to substitute a short paper on a subject of considerable importance at the present moment. Before reading my paper, however, I should like to explain why I have followed this course, and to very briefly refer to one or two matters which are worthy of your attention in the near future.

At the outset I felt inclined to venture upon a reflection of the possible effects for good or evil that might be the outcome of the new Mines Bill; but I ventured to peruse an address given to this institution shortly after the passing of the Mines Bill of 1872, and I was struck with the force with which the president pointed out the severity of that Act, and the almost impossible condition it contained. Such a state of mind exists amongst many of us at the present moment with regard to the 1911 Act; and as I am inclined to think that history will repeat itself, and that in due course we shall view the recent legislation in a different light, I have refrained from addressing you on the topic.

To all students of the Act, however, one potent feature is clearly brought to light—viz., that the responsibilities of the manager have been enormously increased, and, in order to shoulder this responsibility, the colliery manager of the future must possess more than a smattering of science. The school of bitter experience cannot entirely train him to fulfil the duties which he is to be called upon to follow. It has been stated that "a mine manager, like a master mariner, is made only by a long and often painful practical apprenticeship, and that the University life of freedom makes a serious inroad on the unrelenting force of discipline which is essential for every man responsible for the lives of his subordinates, and that the mine manager should be trained in the mine, supplemented by evening classes." Such a statement cannot be too strongly refuted. As an institution, you have always urged the necessity of opportunity being afforded to your sons and young men entering your profession to obtain a university training in the general principles of science underlying the science of mining. You have in no sense fostered competition between university and technical evening classes. Indeed, the scheme which you are largely responsible for has placed each educational body in its proper place, with the most cordial relations existing between them—the one indispensable to the other in the ladder of education.

I should like to allude to a growing requirement which all colliery engineers must, in my opinion, sooner or later turn their attention to—namely, the production of a smokeless fuel for household and manufacturing purposes, with the conversion of the volatile products into liquid fuel. Liquid fuel is required for modern engineering developments. The internal combustion engine already points to the relegation of the steam boiler to the museum, whilst social development points its finger at the volumes of solid matter and wasted energy belching forth from every chimney, whether factory or dwelling. At the same time, mining engineers are realising that in order to produce coal at a price which will permit the colliery to exist, necessitates a price being placed upon the fuel in its crude state, which is in reality beyond its real value. Unless a new field of application is developed which will move the balance from its state of equilibrium in a more favourable direction, an unfortunate collapse is inevitable. The public outcry for liquid fuel, and the reformers movement for smoke abatement, suggests the application of a process by which coal may be treated at the mine, so as to produce a suitable fuel which will burn freely and without smoke, and which will turn out a residue of liquid fuel, from which oil of various characteristics may be fractionated; at the same time permitting great economy in the colliery power consumption. Already much good research has been accomplished in this direction, and it is not unreasonable to expect that a process will be evolved, if not already with us, that will permit the carbonising of coal under conditions of low temperature, which will convert a crude fuel barely being worked at a profit to-day into products which the civilised world is about to demand, and at the same time retaining to the coalmining industry lucrative investment for British capital.

Rescue Appliances of the Injector Type.

Dr. Cadman then read a paper on "Mine Rescue Appliances: a Danger Occurring in the Use of an Apparatus in which an Injector is Employed." He said:

Since the general introduction of self-contained breathing appliances into mines, a number of serious accidents have occurred which have called attention to the dangers attendant on the use of such apparatus. The accidents at Felling, Cadeby, Caeduke, Bellevue, and a number in the United States, all point to the necessity for a very searching enquiry into the design and application of these appliances. Although a carefully prepared general scheme of training is laid down in a Home Office Order, the type of apparatus to be employed is left to the selection of the mineowner. As the number of manufacturers of such appliances is few, the owner must perforce make his choice from apparatus in many respects admittedly clumsy and imperfect.

The coalowners of the South Midlands conducted a long series of experiments with a view to selecting an efficient and safe apparatus, and the results of the research brought about considerable improvement in nearly all the types then in existence; and although legislation to enforce the universal application was inevitable—and indeed desirable—it seems unfortunate that a little more time was not given to permit a more thorough investigation of the subject.

The writer wishes to draw attention to a serious defect in design which has been very clearly disclosed by the recent accident at Caeduke, near Swansea. In this case an examination of the apparatus revealed that the absorbent cartridge was punctured by two small holes, and that two of the tube connections were leaking, and that such leaks were capable of permitting the atmosphere containing carbon monoxide to get into the apparatus. When leakage allows the foul atmosphere to penetrate into the breathing circuit, it must be admitted that such a design is imperfect.

In some of the apparatus at present in use, an injector is introduced into the breathing circuit with the object of promoting circulation and keeping the air supply cool and refreshing. The injector certainly brings about the desired effect, but in doing so it converts the apparatus into two zones of different pressure. On one side of the injector a positive pressure is obtained, and on the other side a negative pressure. It is in the negative pressure zone that leakage from outside the apparatus to the inside may occur. The following experiments have been made with different types of compressed oxygen apparatus to demonstrate this point:—

Apparatus.	Pressure in absorbent chamber in inches of water. (Subject at rest.)	Pressure in absorbent chamber in inches of water. (Subject working.)	Maximum negative pressure near back of injector in inches of water.
"Draeger," new type single cylinder (mouthpiece)	0·2 to −0·6	+0·2 to −0·6	−2·65
Old type, twin cylinder (helmet)	−0·2	+0·1 to −0·3	—
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It will thus be seen that the apparatus in which the injector is used has a negative pressure within the absorbent cartridge, and within certain parts of the circulation tubes, sufficient to allow extensive leakage to occur, if punctures or leaky joints are present.

In order to ascertain how far leaking may occur, a further series of experiments were made upon a small orifice such as a small puncture, or a leaky joint. Results:—

Pressure in inches of water.	Volume of gas leaking in litres per minute. Orifice size 0·07 in. dia.
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During the life of any apparatus permitting a negative pressure to exist in the circulating tubes, leakage of a dangerous character—either due to accident or wear and tear—may occur, and, as has just been demonstrated, a very small aperture will permit volumes of considerable extent to be sucked into such an apparatus.

It is interesting to note how far such leakages may become dangerous. In ordinary practice in galleries, where smoke is employed, leakage may produce no symptoms of discomfort, because the solid matter in the smoke—the CO_2 and sulphur fumes—may all be absorbed by the absorbent cartridge, and there remains sufficient oxygen in the pungent atmosphere to produce no ill effect. Further, the atmosphere in the practice gallery does not as a rule contain any carbon monoxide. An apparatus, then, possessing a serious leak, may be passed as perfectly sound in the practice gallery as usually employed for training.

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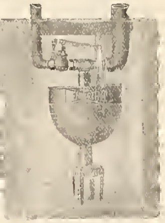

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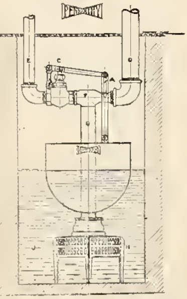

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Mr. S. L. **Thacker** said he had always been of the opinion that the forcible introduction of breathing apparatus and other rescue arrangements resulted very largely from what one might call panic legislation, which was, to some extent, forced upon the Home Office by a non-technical public opinion and a non-technical Press. The paper they had had that day, he hoped, would have attention widely drawn to it. So far the dangers of the apparatus were almost equal to the dangers which it was sought to avert. It was evident that a very heavy responsibility rested upon the man who had to decide when and where the rescue apparatus should be used in the mine. He thought that perhaps the good effect of the organisation of rescue brigades, at any rate in the Midland districts, was more in the direction of discipline in the mine and the additional impetus which might be given to rescue work, and especially in the direction of organisation among the officials themselves.

The **President** said that Mr. Sopwith and Mr. Johnstone hit the nail on the head when they pointed out that a small leak in a positive apparatus was more readily discoverable by the wearer. That was the whole point. It was an intensely small leak which caused the danger. A large leak could be detected, and even a small leak on the positive pressure apparatus was at once realised, because the wearer was not getting his supply, the bag became deflated, and the difficulty in breathing at once became apparent. A mechanical effect at once resulted which showed the fault. Mr Brindley's remark with reference to the manufacturers was one which made him, in replying to that discussion, point out that one of his reasons for placing this matter so seriously before them was to some extent the action of the manufacturers of this apparatus. No doubt some of those present had seen a letter in the *Colliery Guardian* that week in reference to that very point. It had been pointed out that the negative pressure apparatus did cause a danger, and a serious danger, and the only attitude taken up by the manufacturers was to point out that an equally serious defect occurred in positive pressure apparatus. In bringing that matter forward he had not intended to criticise any particular make of apparatus; it was the principle, and only the principle, to which he called attention. As far as he could see, any apparatus with an injector attached to it could quite easily be converted into one which would be free from the objection which he had ventured to point out. Mr. Cockin had asked whether the accidents referred to in the paper had occurred to men using self-contained breathing apparatus. As far as he was aware, every one of those accidents had occurred with men using apparatus on negative pressure. For instance, in the Felling accident they would recollect that two men lost their lives while building or doing some work in an atmosphere of blackdamp. At the time it was very difficult—almost impossible—to explain how those men came to lose their lives. To him the explanation seemed perfectly clear. There would be a small leakage, and the man would ultimately be overcome without any warning of the condition of things. Then there was the Cadeby accident, which apparently was found to be due to the man drawing his mouthpiece from his mouth. Now, that probably was one of the first things a man would do on getting into serious difficulty, particularly in an atmosphere devoid of oxygen. When the oxygen got down to 12 or 10 per cent. a man's faculties became impaired and he did most ridiculous things. Probably the first thing would be to snatch his mouthpiece out of his mouth and career about in an excited and uncontrollable manner. To his mind, that seemed the explanation of the Cadeby accident—that it was the difficulty of breathing an atmosphere deficient in oxygen that caused the man to draw the mouthpiece out of his mouth. A man with a defective apparatus in such an atmosphere was a danger not only to himself but also to the people who were with him.

Mr. **Johnstone** suggested that the discussion should not be closed, but should be adjourned. No doubt many of the members, after seeing the president's remarks in print, would like to express their opinions upon what was really a most important subject, and one which he would like to see very fully discussed.

The **President** said that if the meeting wished it, he would agree to this.

The discussion of the paper was adjourned.

CAGE FENCE GATES.

A branch of the National Association of Colliery Managers was recently formed in North Staffordshire, and the first evening meeting in connection with it has been held at the North Stafford Hotel, Stoke-on-Trent, under the presidency of Mr. A. M. **Henshaw**. Six new members were elected, and the president remarked that this made their total membership 32.

Mr. W. G. **Peasegood** read a short paper on the subject of "Cage Fence Gates," illustrating his remarks with a model of a cage fitted with gates, and a diagram. The gates are fitted at the Fair Lady pit of the Madeley Collieries, near Newcastle, where anyone interested may inspect them. Proceeding, he said: These gates are considered by the management quite safe, inasmuch as they cannot be opened outwards into the shaft. They are of light construction, each set of double gates for a deck weighing only 50 lb. They do not take up any room in the decks of the cage during coal winding, being detachable. They can also be home made.

They are fitted to a pair of three-decked cages, the inside measurements of the decks being 7 ft. 1½ in. long, by 3 ft. 3½ in. wide, by 4 ft. 2½ in. high. There is only just sufficient room for two tubs, leaving no room for a fixed gate. Previously eight men rode in a deck, but owing to the gates opening inwards it has reduced this number to seven per deck. The gates were first made opening into the shaft, but it was thought that the men would certainly lean on them, as they do on the side of the cage, and should the pawl or catch be accidentally knocked out, the gates would open out into the shaft, and become a false security. They were, therefore, made eventually as the ones described, opening inside the cage, and being impossible of opening outside into the shaft.

On the four uprights of the cage, and at equal distances from the cage hoops, are riveted eight eye-brackets of 3 in. by ½ in. iron with the eye on the inside of the uprights. Into these holes, or eyes, the tops of which are counter-sunk, drop the ends of the top and bottom bars of the gate. The top bar is cranked the exact depth of the bracket, the crank of the bottom bar being ¾ in. longer, namely 3¾ in. The extra length makes it easier to hang the gates, the bottom bar being started in first. The crank of the top and bottom bars answers two purposes—first, as a hinge; secondly, it prevents the gate opening out into the shaft. They are made in two parts, coming together when closed. A pawl or catch being fixed on the top of one of the gates, closes on to the other when in position, making them quite rigid. The top and bottom bars and the end upright are made in one piece of ¾ in. round iron, the remaining upright bars being of ½ in. round. Holes in the top and bottom bars are punched to receive the upright bars, which are sharpened like a chisel point.

The gates are interchangeable, and a spare set is kept handy in case of one being damaged. The cost of material and making, which can be done by the colliery smith, is about 15s. per deck.

Mr. G. P. **Hyslop** said he had borrowed the idea from Mr. Peasegood, and put similar gates on one cage, but at the same time he could not see that the gates were much safer than rigid bars. The number of men carried with these gates in use depended on the proportion of the cage. In their case, they could wind as many men as before.

Mr. W. **Barber** said the reduction in the number of men the cage was capable of holding was a disadvantage where a large number of men had to be dealt with.

Mr. F. E. **Buckley** said he was more in favour of two or three bars made up into a gate, and dropped into slots in the sides of the cages.

Mr. **Barber** said he had a single gate hinged on one side, and securely bolted on the other.

The **President** observed that they had experienced much the same difficulty as Mr. Peasegood. They had cages that were comparatively small, holding eight men on a deck, and they could not very well afford to sacrifice one man. Their objection was to a gate that had to be taken off and put on, and they devised two half-gates, which were fixed inside a frame. There was a hinge at the top of the frame, and the whole arrangement was swung up to the top during the time they were not winding men. There was a latch to hold the two half-gates together. Mr. Benshaw added that at many collieries the contriving of cage gates had proved one of the most difficult little mechanical problems that the mechanical engineer had had to tackle.

Mr. J. R. L. **Allott** said they had installed a lattice gate, which slid up and down side pieces. Mr. Allott further stated that the best type he had seen was in Germany. The gate was a corrugated roller shutter, such as one saw in front of a shop window. It ran in iron channels at the sides and coiled up at the top, but in this case a high cage was needed, because the coiled shutter made a roll of about 8 in. diameter.

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it would be better understood by the
y saw it in print. Mr. Haldane drew two
g the different consumptions of oxygen
curve rapidly dropped until the balance
that balance falling with different
til a point was reached at which less than
of oxygen was inside the apparatus, at
he man became incapacitated with little
(*See* figs. 1 and 2).

IACKER said he had always been of the
the forcible introduction of breathing
other rescue arrangements resulted very
what one might call panic legislation,
some extent, forced upon the Home Office
nical public opinion and a non-technical
aper they had had that day, he hoped,
tention widely drawn to it. So far the
e apparatus were almost equal to the
it was sought to avert. It was evident
eavy responsibility rested upon the man
cide when and where the rescue apparatus
d in the mine. He thought that perhaps
t of the organisation of rescue brigades,
the Midland districts, was more in the
discipline in the mine and the additional
h might be given to rescue work, and
the direction of organisation among the
elves.

DENT said that Mr. Sopwith and Mr.
the nail on the head when they pointed
nall leak in a positive apparatus was more
erable by the wearer. That was the whole
, an intensely small leak which caused the
rge leak could be detected, and even a
n the positive pressure apparatus was at
because the wearer was not getting his
ag became deflated, and the difficulty in
nce became apparent. A mechanical effect
ed which showed the fault. Mr Brindley's
reference to the manufacturers was one
him, in replying to that discussion, point
f his reasons for placing this matter so
re them was to some extent the action of
urers of this apparatus. No doubt some
at had seen a letter in the *Colliery Guardian*
reference to that very point. It had been
that the negative pressure apparatus did
ger, and a serious danger, and the only
n up by the manufacturers was to point
equally serious defect occurred in positive
aratus. In bringing that matter forward
tended to criticise any particular make of
, was the principle, and only the principle,
called attention. As far as he could see,
is with an injector attached to it could
e converted into one which would be free
ection which he had ventured to point out.
ad asked whether the accidents referred to
had occurred to men using self-contained
paratus. As far as he was aware, every
e accidents had occurred with men using
negative pressure. For instance, in the
ent they would recollect that two men lost
while building or doing some work in an
of blackdamp. At the time it was very
nost impossible—to explain how those men
their lives. To him the explanation seemed
ar. There would be a small leakage, and
uld ultimately be overcome without any
he condition of things. Then there was the
lent, which apparently was found to be due
drawing his mouthpiece from his mouth.
obably was one of the first things a man
getting into serious difficulty, particularly
here devoid of oxygen. When the oxygen
12 or 10 per cent. a man's faculties became
d he did most ridiculous things. Probably
g would be to snatch his mouthpiece out of
nd career about in an excited and uncon-
nner. To his mind, that seemed the
of the Cadeby accident—that it was the
breathing an atmosphere deficient in oxygen
the man to draw the mouthpiece out of his
nan with a defective apparatus in such an
was a danger not only to himself but also to
ho were with him.

STONE suggested that the discussion should
d, but should be adjourned. No doubt
e members, after seeing the president's
rint, would like to express their opinions
was really a most important subject, and
e would like to see very fully discussed.

IDENT said that if the meeting wished it, he
to this.

ssion of the paper was adjourned.

CAGE FENCE CATES.

A branch of the National Association of Colliery Managers was recently formed in North Staffordshire, and the first evening meeting in connection with it has been held at the North Stafford Hotel, Stoke-on-Trent, under the presidency of Mr. A. M. HENSHAW. Six new members were elected, and the president remarked that this made their total membership 32.

Mr. W. G. PEASEGOOD read a short paper on the subject of "Cage Fence Gates," illustrating his remarks with a model of a cage fitted with gates, and a diagram. The gates are fitted at the Fair Lady pit of the Madeley Collieries, near Newcastle, where anyone interested may inspect them. Proceeding, he said: These gates are considered by the management quite safe, inasmuch as they cannot be opened outwards into the shaft. They are of light construction, each set of double gates for a deck weighing only 50 lb. They do not take up any room in the decks of the cage during coal winding, being detachable. They can also be home made.

They are fitted to a pair of three-decked cages, the inside measurements of the decks being 7 ft. 1½ in. long, by 3 ft. 3½ in. wide, by 4 ft. 2½ in. high. There is only just sufficient room for two tubs, leaving no room for a fixed gate. Previously eight men rode in a deck, but owing to the gates opening inwards it has reduced this number to seven per deck. The gates were first made opening into the shaft, but it was thought that the men would certainly lean on them, as they do on the side of the cage, and should the pawl or catch be accidentally knocked out, the gates would open out into the shaft, and become a false security. They were, therefore, made eventually as the ones described, opening inside the cage, and being impossible of opening outside into the shaft.

On the four uprights of the cage, and at equal distances from the cage hoops, are riveted eight eye-brackets of 3 in. by ½ in. iron with the eye on the inside of the uprights. Into these holes, or eyes, the tops of which are counter-sunk, drop the ends of the top and bottom bars of the gate. The top bar is cranked the exact depth of the bracket, the crank of the bottom bar being ¾ in. longer, namely 3¾ in. The extra length makes it easier to hang the gates, the bottom bar being started in first. The crank of the top and bottom bars answers two purposes—first, as a hinge; secondly, it prevents the gate opening out into the shaft. They are made in two parts, coming together when closed. A pawl or catch being fixed on the top of one of the gates, closes on to the other when in position, making them quite rigid. The top and bottom bars and the end upright are made in one piece of ¾ in. round iron, the remaining upright bars being of ½ in. round. Holes in the top and bottom bars are punched to receive the upright bars, which are sharpened like a chisel point.

The gates are interchangeable, and a spare set is kept handy in case of one being damaged. The cost of material and making, which can be done by the colliery smith, is about 15s. per deck.

Mr. G. P. HYSLOP said he had borrowed the idea from Mr. Peasegood, and put similar gates on one cage, but at the same time he could not see that the gates were much safer than rigid bars. The number of men carried with these gates in use depended on the proportion of the cage. In their case, they could wind as many men as before.

Mr. W. BARBER said the reduction in the number of men the cage was capable of holding was a disadvantage where a large number of men had to be dealt with.

Mr. F. E. BUCKLEY said he was more in favour of two or three bars made up into a gate, and dropped into slots in the sides of the cages.

Mr. BARBER said he had a single gate hinged on one side, and securely bolted on the other.

The PRESIDENT observed that they had experienced much the same difficulty as Mr. Peasegood. They had cages that were comparatively small, holding eight men on a deck, and they could not very well afford to sacrifice one man. Their objection was to a gate that had to be taken off and put on, and they devised two half-gates, which were fixed inside a frame. There was a hinge at the top of the frame, and the whole arrangement was swung up to the top during the time they were not winding men. There was a latch to hold the two half-gates together. Mr. Henshaw added that at many collieries the contriving of cage gates had proved one of the most difficult little mechanical problems that the mechanical engineer had had to tackle.

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dangerous position, and the whole of the men who went back to the mine would have been endangered. It was a monstrous suggestion. The first part of the Mines Act provided that the management was responsible for the safety of the mine, and the second section provided that management should be management on the spot, not by correspondence. This was what he called management by correspondence. The greatest precautions were constantly taken at Bentley. He was quite satisfied they ought not to do the things the Home Office suggested. If they did he would not give a fortnight's life to the colliery, for they would have the place on fire.

Can you suggest why the mines inspectors should say this pit was unsatisfactory if it was not so?—Mr. Pickering, to my knowledge, never suggested anything of the sort His opinion would have had the greatest weight—any opinion of his on any colliery matter.

The Chairman (Mr. G. B. C. Yarborough): You do not agree with the methods of the Home Office?—That is so. I feel a little sore that they did not follow the report of the Royal Commission in drafting the Mines Act, but I have no quarrel with them.

Mr. Gichard: You say their suggestion is not in common sense?

The Chairman: I think you are pressing the cross-examination as to credit to its furthest limits. This is really a very narrow enquiry.

Mr. Gichard: When I was consulted I advised that none of the correspondence should be brought forward at all, because as the Home Office had approached the management first of all, and the management had replied, it might have been said they had asked them to commit themselves. But at the first hearing one of the witnesses, without being asked by Mr. Craig, went out of his way to speak about it.

In re-examination by Mr. Norman Craig, Dr. Haldane stated the wastes did not really come within the section of the Act, which applied to shafts, roads, levels, stables, and workings; 2½ per cent. of gas, without added circumstances, was not in the slightest degree dangerous. The Bentley lamps were double gauzed and naked lights were wholly prohibited. It was a very common thing to have 2½ per cent. of gas or upwards in a gassy mine. If the management was adequate and the men were withdrawn, there was absolutely no reason for shutting up the whole mine or doing anything but taking steps to dilute that 2½ per cent.

As regards the Royal Commission, the question of harmfulness or harmlessness of gas was limited to the danger of explosion?—Yes, that is so.

Has anyone to your knowledge suggested that such percentages of gas as have been dealt with could conceivably be harmful to health?—No person with any knowledge has ever suggested it.

In answer to further questions, Dr. Haldane said the presence of gas led necessarily to a more perfect system of ventilation, which meant a larger body of air being drawn through the mine. He had no doubt the presence of gas in mines had saved far more lives by the better air and ventilation. It meant pure air everywhere, and at Bentley one was always in a current of air. According to statistics, the death-rate among colliers was about equal to that among agricultural labourers, apart from accidents. It was not a reasonable commercial contingency to anticipate an outbreak of fire at a particular place where a particular fall had occurred. A fire in itself distilled gas from the coal, and so operated as a retort.

Mr. Craig: Is your security against a large extension of fires that it distils gas from the coal, and, acting as a retort, prevents the entry of fresh air?—Partly, but partly the safeguard is in a tightly packed goaf. There is nothing there but firedamp, pure methane given off from the strata, which displaces all the oxygen and keeps the air away from the goaf and makes it absolutely safe.

In the goaf, the more methane you get the safer your goaf is?—That is recognised by every colliery manager.

As regards the system of ventilation, is the mine provided with parallel intakes?—Yes, double intakes on parallel lines. Witness agreed that the Home Office had suggested that upon any indication of abnormal heating the whole of the men working all over the pit should be withdrawn except those dealing with the fire. That struck him as excessively dangerous.

Mr. Gichard put in the whole of the Home Office correspondence.

The Chairman: I don't think it matters. We shall decide this case, not according to the views of the Home Office, but of ourselves.

Dr. Haldane was next asked as to Prof. Cadman's statement at the previous hearing in regard to the amount of gas coming out of Bentley shaft. The latter had stated something like 4 million cubic feet of gas would pass through in 24 hours, and would illuminate six towns of the size of Doncaster.

Dr. Haldane: I think those figures are perfectly correct so far as my calculations go. I have given in one of my papers the case of another mine which had nearly double the amount of gas—70 or 75 per cent. more—coming out of the shaft. The total amount of air coming out of Bentley was absolutely stupendous, and reduced the gas to 1 per cent. The gas coming out of the shaft at Bentley represented a very small fraction of the potential gas coming out in the form of coal. If the coal from Bentley were all converted into gas—which would be quite an easy thing to do—it would supply not merely six little towns of the size of Doncaster, but London, Paris, Berlin and St. Petersburg quite easily.

Mr. Craig: Supposing you were to take the air coming out in relation to its consumption by human beings?—Well, it would supply the oxygen required for about 7 million persons per day, equal to the population of London.

Mr. Bailey's Evidence.

Mr. T. H. Bailey, of S. and J Bailey, mining engineers, Birmingham, stated that he was for 15 years manager of the Hill's Plymouth collieries at Merthyr Tydvil, with an output of a quarter of a million tons per year He had heard the figures given as to the amount of gas coming from the Bentley Colliery, and in his experience they were not startling. He had seen very much larger percentages from other collieries. At the beginning of this year he was asked to advise not only in regard to Bentley, but Brodsworth and the Denaby and Cadeby collieries. He made an inspection of these collieries and reported. He made something like 14 inspections of Bentley, and was there before there was any question of complaint which had led to these summonses. He was consulted as to the best way of dealing with gob fires. It was absolutely essential, in the case of a gassy mine, to preserve a continuous forward movement of the working face if they were to be really safe. If the face stood, the roof broke, and the floor also broke, and through these breaks they got far larger emissions of inflammable gas. The great thing was to keep the face going, and let the roof and floor come gradually together without breaking. The effect at Bentley of the national coal strike at the beginning of this year came within his own observations. On the line of face, where the face was standing through the six weeks of strike, they had had five gob fires. They had always followed the holding up of the continuous progress of the coal face. At Brodsworth pit, curiously, they had had five fires on the very same line of stoppage. Asked if air crossings were liable to lead to danger, the witness stated wherever they were constructed there was always the difficulty of making them airtight. At Brodsworth, the previous month, within 3 or 4 yards of a crossing, it was discovered one of the posts was on fire and flames came out. Had it been at a time when the men were at work he didn't know what would have happened. As to the suggestion of the Home Office that all the men should be withdrawn upon signs of abnormal heating, messages would have to be sent right through the mine, and the process of withdrawing the men and returning them would involve hours. It was a most impracticable suggestion.

In cross-examination by Mr. Gichard, witness said if the gas was continually coming off it was very difficult to get rid of it, and it might be months before they got rid of it if they were to draw the men out. He agreed that 2½ per cent. pointed the finger of warning to the management, who should then look for the point at which the danger occurred and watch it. If the goaves were tightly packed, gas could only accumulate to a very small extent. The only thing was to get these goaves tightly filled with methane, and then they would not have any fire at all. He considered the ventilation of Bentley pit was excessive. There was the same amount of gas coming off, but they had a greater percentage of air. He did not think the gas was one whit less than it was in July. Every indication of danger was watched for; he had never known anything watched in the way it was watched at Bentley and Brodsworth.

Mr. Gichard: Bearing in mind the unfortunate conditions appertaining to the Bentley mine, do you suggest there ought ever to be allowed in that mine 2½ per cent. of gas in the general body of the air?—Yes, I do, and I should not be afraid of three or four per cent. if I could feel I could stop the risk by keeping my face going. I would far sooner take risk with regard to the percentage of gas in the air which I know I could deal with and watch, than stop the face and get three or four gob fires. As long as you can stop the gob fires you get rid of a very great liability to trouble.

You have not stopped the gob-fires?—We have stopped them to a very great extent.

There has been one since Mr. Hudspeth went down?—It is on the line of face I spoke to you about during the stoppage. I say that if it had not been for the stoppage during the strike that would not have been there. As to ventilation, he thought it a strong disadvantage to put so much air through the pit. He felt sure they would get some fires round the air crossing at Bentley; it had been put in too close to the face and was cracking. These fires took from three to four months before they broke out. He knew of similar air crossings. There was one at South Duffryn, in Wales, but there was no gob fire there. There was a larger quantity of gas emitted from Tylorstown Colliery than Bentley. Witness said as to the goaves at Bentley it was a good thing they were tight and solid, as it prevented oxygen getting in. If it were not so, he did not know where Bentley Colliery would be.

The Bench adjourned until to-day (Friday), when it is hoped to complete the case.

MINING AND OTHER NOTES.

At Gosforth on Saturday night, Mr. Jethro Longridge was presented with a handsome testimonial, subscribed for by the directors, officials and workmen of the Burradon and Coxlodge Coal Company, as a mark of esteem, on the occasion of his retirement after 23 years' service, as manager of the Burradon and Hazelrigg Collieries.

The presentation of certificates in connection with the Lancashire and Cheshire Coalowners' Rescue Station took place on Saturday at the Mining College, Wigan. Mr. C. Pilkington, of Manchester, the chairman of the Rescue Station Committee, presided, and there were present the Right Hon. Viscount Brackley, who distributed the certificates to the men who had qualified during the year, Sir T. R. Ratcliffe-Ellis, Messrs. J. Gerrard (his Majesty's Inspector of Mines), Jesse Wallwork (mining engineer to the trustees of the Duke of Bridgewater), and others. Mr. Arthur Ratcliffe-Ellis, the secretary, reported that during last year 361 new men had been trained at the central station at Howe Bridge in the use of the rescue apparatus. They had now 781 trained men in Lancashire and Cheshire, 96 medallists who had passed through the second year's tests, 275 men who had passed the first year's tests, and about 100 men who were waiting to pass the medal tests. During the year the rescue brigades had been called out on active service four times, once out of their own district, to the Exhall Colliery, near Nuneaton.

At the last monthly meeting of the West of Scotland Branch of the Association of Mining Electrical Engineers a paper was read by Mr. Sidney A. Simon, B A. In the evening the members of the branch held a most successful smoking concert in White's Restaurant, Gordon-street.

An alarming occurrence took place on Saturday at the Banknock Coal Company's Livingstone Colliery, Hollandbush, resulting in considerable damage. Some loaded hutches which ran away in the upper seam dashed through the gates guarding the shaft and fell down the shaft. In their fall the hutches badly smashed the cage and completely wrecked the shaft.

Mr Ernest Taylor, of the electrical staff at Denaby Main Colliery, has been appointed chief electrician at the newly developed Rossington Colliery, near Doncaster.

At a Yorkshire divisional meeting of the Co-operative Wholesale Society, at Ossett, Yorks, last Saturday, the Horbury, Cleckheaton, Dewsbury, Heckmondwike, and Wakefield societies asked the directors to consider and report upon the advisability or otherwise of the society entering the coal trade as colliery proprietors. The chairman undertook that the directors would make all necessary enquiries.

At a meeting of the Swinton and Pendlebury District Council held last week a letter was read from the Lancashire Electric Power Company stating that they had arranged, subject to the consent of the Council, to supply Messrs. A. Knowles and Sons with current for haulage purposes, principally at the Pendlebury and Clifton Hall Collieries. The present requirements were about 320-horse power at Pendlebury, and 250-horse power at Clifton Hall. It was resolved that the Council consent to the arrangement.

Mr. J. V. Nancarrow, solicitor, Albert-road, Middlesbrough, has been appointed secretary of the Middlesbrough Chamber of Commerce as from January 1 next.

The Oakbank Company have acquired an important shale field in the West Calder district, on the estate of Westwood, owned by Captain Steuart. The new field is only a short distance from that recently opened by the Pumpherston Oil Company at Breich. Young's Oil Company had a lease of the Westwood shales many years ago, but only a small section of the upper seams were worked, and all the deep seams are practically untouched. Further developments are expected in the West Calder district, as one of the leading oil companies is negotiating for a lease of the Hermand and Hartwood shale fields.

Dr. William H. Perkin, F R.S., Professor of Chemistry in the Victoria University of Manchester, has intimated to the Vice-Chancellor of Oxford his acceptance of the Waynflete Professorship of Chemistry, which was unanimously offered to him by the electors a short time ago.

The Burradon and Coxlodge Coal Company have recently opened a new seam in the Old pit. This is the Beaumont seam, and is of excellent quality, with a height of about 4 ft.

Mr. A. W. Parkin, manager of Messrs. H. Stobart and Co.'s Newton Cap Colliery, Bishop Auckland, has been the recipient of several handsome presents on the occasion of his approaching removal to a post in North Staffordshire.

Mr. J. V. Robinson, of Hartlepool, read a paper on "Waste Heat Utilisation" at the last meeting of the Cleveland Institution of Engineers held at Middlesbrough. He said that in the Cleveland district the average annual production of pig iron for the last three years had amounted to about 2¼ million tons. If the whole of the furnaces were blown by gas engines, there would be available for external use, according to competent authorities, about 1-horse power per ton of pig iron produced per month. In the Cleveland district this would be about 214,300-horse power. Even if the surplus gas was used under boilers, upwards of 100,000-horse power could be obtained, which would leave a surplus after all local needs were met. This surplus could be utilised to attract fresh industries. This ignored entirely the power obtainable from coke-oven gas, which

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This was what he called management by
The greatest precautions were constantly
ey. He was quite satisfied they ought not to
he Home Office suggested. If they did he
a fortnight's life to the colliery, for they
place on fire.

gest why the mines inspectors should say
satisfactory if it was not so?—Mr. Pickering,
dge, never suggested anything of the sort.
would have had the greatest weight—any
on any colliery matter.

n (Mr. G. B. C. Yarborough): You do not
methods of the Home Office?—That is so. I
re that they did not follow the report of the
sion in drafting the Mines Act, but I have no
hem.

: You say their suggestion is not in common

an: I think you are pressing the cross-
s to credit to its furthest limits. This is
arrow enquiry.

: When I was consulted I advised that none
ondence should be brought forward at all,
e Home Office had approached the manage-
ll, and the management had replied, it might
they had asked them to commit themselves.
t hearing one of the witnesses, without being
Craig, went out of his way to speak about it.

nation by Mr. Norman Craig, Dr. Haldane
tes did not really come within the section of
applied to shafts, roads, levels, stables, and
per cent. of gas, without added circumstances,
e slightest degree dangerous. The Bentley
ouble gauzed and naked lights were wholly
t was a very common thing to have 2½ per
r upwards in a gassy mine. If the manage-
quate and the men were withdrawn, there was
reason for shutting up the whole mine or
g but taking steps to dilute that 2½ per cent.

the Royal Commission, the question of
or harmlessness of gas was limited to the
losion?—Yes, that is so.

to your knowledge suggested that such per-
as as have been dealt with could conceivably be
health?—No person with any knowledge has
d it.

to further questions, Dr. Haldane said the
s led necessarily to a more perfect system of
which meant a larger body of air being drawn
mine. He had no doubt the presence of gas in
ved far more lives by the better air and ventila-
ant pure air everywhere, and at Bentley one
n a current of air. According to statistics,
te among colliers was about equal to that
ultural labourers, apart from accidents. It was
able commercial contingency to anticipate an
fire at a particular place where a particular
rred. A fire in itself distilled gas from the coal,
ted as a retort.

: Is your security against a large extension of
distils gas from the coal, and, acting as a retort,
entry of fresh air?—Partly, but partly the
in a tightly packed goaf. There is nothing
edamp, pure methane given off from the strata,
ces all the oxygen and keeps the air away from
makes it absolutely safe.

af, the more methane you get the safer your
at is recognised by every colliery manager

s the system of ventilation, is the mine provided
el intakes?—Yes, double intakes on parallel

ess agreed that the Home Office had suggested
ny indication of abnormal heating the whole of
orking all over the pit should be withdrawn
e dealing with the fire. That struck him as
dangerous.

ard put in the whole of the Home Office
nce.

rman: I don't think it matters. We shall decide
t according to the views of the Home Office, but

ane was next asked as to Prof. Cadman's state-
previous hearing in regard to the amount of gas
t of Bentley shaft. The latter had stated
like 4 million cubic feet of gas would pass
24 hours, and would illuminate six towns of the
caster.

ane: I think those figures are perfectly correct
ny calculations go. I have given in one of my
case of another mine which had nearly double
of gas—70 or 75 per cent. more—coming out of
The total amount of air coming out of Bentley
tely stupendous, and reduced the gas to 1 per
gas coming out of the shaft at Bentley repre-
ry small fraction of the potential gas coming out
in the form of coal. If the coal from Bentley were all converted into gas—which would be quite an easy thing to do—it would supply not merely six little towns of the size of Doncaster, but London, Paris, Berlin and St. Petersburg quite easily.

Mr. Craig: Supposing you were to take the air coming out in relation to its consumption by human beings?—Well, it would supply the oxygen required for about 7 million persons per day, equal to the population of London.

Mr. Bailey's Evidence.

Mr. T. H. Bailey, of S. and J. Bailey, mining engineers, Birmingham, stated that he was for 15 years manager of the Hill's Plymouth collieries at Merthyr Tydvil, with an output of a quarter of a million tons per year He had heard the figures given as to the amount of gas coming from the Bentley Colliery, and in his experience they were not startling. He had seen very much larger percentages from other collieries. At the beginning of this year he was asked to advise not only in regard to Bentley, but Brodsworth and the Denaby and Cadeby collieries. He made an inspection of these collieries and reported. He made something like 14 inspections of Bentley, and was there before there was any question of complaint which had led to these summonses. He was consulted as to the best way of dealing with gob fires. It was absolutely essential, in the case of a gassy mine, to preserve a continuous forward movement of the working face if they were to be really safe. If the face stood, the roof broke, and the floor also broke, and through these breaks they got far larger emissions of inflammable gas. The great thing was to keep the face going, and let the roof and floor come gradually together without breaking. The effect at Bentley of the national coal strike at the beginning of this year came within his own observations. On the line of face, where the face was standing through the six weeks of strike, they had had five gob fires. They had always followed the holding up of the continuous progress of the coal face. At Brodsworth pit, curiously, they had had five fires on the very same line of stoppage. Asked if air crossings were liable to lead to danger, the witness stated wherever they were constructed there was always the difficulty of making them airtight. At Brodsworth, the previous month, within 3 or 4 yards of a crossing, it was discovered one of the posts was on fire and flames came out. Had it been at a time when the men were at work he didn't know what would have happened. As to the suggestion of the Home Office that all the men should be withdrawn upon signs of abnormal heating, messages would have to be sent right through the mine, and the process of withdrawing the men and returning them would involve hours. It was a most impracticable suggestion.

In cross-examination by Mr. Gichard, witness said if the gas was continually coming off it was very difficult to get rid of it, and it might be months before they got rid of it if they were to draw the men out. He agreed that 2½ per cent. pointed the finger of warning to the management, who should then look for the point at which the danger occurred and watch it. If the goaves were tightly packed, gas could only accumulate to a very small extent. The only thing was to get these goaves tightly filled with methane, and then they would not have any fire at all. He considered the ventilation of Bentley pit was excessive. There was the same amount of gas coming off, but they had a greater percentage of air. He did not think the gas was one whit less than it was in July. Every indication of danger was watched for; he had never known anything watched in the way it was watched at Bentley and Brodsworth.

Mr. Gichard: Bearing in mind the unfortunate conditions appertaining to the Bentley mine, do you suggest there ought ever to be allowed in that mine 2½ per cent. of gas in the general body of the air?—Yes, I do, and I should not be afraid of three or four per cent. if I could feel I could stop the risk by keeping my face going. I would far sooner take risk with regard to the percentage of gas in the air which I know I could deal with and watch, than stop the face and get three or four gob fires. As long as you can stop the gob fires you get rid of a very great liability to trouble.

You have not stopped the gob-fires?—We have stopped them to a very great extent.

There has been one since Mr. Hudspeth went down?—It is on the line of face I spoke to you about during the stoppage. I say that if it had not been for the stoppage during the strike that would not have been there. As to ventilation, he thought it a strong disadvantage to put so much air through the pit. He felt sure they would get some fires round the air crossing at Bentley; it had been put in too close to the face and was cracking. These fires took from three to four months before they broke out. He knew of similar air crossings. There was one at South Duffryn, in Wales, but there was no gob fire there. There was a larger quantity of gas emitted from Tylorstown Colliery than Bentley. Witness said as to the goaves at Bentley it was a good thing they were tight and solid, as it prevented oxygen getting in. If it were not so, he did not know where Bentley Colliery would be.

The Bench adjourned until to-day (Friday), when it is hoped to complete the case.

MINING AND OTHER NOTES.

At Gosforth on Saturday night, Mr. Jethro Longridge was presented with a handsome testimonial, subscribed for by the directors, officials and workmen of the Burradon and Coxlodge Coal Company, as a mark of esteem, on the occasion of his retirement after 23 years' service, as manager of the Burradon and Hazelrigg Collieries.

The presentation of certificates in connection with the Lancashire and Cheshire Coalowners' Rescue Station took place on Saturday at the Mining College, Wigan. Mr. C. Pilkington, of Manchester, the chairman of the Rescue Station Committee, presided, and there were present the Right Hon. Viscount Brackley, who distributed the certificates to the men who had qualified during the year, Sir T. R. Ratcliffe-Ellis, Messrs. J. Gerrard (his Majesty's Inspector of Mines), Jesse Wallwork (mining engineer to the trustees of the Duke of Bridgewater), and others. Mr. Arthur Ratcliffe-Ellis, the secretary, reported that during last year 361 new men had been trained at the central station at Howe Bridge in the use of the rescue apparatus. They had now 781 trained men in Lancashire and Cheshire, 96 medallists who had passed through the second year's tests, 275 men who had passed the first year's tests, and about 100 men who were waiting to pass the medal tests. During the year the rescue brigades had been called out on active service four times, once out of their own district, to the Exhall Colliery, near Nuneaton.

At the last monthly meeting of the West of Scotland Branch of the Association of Mining Electrical Engineers a paper was read by Mr. Sidney A. Simon, B.A. In the evening the members of the branch held a most successful smoking concert in White's Restaurant, Gordon-street.

An alarming occurrence took place on Saturday at the Banknock Coal Company's Livingstone Colliery, Hollandbush, resulting in considerable damage. Some loaded hutches which ran away in the upper seam dashed through the gates guarding the shaft and fell down the shaft. In their fall the hutches badly smashed the cage and completely wrecked the shaft.

Mr. Ernest Taylor, of the electrical staff at Denaby Main Colliery, has been appointed chief electrician at the newly developed Rossington Colliery, near Doncaster.

At a Yorkshire divisional meeting of the Co-operative Wholesale Society, at Ossett, Yorks, last Saturday, the Horbury, Cleckheaton, Dewsbury, Heckmondwike, and Wakefield societies asked the directors to consider and report upon the advisability or otherwise of the society entering the coal trade as colliery proprietors. The chairman undertook that the directors would make all necessary enquiries.

At a meeting of the Swinton and Pendlebury District Council held last week a letter was read from the Lancashire Electric Power Company stating that they had arranged, subject to the consent of the Council, to supply Messrs. A. Knowles and Sons with current for haulage purposes, principally at the Pendlebury and Clifton Hall Collieries. The present requirements were about 820-horse power at Pendlebury, and 250-horse power at Clifton Hall. It was resolved that the Council consent to the arrangement.

Mr. J. V. Nancarrow, solicitor, Albert-road, Middlesbrough, has been appointed secretary of the Middlesbrough Chamber of Commerce as from January 1 next.

The Oakbank Company have acquired an important shale field in the West Calder district, on the estate of Westwood, owned by Captain Stouart. The new field is only a short distance from that recently opened by the Pumpherston Oil Company at Breich. Young's Oil Company had a lease of the Westwood shales many years ago, but only a small section of the upper seams were worked, and all the deep seams are practically untouched. Further developments are expected in the West Calder district, as one of the leading oil companies is negotiating for a lease of the Hermand and Hartwood shale fields.

Dr. William H. Perkin, F.R.S., Professor of Chemistry in the Victoria University of Manchester, has intimated to the Vice-Chancellor of Oxford his acceptance of the Waynflete Professorship of Chemistry, which was unanimously offered to him by the electors a short time ago.

The Burradon and Coxlodge Coal Company have recently opened a new seam in the Old pit. This is the Beaumont seam, and is of excellent quality, with a height of about 4 ft.

Mr. A. W. Perkin, manager of Messrs. H. Stobart and Co.'s Newton Cap Colliery, Bishop Auckland, has been the recipient of several handsome presents on the occasion of his approaching removal to a post in North Staffordshire.

Mr. J. V. Robinson, of Hartlepool, read a paper on "Waste Heat Utilisation" at the last meeting of the Cleveland Institution of Engineers held at Middlesbrough. He said that in the Cleveland district the average annual production of pig iron for the last three years had amounted to about 2¼ million tons. If the whole of the furnaces were blown by gas engines, there would be available for external use, according to competent authorities, about 1-horse power per ton of pig iron produced per month. In the Cleveland district this would be about 214,300-horse power. Even if the surplus gas was used under boilers, upwards of 100,000-horse power could be obtained, which would leave a surplus after all local needs were met. This surplus could be utilised to attract fresh industries. This ignored entirely the power obtainable from coke-oven gas, which had been utilised in the district to a greater extent than blastfurnace gas. He submitted the necessity of economical blastfurnace plant, and co-operation with local power companies, as the most convenient way of finding a market for the waste-heat power.

It is stated that boring operations have been commenced at Woodthorpe Colliery, which is owned by the Nunnery Company. The Silkstone seam has been worked at the pit for the past 37 years, and is quickly becoming exhausted. A further depth of 60 or 70 feet is now to be reached, with the object of securing the Winmoor seam. None of the collieries in the locality have gone below the Silkstone seam.

Delegates from various mining districts in the Lothians met in Edinburgh recently for the purpose of making the necessary arrangements in connection with the ambulance competition it is proposed to hold for mine workers in Mid, West, and East Lothian. A communication was read from Lord Murray of Elibank, in which his lordship stated he was very much interested in the encouragement of ambulance work amongst the great mining community, and offered a shield for competition. A short address was given by Col. Barnes, secretary of St. Andrew's Ambulance Association, under whose auspices it is proposed the competition should be held, and a committee, with Mr. Walker as chairman and Mr. John M. Gourlay, Niddrie, as hon. secretary, was afterwards appointed.

Probate of the will of the late Right Hon. Christopher, Baron Furness, of Grantley, has been granted to his son, Lord Furness, his nephew, Mr. Stephen Wilson Furness, M.P., and Mr. Frederick William Lewis, the executors and trustees named in the will. The estate is sworn provisionally at a million sterling, but this comprises only a portion of the testator's personal estate, and does not include any of his landed properties. The residuary estate is to be vested in a trust company to be formed, shares in which are to held by trustees in trust, as to the major portion for the present Lord Furness, and the balance for testator's nephews and nieces named in the will.

A largely-attended meeting of the East of Scotland branch of the Association of Mining Electrical Engineers was held at Dunfermline recently, when the vice-president, Mr. H. Gordon Fraser, Leven (Fife Coal Company), submitted a paper on the lessons to be learned from the fatal and non-fatal electrical accidents in Scottish mines during 1911. In the course of his paper Mr. Fraser urged that it was important that one man in particular in a brushing squad should have an electrical knowledge. In the discussion which followed Mr. J. Gillespie said he did not know how that knowledge was to be acquired unless the electrician in charge of a colliery undertook the tuition of a class composed of firemen, machinemen and brushers. He was aware that there was such a class at a colliery in Fife, but he had not heard of similar instruction being given elsewhere in Scotland.

Strong efforts are being made to bring the Fife coal under the notice of Admiralty officials. Fifteen years ago navigation coal was entirely unknown in Fife. It was first discovered in the Fife Coal Company's Aitken pit. Since then navigation seams have been opened at various collieries. It is claimed that some of the seams are quite equal to the Welsh navigation coal supplied to the Navy. The large new coaling station to be established at Rosyth Naval Dockyard is within very easy and direct railway communication of the Fife collieries.

Mr. J. H. Heyes, clerk to the Little Hulton (Lancs.) District Council, has issued an important statement dealing with the council's gas undertaking, the council obtaining gas for the lighting of their township from Lord Ellesmere's coke works at his Brackley collieries. The accounts just presented by Mr Heyes are up to September 30, 1912. The original cost is shown to be £11,235, and of that amount £10,299 is still owing. The cost was as follows :—The cost of obtaining Parliamentary powers was £1,575; purchase of gas undertaking from Salford Corporation and intercepting mains, &c., £7,900; alterations to mains, £310; working capital, £1,000; purchase of fittings, &c., from Farnworth Gas Company, £115; mains, £335; making a total of £11,235.

The highest marks in the October associate membership examination of the Institution of Civil Engineers, have been obtained by Mr. C. Quartanoe, of Newcastle-on-Tyne, and Mr. H. Knowler, of Sutton, Surrey. The council have accordingly directed that Mr. Quartenos, who is ineligible for the Bayliss prize by reason of his not being a present or former student of the institution, receive honourable mention, and that the prize—of the value of £15—be awarded to Mr. H. Knowler, Stud.Inst.C.E., under the conditions of its foundation.

At meetings of the directors of Furness, Withy and Co. and Irvines Shipbuilding and Dry Docks Company, held on Saturday, at West Hartlepool, Mr. Stephen Wilson Furness, M.P., was elected chairman of each company in succession to the late Lord Furness.

At the annual dinner of the Mining Institute of Scotland, held in Glasgow, the chair was occupied by Mr. James Hamilton, the president. Lord Provost Stevenson said he hoped the institute would help the Corporation to get the smoke nuisance disposed of in a way that would be profitable to the users of coal and agreeable to their fellow citizens.

A special meeting was convened by the Mayor of Doncaster (Councillor J. T. Kay), recently, in the Guildhall, to consider the best means of wiping off a debt of £1,200 on the Doncaster Royal Infirmary, and of raising additional income. Since the colliery development around Doncaster the infirmary has got into difficulties owing to the heavy demands made upon it. Canon Sandford said it was really the colliery companies who ought to be responsible for the expenditure, and bear the expense of the accidents occurring at their pits. They could do it in two ways. They could establish cottage hospitals at each pit, or for one, two, or three pits. He believed there was already one at Frickley Colliery, and he had heard of one being projected at Maltby. If the collieries would take charge of their own accidents, and bear the whole of their expense the burden would not fall on Doncaster Infirmary, and they would be able to meet the demands upon them. It might be said, on behalf of the colliery cottage hospitals, that it was more expensive to manage small places than large ones, and that in small places they could not command the same efficiency in the staff and up-to-date apparatus. In that case they ought to have a much bigger hospital than they had at Doncaster, and the colliery companies, for the most part, ought to bear the burden. Every colliery company ought to give big sums, three or four figures annually, in order to carry out the work. Councillor W. Clark (ex-Mayor) said one or two colliery companies had risen to the occasion, and had done all that could be expected of them in comparison with the number of patients sent in. Mr. Wortley suggested the colliery companies should be informed that unless their subscriptions are increased very considerably much of the colliery work treated at the hospital will have to be curtailed. Many more lives, would, he thought, be saved by having accommodation nearer the pits than by bringing the men into Doncaster. Dr. Wilson said the infirmary had first claims upon the royalty owners, and they should be tackled. Operations were going on day and night. There had been 12 serious operations at the infirmary only the previous day. It was resolved to have a house-to-house collection, and to approach the employers of labour for greater assistance.

There was an interesting ceremony at the Danum Hotel, Doncaster, recently, when a dinner was given and a presentation made, to Mr. W. H. Dyson, late manager of the Maltby Main Colliery, which he left in September last to become manager of the new pit which is being sunk at Rossington. In the absence of Mr. Thompson (agent), the chair was taken by Mr. Hess, and the presentation, a handsome piano, was made by Mr. Davis, under-manager at Maltby. It had been subscribed for by the officials and workmen of Maltby Main.

Work is being pushed forward by the Manor-Powis Coal Company at their colliery near Stirling. It is about two years since this company was formed, and it is now decided to pay the 6 per cent. cumulative preference dividend due upon the amounts paid up on these shares for the two years to October 31.

Mr. T. H. Blacklock, who has been manager of Bebside Colliery, Northumberland, for the past eight years, is leaving to take up a more responsible position at Newton Hall Colliery, near Bishop Auckland, Durham.

A meeting of Bolton business men was held on the 9th inst., at the Central Hall of that town, to consider a scheme for the reorganising of the Globe Ironworks, belonging to Messrs. John Musgrave and Sons Limited, which firm has been in liquidation since April. Mr. Newton, of the firm of Messrs. David Smith, Garnett and Co., accountants, Manchester, explained the scheme as far as it is developed. It was announced that the amount promised to carry out the reconstruction scheme had reached £70,000, and that the sum still required, £10,000, will be raised in the course of a few days. A committee, consisting of Messrs. John Harwood, J. P. Haslam, W. H. Hoyle, Thomas Magas, and Thomas Scowcroft, was appointed to go through the articles of association and make the necessary arrangements for the management of the concern.

Mr. C. E. C. Shawfield, electrical tramway engineer to the Wolverhampton Corporation, in an address to the members of the Wolverhampton and District Engineers' Society, stated that he found an extraordinary difference in the heat value of coal from different seams in South Staffordshire. He suggested that coal users should unite and insist upon obtaining an actual calorific test of the coals they bought and used. Instead of buying coals by the ton they should purchase by the number of heat units contained. If once the principle was established of paying so much per million of heat units delivered, the purchaser would be always sure of getting value for his money. Under the present system of buying fuel by the ton weight the purchaser might sometimes get what he paid for, but more often he did not. He was fortunate, Mr. Shawfield said, if he got as much as 60 per cent.

The directors of Pease and Partners announce that they have obtained a revision of the terms of the principal leases in connection with the new colliery at Thorne, near Doncaster. They have made arrangements for "freezing" both shafts at the colliery to the requisite depth, so that sinking operations can be carried out through the water-bearing strata, and the work is now being proceeded with.

Developments at the new colliery at Newbiggin, Northumberland, are making satisfactory headway, the winnings in the High Main and Yard seams being now well forward, and giving employment to some 400 men. Gas has been found in the High Main seam, and in consequence it has been found necessary to introduce safety lamps into that seam. The Yard Seam is so far free, and naked lights are accordingly employed. The latest reports show that there is a sustained demand for the coal, and the output is well maintained. Fillers are averaging 9s. per day—a figure well above the county average.

We understand that the Chamber Hall Colliery Company are opening out new mines and effecting surface improvements at their collieries in the Ashton-under-Lyne district.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.—December 17.

The Care of Pit Ponies.

Mr. George Greenwood asked the Secretary of State for the Home Department whether his attention had been called to the case of Samuel Robert Self, a pony corporal at the Glapwell Colliery, who was recently convicted at the Chesterfield county police court of gross cruelty to a pit pony, thereby causing its death, and sentenced to three months' imprisonment with hard labour; whether he was aware that during the hearing of the case evidence was given that during the period from June 1911 to November 28 last, 21 ponies had died in Glapwell Pit, that two had died there since the latter date, and that it was believed that the deaths of these animals had been caused by ill-treatment; whether he would cause an enquiry to be held as to the treatment of ponies in this mine; and whether he would appoint a special inspector for the district in which such mine was situated, as soon as possible.

Mr. McKenna said: I have made enquiry, and I find that when the colliery company prosecuted one of their men on November 28 for cruelty to a pony, their solicitor stated that since June, 1911, the company had lost 21 ponies, and that it was suspected that a considerable number of these had lost their lives through ill-treatment. No evidence to this effect was, however, given, and I am informed that the statement was made under a misapprehension. Besides the pony in connection with which the proceedings were taken, 13 ponies had during the period in question been destroyed or died, eight in consequence of mine accidents and five from other causes. There is no evidence in any of these cases that death was due to ill-treatment. The accommodation and supervision of the animals at the colliery were found by the inspector to be good, and the ponies at work were in good condition. Arrangements will be made for the ponies to be inspected shortly by the consulting veterinary surgeon who has been appointed for the division.

Mr. W. E. Harvey: Will the right hon. gentleman make enquiries as to how long these ponies worked—the number of shifts a week?

Mr. McKenna: Certainly.

He added that special inspectors for this and other districts would, he understood, be appointed immediately. He was only waiting until the result of the test examinations was known.

December 18.

Mr. Duncan Millar asked the Home Secretary whether the inspectors of pit ponies under the Coal Mines Act, 1911, had yet been appointed; and whether, having regard to the number of mines in which ponies were used, he would consider as to making a number of additional appointments beyond the six appointments originally contemplated, in order to secure proper inspection.

Mr. McKenna said: Candidates for the six appointments were nominated by me, in accordance with the recommendations of the Board for Examinations, at the beginning of this month, and the Civil Service Commission were asked to take the necessary steps for the purpose of their appointment as speedily as possible. As I have already explained, it is the duty of the ordinary inspectors as well as of the special inspectors, to take note of the conditions at the mines they visit, in respect of the treatment of the animals employed, and arrangements have been made to give them the assistance, when necessary, of skilled veterinary advice. Until I have had an opportunity of seeing how the new arrangements work, I do not think it would be in accordance with the statements made in Parliament during the passage of the Bill to make any further appointments.

Hours of Winding Enginemen.

Mr. Duncan Millar asked the Home Secretary whether the regulations under Section 57 of the Coal Mines Act of 1911 relating to the shifts of winding enginemen had been finally adjusted, and when they would be issued.

Mr. McKenna said: No, sir; as I have already stated, the objections which were made to the draft regulations have, in pursuance of the Act, to be referred to a referee for enquiry, and the enquiry has not yet been held. The appointment of the referee rests with the reference committee under section 117 of the Act.

THE COAL AND IRON TRADES.

Thursday, December 19.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 34,839 tons of coal and 92 tons of coke were despatched from Tyne Dock, a decrease of 117,976 tons of coal and 1,526 tons of coke when compared with the shipments for the corresponding week of last year. The Blyth clearances totalled 7,341 tons of coal and coke, a decrease of 85,308 tons. There appear to have been no coal or coke shipments from Dunston. The heavy decreases are, of course, mainly due to the dislocation of industry caused by the railway strike. Monday witnessed a full resumption of work on the part of the railwaymen, and liberated to their occupations the thousands of miners who had been laid idle by the dispute. Up to the time of writing, however, the coal trade has not settled down into its usual trend. Collieries are very much hampered for want of a sufficient supply of empty wagons to convey the coal for shipment. At the shipping places, on the contrary, tonnage is present in embarrassingly large volume. On Monday there were stated to be 31 steamers lying at Dunston, over 50 at Tyne Dock, and as many at Blyth. At Tyne Dock only vessels with cargoes to discharge were being admitted, those on turn to load having to wait outside. It will take several days to clear away this congestion. Meanwhile, shippers have the satisfaction of knowing that coal freights are relatively cheap owing to the glut of vessels. Prompt business is not likely to be transacted in any considerable volume until after the advent of the new year, for the available production is used largely for contract requirements. F.o.b. quotations for prompt shipment are generally rather higher than those which ruled before the strike commenced, but figures are only approximate, as the market has not yet had an opportunity of "shaking down." Quotations are as follow, by comparison with those given a fortnight since:—Best steams, Blyths (D.C.B.), 15s. to 15s. 6d. per ton, an advance of from 3d. to 6d.; Tynes (Bowers, &c.), 15s. 6d., 6d. dearer; seconds, Blyths, 15s., 1s. 6d. higher; Tynes (Hastings or West Hartleys), 15s., 1s. increase; unscreened, 13s. 6d. to 14s., 1s. more; smalls, Blyths, 11s. 6d., from 6d. to 9d. up; Tynes, 11s., 1s. advanced; specials, 11s. 6d. to 12s., unaltered; smithies, 17s., 1s. more; gas bests (New Pelton or Holmside), 16s. to 16s. 6d., 6d. up; seconds (Pelaw Main or similar), 15s., unchanged; specials, 16s. 6d., 6d. increased; unscreened bunkers, Durhams, 14s. 9d. to 15s. 6d., a decline of from 3d. to 6d.; Northumbrians, 13s. 6d. to 14s. 6d., 1s. dearer; coking coal, 16s., steady; smalls, 15s. 6d., stronger; households, 15s. 6d. to 16s., unaltered; coke, foundry, 30s., no change; blastfurnace, 27s., firm; and gas coke, 22s., a decline of 6d. An enquiry for 400,000 tons of coking coal for shipment to Belgium over next year has been receiving attention, and it is stated that a portion of the contract has been allotted locally on the basis of ante-strike prices. Further sales are in negotiation. The contract to supply works at Aalborg with 12,000 tons of best steam coals has been placed with local merchants at a price stated to work out at from 13s. to 13s. 6d. f.o.b., shipment over the next six months. The Portuguese Railways are stated to be enquiring for a supplementary supply of 13,200 tons of Durham unscreened coking coal for January-February shipment. Best Blyth steams for next year's delivery are quoted at from 14s. to 15s. per ton f.o.b.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 81,135 tons of coal and 485 tons of coke, as compared with 100,795 tons of coal and 755 tons of coke for the corresponding period of 1911, being a decrease of 19,660 tons of coal and 270 tons of coke. Whilst the strike is settled there is very little available coal, several collieries not having got to work yet owing to the lack of trucks, only a very small quantity of coal is on offer, consequently prices are purely nominal. Gas coals are from 16s. to 17s. 6d. for best qualities, and prompt bunkers are commanding fancy prices, 16s. to 17s. being asked for ordinary kinds, and for smalls of good quality the price is 15s.; but there is very little business passing at these figures. A few days at least must elapse before any reliable idea can be formed as to values. Coke quotations are nominal. Best foundry coke is quoted at 30s. to 34s., blast-furnace coke at 30s., and gas-house coke at 20s. to 22s. Supplies are limited until after the holidays. There is more life in the outward freight market; the rate for London has advanced to about 4s., and Hamburg 4s. 3d. To the Bay Bordeaux has been done at 5s. Mediterranean has fair enquiry, but until the accumulation of tonnage is provided for, rates are sloppy, Genoa only paying 8s. 6d. to 9s., but for January loading 10s. is quoting, turns being very difficult to arrange; there will be very little chartering until the holidays are got out of the way.

Middlesbrough-on-Tees.

COAL.

Work has been resumed, on the north-east coast, at the collieries which were laid idle by the railwaymen's strike. Business, however, is very quiet, as so much coal is sold for delivery before the holidays that there is little chance of new transactions. It is difficult, therefore, to fix prompt prices. Best gas coal is about 16s. to 16s. 6d., with second class in the neighbourhood of 15s. 9d. Bunker coal ranges from 14s. 9d. to 16s. f.o.b. Supplies of coke are now coming to hand, but they are not regular. As is usual at this season of the year, demand is full. Quotations are nominal, buyers and sellers alike holding off. Blastfurnace coke may be put at 30s. for delivery at Teesside works; foundry kinds are quoted up to 35s., and gas house coke is 21s. 6d. to 22s.

IRON.

Blastfurnaces are gradually getting into working order after the enforced stoppages for lack of coke supplies due to the recent strike of railwaymen. There is very little business passing just now, and quietness is likely to rule until after the Christmas holidays. Values of Cleveland pig are easy in spite of the very excellent statistical situation. No. 3 g.m.b. is selling at 67s. 4½d. for early f.o.b. delivery, but that figure might be shaded. No. 4 foundry and No. 4 forge are about the same price as No. 3; mottled and white iron are each in the neighbourhood of 66s. 9d.; and No. 1 is on sale at 70s. There is no east coast hæmatite pig iron available for early delivery. Purchases can be made over periods next year at 82s. 6d. to 82s. 9d. Foreign ore is easier on the basis of 22s. 9d. ex ship Tees for rubio of 50 per cent. quality. There is very little business passing in the manufactured iron and steel industries, but all branches are very busily employed—so much so, that many producers do not care to enter into further contracts just now, especially as they look for further improvement in values in the near future. Principal market quotations stand:—Common iron bars, £8 10s.; iron ship plates, £8; iron ship angles, £8 10s. to £8 12s. 6d.; iron ship rivets, £9 15s.; steel bars (basic), £7 15s.; steel bars (Siemens), £8 5s.; steel ship plates, £8 5s.; steel ship angles, £7 17s. 6d.; steel joists, £7 7s. 6d. to £7 10s.; cast iron railway chairs, £4 10s.; light iron rails, £7 to £7 5s.; heavy steel rails, £6 15s.; and steel railway sleepers, £7 to £7 2s. 6d.—railway material net and all other descriptions less 2½ per cent.

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South-West Lancashire.

COAL.

The colder weather and the approach of the Christmas stoppage have put a fair amount of briskness in the inland household trade, and some pressure is already being felt for special qualities. Prices are unchanged, at about the following figures:—16s. 3d. for best coals, good medium grades 14s. 6d. to 14s. 9d., and kitchen coals 12s. 3d.—all into wagons at the pits. Forges and users of screened coal for manufacturing purposes continue to take full supplies, with prices at about 12s. 6d. for ordinary grades. There is a strong demand for shipping for all classes of fuel, and very little coal to spare until after the New Year holidays. Railway traffic is working very badly, and in some instances coal in urgent demand has had to be put on the ground at the collieries for want of empty wagons. Prices naturally are higher, and for any small quantity of Lancashire steam coal that may be available, 13s. 6d. to 14s. 6d. f.o.b. can be readily obtained. The coastwise and cross-Channel trade for household coals also shows a considerable improvement, and prices are firm at about 16s. 6d.—and in some cases a little more than that for best coals—with good medium grades 15s. to 15s. 3d., both f.o.b. Garston and net. There is nothing fresh to say in reference to slacks. Week by week the demand gets more urgent, and a very strong tone prevails both for open sale and for the few contracts that remain unbooked for deliveries over next year.

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South Lancashire and Cheshire.

COAL.

There was a good attendance on the Manchester Coal Exchange on Tuesday. The demand for house coal has steadily improved, and prices are firm at late rates: 16s. 6d. to 17s. for the best house grades, with good medium qualities at 15s. 3d. to 16s., and the commoner sorts from 12s. 6d. to 13s.—all into wagons at the pit. Furnace coal continues in good request, with steady prices at about 12s. 6d. per ton at the pit. Shipping coal is brisk and prices firm at about 14s. f.o.b. Partington. In some cases advances have been obtained. The heavy call for slack is maintained, with very firm prices at about 9s. to 9s. 9d. for the best qualities, and the commoner grades at from 8s. to 6s. 6d.—all into wagons at the pit. For early delivery somewhat higher prices have been got.

IRON.

There was a good attendance on 'Change in Manchester on Tuesday last. Pig iron remains very firm, and prices are well maintained. All the forges are extremely busy, with crown iron at £8 15s., second quality £8 5s., hoops £8 17s. 6d., sheets £9 7s. 6d., and are very backward with deliveries. The steelworks are also busy, with bars at £8 7s. 6d., less 2½ per cent., and billets £6 7s. 6d. net. Heavy engineers and foundries fairly well employed. Wagon builders fully occupied. Textile machinery makers full of work.

Yorkshire and Derbyshire.

Leeds.

COAL.

There was another big muster of traders on the Yorkshire Coal Exchange on Tuesday, and, being the last market before the holidays, there was a considerable degree of animation. This was especially the case in regard to all descriptions of steam-raising fuel. The most persistent enquiries were met for coking slacks and small washed nuts. Local merchants were more disposed to buy small parcels of house coal, but on the whole this department of the trade was neglected. Complaints of serious delays on the railways were numerous, and instances were given of loaded trucks occupying 10 days to get from the collieries to the depots—a distance of less than 20 miles. The collieries, too, have suffered considerably from the same cause, and the average time worked during the week will probably equal only five full days. Business in house coal continues curiously quiet in view of the holidays. London merchants and factors have been content with contract tonnage. Reports from the metropolitan depots indicate a very quiet state of things in the retail trade. In spite of this, however, pit prices are maintained at about the following average:—Haigh Moor selected, 14s. to 14s. 6d.; Wallsend and London best, 13s. to 13s. 9d.; Silkstone best, 13s. to 13s. 6d.; Silkstone house, 12s. to 12s. 6d.; house nuts, 11s. to 11s. 6d. In the coastwise trade, shipping tonnage has been more plentiful, and freights are distinctly easier. Business has been done this week at the following f.o.b. Hull prices:—Haigh Moor best, 16s. 6d. to 17s. 3d.; Silkstone best, 15s. 9d. to 19s. 6d.; Silkstone house, 14s. 6d. to 15s.; house nuts, 13s. 6d. to 14s. In Leeds, Bradford, Halifax, Huddersfield and the heavy woollen district, merchants are a shade busier, but the demand runs mainly on the cheaper qualities. Current quotations:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 15s. 6d.; ordinary house coal, 14s. to 15s.; secondary sorts, 13s. to 14s. In manufacturing fuel there is a pronounced scarcity, and spot parcels are readily bought at higher figures. Rough slacks and small washed nuts are particularly scarce. Current pit prices:—Washed nuts, 11s. 3d. to 12s. 3d.; large double-screened engine nuts, 10s. 9d. to 11s. 6d.; small nuts, 10s. to 10s. 6d.; rough unscreened engine coal, 10s. 6d. to 11s.; best rough slacks, 8s. 9d. to 10s.; small slacks, 8s. 3d. to 8s. 9d.; coking smalls, 7s. 6d. to 8s. 6d. Washed furnace coke is in great demand for Frodingham and the Midlands, but less is being sent to the Middlesbrough district. Average samples realise 20s. at the ovens, with special qualities up to 21s. There is practically nothing offering in the shape of gas coal, as contract deliveries absorb the whole output. A few spot lots are reported to have been sold at the following pit prices:—Screened gas coal, 12s. to 13s. 6d.; gas nuts, 11s. to 12s. 6d.; unscreened gas coal, 10s. 6d. to 11s. 6d. There is a brisk demand for gas coal for export at the Humber ports, and for December shipment the following f.o.b. prices are quoted:—Screened gas coal, 14s. to 14s. 6d.; gas nuts, 13s. to 13s. 6d.; unscreened gas coal, 13s. 3d. to 13s. 9d. There will be no market next week, and it is anticipated that very little business will be done after the stoppage for the Christmas holidays until the new year.

Barnsley.

COAL.

The indication apparent last week of the upward tendency of prices for most classes of steam coal has been fully realised, and at the local exchange on Wednesday there was a very large attendance of buyers who were anxious to secure their requirements for the early part of next year. Coalowners who have largely completed their arrangements for the coming year were in a very firm mood in regard to forward business, and in several respects values jumped up to a somewhat remarkable extent. Large steam coal, which hitherto had remained somewhat steady, was influenced by the larger tonnage which is being required, and no doubt the prospected heavier demand for the lower Baltic ports had a great deal to do with forcing up prices. The best large steams freely made from 12s. 3d. to 12s. 6d. per ton, and it was reported that shippers are now seeking to fix up arrangements at 11s. 9d., which they were quoted a few weeks back, but their offers met with little response. Secondary qualities of large steam coal also were dearer, from 11s. to 11s. 6d. now being obtained, and in a smaller degree better prices were realised for Parkgate and Shafton fuel, which in the present times of high prices are being more largely requisitioned. It became known that the Midland and Lancashire and Yorkshire railway companies which had been holding back from accepting tenders at 11s. 6d., had now agreed to pay the figure, and of course the placing of so great a bulk of fuel, which the railway companies now take from this district, also contributed to the advantage of sellers. The remarkable dearth of small coal for manufacturing purposes still prevails, and though it seems almost incredible to the collieries making full time, buyers were unable to obtain adequate supplies even at much advanced prices. As an alternative, these consumers are falling back upon secondary qualities of house nuts, which have been freely taken, although an increase of from 1s. 6d. to 2s. per ton has to be paid when compared with the price of slacks. Under the

THE WELSH COAL AND IRON TRADES.

Thursday, December 19.

North Wales.

Ruabon.

COAL.

The general condition of the coal trade in this locality is good, and the outlook, for the next few months, at any rate, is distinctly promising. All the collieries are in full work, with a plenitude of orders, both for immediate and forward deliveries. Wagons are being returned to the collieries somewhat more satisfactorily than has been the case of late. Household coal is in great demand. Gas coal is also in good demand, as gasworks managers are anxious to get in extra stock to carry them over Christmas. The colliery companies are also disposing of their steam coal without any trouble, and there is very little available for shipment. The position of nuts remains unchanged, there are very few on the open market, and what there are finds a ready sale at a good price. Slack is readily disposed of, both for manufacturing and coking purposes, and the supply is limited of good rough qualities. Gas coke remains firm. The average prices are about the same as last week's, with few exceptions, best large household coal being worth 16s. to 17s. per ton f.o.r.; second quality, 1s. per ton less; steam coal, 14s. per ton; nuts, 12s.; slack, up to 9s. 6d. according to quality; and gas coke about 18s. at works.

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Monmouthshire, South Wales, &c.

Newport.

COAL

Market indications to-day present much the same appearance as last week. There is now very little actual business passing, collieries being taxed to the uttermost to provide for current commitments. Tonnage is ready in large quantities, and shippers are unsparing in their efforts to get away steamers before the holiday break. Colliery stems for January are filling up rapidly, so buyers, who at the moment seem generally disinclined to book at present ruling values, seem content to await the advent of the new year before coming to terms. Smalls continue to maintain the relative high values lately ruling, supplies still being extremely scanty. Values of other qualities are also fully maintained. The house coal trade continues brisk both for export and inland delivery. Pitwood rules easier around 22s. for good wood. In the freight market, rates appear to have passed their nadir for the time being, a stronger tendency developing for all destinations. Latest approximate ruling quotations may be taken as follow, coal prices cash in 30 days, less 2½ per cent.:—Coal: Very best Newport Black Vein large, 16s. 9d. to 17s. 3d.; western-valleys, ordinaries, 16s. 3d. to 16s. 6d.; eastern-valleys, best, 15s. 9d. to 16s. 3d.; other sorts, 15s. 6d. to 15s. 9d.; colliery smalls, best, 12s. 9d. to 13s. 3d.; seconds, 11s. 9d. to 12s.; inferiors, 11s. 3d. to 11s. 6d.; screenings, 13s. to 13s. 6d.; through coals, 14s. to 15s.; nuts, best washed, 14s. 6d. to 15s.; house coal, best, 18s. 6d. to 19s.; seconds, 17s. 6d. to 18s. Patent fuel, 19s. 6d. to 20s. Coke: Furnace, 22s. to 23s.; foundry, 27s. to 30s.

IRON.

Whilst there is very little fresh business moving in the local iron and steel trades, there is, if anything, more rush of work than last reported, and every effort is being made to wipe off arrears of deliveries. Prices in all departments have a strong tendency, but nominally there are few changes to report. There has again been a good output at bar mills, prices ruling unaltered at £5 17s. 6d. Bessemer and £5 17s. 6d. to £6 Siemens for Welsh tin-plate bars. Rail mills are again fully engaged, quotations showing no variation from last figures. There is no easing of the pressure at blast furnaces, where the congestion of orders is extreme and arrears of deliveries very heavy. Prices have again advanced to 91s. to 92s. for Welsh hæmatite delivered to works in the district. Iron ore rules unaltered at 22s. to 22s. 6d. for best rubio c.i.f. Newport. There is now very little fresh enquiry in the tin-plate trade, and the outlook, although not disquieting, is not so rosy as makers would like. Values presently remain based upon 15s. 6d. Bessemer and 15s. 6d. to 15s. 9d. Siemens for 20 × 14 × 112.

Cardiff.

COAL.

The collieries have had a very satisfactory week, with the exception that the difficulty in obtaining tips has continued to be very pressing. The number of vessels in port never fell below 200, whilst on one day they exceeded 250, and the shipments for the week amounted to over 531,000 tons, a record that has rarely been exceeded. Owing to the stormy weather, arrivals over the week-end were much less than expected, and as during next week, in consequence of the holidays, operations will be very greatly restricted, it is anticipated that arrivals from the date of writing will show a daily increasing number. Prices all round are much firmer. For best steam large they range from 18s. 3d. to 18s. 9d., whilst for January loading 19s. has been paid. Even at the latter figure sellers are not at all anxious to close, as they are favourably situated so far as the orders they have already on their books are concerned. Superior second Admiralties command from 17s. 9d. to 18s., and ordinary seconds from 17s. 6d. to 17s. 9d. With regard to contracts for next year, sellers for the most part are holding their hands, as they see no reason whatever to anticipate any diminution in the demand. It is undisputed that at present there is world-wide shortage of coal, notwithstanding the fact that collieries both in this country and abroad are practically at the limit of their capacity. Information from Russia on this point is particularly interesting, as it clearly foreshadows that a large demand will have to be met by other coal producers. The Minister of Marine at St. Petersburg has been authorised to place orders for 23,000 tons of Welsh coal for the port of Sebastopol. The result of the tenders sent in for the supply of 50,000 tons of best steam coals for the French Admiralty is expected to be known on Monday next. Extraordinary activity is being shown by the Austrian Naval Department. It is only a short time ago that they contracted for the supply of patent fuel up to the end of March next, and now they are in the market for an additional 50,000 tons for delivery from March to the end of the year. On the top of these enquiries there have come into the market applications for tenders for the supply of 80,000 tons of double-screened best Welsh coals for the Roumanian State Railways from the end of December for the eight months following. Naturally this enquiry has given rise to considerable uneasiness as to the result of the Peace Conference in London, but though nobody likes the mobilisation that for some time has been going on both in Austria and Russia, optimistic feelings are still in the ascendant. One disturbing element in our own country—that of the strike on the North Eastern Railway—has fortunately been terminated. While it lasted it had an undoubted effect on the South Wales coal market, for through the diversion of vessels northward bound to the Bristol Channel ports, it caused freights to tumble rapidly from the high pinnacle to which they had attained, and, as has been pointed out on more than one occasion in these columns, a reduction in the rate of freight is immediately reflected in the price of coal. In consequence of the difficulty experienced in stemming, merchants in a position to practically guarantee a turn for their boats have been able to charter on very favourable terms. It is, of course, very rare that there is such a combination of circumstances all tending in favour of the collieries, and they are not likely to be repeated just yet. Chartering last week was exceptionally light, the quantity of tonnage taken up only representing a carrying capacity of about 200,000 tons, or less than half that taken up in the preceding six days. In the small coal market the demand has more than overtaken the supply, with the result that prices generally have ruled high. Towards the close of last week as much as from 14s. 9d. to 15s. was paid for cargo qualities, but this week there is an easier feeling, and one or two buyers have been fortunate enough to make purchases at 13s. 9d. to 14s. for immediate delivery. Best bunkerings have sold at 15s. 6d., whilst one or two sellers have demanded as much as 16s. Best ordinaries are 15s to 15s. 3d., best washed nuts are 16s., and washed peas 14s. 6d. The Belgian State Railways have been in the market for supplies for the next six months. Most of their purchases are now made from the Belgian collieries, and they only come into the English and Welsh markets for coals which are unobtainable in their own country. It is reported that Welsh firms have secured orders for 120,000 to 150,000 tons, but no confirmation of this at the time of writing had been received. There is but little free Monmouthshire coal on the market, and consequently very little business is passing. Prices continue very strong, Black Vein coals selling at round about 17s. 6d., western valleys at 17s. to 17s. 3d., best eastern valleys at 16s. 9d., and seconds at 16s. 3d. to 16s. 6d., in each case f.o.b. Cardiff. Tenders have gone in for the supply of 160,000 metrical tons of Monmouthshire and second Cardiff steam coals for the Egyptian State Railways. It is reported that the prices tendered are about 1s. to 1s. 3d. per ton above those at which a similar contract was placed about two months ago. The Custom House returns to hand show that the exports of coal to foreign countries from the Bristol Channel ports during the month of November amounted to 2,614,539 tons, as against 2,236,608 tons in the corresponding month of last year, being an increase of 377,931 tons. From Cardiff alone the shipments totalled 1,702,814 tons, an increase of 184,337 tons. From Newport they amounted to 391,308 tons, an increase of 82,308 tons; from Swansea 321,360 tons, an increase of 24,300 tons, while from Port Talbot there were shipped 175,177 tons, an increase of 74 313 tons. The following table shows the exports to the chief countries of the world, as well as those in November of last year:—

	November 1911. Tons.	November 1912. Tons.
Russia	7,295	19,443
Sweden	21,569	29,679
Norway	8,601	32,054
Denmark	1,268	6,883
Germany	32,146	26,586
Netherlands	11,728	21,201
Belgium	19,474	35,078
France	486,670	625,775
Algeria	48,061	59,747
French Somaliland	—	12,369
Portugal	55,416	79,620
Azores	2,747	5,166
Madeira	9,188	14,426
Spain	72,241	112,229
Canary Islands	45,140	85,071
Italy	501,708	510,318
Austria-Hungary	11,486	5,752
Greece	14,962	74,653
Roumania	24,234	10,100
Turkey (European)	7,397	—
„ (Asiatic)	9,614	—
Egypt	149,646	145,550
Tunis	9,858	14,610
Chili	28,785	27,149
Brazil	124,347	161,134
Uruguay	98,215	46,036
Argentine Republic	256,381	295,530
Channel Islands	3,745	7,592
Gibraltar	6,682	23,867
Malta	31,622	53,254
Aden	14,366	10,383
British India	17,073	250
Straits Settlements	6,267	497
Ceylon	29,315	18,299
Hong Kong	11,058	5,903
West Africa (French)	4,664	7,273
„ (Portuguese)	4,741	10,499
„ (British)	7,183	5,911

There is a greatly improved demand for Rhondda bituminous coals and some collieries are asking 16s. 6d. for No. 3 large, but sales have been made more than once at 18s. Through-and-through is 16s. 3d. to 16s. 6d., and small 15s. 6d. No. 2 large is about 16s., through-and-through 14s. 6d. to 14s. 9d., and small 13s. 6d. Patent fuel manufacturers are exceedingly busy on their contracts. From the Crown works there have been shipped during the week 21,729 tons, whilst other local works have contributed 6,400 tons. Swansea has exported 11,301 tons and Newport 7,686 tons. Prices are very firm, best brands being 22s. 6d. to 23s., and seconds about 1s. 6d. less. It is reported that of the 52,000 tons of patent fuel required by the Bona Guelma Railways, the Anchor Company have secured 15,000 tons, but at what price has not been disclosed. Coke keeps very scarce and special foundry commands 32s. and ordinary 30s. per ton. Furnace coke is from 25s. to 27s. Pitwood has receded to 22s. per ton.

IRON.

A heavy addition has been made to stocks of tin-plates which now stand at 235,000 boxes. Many works are in need of orders, and are accepting very low prices in order to keep their machinery running. For 28 × 20 plates as low as 29s. 9d. has been taken for prompt delivery, or fully 6d. less than the ordinary quotation. Bessemer standard cokes have been sold at 14s. 10½d. to 15s., and oil sizes at 15s. 3d., but many makers demand 3d. to 6d. above these figures. Black-plate is easier, £10 5s. to £10 7s. 6d. being accepted for P. and C. A. rectangles. The steel bar mills keep busy, notwithstanding the fairly large shipments from Germany and America. Over 1,350 steel bars have come forward from American makers for some of the mills in the Swansea district. Siemens tin bars are steady at £6. and Bessemer at £5 17s. 6d. per ton. There is no material change in galvanised sheets. The principal works quote £12 7s. 6d. for 24-gauge corrugateds, but others are taking £12 5s. Big sheets for galvanising, 30-gauge, are quoted at from £10 5s. to £10 10s., or 5s. reduction. Welsh pig iron is steady at 87s. 6d. f.o.t. Rubio iron ore keeps firm, despite the fall in freights from Bilbao. Scrap metals fetch rather more money, particularly cast, which is now 57s. 6d. to 60s. Light wrought has also gone up to 40s.

Swansea.

COAL.

The returns of the trade of the port during the past week were again very favourable, notwithstanding the severe weather experienced. The coal and patent fuel trades continued brisk, the shipments amounted to 126,592 tons. There was a capital attendance on 'Change this morning, and there was no alteration in the general condition of the anthracite market, the undertone being firm. Swansea Valley large was scarce, and last week's quotations were fully upheld. Red Vein large is also a strong market. Machine-made nuts and cobbles were firm, but beans were rather slow. Rubbly culm was firm at last figures, as also was duff. There was a very strong feeling in evidence in the steam coal market, and prices for all qualities were well maintained. Bunkers were again slightly advanced. The following were approximately the closing quotations:—Best malting large (hand-picked), 23s. 6d. to 25s. 6d. net; second quality ditto, 22s. 6d. to 23s. net; Big Vein large, 19s. 6d. to 21s. 6d., less 2½ per cent.; Red Vein large, 15s. 9d. to 16s. 6d., less 2½ per cent.; machine-made cobbles, 21s. 9d. to 23s. 9d.; Paris nuts, 23s. 6d. to 26s. 9d.; French nuts, 23s. 6d. to 27s.; German nuts, 23s. 6d. to 26s. 9d.; beans, 20s. 6d. to 23s.; machine-made large peas, 12s. to 14s.; ditto fine peas, 10s. 6d. to 12s., all net; rubbly culm, 6s. 9d. to 7s. 3d., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 17s. 6d. to 19s.; seconds, 14s. 9d. to 17s. 6d.; bunkers, 13s. 6d. to 17s.; small, 10s. 6d. to 11s. 9d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 19s.; through-and-through, 15s. to 15s. 6d.; smalls, 13s. 6d. to 15s. 6d., all less 2½ per cent. Patent fuel, 17s. to 17s. 9d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

During the past week the yield of pig iron was quite up to the standard of similar recent periods, and in the aggregate the output of steel bars at various works in the district favourably compared with that of any week in the past quarter. A good demand continued for home-rolled material. Normal conditions prevailed at the Mannesmann tube works, and at the foundries in the district. Engineering works had ample work on hand, and there need be no fear of slack times in this particular trade for many weeks to come. The shipments of tin-plates last week were 96,185 boxes, receipts from works 133,386 boxes, and stocks in the dock warehouses and vans 235,017 boxes.

Llanelly.

COAL.

There is very little alteration to report in the coal trade this week. Orders are still very plentiful for most kinds, and prices are about the same. Weather conditions have not been at all favourable for shipping. This has caused stocks to accumulate and several pits are rather short of empties. There is a big rush for all manufacturing kinds, owing to the holidays next week. All steam and bituminous sorts have a strong enquiry and, even at the high prices ruling, there is a big scarcity. Consumers are trying hard to book up their requirements for the first six months at least, but as so many of the collieries have sold their make it is not an easy matter. Bunkers are higher than they have been for years. The anthracite kinds are not all in good demand. There seems a lull in the enquiry for the machine-made kinds and prices are not so firm. Large, culm, and duff are moving well. Prices this week are:—Best malting large, 25s. to 25s. 6d.; seconds, ditto, 23s. to 24s.; Big Vein large, 19s. 6d. to 21s. 6d; Red Vein large, 15s. to 16s.; machine-made cobbles, 22s. to 23s.; German, Paris and French nuts, 25s. to 26s.; machine-made beans, 21s. to 22s.; machine-made peas, 12s. 6d. to 13s.; rubbly culm, 6s. 6d. to 7s. 6d.; duff, 4s. 6d. to 5s. 6d.; large steam, 16s. 6d. to 17s. 6d.; through-and-through, 15s. to 16s.; small steam, 10s. 6d. to 11s.; bituminous small, 11s. to 12s. —all f.o.b.

An important extension has just been carried out on the West Riding Joint Railway, which is worked by the Great Northern and Great Central railway companies, between Nostell and the junction with the Hull and Barnsley line at South Hemsworth Junction. To relieve congestion, a new down main line about four miles in length has been completed, and what was formerly the up main line has been converted into the up goods line, thereby giving an independent line for goods and coal traffic between these points. The new line was opened in October, and has been taking a considerable traffic, not only from Hemsworth and Nostell, but also from Brodsworth and Bullcroft.

H COAL AND IRON TRADES.

HURSDAY, DECEMBER 19.

North Wales.

COAL.

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f orders, both for immediate and forward
ns are being returned to the collieries
tisfactorily than has been the case of late.
in great demand. Gas coal is also in
gasworks managers are anxious to get in
rry them over Christmas. The colliery
o disposing of their steam coal without
here is very little available for shipment.
nuts remains unchanged, there are very
market, and what there are finds a ready
ce. Slack is readily disposed of, both for
nd coking purposes, and the supply is
rough qualities. Gas coke remains firm.
es are about the same as last week's, with
st large household coal being worth 16s.
r.; second quality, 1s. per ton less; steam
nuts, 12s.; slack, up to 9s. 6d. according
as coke about 18s. at works.

thshire, South Wales, &c.

COAL

ons to-day present much the same appear-
There is now very little actual business
being taxed to the uttermost to provide
nitments. Tonnage is ready in large
hippers are unsparing in their efforts to
rs before the holiday break. Colliery
are filling up rapidly, so buyers, who at
generally disinclined to book at present
em content to await the advent of the
coming to terms. Smalls continue to
ative high values lately ruling, supplies
mely scanty. Values of other qualities
ntained. The house coal trade continues
port and inland delivery. Pitwood rules
. for good wood. In the freight market,
ave passed their nadir for the time being,
oy developing for all destinations. Latest
g quotations may be taken as follow, coal
days, less 2½ per cent.:—Coal: Very best
Vein large, 16s. 9d. to 17s. 3d.; western-
s, 16s. 3d. to 16s. 6d.; eastern-valleys,
16s. 3d.; other sorts, 15s. 6d. to 15s. 9d.;
est, 12s. 9d. to 13s. 3d.; seconds, 11s. 9d.
11s. 3d. to 11s. 6d.; screenings, 13s. to
coals, 14s. to 15s.; nuts, best washed,
ouse coal, best, 18s. 6d. to 19s.; seconds,
atent fuel, 19s. 6d. to 20s. Coke: Furnace,
dry, 27s. to 30s.

IRON.

very little fresh business moving in the
el trades, there is, if anything, more rush
reported, and every effort is being made
s of deliveries. Prices in all departments
endency, but nominally there are few
There has again been a good output at
uling unaltered at £5 17s. 6d. Bessemer
o £6 Siemens for Welsh tin-plate bars.
in fully engaged, quotations showing no
ast figures. There is no easing of the
furnaces, where the congestion of orders
rrears of deliveries very heavy. Prices
nced to 91s. to 92s. for Welsh hæmatite
in the district. Iron ore rules unaltered
. for best rubio c.i.f. Newport. There is
esh enquiry in the tin-plate trade, and the
not disquieting, is not so rosy as makers
es presently remain based upon 15s. 6d.
. 6d. to 15s. 9d. Siemens for 20 × 14 × 112.

COAL.

ave had a very satisfactory week, with the
e difficulty in obtaining tips has continued
g. The number of vessels in port never
ilst on one day they exceeded 250, and
the week amounted to over 531,000 tons,
s rarely been exceeded. Owing to the
rrivals over the week-end were much less
d as during next week, in consequence of
ations will be very greatly restricted, it is
rrivals from the date of writing will show
g number. Prices all round are much
steam large they range from 18s. 3d. to
or January loading 19s. has been paid.
figure sellers are not at all anxious to
favourably situated so far as the orders
on their books are concerned. Superior
es command from 17s. 9d. to 18s., and
from 17s. 6d. to 17s. 9d. With regard to
year, sellers for the most part are holding
ey see no reason whatever to anticipate
the demand. It is undisputed that at
rld-wide shortage of coal, notwithstanding
eries both in this country and abroad are
e limit of their capacity. Information
is point is particularly interesting, as it
s that a large demand will have to be
producers. The Minister of Marine at
as been authorised to place orders for
sh coal for the port of Sebastopol. The
ers sent in for the supply of 50,000 tons
s for the French Admiralty is expected to
be known on Monday next. Extraordinary activity is being shown by the Austrian Naval Department. It is only a short time ago that they contracted for the supply of patent fuel up to the end of March next, and now they are in the market for an additional 50,000 tons for delivery from March to the end of the year. On the top of these enquiries there have come into the market applications for tenders for the supply of 80,000 tons of double-screened best Welsh coals for the Roumanian State Railways from the end of December for the eight months following. Naturally this enquiry has given rise to considerable uneasiness as to the result of the Peace Conference in London, but though nobody likes the mobilisation that for some time has been going on both in Austria and Russia, optimistic feelings are still in the ascendant. One disturbing element in our own country—that of the strike on the North Eastern Railway—has fortunately been terminated. While it lasted it had an undoubted effect on the South Wales coal market, for through the diversion of vessels northward bound to the Bristol Channel ports, it caused freights to tumble rapidly from the high pinnacle to which they had attained, and, as has been pointed out on more than one occasion in these columns, a reduction in the rate of freight is immediately reflected in the price of coal. In consequence of the difficulty experienced in stemming, merchants in a position to practically guarantee a turn for their boats have been able to charter on very favourable terms. It is, of course, very rare that there is such a combination of circumstances all tending in favour of the collieries, and they are not likely to be repeated just yet. Chartering last week was exceptionally light, the quantity of tonnage taken up only representing a carrying capacity of about 200,000 tons, or less than half that taken up in the preceding six days. In the small coal market the demand has more than overtaken the supply, with the result that prices generally have ruled high. Towards the close of last week as much as from 14s. 9d. to 15s. was paid for cargo qualities, but this week there is an easier feeling, and one or two buyers have been fortunate enough to make purchases at 13s. 9d. to 14s. for immediate delivery. Best bunkerings have sold at 15s. 6d., whilst one or two sellers have demanded as much as 16s. Best ordinaries are 15s. to 15s. 3d., best washed nuts are 16s., and washed peas 14s. 6d. The Belgian State Railways have been in the market for supplies for the next six months. Most of their purchases are now made from the Belgian collieries, and they only come into the English and Welsh markets for coals which are unobtainable in their own country. It is reported that Welsh firms have secured orders for 120,000 to 150,000 tons, but no confirmation of this at the time of writing had been received. There is but little free Monmouthshire coal on the market, and consequently very little business is passing. Prices continue very strong, Black Vein coals selling at round about 17s. 6d., western valleys at 17s. to 17s. 3d., best eastern valleys at 16s. 9d., and seconds at 16s. 3d. to 16s. 6d., in each case f.o.b. Cardiff. Tenders have gone in for the supply of 160,000 metrical tons of Monmouthshire and second Cardiff steam coals for the Egyptian State Railways. It is reported that the prices tendered are about 1s. to 1s. 3d. per ton above those at which a similar contract was placed about two months ago. The Custom House returns to hand show that the exports of coal to foreign countries from the Bristol Channel ports during the month of November amounted to 2 614,539 tons, as against 2,236,608 tons in the corresponding month of last year, being an increase of 377,931 tons. From Cardiff alone the shipments totalled 1,702,814 tons, an increase of 184,337 tons. From Newport they amounted to 391,308 tons, an increase of 82,308 tons; from Swansea 321,360 tons, an increase of 24,300 tons, while from Port Talbot there were shipped 175,177 tons, an increase of 74 313 tons. The following table shows the exports to the chief countries of the world, as well as those in November of last year:—

	November 1911. Tons.		November 1912. Tons.
Russia	7,295	...	19,443
Sweden	21,569	...	29,679
Norway	8,601	...	32,054
Denmark	1,268	...	6,883
Germany	32,146	...	26,586
Netherlands	11,728	...	21,201
Belgium	19,474	...	35,078
France	486,670	...	625,775
Algeria	48,061	...	59,747
French Somaliland	—	...	12,369
Portugal	55,416	...	79,620
Azores	2,747	...	5,166
Madeira	9,188	...	14,426
Spain	72,241	...	112,229
Canary Islands	45,140	...	85,071
Italy	501,708	...	510,318
Austria-Hungary	11,486	...	5,752
Greece	14,962	...	74,653
Roumania	24,234	...	10,100
Turkey (European)	7,397	...	—
„ (Asiatic)	9,614	...	—
Egypt	149,646	...	145,550
Tunis	9,858	...	14,610
Chili	28,785	...	27,149
Brazil	124,347	...	161,134
Uruguay	98,215	...	46,036
Argentine Republic	256,381	...	295,530
Channel Islands	3,745	...	7,592
Gibraltar	6,682	...	23,867
Malta	31,622	...	53,254
Aden	14,366	...	10,383
British India	17,073	...	250
Straits Settlements	6,267	...	497
Ceylon	29,315	...	18,299
Hong Kong	11,058	...	5,903
West Africa (French)	4,664	...	7,273
„ (Portuguese)	4,741	...	10,499
„ (British)	7,183	...	5,911

There is a greatly improved demand for Rhondda bituminous coals and some collieries are asking 18s. 6d. for No. 3 large, but sales have been made more than once at 18s. Through-and-through is 16s. 3d. to 16s. 6d., and small 15s. 6d. No. 2 large is about 16s., through-and-through 14s. 6d. to 14s. 9d., and small 13s. 6d. Patent fuel manufacturers are exceedingly busy on their contracts. From the Crown works there have been shipped during the week 21,729 tons, whilst other local works have contributed 6,400 tons. Swansea has exported 11,301 tons and Newport 7,686 tons. Prices are very firm, best brands being 22s. 6d. to 23s., and seconds about 1s. 6d. less. It is reported that of the 52,000 tons of patent fuel required by the Bona Guelma Railways, the Anchor Company have secured 15,000 tons, but at what price has not been disclosed. Coke keeps very scarce and special foundry commands 32s. and ordinary 30s. per ton. Furnace coke is from 25s. to 27s. Pitwood has receded to 22s. per ton.

IRON.

A heavy addition has been made to stocks of tin-plates which now stand at 235,000 boxes. Many works are in need of orders, and are accepting very low prices in order to keep their machinery running. For 28 × 20 plates as low as 29s. 9d. has been taken for prompt delivery, or fully 6d. less than the ordinary quotation. Bessemer standard cokes have been sold at 14s. 10½d. to 15s., and oil sizes at 15s. 3d., but many makers demand 3d. to 6d. above these figures. Black-plate is easier, £10 5s. to £10 7s. 6d. being accepted for P. and C. A. rectangles. The steel bar mills keep busy, notwithstanding the fairly large shipments from Germany and America. Over 1,350 steel bars have come forward from American makers for some of the mills in the Swansea district. Siemens tin bars are steady at £6, and Bessemer at £5 17s. 6d. per ton. There is no material change in galvanised sheets. The principal works quote £12 7s. 6d. for 24-gauge corrugateds, but others are taking £12 5s. Big sheets for galvanising, 30-gauge, are quoted at from £10 5s. to £10 10s., or 5s. reduction. Welsh pig iron is steady at 87s. 6d. f.o.t. Rubio iron ore keeps firm, despite the fall in freights from Bilbao. Scrap metals fetch rather more money, particularly cast, which is now 57s. 6d. to 60s. Light wrought has also gone up to 40s.

Swansea.

COAL.

The returns of the trade of the port during the past week were again very favourable, notwithstanding the severe weather experienced. The coal and patent fuel trades continued brisk, the shipments amounted to 126,592 tons. There was a capital attendance on 'Change this morning, and there was no alteration in the general condition of the anthracite market, the undertone being firm. Swansea Valley large was scarce, and last week's quotations were fully upheld. Red Vein large is also a strong market. Machine-made nuts and cobbles were firm, but beans were rather slow. Rubbly culm was firm at last figures, as also was duff. There was a very strong feeling in evidence in the steam coal market, and prices for all qualities were well maintained. Bunkers were again slightly advanced. The following were approximately the closing quotations:—Best malting large (hand-picked), 23s. 6d. to 25s. 6d. net; second quality ditto, 22s. 6d. to 23s. net; Big Vein large, 19s. 6d. to 21s. 6d., less 2½ per cent.; Red Vein large, 15s. 9d. to 16s. 6d., less 2½ per cent.; machine-made cobbles, 21s. 9d. to 23s. 9d.; Paris nuts, 23s. 6d. to 26s. 9d.; French nuts, 23s. 6d. to 27s.; German nuts, 23s. 6d. to 26s. 9d.; beans, 20s. 6d. to 23s.; machine-made large peas, 12s. to 14s.; ditto fine peas, 10s. 6d. to 12s., all net; rubbly culm, 6s. 9d. to 7s. 3d., less 2½ per cent.; duff, 4s. 9d. to 5s. 6d., net. Steam: Best large, 17s. 6d. to 19s.; seconds, 14s. 9d. to 17s. 6d.; bunkers, 13s. 6d. to 17s.; small, 10s. 6d. to 11s. 9d., all less 2½ per cent. Bituminous: No. 3 Rhondda large, 17s. 6d. to 19s.; through-and-through, 15s. to 15s. 6d.; smalls, 13s. 6d. to 15s. 6d., all less 2½ per cent. Patent fuel, 17s. to 17s. 9d., less 2½ per cent. Coal quotations are all f.o.b. cash in 30 days.

IRON.

During the past week the yield of pig iron was quite up to the standard of similar recent periods, and in the aggregate the output of steel bars at various works in the district favourably compared with that of any week in the past quarter. A good demand continued for home-rolled material. Normal conditions prevailed at the Mannesmann tube works, and at the foundries in the district. Engineering works had ample work on hand, and there need be no fear of slack times in this particular trade for many weeks to come. The shipments of tin-plates last week were 96,185 boxes, receipts from works 133,386 boxes, and stocks in the dock warehouses and vans 235,017 boxes.

Llanelly.

COAL.

There is very little alteration to report in the coal trade this week. Orders are still very plentiful for most kinds, and prices are about the same. Weather conditions have not been at all favourable for shipping. This has caused stocks to accumulate and several pits are rather short of empties. There is a big rush for all manufacturing kinds, owing to the holidays next week. All steam and bituminous sorts have a strong enquiry and, even at the high prices ruling, there is a big scarcity. Consumers are trying hard to book up their requirements for the first six months at least, but as so many of the collieries have sold their make it is not an easy matter. Bunkers are higher than they have been for years. The anthracite kinds are not all in good demand. There seems a lull in the enquiry for the machine-made kinds and prices are not so firm. Large, culm, and duff are moving well. Prices this week are:—Best malting large, 25s. to 25s. 6d.; seconds, ditto, 23s. to 24s.; Big Vein large, 19s. 6d. to 21s. 6d; Red Vein large, 15s. to 16s.; machine-made cobbles, 22s. to 23s.; German, Paris and French nuts, 25s. to 26s.; machine-made beans, 21s. to 22s.; machine-made peas, 12s. 6d. to 13s.; rubbly culm, 6s. 6d. to 7s. 6d.; duff, 4s. 6d. to 5s. 6d.; large steam, 16s. 6d. to 17s. 6d.; through-and-through, 15s. to 16s.; small steam, 10s. 6d. to 11s.; bituminous small, 11s. to 12s. —all f.o.b.

An important extension has just been carried out on the West Riding Joint Railway, which is worked by the Great Northern and Great Central railway companies, between Nostell and the junction with the Hull and Barnsley line at South Hemsworth Junction. To relieve congestion, a new down main line about four miles in length has been completed, and what was formerly the up main line has been converted into the up goods line, thereby giving an independent line for goods and coal traffic between these points. The new line was opened in October, and has been taking a considerable traffic, not only from Hemsworth and Nostell, but also from Brodsworth and Bullcroft.

sorts of coal, 11s. 8·6d. The value of the coke exported was 17s. 1·7d. per ton, and of the manufactured fuel 16s. 1·2d. per ton.

A general meeting of the North of England Institute of Mining and Mechanical Engineers was held in the Wood Memorial Hall, Newcastle, on Saturday.

Further evidence was given at Doncaster on Saturday on three summonses issued by the Home Office against the agent and general manager of the Bentley Colliery, Doncaster. It is expected that the case will be concluded to-day (Friday).

A King's Bench Divisional Court on Monday reserved judgment in the appeal by Mr. John Atkinson, inspector of mines, against a decision of the Gateshead County Bench in a case where Mr. Henry M. Imrie, manager of Chopwell Colliery, was summoned on the charge of having contravened a requirement of the Coal Mines Regulation Act by not having an electrical switch-box earthed.

At the Wigan Mining and Technical Training College, on Saturday, Viscount Brackley presented, to 360 men engaged in mining operations, certificates which had been won in connection with the Lancashire and Cheshire Coalowners' Rescue Station at Howe Bridge. Mr. Charles Pilkington, who presided, stated that arrangements had been come to with the Home Office whereby it would be necessary to establish other rescue stations. The scheme which had been approved by the Home Office would bring about the erection of a station in the Accrington or Burnley district, where there would also be a smoke chamber. Then there would be a depot, without a smoke chamber, for the South Manchester district, and there was also in contemplation another station with a smoke chamber somewhere near St. Helens.

A meeting of the Board of Conciliation for the Coal Trade of Monmouthshire and South Wales was held at Cardiff on Monday. A heated discussion took place over certain questions arising under Lord St. Aldwyn's award.

The Trade Union (No. 2) Bill passed through the Standing Committee of the House of Commons last week. The Prime Minister has expressed the hope that the Bill may be passed this session.

There was a general resumption of work on the North-Eastern Railway on Monday, but the coal trade has not yet recovered completely from the untoward stoppage. The scarcity of trucks is acute.

Prof. Cadman delivered his address as president of the South Staffordshire and Warwickshire Institute of Mining Engineers. He followed it by reading an important paper on the use of injectors in rescue apparatus.

A general meeting of the Mining Institute of Scotland was held on Saturday afternoon in Glasgow.

The United States Supreme Court has given judgment against the Government in the general conspiracy charges brought by it against the alleged Anthracite Coal Trust, but in favour of the Government in the charge against the Temple Coal and Iron Company and the charge regarding the so-called 65 per cent. contract, whereby the "railroad coal companies" buy the output of independent companies at a price 65 per cent. of that prevailing at tidewater.

A meeting of the Coal Conciliation Board for the federated mining districts of England and North Wales was held in London on Wednesday to consider an application by the men for an advance of 5 per cent. in the present rate of wages. The meeting was adjourned until January 6.

The "tips" question continues to agitate commercial circles in South Wales. At a meeting of the Cardiff Chamber of Commerce on Wednesday, a resolution was carried expressing the view that the time had arrived when the question of further dock accommodation should receive serious consideration, and that the council should nominate a representative committee of traders to confer with the dock and railway authorities.

In the Commercial Court of the King's Bench Division, this week, Mr. Justice Bailhache heard an action under the Coal Mines (Minimum Wage) Act, 1912. Plaintiffs were the Lofthouse Colliery Company Limited, of Ardsley, and the defendant was Harry Ogden, of Outwood, the president of the local branch of the miners' trade union. Plaintiffs claimed a declaration that their mine was situated in the western and not in the eastern sub-division of the West Yorkshire district for the purposes of the Act. It was pointed out that his Honour, Judge Ambplett, had fixed the Great Northern Railway Company main line as the arbitrary dividing line between the eastern and western sub-divisions. The greater part of plaintiff's colliery was in the western area so defined, and there was a small part in the eastern. Both the shafts of the plaintiff's mine were a little way on the east side, and the question in the case was whether they were to go by the position of the shafts to see what minimum rate of wages should be paid. At the outset, his lordship expressed some doubt as to whether he had jurisdiction, because, he said, the Legislature seemed to have contemplated that such question should be decided outside the law courts. Judgment was reserved till to-day (Friday).

A special general meeting of the South Wales Institute of Engineers was held at Swansea, on Tuesday, and another at Cardiff, on Thursday. Reports will appear next week.

The Barometer and the Mines Act.

The part played by the barometer in mining legislation is interesting. In the Acts of 1872 and 1887, both it and the thermometer were part of the statutory equipment of every colliery. But, inasmuch as no conditions as to taking readings were imposed, these instruments must be regarded as having been often rather ornamental than useful. The only legal requirements were that a barometer and thermometer should be placed above ground in a conspicuous position near the entrance to the mine. The same words are retained in the new Act, although some of the available "conspicuous positions near the entrances to the mine" might be the very worst place for such instrument. The words were doubtless copied without consideration from the old Act, and little or no discussion of this clause took place in Committee. The instruments should, of course, be under cover and accessible, but not necessarily conspicuous.

In the discussion upon Messrs. Hutchinson and Evans' paper at the South Wales Institute there was some question as to whether the barometer would not be better placed below ground. Obviously, however, this would be inadvisable. The readings below ground would be influenced by the ventilation current, and would normally be too low. Stoppage of the fan (in the case of an exhaust fan), or a reversal of the current, would in each case cause the underground pressure to increase, and the barometer would rise. Any variation in the velocity of the current would also have an effect upon the barometric reading. This fact suggests a curious point to which Dr. Haldane has referred. Stoppage of the fan, by suddenly increasing the atmospheric pressure, would at first tend to check the efflux of gas, and the methane content would not, therefore, rise so fast as might be expected. Indeed, by reversing the ventilation the outflow of gas can be shown to be capable of great reduction in certain cases, owing to the considerable increase of pressure thus produced.

Section 71 of the Mines Act is as yet ineffective, because it is provided that the instruments shall be read at such intervals and by such persons as may be prescribed by general regulations not yet formulated. It rests, therefore, with the Secretary of State to make this part of the Act operative, and to prescribe an approved method of keeping barometric records.

The time is thus opportune to consider how this section can be made really serviceable for the object in view, which may be presumed to be the promotion of safety in the pit.

It may be assumed as a reasonable working hypothesis that the critical condition in many pits, so far as the presence of inflammable gas is concerned, will be the approach of a barometric depression after a period of high readings. It cannot, of course, be said that this principle has been absolutely established; but it is supported by a weight of evidence that can hardly be ignored. What the colliery official requires, therefore, is early information of an approaching change in the prevalent type of weather. In a former issue it was shown that the ordinary mercurial barometer, read daily at a fixed hour in the manner usually practised at collieries, is not capable of giving this information promptly. Even if for no other reason, the fact that it is only read after long intervals renders the barometer readings practically useless for colliery purposes. Such readings tell but an imperfect story of the weather changes, even when plotted as a curve. On the other hand, it would scarcely be possible for the Home Secretary to require enough daily statutory readings to be taken to make it certain that the near approach of a depression would not escape notice. It is obvious, therefore, that a critical condition in the pit might easily arise without warning, and might have passed away long before the atmospheric conditions producing them would be recognised.

To render barometric records of any practical use in collieries there appears to be but one available method, and that is to substitute for the mercurial barometer a self-registering aneroid or barograph, as recommended by Dr. Shaw, director of the Meteorological Office, in his work on *Forecasting Weather*. For, independently of any question of the relative sensitiveness of mercurial and aneroid barometers, it is clear that properly corrected readings of the height of the mercury column are not to be expected as a part of the daily routine of the colliery. It is obviously preferable to rely upon an automatic instrument, which is both capable of being checked at intervals, and has also been proved to possess a high degree of sensitiveness. In general, also, such instruments are independent of temperature corrections. The best possible arrangement would be to have both a barograph and a mercurial barometer side by side. The barograph readings could then be periodically checked by the height of the mercury column.

Section 71 also requires a hygrometer to be placed below ground in a conspicuous position near a shaft or outlet, both in the main intake airway and in the main return airway. Self-recording hygrometers, or hygrographs, can now be procured, and the use of such instruments would be advisable. The form made by the

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A special general meeting of the South Wales Institute of Engineers was held at Swansea, on Tuesday, and another at Cardiff, on Thursday. Reports will appear next week.

The Barometer and the Mines Act.

The part played by the barometer in mining legislation is interesting. In the Acts of 1872 and 1887, both it and the thermometer were part of the statutory equipment of every colliery. But, inasmuch as no conditions as to taking readings were imposed, these instruments must be regarded as having been often rather ornamental than useful. The only legal requirements were that a barometer and thermometer should be placed above ground in a conspicuous position near the entrance to the mine. The same words are retained in the new Act, although some of the available "conspicuous positions near the entrances to the mine" might be the very worst place for such instrument. The words were doubtless copied without consideration from the old Act, and little or no discussion of this clause took place in Committee. The instruments should, of course, be under cover and accessible, but not necessarily conspicuous.

In the discussion upon Messrs. Hutchinson and Evans' paper at the South Wales Institute there was some question as to whether the barometer would not be better placed below ground. Obviously, however, this would be inadvisable. The readings below ground would be influenced by the ventilation current, and would normally be too low. Stoppage of the fan (in the case of an exhaust fan), or a reversal of the current, would in each case cause the underground pressure to increase, and the barometer would rise. Any variation in the velocity of the current would also have an effect upon the barometric reading. This fact suggests a curious point to which Dr. Haldane has referred. Stoppage of the fan, by suddenly increasing the atmospheric pressure, would at first tend to check the efflux of gas, and the methane content would not, therefore, rise so fast as might be expected. Indeed, by reversing the ventilation the outflow of gas can be shown to be capable of great reduction in certain cases, owing to the considerable increase of pressure thus produced.

Section 71 of the Mines Act is as yet ineffective, because it is provided that the instruments shall be read at such intervals and by such persons as may be prescribed by general regulations not yet formulated. It rests, therefore, with the Secretary of State to make this part of the Act operative, and to prescribe an approved method of keeping barometric records.

The time is thus opportune to consider how this section can be made really serviceable for the object in view, which may be presumed to be the promotion of safety in the pit.

It may be assumed as a reasonable working hypothesis that the critical condition in many pits, so far as the presence of inflammable gas is concerned, will be the approach of a barometric depression after a period of high readings. It cannot, of course, be said that this principle has been absolutely established; but it is supported by a weight of evidence that can hardly be ignored. What the colliery official requires, therefore, is early information of an approaching change in the prevalent type of weather. In a former issue it was shown that the ordinary mercurial barometer, read daily at a fixed hour in the manner usually practised at collieries, is not capable of giving this information promptly. Even if for no other reason, the fact that it is only read after long intervals renders the barometer readings practically useless for colliery purposes. Such readings tell but an imperfect story of the weather changes, even when plotted as a curve. On the other hand, it would scarcely be possible for the Home Secretary to require enough daily statutory readings to be taken to make it certain that the near approach of a depression would not escape notice. It is obvious, therefore, that a critical condition in the pit might easily arise without warning, and might have passed away long before the atmospheric conditions producing them would be recognised.

To render barometric records of any practical use in collieries there appears to be but one available method, and that is to substitute for the mercurial barometer a self-registering aneroid or barograph, as recommended by Dr. Shaw, director of the Meteorological Office, in his work on *Forecasting Weather*. For, independently of any question of the relative sensitiveness of mercurial and aneroid barometers, it is clear that properly corrected readings of the height of the mercury column are not to be expected as a part of the daily routine of the colliery. It is obviously preferable to rely upon an automatic instrument, which is both capable of being checked at intervals, and has also been proved to possess a high degree of sensitiveness. In general, also, such instruments are independent of temperature corrections. The best possible arrangement would be to have both a barograph and a mercurial barometer side by side. The barograph readings could then be periodically checked by the height of the mercury column.

Section 71 also requires a hygrometer to be placed below ground in a conspicuous position near a shaft or outlet, both in the main intake airway and in the main return airway. Self-recording hygrometers, or hygrographs, can now be procured, and the use of such instruments would be advisable. The form made by the

CORNWALL DINNER.

A dinner was given on Thursday night at the Abercorn Rooms, London, for the purpose of entertaining the hosts of the Joint Meeting of Scientific, Mining and Engineering Societies, which was held in Cornwall in July last, and which was fully reported in a Special Supplement issued with the *Colliery Guardian* of July 26.

The chair was taken by Mr. W. F. Reid, and about 60 persons were present, including the Cornish visitors, amongst whom were Messrs. Arthur Thomas (manager, Dolcoath Mine Limited), Josiah Paull (general manager, South Crofty Mines Limited), J. C. Shepherd (manager, King Edward Mine), Fred. D. Bain (chairman of the Cornwall Joint Scientific Reception Committee), John Gilbert, W. C. Stephens (R. Stephens and Son, Climax Rock Drill Works, Carn Brea), J. J. Berringer (principal of the School of Metalliferous Mining, Cornwall), J. B. Cornish (secretary, Royal Geological Society of Cornwall), Frank Parkyn, Oliver Wethered, Frank Allen, and E. W. Newton, to whom, as an indefatigable secretary, the meeting in Cornwall owed so much of its success.

The toast of the evening, "Our Guests," was happily proposed by Mr. D. A. Louis, and was replied to by Mr. Fred. D. Bain and Mr. John Gilbert. Mr. Bain gracefully acknowledged the benefit which the mining industry of Cornwall derived from the visit of eminent scientific men whose views and suggestions were always of value. He referred to the divergence of opinion upon the relative merits of mechanical and chemical analysis, and suggested that the two methods should be considered as complementary, not as antagonistic.

Mr. E. W. Newton said that the joint meeting of the scientific societies had been greatly appreciated in Cornwall, and that he had received a large number of letters to that effect. One of these, from Mr. Robert Fox, son of the founder of the Royal Cornwall Polytechnic Society, was as follows:—

Grove Hill, Falmouth.
14th December, 1912.

Dear Sir,—My best thanks to the Joint Scientific Reception Committee and its energetic secretary, Mr. Edward W. Newton, for its Record (so valuably compiled and handsomely bound) of the memorable visit of representatives of most of the leading scientific, engineering, and mining institutions of the United Kingdom, India and the Dominions.

Hosts and guests gained many valuable ideas during this week of mutual association, the making of new friendships and the deepening of old ones being the special mark London, Cornwall and the Empire will long retain in connection with this visit.—Yours sincerely,

Edward W. Newton, Esq. Robert Fox.

Between the speeches, Mr. Harrison-Hill entertained the company with his well-known mining songs, which were highly appreciated.

THE IRISH COAL TRADE.

Thursday, December 19.

Dublin.

Coal merchants continue to be more busily engaged as the Christmas holidays approach, and householders and others are now covering requirements for a period, but there is no change in the prices recently ruling. Quotations in the city are as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; steam coals from 20s. per ton upwards; house coal, retail, 1s. 5d. to 1s. 6d. per sack; best coke 23s. per ton, or 18s. per chaldron. Irish coals, at Wolfhill:—Best large malting coal, 20s. per ton; best hand-picked breakage, 20s. per ton and 17s. 6d. per ton; cobbles screened and beans screened, 17s. 6d. per ton; culm, 5s. per ton at the pit mouth. The import trade has been fairly active, although the tempestuous weather during the past week has considerably delayed the arrival of coaling vessels as well as interrupting the work of discharging on the quays. The colliers arriving in this port amounted to 63, chiefly from Garston, Ayr, Cardiff, Newport, Troon, West Bank, Point of Aire, Whitehaven, Liverpool, Ellesmere Port, and Preston. The total quantity of coal landed was 29,000 tons.

Belfast.

There is no change with regard to prices in this port, although there is a busier tone in the local market this week. City prices of house coals are from 22s. 6d. to 26s. 6d. per ton; best Orrell slack, 22s. 6d. Quotations ex quay:—Arley house coal, 22s. 8d. per ton; Scotch house coal, 19s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d.; navigation steam, 16s. 6d. to 17s. 6d; Welsh steam coal, 17s. to 18s. per ton. Coal cargoes arriving during the week were chiefly from Garston, Ayr, Girvan, Troon, Ardrossan, Preston, Glasgow, Workington, and Point of Aire.

INDIAN AND COLONIAL NOTES.

Africa.

Presiding at the annual meeting of the Middleburg Steam Coal and Coke Company, Mr. A. Cadel said that substantial reductions had been made in the railway rates for coal in South Africa. The reduction to the Cape would open out to the coal of the Transvaal an entirely new market, while the modification in the rate to Delagoa Bay, with other circumstances, had helped them and other collieries to develop a trade with India which promised very well for the future. The managing director stated that the miners' strike last spring gave an opening for the export of coal to India. At the time it was looked on as a casual demand, but they recognised the possibility that once South African coal was introduced into India the railway authorities and other large users there would see the advantages of it as an additional source of supply. Fortunately the trade conditions throughout the world had been such as to give their coal the necessary foothold in India, and he was informed that the coalowners' association had sold forward every ton of coal that it was possible to put on board, with the present wharfage facilities at Delagoa Bay, up to next June.

Australia.

Rescue Work in Mines.—A private interview has taken place between the New South Wales Minister of Mines and representatives of the Northern colliery proprietors in regard to the question of establishing rescue stations at various colliery centres. An understanding was agreed to, and Mr. Edden gave the result of the interview to the Press as follows:—"I have," said Mr. Edden, "offered to pay half the cost of the erection of the first station and the equipment, the estimated cost of which is about £2,300. I was under the impression that, as the proprietors in England pay for the upkeep of the rescue stations there, the proprietors here would do likewise. I overlooked the fact, however, that while most of the mines in England are held privately, they are worked here on a royalty basis—in the Maitland district in particular. The Crown, therefore, has something to protect as well as the proprietors. I have promised that, in addition to bearing half the cost, the Government will also pay part of the cost of the upkeep. The proprietors appeared to be perfectly willing to accept these conditions, and have promised to submit the matter to a meeting of the Colliery Proprietors' Defence Association next week. Two sites were suggested for the first station—Kurri Kurri and Weston. It was also proposed that a committee of six—three representing the Government and three the proprietors—control the stations, the Minister to have the power, in the event of a deadlock, to appoint a seventh person to bring about a settlement. I urged on the proprietors the necessity of making a start with the station as soon as possible."

A Test for Explosives.—Mr. A. A. Atkinson, chief inspector of the coal and oil shale mines in New South Wales, has submitted a minute in respect to a fire at the Pelaw Main Colliery caused by flame from a "permitted" explosive. The Minister of Mines has endorsed a minute by the inspector suggesting that enquiries be made from the Agent-General in London as to the cost of establishing a testing station for explosives in New South Wales. Mr. Atkinson adds that the cost was estimated at £1,500 15 years ago, but as the nature of the tests had been made more severe, the cost would be considerably more to-day.

Bowen River Fields.—The recent examination by Mr. Dunstan, Queensland Government geologist, of the Bowen River coal measures, extended over the areas known to contain coal at Pelican Creek, to the north of Birralee Station, and at the Bowen River, near Havilah—between 50 and 60 miles south-west of Bowen. The special object in view in making the inspection was to enable an opinion to be formed on the advisability of the Government sinking bores to prove the seams of coal known to exist on Pelican Creek and Bowen River, and also to inspect the sites where two bores were sunk many years ago to test the coal measures at these localities. Without going into the details concerning all old coalseams (a description of which has been published in old reports), it may be stated that there were only two seams which should receive attention at the present time—the Garrick and Daintree seams, about which the information is very definite. The Garrick seam is on Pelican Creek, about 11 miles above the Bowen River Junction, and is exposed in a cliff on the south side of the stream showing a splendid section of the coal for hundreds of yards. The thickness is not uniform, but an average of 4 ft. 6 in. can be assured, the dip being very gentle, but variable in direction. The coal, where exposed, is in very fair condition, and carries about 16 per cent. of ash, which will probably be much less some distance below the surface, where not exposed to the weather. There are very few traces of bands in the seam, and the coal has a bright lustre, although its joints and faces are very dirty from the effects of flood waters. Altogether the general aspect of the seam and its surrounding features produce a very favourable impression, and an area could be selected near the outcrop, undisturbed by volcanic intrusions which have destroyed the coal in other parts of the field. The Daintree seam is exposed on the southern bank of the Bowen River, between the two tributaries, Rosella and Cockatoo creeks. The seam of workable coal is about 6 ft. thick and the quality is undoubtedly good, but in following it along its course it was seen to be destroyed by coming in contact with an intrusive volcanic mass. There is an area close to the outcrop, however, free from disturbance by volcanic rocks, which would make an excellent site for prospecting operations.

New South Wales Iron Industry.—Parliament has approved an undertaking of the Government to resume an area of land and a private railway, and to dredge a portion of the Hunter River to facilitate the establishment by the Broken Hill Proprietary Company of iron and steel works at Newcastle. The works will cost about £2,000,000.

The Wonthaggi Mines.—Australian expert opinion, writes our Sydney correspondent, appears to be largely divided respecting the probable future of the State collieries at Wonthaggi. Recently, the chairman of the Jumbunna Coal Company, which this year has been unable to declare a dividend, declares that the favourable report of the State manager is misleading, and that only four or five of the numerous bores on the field give indications of payable coal, also that the seams now being worked are broken by layers of mud. He virtually predicts ultimate failure. On the other hand, the State manager is confident of steadily increasing success. He states that the profit made during the year 1911-12 was £9,833, and this would have been larger but for the development of the mine having been retarded in consequence of the want of capital funds, and also by the strike of employees in April and May last. The capital expenditure for the year was £71,971, of which £40,000 was expended on the installation of an electric power plant, and £10,847 in sinking ventilating shafts and driving main levels. The cost of production was increased to some extent by the thin seams having to be worked by hand in consequence of the electric installation having been delayed. This caused an increase in the percentage of slack. The total output for the year was—screened coal 229,672 tons, unscreened coal 12,969 tons, slack 212,180 tons, total 454,821 tons; the total since November 1909, when working operations were commenced, being over 1,000,000 tons. A conservative estimate of the quantity of coal 2 ft. 6 in. thick and over, available on the State mine area at present, based on reliable information obtained from 280 bores put down in an area of 5,100 acres, and allowing for 20 per cent. loss in mining, is 20,000,000 tons. This, it is thought, is ample justification for the establishment of the mine under State control.

Canada.

The Pacific Coast Collieries Limited has been organised with an authorised capital of 8,500,000 dols., consisting of 3,500,000 dols. common, and 1,500,000 6 per cent. preferred stock, and 3,500,000 dols. bonds, and has taken over the Pacific Coast Coal Mines Limited, one of the largest operating coal companies on Vancouver Island. The company, which owns its own railways, docks, &c., is at present shipping about 600 tons of coal per day from Boat Harbour and Suquash on the East coast of the island. The No. 3 mine is almost equipped, and the production in the spring will probably be increased to 1,500 tons daily. The extensions now projected will considerably increase this amount by 1914. The company controls an area of 20,000 acres of good coal land, on part of which over 115,000,000 tons of coal have been proved. James Carruthers, Montreal, is president of the new company, and among other members are Robert Bickerdike, M.P., Montreal; Hon. Price Ellison, Victoria, B.C.; A. H. B. McGowan, M.P., Vancouver; R. T. Elliott, K.C., Victoria; and Edmund Bristol, M.P., Toronto.

A report of R. O. Wynn-Roberts to the provincial government of Saskatchewan, as to the feasibility of developing gas and power from the lignite deposits of the province, states that there are 2,000,000,000 tons of lignite coal in the fields, south of Regina and Moose Jaw, in addition to very large quantities extending at intervals from Estevan to North Battleford. The development of power and gas, and the making of briquettes from the lignite will be found practicable and economical, and will prove an important factor in the development of the cities.

The Panama Canal.—Our Toronto correspondent says:—With the opening of the Panama Canal a great expansion in the trade of British Columbia is regarded as assured. The development of the coal industry, which has been rapid of late years, is likely to be further increased by the growth of steamship traffic under the new conditions. During the decade 1901-10 inclusive the coal output of the province was doubled, having increased from 1,439,590 tons to 2,800,046 tons, and as it is estimated that the opening of the Panama Canal will treble the number of steamers on the Pacific coast, the coalmines may be expected to increase their output at a greater rate than in the past. The stimulus given by the anticipated development of steamship traffic will principally benefit the mines of the coast district. There are two entirely different sections in the coalmining area of the province. The mountain section, more particularly the Crow's Nest field, ships large quantities south to the American railways, and the Fernie mines find the principal market for their product in the prairie provinces to the east. But these mines are too far from

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The Pacific Coast Collieries Limited has been organised with an authorised capital of 8,500,000 dols., consisting of 3,500,000 dols. common, and 1,500,000 6 per cent. preferred stock, and 3,500,000 dols. bonds, and has taken over the Pacific Coast Coal Mines Limited, one of the largest operating coal companies on Vancouver Island. The company, which owns its own railways, docks, &c., is at present shipping about 600 tons of coal per day from Boat Harbour and Suquash on the East coast of the island. The No. 3 mine is almost equipped, and the production in the spring will probably be increased to 1,500 tons daily. The extensions now projected will considerably increase this amount by 1914. The company controls an area of 20,000 acres of good coal land, on part of which over 115,000,000 tons of coal have been proved. James Carruthers, Montreal, is president of the new company, and among other members are Robert Bickerdike, M.P., Montreal; Hon. Price Ellison, Victoria, B.C.; A. H. B. McGowan, M.P., Vancouver; R. T. Elliott, K.C., Victoria; and Edmund Bristol, M.P., Toronto.

A report of R. O. Wynn-Roberts to the provincial government of Saskatchewan, as to the feasibility of developing gas and power from the lignite deposits of the province, states that there are 2,000,000,000 tons of lignite coal in the fields, south of Regina and Moose Jaw, in addition to very large quantities extending at intervals from Estevan to North Battleford. The development of power and gas, and the making of briquettes from the lignite will be found practicable and economical, and will prove an important factor in the development of the cities.

The Panama Canal.—Our Toronto correspondent says:—With the opening of the Panama Canal a great expansion in the trade of British Columbia is regarded as assured. The development of the coal industry, which has been rapid of late years, is likely to be further increased by the growth of steamship traffic under the new conditions. During the decade 1901-10 inclusive the coal output of the province was doubled, having increased from 1,439,590 tons to 2,800,046 tons, and as it is estimated that the opening of the Panama Canal will treble the number of steamers on the Pacific coast, the coalmines may be expected to increase their output at a greater rate than in the past. The stimulus given by the anticipated development of steamship traffic will principally benefit the mines of the coast district. There are two entirely different sections in the coalmining area of the province. The mountain section, more particularly the Crow's Nest field, ships large quantities south to the American railways, and the Fernie mines find the principal market for their product in the prairie provinces to the east. But these mines are too far from

Letters to the Editor.

The Editor is not responsible either for the statements made or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

COAL STACK FIRES.

Sir,—In order to minimise the extent of coal stack fires, it might be found practicable in some cases to cover the face of a stack to the depth of a few inches with coke dust and then pour molten pitch on the top of it, thereby excluding the air. The stack would require coating all over, otherwise a draught might be created. A further advantage would be that oxidation would be prevented by the exclusion of the air. Of course, if the stack could be hermetically sealed there would not be any possibility of a fire. The small amount of oxidation which the oxygen of the air sealed with the coal would allow would be limited to a very small amount, and when this oxygen was exhausted the coal would be practically stored in an inert gas, *i.e.*, nitrogen.

There has not been an opportunity for sealing the coal stacks here, as suggested, but probably some of your readers may have tried some such system.

Haddersfield Gas Works, Edward A. Harman.
December 7, 1912.

COMPARISON OF RESCUE APPARATUS OF THE INJECTOR AND NON-INJECTOR TYPE.

Sir,—With reference to Mr. Jacobson's letter which appeared in your columns last week, I would state that I quite agree with his first statement that if an apparatus of the positive pressure type is defective and allows a leakage, say due to the breathing bag being punctured or similar cause, the pressure which is inside the apparatus will be immediately released, consequently when inhalation takes place a negative pressure will occur inside the apparatus and outside air will penetrate.

There are other advantages in favour of the injector type, in addition to those mentioned by Mr. Jacobson, and one is of particular importance, which I have proved in more than one instance, *i.e.*, after a disaster a rescue party has come out of the mine and there has been a shortage of rescue apparatus, so that the apparatus used by the team which has just come out of the mine, has to be re-charged and sent down with another team.

With the injector type of apparatus, in which the regenerative material is contained in interchangeable metal cases, the apparatus can be re-charged in a minute or two, whereas if the regenerative material were not contained in these cases it would be necessary to empty out the caustic soda, and thoroughly wash and dry the bags before putting in further caustic soda, to obtain anything like satisfactory results with the apparatus. The result is that the apparatus cannot be immediately used, and a delay of perhaps an hour or two is necessary before the non-injector type apparatus can be employed again.

I trust that Prof. Cadman, with his very extensive experience in mine rescue work, will reply to the remarks which have been made, particularly in regard to the question of the examination of the apparatus by a second person, as I always understood that the routine in well-organised rescue stations was that before men went into the fumes with an apparatus the same was examined by the superintendent or by the leader of the party, and I think most rescue stations issue this rule in their printed instructions.

I may say that after a good deal of experiment the Mining Engineering Company have been able to replace the injector in the apparatus in special cases where it is not required, and this has been accomplished by a special fitting to the present "Meco" reducing valve; the result, however, is that the circulation in the apparatus is reduced to about 50 litres per minute, consequently less work can be done.

I cannot see any advantage in doing away with the injector, as with modern "Meco" injectors, choking of the oxygen inlet is impossible owing to the system of gauzes and felt washers employed. The "Meco" injector apparatus gives high efficiency, maintains the air cool, and does not in any way put a strain on the lungs. These points are all confirmed in the Birmingham committee's report, which states that for strenuous conditions the injector type of apparatus should be employed, and the same report placed the old type "Meco" as being the best. The new type "Meco" apparatus is a great improvement on the one which was tried at Birmingham, particularly as regards comfort and suitability for pit work.

In conclusion I might state that the best test for rescue apparatus is to try them in the pit and see which are the best suited to working under mining conditions. A test of this description was made at the Porth rescue station this year, and the emphatic superiority of the injector type of apparatus was very pronounced.

Those who have studied the evolution of rescue apparatus from the early experiments will be able to trace the introduction of the injector as one of the vital improvements which have made possible really strenuous work in rescue apparatus.

H. S. Jenkins.

Meco Works, Moorfields, Sheffield,
December 17, 1912.

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At the Hull County Court recently, before his Honour Deputy-Judge Alexander, an action was brought by Mr. Frank Lineham, of Messrs. F. Lineham and Co., coal merchants, Hull, to recover from Messrs. John Watt and Co. Limited, Hull, the sum of £63 11s. for alleged breach of contract.—Mr. W. H. Owen, counsel for the plaintiff, said that his clients entered into contracts with Messrs. Watt and Co. for the supply of coal and coke for the six months, October 1911 and March 1912. In the agreement there was a cause providing that in the event of supplies being prevented by a strike or lock-out, the contract should be suspended until such time as the supply could be resumed under normal conditions. The defendants, Mr. Owen added, claimed that this clause came into operation, that there was a shortage before ever the strike commenced, that they were deprived of their deliveries in anticipation of the strike, and the consequent inflation of prices. The plaintiffs, however, contended that whilst the defendants were not delivering supplies as demanded by the contract, they (the defendants) had in stock practically all that it was necessary to supply, and sold it on the market at greatly enhanced prices. Owing to the defendants failing to keep up the supply, and the difficulty thus arising, plaintiffs had lost one customer of £200 a year. Dr. Eric Jackson, for the defendants, said that his clients admitted a breach during November, December and January of coke, but did not admit a breach in March. In regard to the first three months named there was no claim from the plaintiff at any time until the particulars were filed. He contended that under the strike clause he was exempt from any delivery in March. He denied that his clients had any stock on hand

His Honour, in giving judgment, said that this was an important commercial case of a type which frequently arose out of a strike. Certain facts were admitted in respect of short delivery of coke in November, December and January, 80 tons in all, and he observed that the contract price was 13s. 9d. per ton, and a fair market value 15s. As plaintiffs were also entitled to the cost of cartage from the place where they obtained their supplies for the needs of their customers, he, therefore, in respect of the 80 tons, awarded 3s. per ton, or £12 in all. His Honour dealt in the same way with the short deliveries of coal, which were admitted, and awarded plaintiffs 4s. 6d. per ton in respect of 50 tons. As regarded the other coke, he said that the defendants had some 50 tons in hand on February 20, and they afterwards sold it to Messrs. Strachan and Co. at prices varying from 20s. to 22s. per ton. In his view the defendants could not shelter themselves behind the strike clause when they had the coke in hand. The strike clause ceased then. When they had the coke in hand it was their duty to deliver it His Honour awarded 7s per ton in respect of 33 tons of coke not delivered—in all, £11 11s. Further, he said there was no actual strike of gasworkers or a stoppage of coke production—at all events in Hull—and the defendants could have obtained coke with which to fulfil the contract. The strike clause in this instance protected the defendants in the event of a strike being in progress interfering with the supply of coke in the neighbourhood. As to the coal, the matter was difficult The strike began at noon on February 28, and the defendants were not in default until after the strike began. The defendants had coal in hand with which to supply this order, and were not in default the next day. The supplies of coal had been despatched from the collieries on the morning of February 28, and it would have been delivered at Hull in the ordinary course on February 29 in sufficient time for the defendants to deliver some portion of it at all events. If it had been despatched after the strike, in all probability they would not have been able to do so. His Honour, however, found for the plaintiffs, and awarded them 8s. per ton in respect of 16 tons as a fair measure of damages—in all, £6 8s. The net result was that the plaintiffs recovered in all £42 11s. 6d.

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Sir A. B. Markham, speaking at the annual staff dinner of the Tredegar Iron and Coal Company (which took place in Cardiff on Saturday) referred to the fact that there were officials present who had served the company for periods of 45 to 50 years, many of them having served under the old company before the present organisation was established in 1873. He said that in the Sirhowy Valley for the past 20 years they had been more of a happy family than in any other valley in South Wales; and this was in the main due to the general manager and the officials. It was the duty of every official to treat each workman as a man; and in his judgment the good feeling which existed was due to the way in which the officials dealt with the workmen.

Two employees at Graham's pit, Sirhowy, were on Monday decorated by the King for conspicuous bravery in the mine. Henry Saunders, overman, and Alexander Griffiths, collier, attended at Buckingham Palace to receive Edward Medals of the second class in recognition of their bravery in working under a fall, at risk of life, in order to bring out a comrade who was buried under the *débris* for six hours.

The two thousand guineas prize which the Society of Motor Manufacturers and Traders is offering for a home-produced fuel will doubtless stimulate experiment and research in South Wales, where—as our columns have lately shown—special interest is taken in the recovery of by-products, several installations for the production of benzol, &c., being in progress.

Cardiff Chamber of Commerce has again discussed the question of insufficient dock facilities in respect of the shipment of coal, and at the ordinary monthly meeting on Wednesday, it was decided to form a representative committee of traders, who should confer with the dock and railway authorities and take any necessary steps.

RAILWAY AND CANAL COMPLAINTS.

According to the 12th report by the Board of Trade on proceedings under section 31 of the Railway and Canal Traffic Act, 1888, including proceedings upon complaints made under the Act of 1894, 2,141 cases have been dealt with from 1889, of which number 2,084 related to complaints against railway companies and 57 against canal companies. The total number for 1910-11 was 284, the nature of the complaints being:—Rates unreasonable or excessive in themselves, 29; undue preference, 87; rates unreasonably increased, 17; classification, 47; delay in transit, 27; liability, 9; rebates, 23; through rates, 9; miscellaneous, 36. The proceedings taken by the Board of Trade resulted in the settlement, or partial settlement, of 88 cases; in 97 cases the complaints were not proceeded with, while in 98 cases an amicable settlement could not be effected. In the remaining case the proceedings have not yet been completed.

The report adds that in certain of the cases in which an amicable settlement was not reached, it seemed clear to the Board of Trade that the complainants had no real ground for complaint; other cases involved questions of undue preference or other questions of a legal character which could only be decided by the Railway and Canal Commissioners. In some cases the offer of the Board of Trade to arrange a meeting to discuss the complaint was not accepted by one of the parties; and a few cases were of the nature of proceedings required as a preliminary to proceedings before the Railway and Canal Commissioners. In other cases, where it appeared that ground for complaint existed, the Board of Trade were unable to induce the companies to make proposals to which the complainants could agree. During 1911 several complaints of delay in transit arose out of the disorganisation resulting from the railway strike of that year. Such cases have not been included in the report. It is noted that during 1910 and 1911 there was a further increase in the number of cases dealt with by the Board of Trade, 284 complaints having been taken up, compared with 280 and 243 during the periods 1908-9 and 1906-7 respectively.

In an appendix to the report is given a digest of cases mentioned in the eleventh report, on which further proceedings have been taken and of new cases.

Owing to the continued expansion of their business, Messrs. W. F. Stanley and Co. Limited have been compelled to provide much larger office accommodation, and will now occupy the whole of the upper part of the premises at 286, High Holborn, where their showrooms have been on the ground floor for some time, retaining their old premises at 4 and 5, Great Turnstile, for export only.

OBITUARY.

At Norton Cemetery, on the 28th ult, the funeral took place of Mr. William Thrutchley, of 15, Brook-road, Meersbrook. Mr. Thrutchley was 57 years of age, and for the last 17 years had acted as the Sheffield representative of the Rothervale Collieries Limited.

The death of Mr. Joseph Archer, senior partner in the firm of Joseph Archer and Son, mineral agents and mining engineers, of Doncaster, has taken place at his residence, Meadhurst, Doncaster, after a comparatively short illness. The deceased gentleman, who was born at Ridgeway, was the eldest son of Mr. John Archer, and grandson of John Archer, of Marklands, Elmton, the home of his ancestors since 1659. Articled in the mineral estate office of the Earl of Wharncliffe at Sheffield, he subsequently became chief assistant to Mr. Rowland Childe, of Wakefield, from 1866 to 1867. He practised in partnership with Mr. T. S. Grace in Wakefield and Sheffield from 1868 to 1876, and then in Sheffield until 1906, when he removed to Doncaster after taking his son, Mr. J. Fletcher Archer, into partnership at the beginning of 1905. He had been for many years mining agent for several extensive and important estates. He was frequently called upon for expert advice with reference to other coalfields, and acted as adviser to the Doncaster Corporation in reference to their mineral rights. He has been a member of the Institution of Mining Engineers since 1872. His widow, with four children, survives him.

The death occurred on the 7th inst., at the residence of his daughter, Chorley, Lancs., of Mr. George L. Robinson—for many years manager of Fenham Colliery, Newcastle-on-Tyne; afterwards manager of Messrs. Bolckow, Vaughan and Co.'s Shildon Lodge Colliery, Bishop Auckland, Co. Durham; and later general manager of Podmore Hall Collieries, North Staffordshire—at the age of 71 years.

Sir William Edward Murray Tomlinson, Bart., died on Tuesday at his residence, Heysham House, near Lancaster. The eldest son of Mr. Thomas Tomlinson, a Bencher of the Inner Temple, he was born in 1838, and was educated at Westminster and Christ Church, being called to the Bar by the Inner Temple in 1864. He represented Preston as a Unionist from 1882 to 1906, when he was defeated. In 1902 he was created a baronet. Sir William was associated with colliery interests in Lancashire for nearly 40 years. He was chairman of the Ellerbeck Collieries Limited, Coppull, near Wigan, and for 30 years he served as director of the Worsley Mesnes Colliery Company and of the Winstanley Collieries Company Limited. He was also connected with the Eccleston Hall Colliery Company. At one time he had also considerable interests in the North Wales coalfield. He had been chairman of the British Dominions Marine Insurance Company, and deputy chairman of the British Dominions Insurance Company. He was a bachelor, so that the baronetcy becomes extinct.

The death has occurred of Dr. G. B. Neave, senior lecturer in the chemistry department of the Royal Technical College, Glasgow. Among other offices, he held for some considerable time past that of honorary secretary of the Scottish Section of the Society of Chemical Industry.

On November 29, in the person of Mr. James Stott, who died at the advanced age of 84, there passed away one of the oldest members of the Lancashire coal trade. It is going back a long way when we say that it is over 60 years ago that he first became a colliery proprietor. During his long life he worked collieries and ironworks in North Staffordshire, Derbyshire, Cheshire, and in Lancashire, and he has been connected with many large mining estates. He was, we may say, one of the very few now remaining who were present at the dinner called to discuss the inauguration of the *Colliery Guardian*.

The death has occurred at his residence, Moorland View, Bramley, Leeds, of Mr. Sam Haley, managing director of the firm of Thomas Haley and Co. Limited, engineers, Railway Foundry, Bramley. Mr. Haley, who was 73 years of age, went to Bramley from Cleckheaton about 1863, and founded the firm of which he was the head.

The death occurred at Lancaster on Sunday of Mr. George Worsdell, the founder of the Dallam Forge, Warrington. Mr. Worsdell was born in Preston in 1821. His father, Mr. T. C. Worsdell, constructed the first passenger carriages for the Liverpool and Manchester Railway. His three sons, Nathaniel, Thomas, and George, also became associated with railway work from its very early days. The eldest son, Nathaniel, helped to set up the "Rocket," and his sons, Mr. Thomas William Worsdell, now of Arnside, and Mr. Wilson Worsdell, of Gateshead, are well known as two of the leading locomotive engineers of the day. Mr. Thomas Worsdell, second son of the coachbuilder, established a business in Birmingham, in which he trained as assistants the brothers Tangye. He died at Ulverston in 1893. Mr. George Worsdell, the third son, has now passed away. It was in 1845 that he established the Dallam Forge at Warrington, and in 1851 he received the much coveted medal of the Great Exhibition "for excellence of iron and of railway plant." Unfortunately the high tension of his life laid the foundation of insomnia of a serious type, which in 1857 led to a temporary but complete breakdown of health. After two years' rest at Workington he took an appointment at the Ashbury Carriage and Plant Works at Openshaw, and became general manager, but he was unable to stand the strain, and for the same reason, having taken over later the management of the Lancaster Wagon Company, he was, in 1872, compelled finally to retire from business life.

The death took place at his residence, Carron Grange, near Falkirk, on the 2nd inst., of Mr. Thomas Bamforth, general manager of the Carron Company. Mr. Bamforth, who was in his 73rd year, was a native of Sheffield. He was trained there to the ironfounding trade, and was ultimately appointed manager to the firm of Hardy and Padmore, ironfounders, Worcester. In 1876 he was appointed by Carron Company as their foundry manager, and 11 years ago he succeeded the late Mr. Arch. M'Lellan as general manager to the company. This position he held till his death. He is survived by a widow and family of two daughters.

Sir George Darwin, Plumian professor of astronomy and experimental philosophy at the University of Cambridge since 1883, died at Cambridge on the 7th inst. after an illness of some months' duration. He was presented in 1911 with the Copley Medal of the Royal Society, and he protested that its early bestowal was due in his case to the merely practical applicability of some of his investigations. One of these was concerned with the pressure of loose earth, a subject of supreme interest to engineers, and one for which he received another medal from the Institution of Civil Engineers.

Mr. Edward Edwards, secretary of the Taff Vale Railway Company, died at Cardiff, on the 5th inst., from heart failure, at the age of 78. Mr. Edwards was for 63 years in the service of the company, and witnessed many great developments in that portion of the South Wales coalfield.

The death occurred on the 4th inst. at his residence, 16, Rosslyn-terrace, Kelvinside, Glasgow, of Prof. Andrew Jamieson, M.Inst.C.E., F.R.S.E. Prof. Jamieson was well known as a consulting engineer, and was the author of a large number of important works dealing with electrical and engineering subjects, notably submarine cables. In 1880 Mr. Jamieson was appointed principal of the Glasgow College of Science and Art, in which he conducted engineering and electrical engineering classes for a number of years. He afterwards carried on the business of a consulting engineer, and was engaged in educational work.

The death is announced, at the age of 49, of Geheime Regierungsrat Konrad Engel, who for over 10 years filled the position of business manager to the Association of Mining Interests in the Dortmund district, and took an active part in the management of our contemporary *Glückauf*. In 1906 he was appointed to a post in the commercial department of the Prussian Ministry of Commerce and Industry, and in 1910 was made chief of the newly established department for settling the participation output of the German potash mines.

The death has occurred of Mr. Henry de Mosenthal, F.I.C., F.C.S., technical secretary to the Nobel-Dynamite Trust Company Limited, from heart failure, at the age of 62

DEVELOPMENTS IN THE FOREST OF DEAN.

The Deep Measures.

We understand that a sale has just been concluded whereby a large area of Forest of Dean coal has been disposed of with the view to its development at an early date. The deal was over one of the groups of gales into which the deep seams were arranged under the 1904 Act, and it is the last of them. In the award it is described as the South-Eastern United Group. It is an area of 460 acres, and contained within it are six coalseams whose total thickness is stated to measure up to 15 ft. The names of the seams and their thickness respectively are:—No coal 1 ft. 6 in., Brazilly 2 ft., Yorkley 2 ft., Whittington 2 ft., Coleford 5 ft., and Trenchard 2 ft. 6 in. The estimated quantity of No coal is put down at 1,033,000 tons, of Brazilly, Yorkley and Whittington 1,380,000 each, Coleford High Delf 3,450,000 tons, and Trenchard 1,725,000 tons, which means that the owners have made a purchase of coalseams which are calculated to yield as much as 10,348,000 tons of good marketable coal. The Five-feet seam of Coleford High Delf has become a quite famous article of fuel because of its steam-producing qualities. It is in great demand, and the collieries at present working this coal are raising as much as it is possible for them, with their present developments, to do. This group, like the other groups, had been granted to the freeminers, and it was their committee, of whom Mr. S. J. Elsom is the president, through whom the sale was effected. The purchasers are the Parkend and New Fancy Deep Navigation Colliery Company, of whom Mr. T. H. Deakin is the best-known personal representative. The locality of the area is on the West Dean side of the coal basin, and, we understand, lies immediately underneath the gales at present being worked by this company at their New Fancy and Parkend Collieries. With regard to the question of the financial aspect of the business, the consideration is, as in the case of the deals with all the other deep gale groups, that the freeminers are to receive a royalty of 1d. per ton on the coal raised. By way of earnest money and as settling the bargain, £100 was paid down and banked in the freeminers' account, but this sum will be calculated in

he time comes that it accrues. It may
refer to the other sales that have taken
he deep gales. In each case they contain
ns of coal, whilst the terms are also
uthern United contains 533 acres. The
d at 1,199,250 tons, the Brazilly, Yorkley
sins at 1,599,000 tons each, Coleford High
and Trenchard at 1,998,500 tons, making
12,002,500 tons of coal. The area of
d is 860 acres and contains the following
oal, 1,935,000, Brazilly, Yorkley and
000 each, Coleford High Delf 6,450,000,
00; total, 19,350,000 tons. Alexander
t area) 205 acres, No coal 461,250 tons,
and Whittington 615,000 tons each,
1,537,500 tons, Trenchard 768,000 tons,
. Eastern United (the largest) 1,945
6,250 tons, Brazilly, Yorkley and Whit-
ns each, Coleford 14,587,000 tons, Tren-
ns, total 43,762,500 tons, Holly Hill 901
027,250 tons, Brazilly, Yorkley and
001 tons each, Coleford 6,737,500 tons,
tons, total 20,272,500 tons. This makes
10,348,000 tons of coal in those groups,
is 4,904 acres. The quantity of coal in
under:— No coal, 11,032,000 tons;
nd Whittington, 14,712,000 tons each;
, 36,790,000 tons; Trenchard, 18,390,000
n United, which was granted to the
1907, was sold to the Princess Royal
The Western United was also granted
lisposed of to Mr. M. Maclean for the
any. Holly Hill and Alexander No. 3
mp Meadow Colliery Company in 1908
ly, whilst Eastern United was purchased
s in 1908 by Messrs. Henry Crawshay
iners or their successors will receive no
13s. 4d. during the period when the
d; individually, it means about £150
he freeminers' share in the fuel is ½d. a
ally about one-sixth of that which the
oyalties from the colliery proprietors, it
h of the several groups of deep coal to
on and a-half of money. It is significant
tice that in every case but one the
groups of deep seams are the old
of the district, the only new element
onsequence of it being Mr. Maclean's

NTAL MINING NOTES.

Austria.

s *in Vienna*.—Ostrau-Dombrau-Karwin
9 10 kronen, cubes 27·60-28·60 kr., nuts
s 22·50-22·70 kr., washed smithy coals
8-40 kr. per ton, net cash, ex shutes
er Silesian coals: best large 32·30-
hes 32·30-33·10 kr., medium large
2·30 kr., seconds large and cubes
t nuts I. 32·70-33·50 kr., II. 29·60-
lle 23-23·20 kr., seconds 22-22·50 kr.,
nhof. In 10-ton loads: best large
30·70-31·50 kr., nuts 31·10-31·70 kr.,
of. Gas coke from Vienna gasworks,
ite: Dux large 21·70-23·20 kr., Brüx-
0 kr., nuts 21·20-22·70 kr., Mariaschein
nuts 23·20-24·70 kr., ex Franz Josefs or

Belgium.

hat the following prices were fixed in
es of coal contracted for by the State
all coals, type II., 16 fr.; *demi-gras*,
.; ditto, ditto, type III., 17 fr.; *gras*,
uettes, type I., 24 fr.; ditto, type II.,
epresent advances of 1½ fr. for coal and
as compared with the last contract.
whole of 1913. The conclusion of this
as a spur to private business, and, in
it has served to increase the optimism
umors, however, are disposed to adopt
licy. Rolling stock continues very
are rather under a cloud, as a
ild weather.

France.

rankfort Gazette, the administration of
ilways has apportioned the order for
way fuel as follows:—Great Britain,
ot of Pas-de-Calais, 150,000 tons;
s; the balance of 420,000 tons, repre-
being placed in the Pas-de-Calais

Germany.

e resolution adopted at the meeting of
' Union on the 15th inst., notice to
ry 2 was handed in on Wednesday on
mployed in the State Collieries in the

An explosion occurred on Wednesday in Minister Achenbach Colliery at Mengede, north of Dortmund. The same day 43 dead and 13 injured had been brought up. It was then believed that all the killed and injured had been recovered.

Ruhr Coal Market.—Owing to the scarcity of railway wagons the deliveries of late have only been about two-thirds of the possible total. The result of this deficit is a great loss, not only to the collieries, but also to the workers and the local business world depending on their custom. Apart from this, the situation may be regarded as satisfactory. The political complications have not yet affected the iron industry, and the few indications of slackness observable have had no effect on the demand for coal. The works are well booked with orders for some time ahead, and this will ensure corresponding activity in the sales of fuel; and the particularly brisk condition of the pig iron market renders the prospect of the corresponding grades of coke and coking coal very favourable. With the advance of the winter season, the demand for house coal has considerably improved, especially in South Germany, where, however, the lack of railway wagons is highly disturbing and likely to cause great inconvenience should the weather turn colder. Exports are large, Belgium and Holland being extensive consumers; and in the latter country especially the Syndicate has almost entire control of the market. In northern Germany there is some risk that the difficulty in obtaining supplies from the Ruhr may let English coals into the market again in quantity, though the high price of the latter is against it. Briquettes are selling about as usual.

Fuel Traffic in the Ruhr Harbours in October.—The total consignments of coal, coke and briquettes to the Ruhr harbours by rail were as follow:—Ruhrort 920,299 tons, Duisburg 256,538 tons, Hochfeld 40,710 tons, or 1,217,547 tons in all. Outward shipments. To Coblenz and places higher up river 651,026 tons, to places below Coblenz 18,979 tons, to Holland 481,327 tons, to Belgium 314,028 tons, to France 29,391 tons, to other destinations 20,853 tons. Total shipments from: Ruhrort 927,650 tons, Duisburg 258,460 tons, Hochfeld 43,688 tons, Rheinpreussen 97,666 tons, Schwelgern 106,579 tons, Walsum 81,560 tons; aggregate, 1,515,605 tons.

Coal Market in Upper Silesia.—Though less acute, the shortage in the supply of railway wagons is still highly inconvenient and the cause of considerable damage to a wide circle, consumers, whose stocks are generally small, being very discontented. Generally, however, the position is highly satisfactory, the iron industry, which constitutes the most important factor, being well engaged for some months ahead. The trade in house coals is growing, although extensive purchases were completed several weeks back. Gas coals are in better request, owing to the advance of the season, and coking coals cannot be raised fast enough. The demand for export shows no sign of diminution, and is difficult to satisfy completely, the requirements of Austria-Hungary being given the preference over those of Russian-Poland. The coke market is in a highly satisfactory condition, the demand exceeding the supply, so that very few stocks are left and the output is disposed of immediately. The ironworks are very busy and need large supplies of blastfurnace coke; and the supply is so short that many works have barely two days' stock in hand. The foundries are also complaining of insufficient deliveries, but at present there is little prospect of any improvement.

Russia.

The scarcity of fuel in Russia is unabated. The negotiations that have taken place between the Railways Administration and the Prodongol Syndicate have not improved the situation. The former alleges that the Syndicate is responsible for it by purposely limiting the output. At the last adjudication the Syndicate offered only 90 million poods, or three-quarters of the quantity required, and at prices at which the authorities refused to treat. The expedient adopted, apart from the foreign orders given out, is to seize coal in transit for private customers. The Syndicate's excuse is the shortage of labour. It is said that the workmen in the Donetz coalfield do not exceed 125,000 in number, whereas 160,000 are required in order to work the pits to their full capacity. Coal is exceptionally scarce at Odessa, and manufacturers in this district are demanding the removal of the duty on British coal, and that an interdict should be temporarily placed on exports. In the Moscow district the shortage is less seriously felt, owing to the more extensive use of oil, and the existence of large peat bogs and timbered lands in the neighbourhood.

The Scottish branch of the National Association of Colliery Managers has been in existence three years, and has a membership of 240. At their second annual dinner held in Glasgow, 120 gentlemen were present. Mr. Charles C. Reid occupied the chair, and the guests included Mr. Robert Baird, secretary of the Scottish Coalmasters' Association. Mr. Matthew Brown, general manager of the Banknock Coal Company, said the mine manager had of necessity to leave a great deal to his under officials, and that the status of the under-manager, and of several other of the officials ought to be raised, and a greater amount of responsibility placed upon them.

COAL, IRON AND ENGINEERING COMPANIES.

Alldays and Onions Pneumatic Engineering Company Limited.—The report for the year to August 3 last states that the result of the year's trading (after providing for depreciation and all other outgoings) is a net profit of £17,114, to which is added £14,063 brought from the last account, making a total of £31,177. The directors recommend, after allowing for debenture interest and preference dividend, a dividend on the ordinary shares at the rate of 5 per cent. per annum for the year, less interim dividend paid April 1, 1912, and a bonus on the ordinary shares at the rate of 5 per cent. per annum, carrying forward £20,097.

Anglo-French (Transvaal) Navigation Coal Estates Company Limited.—An interim dividend of 6¼ per cent. (1s. 3d. per share) on the 7 per cent. preference shares.

Dunderland Iron Ore Company Limited.—The report states that an option was given to Messrs. Fried. Krupp, of Essen, to co-operate with the company on certain terms, and, in order to comply with the scheme of capital rearrangement, separate meetings of creditors and members were subsequently held, at which the scheme was duly approved. The High Court of Justice subsequently sanctioned the scheme and a reduction of share capital. The reduced share capital of £450,000 was, by a resolution of the board of directors, afterwards converted into ordinary stock for an equivalent amount. Subsequently Messrs. Fried. Krupp, of Essen, decided not to exercise their option to participate in the finance of the company, and in order to safeguard the interests of the prior lien bondholders an application was made to the court for a receiver. Sir William B. Peat was accordingly appointed, on July 31, 1912, receiver and manager on behalf of the bondholders. The directors are co-operating with the receiver and the trustees in earnest efforts to formulate a scheme to provide the capital necessary for the restarting of the plant, commencing on a small scale. The directors regret to report the death of Mr. Walter S. B. McLaren, M.P., and also the retirement of Mr. John Macaulay. The board have appointed Mr. A. O. Julius a director of the company.

Endemann and Co. Limited.—This private company has been registered, in Edinburgh, with a capital of £35,000 (15,000 cumulative preference and 20,000 ordinary shares of £1), to acquire the business of Endemann and Co., 53, Bothwell-street, Glasgow, coal importers. First directors, W. H. Endemann, A. F. H. Koch, and O. Peters. Registered office, 53, Bothwell-street, Glasgow.

Evans (Richard) and Co. Limited.—The directors have declared an interim dividend of 3 per cent. for the half-year.

Haggie (R. Hood) and Son Limited.—The directors, in their report for the 12 months to October 31 last, state that, including the balance of £11,234 15s. 2d. brought forward on November 1, 1911, there is an available profit of £41,365 10s. 7d., which the directors recommend should be appropriated as follows:—Dividend on preference shares at the rate of 5 per cent. per annum (less tax), of which 2½ per cent. was paid on July 3 last, £4,000; dividend on ordinary shares at the rate of 10 per cent. per annum (less tax), of which 2½ per cent. was paid on July 3 last, £8,000; bonus of 1s. per share on the ordinary shares (less tax), £4,000; transfer to reserve account, making it £50,000, £10,000; write off an instalment of expenditure on extensions of buildings and plant during the 12 months, £4,000; balance to be carried forward to next year, £11,365 10s. 7d.

Knowles (Andrew) and Sons Limited.—In the Chancery Division, on the 17th inst., Mr. Justice Neville sanctioned a petition by Andrew Knowles and Sons Limited for the reduction of its capital from £937,500 to £750,000. Mr. Younger, K.C., said it was proposed to reduce the liability on the shares by £7 10s. per share. The capital was divided into 25,000 shares of £37 10s. each. Of those, 600 had been fully paid up, but the remaining 24,000 had only been paid up to the extent of £24. It was proposed to put all the shares on an equal footing, reducing the value to £30 per share, and returning £13 10s. on each of the 600 shares that had been paid up. There was no opposition.

Manor-Powis Coal Company Limited.—The report for the year ended October 31, 1912, states that, after providing for depreciation to the extent of £400, there remains £1,032, from which the directors recommend payment of a cumulative dividend at the rate of 6 per cent. per annum on the amounts paid up on the preference shares, less tax, for the period from the commencement of the company till October 31, 1912. This payment will absorb £646, leaving £385 to be carried forward. The directors have decided to make a further call of 2s. 6d. per share. The Upper Hirst seam having been reached at the time of the last general meeting, the second shaft was thereafter sunk to the same position. When this stage was reached sinking was suspended for a time, in order to develop some output. The shafts were also sunk to the Lower Hirst, which was found of workable thickness and of good quality, and a coal-cutter is now working in this seam. The sinking is making progress, and No. 1 shaft is nearing the Manor coal.

Murchie (James) and Co. Limited.—This private company has been registered, with a capital of £10,000 in £1 shares (5,000 6 per cent. cumulative preference), to carry on the business of manufacturers of machinery, &c., and to adopt an agreement with J. Murchie. First directors, J. Murchie, J. W. Hinchley, and W. E. Sharp.

Natal Navigation, Collieries, and Estate Company Limited.—The directors have declared an interim dividend of 3¾ per cent. (9d. per share) for the half-year ending December 31.

New Dynant Anthracite Colliery Company Limited.—The directors have arranged a loan at 7 per cent., sufficient to meet necessary capital outlay, the loss in trading, and enable the company to meet the interest on debentures. It was stated at the annual meeting that 1913 should see the output exceed 80,000 tons.

Patchett (W. J.) Limited.—This company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of engineering contractors, &c., and to adopt an agreement with W. J. Patchett. Minimum cash subscription, seven shares. First directors, W. J. Patchett, R. W. Dowson, and D. G. Patchett. Registered office, Crofton-avenue, Hillsborough, Sheffield.

Powell Duffryn Steam Coal Company Limited.—The directors have issued to their shareholders letters offering 103,125 new £1 shares at a premium of 20s. per share, making the issue price 40s. per share. The allotment is of one new share for each 10 held. With the present shares standing at 54s. 6d, the new shares will mean a substantial bonus to the holders. The amount payable on acceptance is 5s. on account of capital and 5s. on account of premium, the balance being called in similar amounts at intervals of not less than two months.

Prestwich (J. C.) Limited.—This private company has been registered, with a capital of £12,000 in £1 shares, to carry on the business of manufacturers of and dealers in screws, screw bolts, nuts and rivets, &c., carried on by W. M. and E. Prestwich at Bag-lane, Atherton, as J. C. Prestwich. First directors: W. Prestwich, M. Prestwich and E. Prestwich.

Pumpherston Oil Company Limited.—Mr. Thomson McLintock presided at special meetings of the Pumpherston and Tarbrax oil companies in Glasgow on the 17th inst. to consider resolutions for amalgamation. At present both companies have the same directors. The resolutions were adopted at both meetings.

Redpath, Brown and Co. Limited.—The directors report that, after deducting all trade charges and salaries and making allowances for the realisation of the accounts, there remains a profit for the 12 months ended October 31, 1912, of £36,117, to which falls to be added the balance carried forward from last year, £4,717, making a total available balance of £40,834. The directors recommend that this sum be applied as follows: To write depreciation off plant and buildings, £5,000; to reserve fund for preference share dividend, £5,000 (making this £25,000); to reserve fund (general), £6,000 (making this £15,000); to dividend on preference shares, less tax, £7,033 (5 per cent. per annum paid on May 15, 1912, 6 per cent. per annum paid on November 11, 1912); to 8 per cent. dividend on ordinary shares, free of tax, £10,000 (of which 3 per cent. was paid as interim dividend on June 30, 1912); leaving a balance of £7,801 to be carried forward, subject to directors' fees.

Saron Anthracite Collieries Limited.—Applications have been invited for 80,000 ordinary shares of £1 each at par in this company, which has an authorised capital of £100,000, and has been formed to develop coal and iron properties in Ireland. The company have also acquired the Woodfield Collieries, near Newport, Mon. The directors are Sir George W. Kekewich, Mr J. M. Bottomley, Mr. Benjamin Preston Harris (managing director), and Mr. Thomas Woods.

Steel Company of Canada Limited.—Dividend of 1¾ per cent. on the preference shares for the quarter.

Transvaal Coal Trust Limited.—Dividend of 2s. 6d. per share. This compares with a distribution of 1s. 6d. per share a year ago.

Union Steel Corporation (of South Africa) Limited.—The report for the period between November 15, 1911 (the date of registration), and September 30, 1912, states that on July 8 last an agreement was entered into between the Union Government and the corporation, in accordance with the agreement between that Government and Mr. H. H. Wright, dated June 26, 1911, and in substantially the same terms, thus assuring to the corporation the rights acquired by it regarding the purchase of scrap iron and steel, &c. In accordance with the agreement between the corporation and the Vereeniging Estates Limited, a convenient works site has been selected on the Vaal River, adjoining Vereeniging, in close proximity to the main line of railway between Johannesburg and Cape Town, and to two collieries, with which it will be connected by railway sidings, and to a power station of the Victoria Falls and Transvaal Power Company. The directors estimate that production, in the absence of any unforeseen circumstances, will be commenced about the middle of next year.

Vaglian Anthracite Collieries Limited.—An extraordinary general meeting will be held, on the 1st prox., for the purpose of considering and, if deemed expedient, passing an extra-ordinary resolution to the effect that the company cannot, by reason of its liabilities, continue its business; that it is advisable to wind up voluntarily; and that Arnold Foster Baynes, of 10 and 11, Austin Friars, E.C., be appointed liquidator.

Withank Colliery Limited.—The accounts show a profit for the year of £75,068, making, with the balance of £40,495 brought forward, a total of £115,563, and after deductions there is an available balance of £104,140. An interim dividend was paid in February last of 15 per cent. (3s. per share), and the directors declare a final payment at the same rate, making 30 per cent. for the year, and absorbing £63,000, leaving a balance of £41,140 to be carried forward.

Woodfield Colliery Limited.—In the Chancery Division on the 17th inst. Mr. Justice Neville, on the petition of the Swansea Wagon Company Limited, judgment creditors, made an order for the compulsory winding-up of the Woodfield Colliery Limited. There was no opposition.

Wright (Henry) Limited.—This private company has been registered, with a capital of £15,000 in £1 shares, to take over the business carried on by Henry Wright at Market-place Buildings, Sheffield, and to carry on the business of coal, coke, iron, steel rail, mineral and metal merchants, &c. First directors: Henry Wright, Miss F. A. Wright and Sam Le Pla.

The annual speed test of the Transvaal Automobile Club was held on Saturday, September 7, in the vicinity of the Modder B Gold Mining Company. The mile, which had been carefully measured, was straight, but there was a dip and a slight gradient which had to be negotiated. The conditions provided for a flying start and finish, and the cars were handicapped according to horse-power. The fastest time prize was won by Mr. C. Hoare on a 15-horse power Talbot. The mile was covered in exactly one minute. In the annual Transvaal Automobile Club hill-climbing competition held on September 29, the best time, that of Mr. C. Hoare, on a 15-horse power Talbot, was a record for the course, some 1,400 yards, which was covered in 1 minute 46⅗ seconds. This hill climb was conducted on one of the steepest hills in the Transvaal. Mr. C. G. Saker was second on a 12-horse power Talbot. In addition to winning the event, Mr. C. Hoare, on a 15-horse power Talbot, secured the prize for fastest time.

THE FREIGHT MARKET.

The strike of railwaymen effectively banished the idea of doing much business in the way of coal shipping on the north-east coast last week, and the market is only now beginning to regain vitality. Rates for outward loading from the Tyne are based on very low figures, there being a rare glut of tonnage in the river. London is being done at from 3s. 9d. to 4s., Hamburg at 4s. 3d., Havre at 6s., Bordeaux at 5s., and Genoa at 9s.—a considerable falling-off from figures which ruled a month ago. At South Wales, chartering has been rather light in volume. Rates are generally firm, however. At the Clyde, a moderate amount of business is being done. The Humber is quiet and featureless. Homewards, an average amount of fixtures is recorded. The American market is quiet, excepting for a little activity for grain boats. Cotton is inactive, and lumber rates are down. The River Plate rules steady. Australia is rather quieter. Rice ports are dull, at fully late rates. The East Indies are slow all round. Black Sea rates tend to ease, tonnage offering freely. The ore ports are quiet. The Baltic is steady. For sailing vessels, the market is weakening.

Cardiff to Antwerp, 4,000, 4s. 1½d.; Cadiz, 2,000, 8s. 6d., ppt.; Chantenay, 2,200, 6½ fr., ppt.; Cape Verds, 1,950, 10s., ppt.; 1,950, 10s., January 1; Corunna, 1,800, 7s., ppt.; Caen, 1,600, 5s. 3d., ppt.; Devonport, 2,300, 2s. 5d., with options; 322, 3s.; 2,200, 2s. 6d., Admiralty; Dedeagatch, 3,200, 12s. 6d., f.d.; Dakar, 1,950, 10s., ppt.; Dover, 800, 4s., Admiralty; 1,900, 3s., with options; Genoa, 2,200, 9s., ppt.; Gibraltar, 1,750, 6s. 6d., net terms; Honfleur, 1,500, 5s.; Haulbowline, 1,900, 2s. 1½d.; Islands, 3,800, 9s. 4½d., January 10; 2,200, 9s. 3d., mid-January; 3,000, ditto, ditto; Las Palmas, 3,000, 9s. 4½d., January; 5,700, 9s. 3d.; 3,000, 9s. 3d., January 15; Lisbon, 2,600, 7s. 6d.; Monte Video, 16s., January 16; 16s., January 5; Malta, 3,400, 9s. 6d., ppt.; Marseilles, 4,700, 10½ fr., ppt.; 4,000, 11 fr.; Naples, 3,400, 10s., ppt.; 4,500, ditto, ditto; Pembroke, 950, 3s., Admiralty; Portland, 3s. 1½d., Admiralty; Portsmouth, 3s. 1½d., Admiralty; Rio de Janeiro, 5,000, 16s.; Teneriffe, 3,000, 9s. 4½d., January; 3,000, 9s. 3d., January 15; Varna, 5,600, 10s.; Venice, 5,600, 10s., 500, ppt.; 5,800, 10s., spot.

Tyne to London, 2,000, 4s. 6d.; 1,300, 3s. 9d.; Hamburg, 1,500, 4s. 3d.; Bas-Indre, 1,800, 5s. 3d.; Genoa, 3,600, 9s.; Antwerp, 1,000, 6s., from Dunston; Bordeaux, 2,000, 5s.; Rotterdam, 2,000, 3s. 9d.; Havre, 1,200, 6s.

Methil or Burntisland to Genoa, Savona or Leghorn, 2,800, 11s. 3d., with 160 hours.

Grangemouth to Palermo, 1,500, 10s. 9d.; Helsingfors, 2,500, 7s. 9d.; Riga, 1,600, 6s.

Wales to Iquique, sail, 18s. 6d., April-May.

Garston to Buenos Ayres, sail, 23s. 6d., sodas; Buenos Ayres-Boca, sail, 23s., free of Boca dues, sodas, January-February.

Swansea to Huelva, 1,500, 7s. 6d.; Bona, 2,000, 13 fr. coal, 14 fr. fuel, ppt.; Rouen, 1,000, 6s., ppt.; Honfleur, 1,500, 5s.; 950, 5s. 6d.; Dieppe, 950, 5s. 6d.; La Rochelle, 3,400, 7½ fr.; St. Nazaire, 2,100, 7 fr., ppt.; Rochefort, 2,400, 7½ fr., 500, ppt.; Morlaix, 950, 6s. 9d. coal, 7s. 3d. fuel, ppt.; Limerick, 300, 8s. 6d.; Belfast, 580, 3s. 9d., part cargo; Bordeaux, 1,900, 7½ fr., ppt.; Pola, 4,000, 12s. coal, 12s. 9d. fuel; Luderitz Bay, sail, 25s.; Barcelona, 2,000, 9s., December 23; Havre, 650, 6s. 3d.

Hull to Riga, 1,500, 6s.; London, 2,500, 3s. 6d.; Alexandria, 5,000, 9s. 1½d.; Pernau, 1,450, 8s.

Goole to Rotterdam, 1,150, 4s. 6d., ppt.

Newport to Cadiz, 2,000, 8s. 6d.; Gibraltar, 1,700, 6s. 9d., f.d., 600, January 1; Naples, 3,200, 10s.; 4,000, 10s., spot; Marseilles, 4,000, 11 fr.

Glasgow to Bordeaux, 1,700, 8¼ fr.

Middlesbrough to Malmo, 750, 7s. 6d., pig iron; Aarhuus, 1,100, 7s., pig iron.

Burntisland to London, 2,100, 3s. 6d.

Birkenhead to Bombay and Kurrachee, 13s., net terms, rough and general, January.

Methil to St. Malo, 1,600, 6s. 6d.; Middlefahrt, 750, 8s.

Hamburg to United States, 11s. 7½d., kainit, end December.

Forth to Kiel, 3,000, 5s.

Liverpool to West Coast South America, three ports (last a nitrate port), sail, 28s. 4½d.

Port Talbot to La Pallice, 2,500, 6¾ fr., ppt.

Burryport to Rouen, 650, 6s.

Rotterdam to Honfleur, 1,500, 5s. 9d., spot; St. Nazaire, 3,400, 6s., ppt.; 3,400, 6s. 4½d., Trignac terms, ppt.; 2,300, 5s. 9d., ppt.; 2,900, 5s. 9d., Trignac terms, December 22; Bordeaux, 2,800, 6s., December 27; 3,700, 5s. 9d., December 21; 3,400, 5s. 6d.; Livorno, 4,300, 11s. 3d. coal, 12s. fuel, ppt.; Porto Vecchio di Piombino, 3,200, 12s., ppt.

Partington to Buenos Ayres, 6,500, 18s., December.

Homeward charters:—Batoum, 5,500, Liverpool, 20s. cotton seed, 10s. 6d. ore, December-January; Nicolaieff, 5,200, Marseilles, 13¾ fr., ppt.; 6,000, berthed Rotterdam, about 9s. 3d., ppt.; 5,800 max., Weser or Hamburg, 9s. 10½d., with 3d. less barley, December-January; Nicolaieff or Odessa, 4,800, Hamburg or Weser, 10s. 3d., with 3d. less barley, ppt.; Kohsichang, 2,702 net, United Kingdom-Continent, 33s. one port, 33s. 6d. two ports, February; Bombay, 2,612 net, Philadelphia or Baltimore, 23s. 6d., ore, January; 7,000, United Kingdom-Continent, 22s. 6d. two ports, on d.w., December-January; 6,000, Hull, Antwerp, Genoa or Marseilles, 22s., d.w., January-February; 23s., two ports United Kingdom-Continent, d.w.; Gulf timber port, 950 stds., 10 per cent., West Italy, 140s. one port, 142s. 6d. two ports, January; 1,350 stds., 10 per cent., Antwerp, Ostend, 127s. 6d. one port, 130s. two ports, January-February; 1,200 stds., River Plate, 175s., March; Alexandria, 4,400 d.w., Hamburg, 9s., cotton seed, December; Aguilas, 2,500, Calais, 8s., December; Porman, 3,000, Maryport, 8s., December; 4,100, Rotterdam, 6s. 1½d., 1,000-1,000, December; La Calera, 3,000, West Hartlepool, 9s., December; Bilbao, 3,400, Middlesbrough, 6s. 9d., ppt.; 1,400, Newport, 5s. 7½d., ppt.; Pomaron, 1,200, Berwick, 9s. 6d., option Leith 8s., Dec.; Melbourne, sail, 35s., United Kingdom-Continent, o.c., option South Africa 27s. 6d., charterers paying extra insurance, January; Buenos Ayres, sail, 22s., United Kingdom-Continent, H. to H., option Baltic 24s., quebracho, December-January; Kurrachee, 9,500, United Kingdom-Continent, 16s. 6d. p.p., net terms, January; Anguar Island, 2,742 net, Stettin, 41s. 6d., January; Carthagena, 5,000, Rotterdam, 5s. 10½d., 1,000-1,000, option 5s. 9d., 1,200-1,200, ppt.; 3,900, 6s., ppt.; 3,000, Middlesbrough, 6s. 9d., December; Huelva, 3,000, Rotterdam, 7s. 9d., f.d., December; 5,000, Northern States, 10s. 1½d., Tinto terms, end December; 4,000, Rotterdam, 5s. 9d., Tinto terms, January; 4,500, 5s. 10½d., Tinto terms, February; Talenta Channel, 5,000, West Hartlepool, 8s., ppt.; Portland, Me., 19,000 qrs., Lisbon, 4s. 6d., January; Adelaide, sail, 35s. 6d., United Kingdom-Continent, with options, January; nitrate ports, sail, p.t., United Kingdom-Continent, July-August; time charter, Transatlantic trade, basis 10s. one trip, delivery Tampa, re-delivery United Kingdom-Continent, with options; 11s., one trip, United States to Manchester; Baltimore, 24,000 qrs., 10 per cent., Antwerp or Rotterdam, 3s. 6d., December 31 cancelling; 23,000 qrs., 10 per cent., Rotterdam 3s. 1½d., Hull or Hamburg 3s. 3d., heavy, January 1-15; Novorossisk, 4,400 max., Trieste and one port East Italy or Sicily, 25 fr. for 1,750 tons sunflower seed, 15½ fr. for balance heavy grain, December; 1,078 net, Denmark, 17s. 6d. one port, 17s. 9d. two ports, 18s. three ports, oilcake, cancelling January 5; 1,339 net, 17s. 6d., oilcake, January; San Lorenzo, 4,500, 10 per cent., South Africa (Cape-Delagoa Bay range), 21s. one port, 21s. 9d. two ports, option Buenos Ayres loading 1s. 6d. less, ppt.; 3,800, 10 per cent., Barcelona or Genoa, 21s. 6d. one port, 22s. both ports, December 25; 5,200, 10 per cent., United Kingdom-Continent, 21s. 6d. o.c., less 6d., option full cargo below bar 1s. 6d. less, February; 19s., less 6d. direct, seed 1s. extra, spot; Northern Range, 25,000 qrs., 10 per cent., Avonmouth, 3s. 3d. heavy, option barley, 3s., January; Galveston, 30,000 qrs., 10 per cent., Antwerp, Rotterdam, Bremen or Hamburg, 4s., January; Buenos Ayres or La Plata, 4,500, 10 per cent., United Kingdom-Continent, 18s. o.c., no reduction direct, 1s. extra seed, December 23; 5,500, 10 per cent., 18s. 3d. o.c., less 6d., less 3d. further if p.p., ppt.; Larnes, 4,400, Rotterdam, 7s., December; Honaine, 4,000, Rotterdam, 6s. 9d., ppt.; time charter, European trade, 2,250, £510, five years; 850, £450, 12 months; time charter, general trade, 4,125, £1,050, six months; Poti, 2,070 net, Servola, 9s., December-January; Sulina, 3,000, Bergen-Christiania, basis 15s, one port, ppt.; Fremantle, 5,000, United Kingdom-Continent, 41s. 3d., with options, January-February; Parazuelos, 4,300, Rotterdam, 6s. 9d., December; Aguilas, 3,100, Servola, 8s. 6d., December; Santander, about 2,000, Rotterdam, 6s. 4½d., December; Virginia, 1,985 net, Alexandria, 20s., January; Bona, 5,300, Servola, 7s., f.d., December; Gulf timber port, sail, 17¾ dols., Monte Video, April-May; Halifax, sail, 13 dols., Monte Video or Buenos Ayres; Newcastle, N.S.W., sail, 24s., Talcahuano, Taltal range, June-July; Savannah, 50s., United Kingdom-Continent.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER *and* LAST WHITE *pages.*

Abstracts of Contracts Open.

HENDON, JANUARY 6.—For best nutty slack coal, for the Hendon Urban District Council.

LONDON, JANUARY 2.—For coal and coke, for the Wandsworth Borough Council.

RUGBY, JANUARY 10.—For 100 tons of steam coal (peas), for the Urban District Council.

TEDDINGTON, JANUARY 4.—For rough slack, about 1,500 tons, for the Teddington Urban District Council.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

BELFAST, JANUARY 1.—*Electric Derrick Crane.*—For an electric derrick crane, capable of lifting 120 tons, for the Harbour Commissioners.

BURY, DECEMBER 27.—*Iron Castings.*—For iron castings, for the Bury and District Joint Water Board.

HEBDEN BRIDGE, DECEMBER 31.—*Diesel Engine, &c.*—For one 240 kw. Diesel engine and dynamo, for the Urban District Council.

LONDON, JANUARY 9.—*Dynamo, &c.*—For a steam dynamo, switchboard, and connections, for the Fulham Guardians.

MELBOURNE (AUSTRALIA), JANUARY 15.—*Steel Rails, &c.* For 3,300 tons of 100 lb steel rails and 302 tons of fishplates, for the Victorian Government Railways. Forms can be obtained from Mr. J. W. Taverner, Agent-General for Victoria, Melbourne-place, Strand, London, W.C.

SALFORD, DECEMBER 23.—"*Livesey*" *Washers.*—For three "Livesey" washers, for the Corporation.

Partnerships Dissolved.—The *London Gazette* announces the dissolution of the following partnerships:—G. Booth, H. Booth, and J. J. Wood, carrying on business as machinists, at Stable-street, Hollinwood, under the style of George Booth and Sons, so far as regards G. Booth; G. W. Robson and J. A. Leybourne, carrying on business as iron, steel, bolt, nut and general merchants, at Villiers-street, Sunderland, under the style of Geo. W. Robson; E. P. Carter and G. E. Carter, carrying on business as die sinkers and tool makers, at Spencer-street, Birmingham, under the style of Edgar P. Carter; P. C. James and S. W. Reid, carrying on business as brick and tile merchants, at Godstall-chambers, Chester, under the style of James and Reid.

Explosives in Mines.—A deputation from the Northumberland and Durham Miners' Associations went to London on Wednesday last week, and had an interview with the members of the Departmental Committee appointed by Mr. McKenna on the Explosives Order recently issued from the Home Office. Mr. Cairns spoke on the use of squibs and fuses and the electric firing of shots. He contended, with the other members of the deputation, that the firing by squibs was much safer than the firing by fuses. The deputation suggested that from the point of view of safety and expense, and because they are less cumbersome, squibs should be used. They would be agreeable, in wet holes, to the firing with an electric battery. On the following day evidence was given on behalf of the Anthracite Miners' Association with a view to retaining the use of squibs in preference to fuses in collieries where naked lights and compressed gunpowder are used.

"Sentinel" Patent Stop Valves

Continuously Efficient

No. 201
Word: **Apercibo**

L FEATURES

s of Pressure.—The pascally full area, and the flow g directed in easy curves ssure is negligible.

-The Chests are of best nd their carefully rounded iem great strength. The

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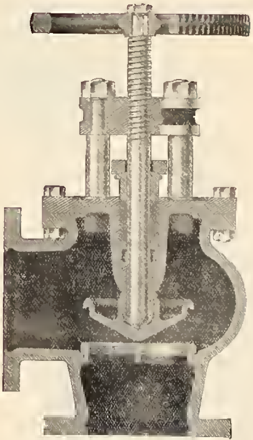

Catalogue 25S, illustrating and giving full particulars of these and other "Sentinel" Valves for Steam and Water, will be sent on application.

No. 203
Code Word: **Apercu**

SPECIAL FEATURES

8. Erosion Prevented.—Chamfering the seats combined with the shape of the internal valve throws the steam clear of the faces. The projection on valve throttles steam till faces are clear.

9. Chattering Eliminated.—The internal valve receives pressure from the spindle below the level of its working face, and so does not chatter and bruise itself, which effect rapidly destroys ordinary valves.

10. Water Hammer is avoided by the cylindrical part of the internal valve practically fitting inside seating ring. The first turn of hand-wheel lets but little steam pass.

11. Rotating Valve.—Every time it is opened the internal valve rotates and finds a new position, thus keeping the faces level.

12. No Binding.—The spindle is of nickel steel, having practically the same coefficient of expansion as the chest, so that valves shut cold do not bind when hot, as is usual. The spindle, too, is about three times as strong as bronze spindles usually fitted, which we will supply if required without extra charge.

atisfaction always use and specify "Sentinel" Valves

LEY & MACLELLAN, LTD
"Sentinel" Works
Polmadie, Glasgow

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Telephone
173 Queen's Park

rs. Alley & MacLellan, Limited, Polmadie, Glasgow

e send (us/me) a copy of your Catalogue 25 S.

LAW INTELLIGENCE.

SUPREME COURT OF JUDICATURE.

COURT OF APPEAL.—December 16

Before the Master of the Rolls, and Lords Justices Farwell and Hamilton.

Mineral Rights Duty—Right of Appeal.

Commissioners of Inland Revenue v. Joicey.—This was an appeal by the Commissioners of Inland Revenue from a decision of Mr. Justice Horridge. The respondent, James Joicey, was the owner of certain copyhold lands in Durham, and the South Moor Colliery Limited were the lessees of the coal, ironstone and fireclay under these lands under a lease dated January 30, 1870, granted by the Ecclesiastical Commissioners for a term of 42 years. By deed dated September 1, 1897, Joicey demised to the colliery company full power and liberty to work, get, or carry away all the coal, ironstone, and fireclay under his lands, without having or making any support for the surface of these lands for the remainder of the term of 42 years, at a rent of 1½d. for every ton brought to the surface. In default of a return by Joicey, the Commissioners assessed him to Mineral Rights Duty on the rental value of the right to work minerals granted by the lease of September 1, 1897. This was done under section 20 (1) of the Finance (1909-1910) Act, 1910, and the assessment was fixed at £500, the duty thereon being £25. Joicey appealed to the referee against this assessment on the ground that he was not liable to any assessment. The referee held that the right demised by the lease was not a right to work minerals and was not assessable to Mineral Rights Duty. The Commissioners of Inland Revenue appealed, and at the hearing before Mr. Justice Horridge a preliminary objection was taken that no rules of Court relating to an appeal by the Commissioners had been made and that they therefore had no right of appeal. His lordship held that, on the rules of Court as at present framed, he could not deal with an appeal by the Commissioners. He therefore dismissed the appeal. The Commissioners appealed from that decision.

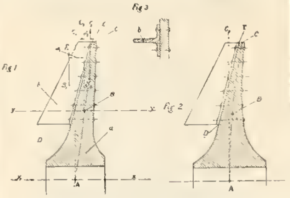
Their lordships allowed the appeal, and the petition remitted to Mr. Justice Horridge.

The Master of the Rolls, in the course of his judgment, said he thought the words "any person aggrieved" were not limited to the subject, but included the Commissioners.

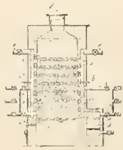
North Staffordshire Mining Classes.—The annual distribution of prizes gained by the students of the North Staffordshire Mining Classes took place at the Town Hall, Stoke-on-Trent, on the 7th inst. The chair was occupied by Mr. T. W. Bratton, chairman of the Stoke-on-Trent Higher Education Committee, who said he hoped that by next year the students would be accommodated in a school worthy of their energies, studies and high calling. Mr. J. T. Stobbs (mining lecturer) reported that during the past session mining classes were held at the following centres in the North Staffordshire coalfield:—In the county borough of Stoke-on-Trent: Mining School (Stoke), Longton, Fenton, Hanley, Burslem and Tunstall; in the county of Stfford: Newcastle, Cheadle, Hanford, Chesterton, Talke, Audley, Newchapel, Smallthorne, Fegg Hayes and Silverdale. These classes were attended by over 600 students. A large addition to their work was made by the Coal Mines Act, 1911, and on account of the large number of mines which worked afternoon and night shifts, it was necessary to provide the means of training as near as possible to the homes of the men. Firemen's courses were conducted mornings and night at the following centres:—Mining School, Longton, Tunstall, Smallthorne, Knypersley, Butt-lane, Chesterton, Silverdale and Cheadle. Mr. T. W. D. Gregory (mining chemistry lecturer), in his report, stated that the system of training students was similar to that of previous years. Classes of various grades were held in the Mining School and at Norton-in-the-Moors. As was the case in the previous session, more applications for entries into the classes were received than could be entertained, owing to lack of accommodation. The work of the students was very good and the attendance satisfactory. Recent legislation had undoubtedly made the work of these classes of greater importance. Hydrometry, gas-testing and gas analysis were subjects which now all colliery officials must know something about. He looked forward with eagerness to the completion of the new school, for the carrying on of the work in their present quarters was difficult. Mr. W. Simons (general manager of the Shelton Iron, Steel and Coal Company Limited), in the course of an address on the importance of technical education, said they must recognise that the demand on the mining student was increasing every year, and that they had a great deal of work to do in order to qualify themselves for a position of trust and responsibility. The increased cost of working and keenness of competition was such that even collieries could not afford to waste coal; neither could they afford to ignore the possibilities of utilising the waste heat. After referring to the excellence of the work done in those mining classes, he said there was one thing he hoped for when the new school opened—namely, that equally successful classes in mechanical engineering, electrical engineering, and for the metallurgy of iron and steel would be provided. These were important branches of the industries of the district, and better facilities were badly needed for their teaching. Mrs. Simons afterwards distributed the prizes.

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

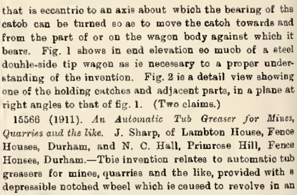
8713 (1912). *Improvements in Centrifugal Pumps and Compressors.* A. Huguenin, Weinbergstrasse 139, Zurich, Switzerland, engineer.—This invention relates to a rotor for centrifugal pumps and compressors of the type wherein the blades are mounted on one side of the rotor disc, whilst the disc itself is of conical or conoidal form, provided with blades on its exterior or convex surface, and of a gradually decreasing thickness from its central portion towards its periphery; and the invention has for its object the construction of a rotor of this type wherein, notwithstanding that the blades are arranged all on one side, the bending strains due to the action of centrifugal force on the disc and on the blades are as far as possible reduced or even entirely eliminated. For this purpose the generating line of the conical or conoidal surface that is medial between the front and rear surfaces of the disc and with respect to which these surfaces are symmetrically arranged is inclined to the axis to the side opposite to that provided with blades to such an extent that, in any longitudinal central section of the disc, the bending moments about the point of intersection of the generating lines of the medial section and a coaxial cylindrical section, arising from the action of centrifugal force on those portions of the blades and of the disc lying outside the cylindrical section wholly or mainly neutralise each other. Two constructions of rotors according to the invention are shown in the accompanying drawings. There is also illustrated in the said drawings a disc in which the blades mounted upon one side thereof are of T-shaped cross-section. (Four claims.)



9292 (1912). *Improvements in and relating to the Distillation of Bituminous Coal and the like.* A. G. Glasgow, 1, West Main-street, Richmond, Virginia, U.S.A., temporarily domiciled at 38, Victoria-street, Westminster. (Communicated from abroad by J. M. Rusby, of N.W. Corner of Broad and Arch Streets, Philadelphia, Pennsylvania, U.S.A.)—According to this invention the bituminous coal, or any other carbonaceous matter to be distilled, is disposed in layers or other forms of small transverse section, which are in immediate contact with, and separated from each other by layers of refractory material, so that the charge, which is composed of those alternate layers, is free to descend, the requisite depth and alternating character of the charge being maintained by the superposition of correspondingly disposed carbonaceous matter and refractory material as the residual material is removed from the bottom. The layers of refractory material are of such kind—preferably moderately finely-divided fragments free from such finer material as would clog their interstices—that they are freely permeable by gases, and they are so disposed as to form, with possible connecting passages, long continuous porous ducts, which are thus easily traversible by gases throughout their entire length. The transverse section of these ducts is that all of the refractory material forming the duct is either in immediate contact with, or very close to, the carbonaceous material to be distilled, which immediately adjoins or surrounds the duct of refractory material. Heated gases are caused to traverse the ducts of refractory material either continuously or intermittently, according to the nature of the carbonaceous material being distilled and the nature of the products desired to be obtained therefrom. These heated gases may be produced by, and introduced into the ducts from, some external source; preferably, however, the refractory material forming the ducts shall be lumps of coke or hard coal, and the hot gases be generated by the combustion of a portion of this coke or hard coal, and also by the combustion of a portion, large or small as desired, of the combustible gases and vapours distilled from the surrounding carbonaceous material, which gases and vapours flow from the carbonaceous material into the ducts; air with or without steam for supporting this combustion is supplied in whatever quantity is necessary into the inlet end of the ducts, and the resulting hot combustion gases flow through the entire length of the ducts, thoroughly permeating the refractory material. The heat of the hot combustion gases is imparted to the carbonaceous material in two ways; a portion of the hot gases come directly into contact with the carbonaceous material, and thus yield up their heat directly and instantaneously, while another portion of the hot gases imparts its heat to the refractory material, whence this heat is radiated and conducted into the carbonaceous material. If, as may be desired, the passage of hot gases through the ducts is intermittent, then the refractory material will store heat from the hot gases during their flow, and again give this heat out to the carbonaceous material during the period of cessation of flow of the hot gases. If it is desired to collect for sale or other external use the gases and vapours distilled from the carbonaceous material, then the admission of air and combustion shall be made intermittent, and this period of combustion shall be made as brief, and the admission of air and combustion correspondingly as rapid, as desired; thereby, the combustion of gases and vapours distilled from the carbonaceous material, which distillation takes place approximately at a uniform rate, can be rendered as small as desired. If the portion of the gases and vapours which it is desired to burn is so small as to not suffice for the generation of the total amount of heat required, then the refractory material shall be coke or hard coal, and its combustion shall replace to the necessary degree that of the distilled gases and vapours. These gases and vapours can, during the period of cessation of air admission and combustion, be removed by appropriate outlets, and stored or used externally as desired. The accompanying drawing is a view, principally in central section, illustrating apparatus in connection with which the invention can be practised in one way. (Four claims.)

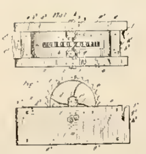


17475 (1912). *Improvements in Catches for Tip Wagons.* W. S. Hudson and R. A. Hudson, both of Gildersome Foundry, near Leeds.—This invention relates to tip wagons of the kind furnished with holding catches to prevent the body tipping whilst travelling. According to the invention the holding catch or each such catch is mounted on an axis



that is eccentric to an axis about which the bearing of the catch can be turned so as to move the catch towards and from the part of or on the wagon body against which it bears. Fig. 1 shows in end elevation so much of a steel double-side tip wagon as is necessary to a proper understanding of the invention. Fig. 2 is a detail view showing one of the holding catches and adjacent parts, in a plane at right angles to that of fig. 1. (Two claims.)

15566 (1911). *An Automatic Tub Greaser for Mines, Quarries and the like.* J. Sharp, of Lambton House, Fence Houses, Durham, and N. C. Hall, Primrose Hill, Fence Houses, Durham.—This invention relates to automatic tub greasers for mines, quarries and the like, provided with a depressible notched wheel which is caused to revolve in an oil or grease tank by the passage over it of the tub or wagon and to transmit the oil or grease to their axles by contacting therewith. It consists in a particular arrangement of the spring controlled depressible and slidable bearings of such apparatus whereby a simplification of construction is



effected. Fig. 1 is a plan (with cover removed) of an automatic tub greaser constructed in accordance with the invention; and fig. 2 is a side elevation. The rotary contact surface, as usual, is in the form of a wheel *b* provided with notches *c*, and whose axle *d* is capable of revolving in bearings *e*. These bearings are formed with enlargements *f* which are adapted to slide in holes *g* formed in the upper angular ends *h* of brackets *i* which are secured to the sides *a* of the receptacle by bolts *k*. The reduced shank ends or slide pieces *l* of those bearings pass through holes

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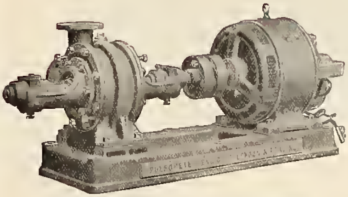
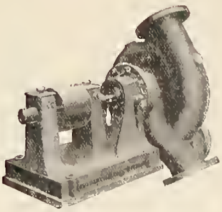


HIGH LIFT CENTRIFUGAL PUMPS.
TYPE C.
For Lifts up to 150 ft.
List No. 522.



CENTRIFUGAL PUMPS.
Volute Type. Belt Driven.
For Lifts up to 80 ft.
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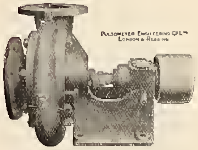

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CENTRIFUGAL PUMPS.
For Lifts up to 40 ft.
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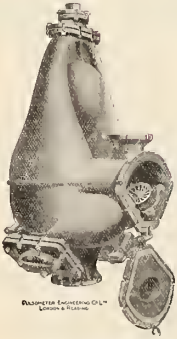

"PULSOMETER"
STEAM PUMP.
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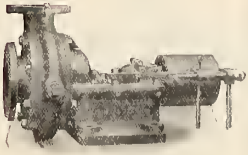
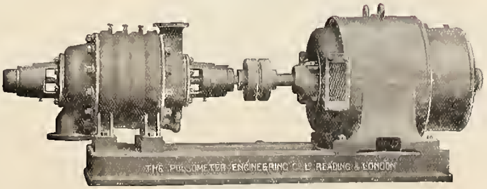


TYPE A.
CENTRIFUGAL PUMPS
with Fast and Loose Pulleys.
List No. 524.



TURBINE PUMPS.
Motor or Belt Driven.
For Lifts up to 1,200 ft.
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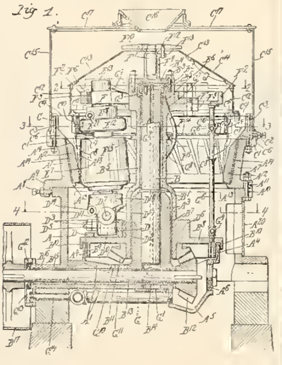
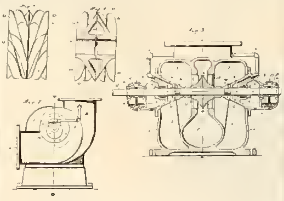
in the lower angular ends of the brackets, and interposed between the upper and lower angular ends of the brackets are spiral springs *n* whose extremities bear against the lower angular ends *m* of the brackets and the enlargements *f*, thereby holding the bearings *e* normally in a raised position. The ends of the tub axles passing over the rotary contacting surface *b* engage with the teeth *c* thereof, causing the same to be depressed and at the same time transmitting a partial rotary motion thereto. To one of the flanges b^1 is hinged at *c'* the divided top cover d^1 braced together by U-shaped straps e^1 which are riveted to the divided ends of the cover. The latter, which is formed with a central slot to pass over the wheel *b*, is furnished at its fore end with a hasp g^1 or other suitable fastening which is passed over an eye h^1 and is secured by a pin *i'* attached at the end of a chain j^1 fixed to the receptacle. (Two claims.)

25137 (1911). *Improvements in Crushing Machines.* E. B. Symons, 605, Majestic Buildings, Milwaukee, Winconsin, U.S.A.—This invention relates to improvements in crushing machines of the kind wherein one or more substantially upright rolls are arranged to travel around and within a substantially horizontal crushing ring for the purpose of crushing material fed between the ring and the roll or rolls, and has for object to improve the construction and working of such machines. Fig. 1 is a vertical section through one construction of machine of the kind referred to embodying the invention. A quantity of material of the desired size—say, for example, stone which has been crushed to the point where its larger pieces are of the diameter of 1½ in. or 2 in.—is fed from the chute on to the rotating distributing plate, whence it is thrown laterally on to the immovable conical feeding apron. The particles travel down over this apron, but since they have been fed on to it by a centrifugal feeder distributor they move spirally across its surface and drop off its edge with a tendency to move both laterally and downwardly. The particles are fed into the pockets above the ring, whence they slide down into the respective channels registering with such pockets. All those particles which are of a diameter greater than the distance between the crushing surfaces at the top of the ring are, of course, struck by the travelling rolls and cracked or crushed. These crushed particles with the other smaller particles descend through the channels until they are again struck and crushed, and so the operation continues until the material reaches the lower zone, where the crushing surfaces are substantially parallel to each other. This zone is of any desired width, but in the form shown is about one-fourth or one-fifth of the total crushing surface. To accommodate the machine to any desired result, and vary its operation with reference to the size of the particles introduced and the size of the completed product, the roll may be moved bodily by adjusting the shims or inclined more or less to the vertical. (Twenty-two claims.)



25877 (1911). *Improvements in or relating to Centrifugal Pumps.* C. V. Kerr and J. H. McEwen, both of 392, North Main-street, in the city of Wellsville, county of Alleghany, New York, U.S.A.—The object in developing is to secure such a form of centrifugal pump that will have good efficiency when running at steam turbine speeds, and delivering a large volume of water at low heads, such as used for condensers in power plants, irrigation systems and circulating water generally. The principal feature of the invention consists in a centrifugal pump having a rotary impeller consisting of a plurality of helicoidal blades mounted on a conoidal drum, characterised in that each of the said blades varies in depth in such a manner that the tips of the blades are all at the same radial distance from the axis of rotation of the impeller. Another feature consists in the fact that the impeller has an imperforate conoidal periphery, and on its periphery a series of vanes arranged as right and left hand helicoids extending to the apex of the periphery. Another feature consists in the fact that the helicoids of the impeller meet near the centre of the periphery to form V-shaped passages. Still another feature is characterised by the fact that in a centrifugal pump comprising a casing having formed therewith a discharge conduit and suction chambers one located on either side of the said conduit, the said impeller is located wholly outside the said discharge conduit and is adapted upon rotation to pass fluid from the suction chambers to the discharge conduit. A further feature consists in the provision of covers for the pump casing, each cover being provided with a pressure chamber adapted to contain water, a thrust sleeve also being fixed on the shaft at each side of the impeller and between the said covers, and means for effecting fluid pressure in the chambers. Further features consist in forming the inner conduit in the form of a spiral and in providing a nozzle surrounding the periphery of the impeller through which nozzle the fluid discharged from the impeller is adapted to pass on its way to the discharge conduit. Fig. 2 is a side view of the pump. Fig. 3 an enlarged vertical longitudinal section on line III—III of fig. 2. Fig. 7 is an enlarged peripheral view of the impeller. Fig. 8 is a central transverse section of said impeller. (Ten claims.)



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14894. Gas-producers. Dowson and Mason Gas Plant Company and Cunningham.
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28072. Direct recovery of ammonia from the products of the destructive distillation of coal or the like. Carl Still (Firm of).

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Trade Unions No. 2 Bill, 339, 1½d.
Labour Gazette, December, 2½d.

PUBLICATIONS RECEIVED.

Canadian Department of Mines: Summary Report of the Department of Mines for Year ending December 1911. Ottawa: T. H. Parmelee (Printer).

Report of the Department of Mines, Pennsylvania: Part I.—Anthracite, 1911; Part II.—Bituminous. Harrisburg: C. E. Aughinbaugh.

"Transactions of the North-East Coast Institution of Engineers and Shipbuilders" (Vol. 29, Part 2), December, price 5s.; "Annales des Mines" (tome 2, No. 11): "Mines Department, Union of South Africa, Statistics for the month of October"; "Excerpt Minutes of Proceedings of the Institution of Civil Engineers (Vol. 189, Part 3): '(1) Roller and Ball Bearings, (2) The Testing of Antifriction Bearing Materials,'" by Prof. J. Goodman; "The Hapnawhenua Viaduct, New Zealand," by F. W. Fulkert; "An Experimental Determination of the Stresses in a Roof Truss," by C. H. Lander, Gilbert Cook, and J. E. Petavel; "Daily Fluctuations in Sewage Flows," by W. Fairley; "The Making and Driving of Reinforced Concrete Piles," by G. B. R. Pimm; "Experiment on the Adhesion of Old and New Concrete," by Hector St. George Robinson; "Reinforced Concrete Sea Defences," by J. S. Owens and F. J. Wood; "The Main Drainage of Glasgow," by A. B. McDonald and G. M. Taylor; "The Construction of the Glasgow Main Drainage Works," by W. E. Easton; "Glasgow Main Drainage: The Mechanical Equipment of the Western Works and of the Kinning Park Pumping Station," by David Homa Morton; "Some Features of the West African Government Railways," by F. Shelford; "The Journal of State Medicine" (Vol. 20, No. 12), December, price 2s.; "The Engineers' Magazine" (Vol. 44, No. 3), December, price 1s.; "Canada Department of Mines, Mines Branch: 'Report on the Utilisation of Peat Fuel for the Production of Power—being a Record of Experiments Conducted at the Fuel Testing Station, 1910-1911,'" by B. F. Haanel; "Transactions of the Institution of Engineers and Shipbuilders in Scotland" (Part 2); "Records of the Geological Survey of India" (Vol. 42, Part 3. 1912).

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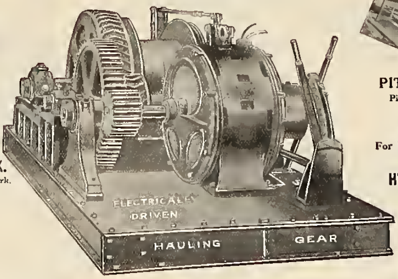

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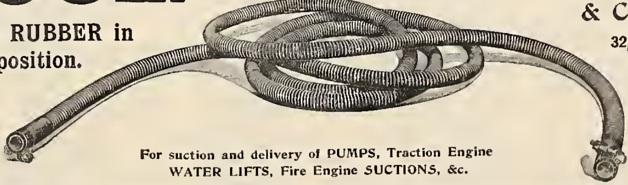

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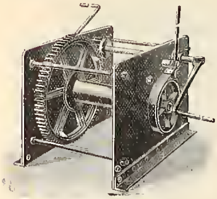

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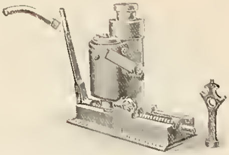

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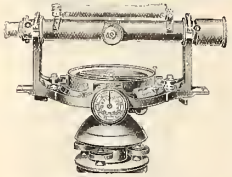

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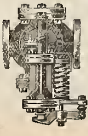

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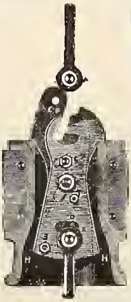

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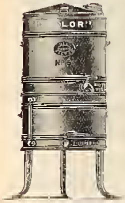

(Patent No. 12,359, May 30th, 1903).

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Walker Hill and Co. ... —
Walker, Thos., and Son Ld. ... Shiplog, Birmingham ... —
Ward, T. W., Ld. ... Forward, Sheffield ... 1300, 1324
Waterfall, H. and R., and Barber ... Niagara, Sheffield ... Cover iv
Wellington Tube Works Ld. ... Vigilantia, Tipton ... Cover ii
Whittaker, C., and Co. Ld. ... Bricks, Accrington ... —
Wigan Wagon Co. Ld. ... Wagon, Wigan ... 1277
Willcox, W. H., and Co. Ld. ... Willcox, Southwark St. ... 1315
Witton Fire Brick Co. Ld. ... 1277
Wood, John, and Sons Ld. ... Haulage, Wigan ... 1323
Wootton Brothers Ld. ... Wootton, Coalville ... —
Wright, J. and E., Ld. ... Universe, Birmingham ... —
Wright, Joseph, and Co. ... Wright, Tipton ... 1283
Yeadon, Son and Co. ... Yeadon, Leeds ... 1300
Yorkshire Boiler Co. Ld. ... Steam, Bradford ... Cover iv
Yorkshire Engine Co. Ld. ... Engine, Sheffield ... 1324
Yorkshire Hennebique Contracting Co. Ld. ... Ferro, Leeds ... 1277
Youngs ... Oldens, Birmingham ... —

Where the Numeral is absent the Advertisement does not appear in the present issue.

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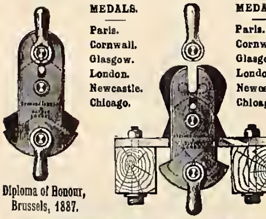

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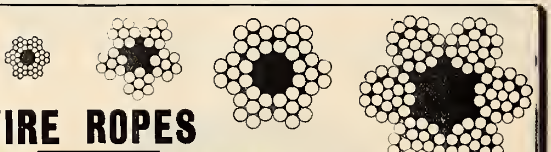

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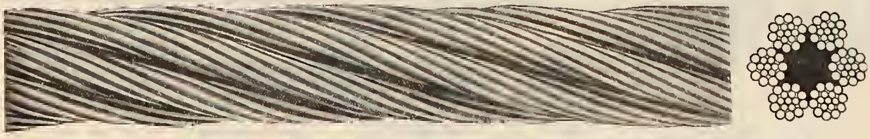

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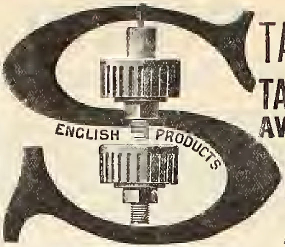

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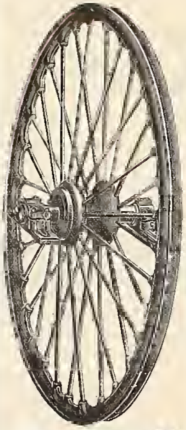

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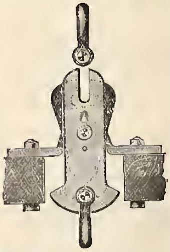

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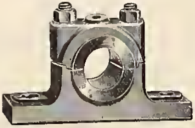
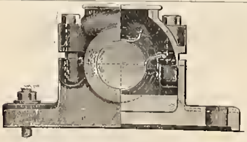


Diameter.	1 in.	1½ in.	2 in.	2½ in	3 in.
No. 3. Plummer block, brasses top and bottom	10d.	1/9½	3/2½	5/8½	9/0½
No. 7. Bright turned flange couplings	2/7½	3/6½	5/3½	7/7½	10/1½



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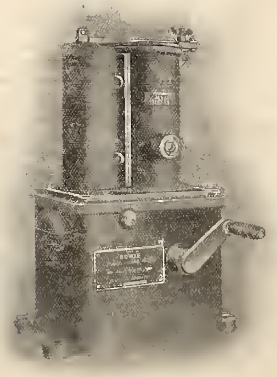

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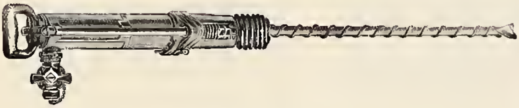

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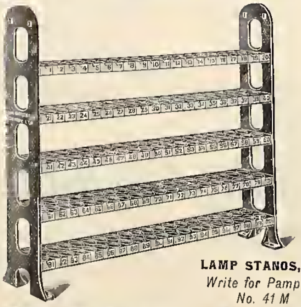

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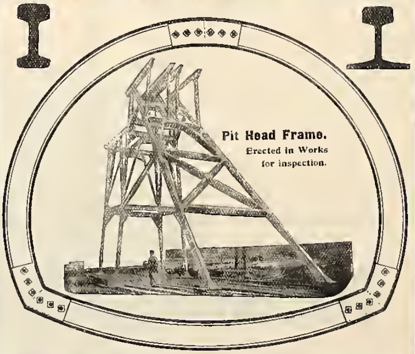

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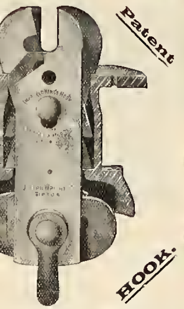

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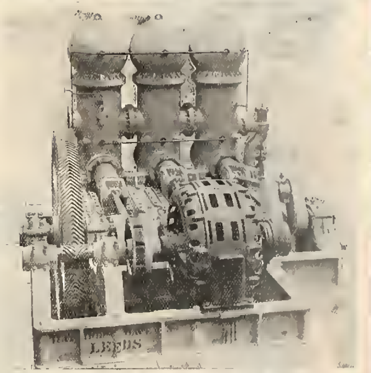

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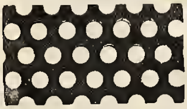

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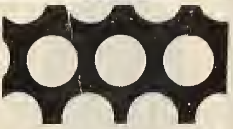

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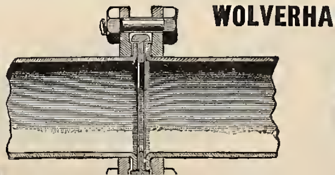

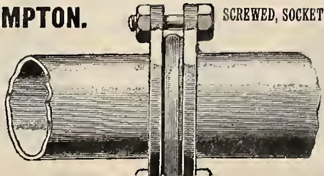

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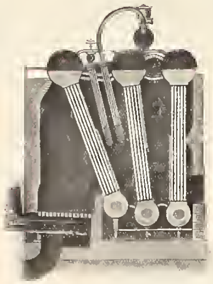

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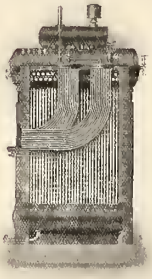
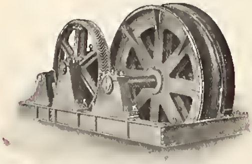
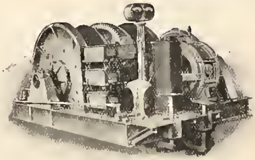


Front Sectional View of Boiler, showing Superheater in Position.



Electric Endless-rope Haulage Gear.

Electric Winding Gear.



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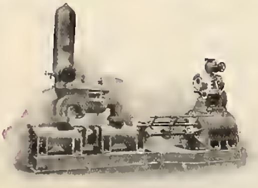
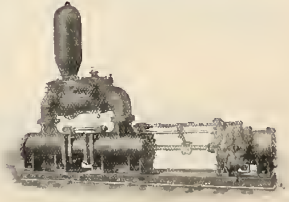


Direct Acting Mine Pump.

Boiler Feed Pump.



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British "Hardy Simplex" B6 Type versus German Type (Sold in England under a "Fancy" Title).

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TS MADE AUGUST 19th, 1912, IN IMPORTANT COLLIERY IN NOTTINGHAMSHIRE.

t No. 1.—Flat Hole, with Twist Drills.

		AIR CONSUMED.	AIR PRESSURE.
an Machine - -	72 in. in 10 min. 55 sec.	200 cub. ft.	65-70 lb. sq. in.
DY SIMPLEX -	**74** in. in **6** min. **55** sec. -	**193** cub. ft.	,, ,,

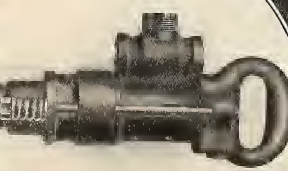
t No. 2.—Hole Dipping, 1 in 4, with Hollow Drills.

		AIR CONSUMED.	AIR PRESSURE.
an Machine - -	54 in. in 26 min. 15 sec.	Not taken.	65-70 lb. sq. in.
DY SIMPLEX -	**64** in. in **8** min. **50** sec. -	,, ,,	,, ,,

Time taken from Starting First Drill until Last Drill Extracted from Bore Hole.

"HARDY SIMPLEX" B6 Machines proved **MORE ECONOMICAL IN AIR CONSUMPTION, AND FROM 50 °/₀ TO 300 °/₀ FASTER.**

ABOVE ARE OFFICIAL FIGURES.



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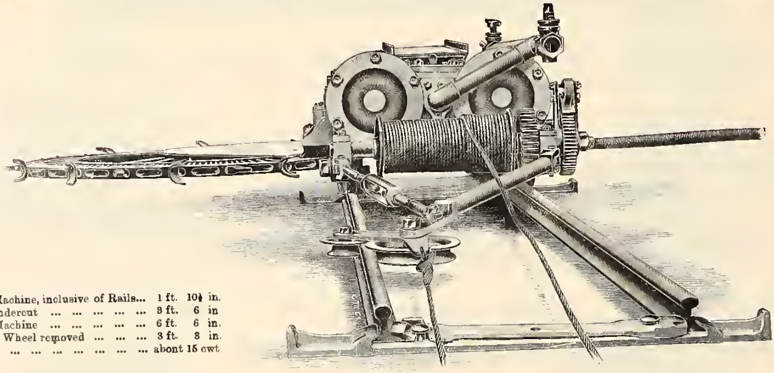

Height of Machine, inclusive of Rails...	1 ft.	10½ in.
Depth of Undercut	3 ft.	6 in
Length of Machine	6 ft.	6 in.
Width with Wheel removed	3 ft.	8 in.
Weight	about 15 cwt	

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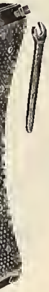

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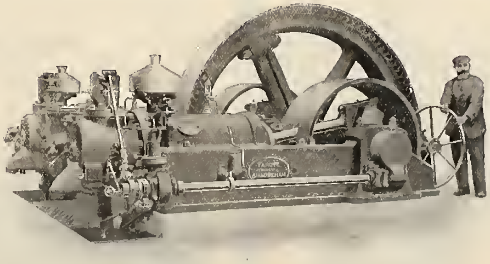

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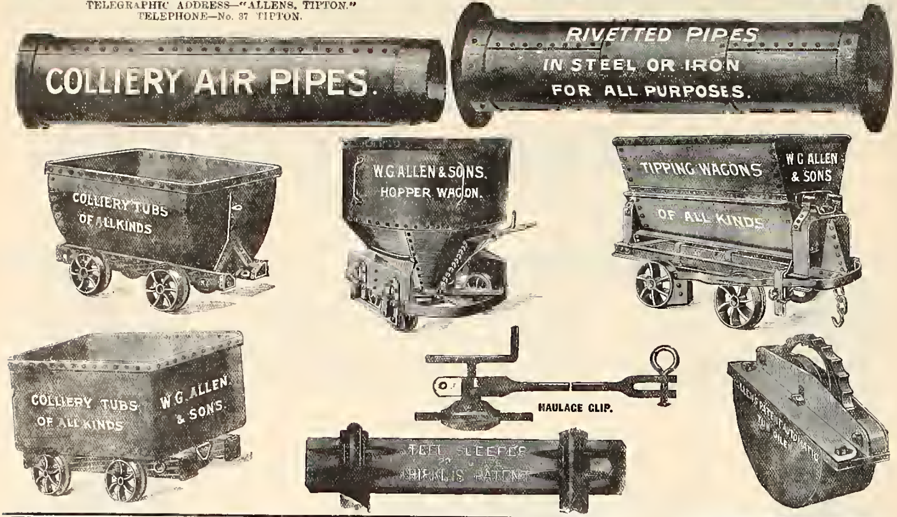
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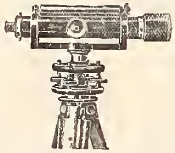

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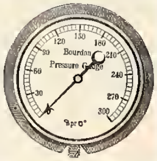

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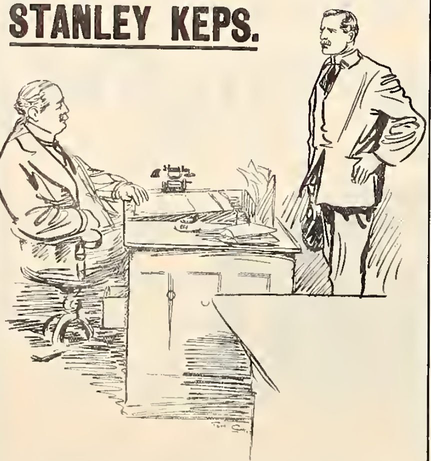

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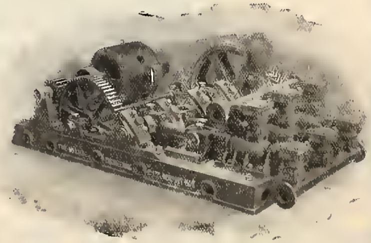

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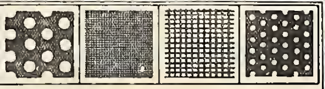

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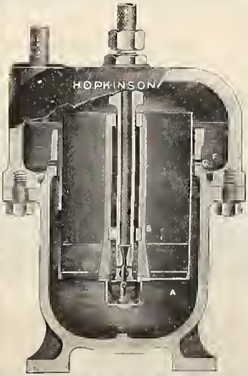

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The valve remains on its seat until the float has sunk low enough to touch the collar on valve; it then immediately begins to discharge.

The Gallery or Water Pocket F is an important feature, as it fills with water when the float is at rest; when the float begins to rise from its lowest position, the water thus collected flows through the hole G into the body A, thus ensuring a rapid elevation of the Float independent of a small amount of water passing into the trap. The valve is not rigidly connected with the bucket, and it is therefore held on to its seat until the Float acts on the Valve. This device is, therefore, most reliable under all conditions of working, but more especially when the volume of water entering the trap is small. Its lifting effect on the Float is indicated by the sharpness with which the water discharge is cut off.

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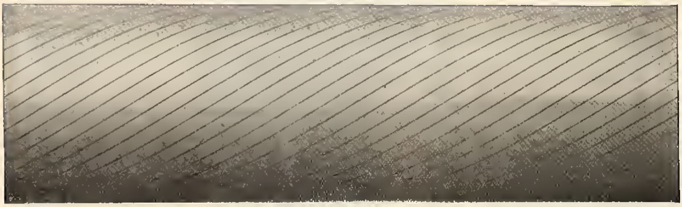

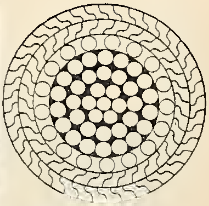

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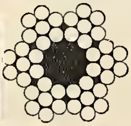

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LONDON—WILKINSON, MADOE & CO., 46, Upper Thames Street, E.C.

THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

FRIDAY, DECEMBER 27, 1912

No. 2713.

MBOLS FOR MINE MAPS.*

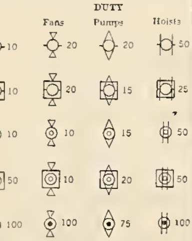
y H. H. Clark.

Law passed by the Pennsylvania requires that the location of all apparatus forming part of the f bituminous coalmines shall be d that the map shall also show the tor, generator, or transformer, and ity. Since the passage of this law e discussion as to symbols that rrying out the requirements of the Bureau of Mines for some time ment of the statute just mentioned the same subject, and had prepared for the purpose. Realising the l attend the adoption of a uniform electrical apparatus on mine maps, ng the following description of its consideration of all who may be tter.

ting apparatus of a certain class bear a common distinctive mark. easier to memorise and recognise. en in this paper rotating machines ircles, explosion-proof apparatus are rs, and signals are enclosed in a r possible, related symbols should common basic character, as words root, by the addition of prefixes and e shades of meaning. This plan has the following list. For instance, a al character has been taken to current motor, and is reproduced in ng to direct-current motors of any g square is added to represent an tor, and certain other additions are fan motors, pump motors, or hoist

otating Machines.

nines are represented by circles. A s is given in fig. 1. The symbol for



. 1.—Symbols for motors.

otor has been used in electrical years, and is suggestive of a com- brushes. The alternating-current suggestive of the slip rings used in t type of machine. The symbol for ating-current motors is distinguished le circle solid. High-voltage direct- not used, and it is not necessary to n motors of low and medium voltage, e system sufficiently defines the motor n-proof types of any of the above ented by enclosing in a square the en-type machine. The symbol which motor is driving a fan is made by tor symbol two triangles to suggest mp-motor symbol is made by adding These distinguish it perfectly from mbol, and may be considered as suggesting a section through the impeller of a centrifugal pump.

The symbol for a hoist motor is formed by the addition of two parallel lines to the motor-symbol root. These lines suggest the track over which the hoist acts. The symbol for a direct-current generator is the direct-current motor symbol with the letter G added. (*See* fig. 2.)

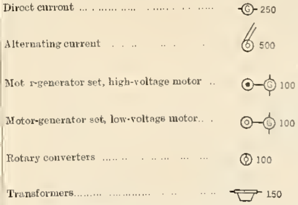


Fig. 2.—Symbols for generators, converters, and transformers.

The symbol for an alternating-current generator is the alternating-current motor symbol with brushes added to the slip rings. The symbol for representing motor-generator sets is made by connecting with a line the motor and generator symbols. The rotary-converter symbol is the result of superimposing a direct-current generator symbol upon the symbol for an alternating-current motor. For the sake of simplicity the G of the generator symbol is omitted.

The transformer symbol, which is suggestive in form, is taken from a list of symbols published by the National Electrical Contractors' Association, and approved by the American Institute of Architects.

Switches.

The representation of switches is simple, as is shown by the symbols in fig. 3. The root is the character S, which is used by the National Electrical Contractors' Association. The figure preceding the root denotes the number of poles, and the figure used as an exponent denotes the number of throws. For the sake of simplicity figures are not used to denote single pole or single throw. Explosion-proof switches are represented by enclosing in a square the symbol for the open-type switch. The symbols for oil-type switches have been previously used for the same purpose. The symbol for the automatic trolley switch cannot be regarded as especially suggestive, but is distinctive enough and is easily made.

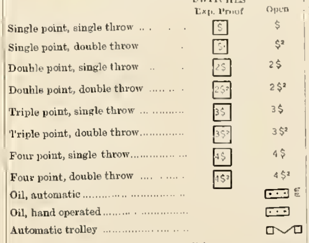

SWITCHES
Exp. Proof
Open
Single point, single throw
$
Single point, double throw
$²
Double point, single throw
2$
Double point, double throw
2$²
Triple point, single throw
3$
Triple point, double throw
3$²
Four point, single throw
4$
Four point, double throw
4$²
Oil, automatic
Oil, hand operated
Automatic trolley

Fig. 3.—Symbols for switches.

Miscellaneous Apparatus.

A list of the symbols for miscellaneous apparatus is given on figs. 4 to 6. The symbol for a lightning arrester is suggestive of the multigap type of that class of apparatus. The symbol for a switchboard is intended to suggest a cross-section of a panel and its supporting pipe framework. The symbol for a section insulator suggests the function of that device; moreover, it is distinctive and easily made. The borehole symbol is distinctive and easily made. It differs in form from the symbol that has been used in the past for boreholes in which wires may or may not be present. The incandescent-lamp symbol is simple, distinctive, and not unlike symbols which have been previously used for lamps.

The signal symbols are related by making their general shape triangular. A signal light is represented by enclosing in a triangle the symbol which represents an incandescent lamp. A signal bell or gong is represented by a circle enclosed in a triangle.

Inasmuch as the telephone may be regarded as a signalling device this symbol is also made triangular, dots being placed at the corners of the triangle to make the symbol distinctive. This symbol is easier to make and duplicate than the outline of a telephone mouthpiece, although the latter is more suggestive.

The old conventional symbol is used for ground connections. A circle has been added to denote a ground to a pipe. The letter R has been added to denote a ground to a track rail, and both the R and the circle have been added to represent the cross-bonding of pipe and rail.

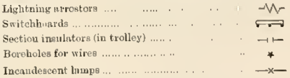


Fig. 4.—Miscellaneous symbols.

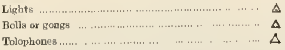


Fig. 5.—Symbols for signals.

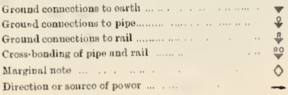

Ground connections to earth
Ground connections to pipe
Ground connections to rail
Cross-bonding of pipe and rail
RO
Marginal note
Direction or source of power

Fig. 6.—Symbols for ground connections, &c.

The symbol for a marginal note has been included in the list of symbols, so that desirable information not shown by the symbols may be noted on the margin of the map and be conveniently available for reference. The direction of the source of power from any point is shown by an arrow pointing toward the source.

Conductors.

A list of the symbols for conductors is given below:—

Trolley	T
Medium and low voltage, bare	B
Medium and low voltage, insulated	I
Medium and low voltage, leaded	D
Medium and low voltage, armoured	E
High voltage, leaded	L
High voltage, armoured	A
Ground	G
Telephone	P
Shot-firing	H
High-tension lines on surface	═ ═ ═

In connection with the letter representing conductors, figures can be used to indicate the number of such conductors that pass any designated point.

Regardless of the system used, more or less difficulty will be experienced in clearly representing several parallel conductors on small scale maps. The following plan has been adopted by the Bureau of Mines as most satisfactory for general use:—A single dotted line is shown on the map wherever there are any electric wires. The presence and extent of such wires are then apparent at a glance. The number and character of the circuits are shown by symbols placed at points where the circuits begin or end. The symbols are understood to refer to what is passing inbye from the points at which the symbols are displayed. Whenever a circuit or a conductor is added or dropped a new symbol is

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Paper 22, United States Bureau of

placed on the map. These symbols consist of groups of letters, each of which represents a conductor, as defined in the list above.

A general idea of the application of these conductor symbols may be obtained from fig. 7. For the sake of simplicity only one entry is shown. For the sake of clearness explanatory notes are placed on the maps instead of in the text. Fig. 8 shows the application of some of the symbols to an actual mine map. Notes have been written out for each symbol and placed on the map to make it self-explanatory.

Expansion of the System.

The list of symbols given herewith does not cover all of the electrical equipment of a mine, but enough are given to represent the permanent machines and conductors. No symbols have been prepared for portable or temporary apparatus, as the representation of such apparatus on maps will seldom be required.

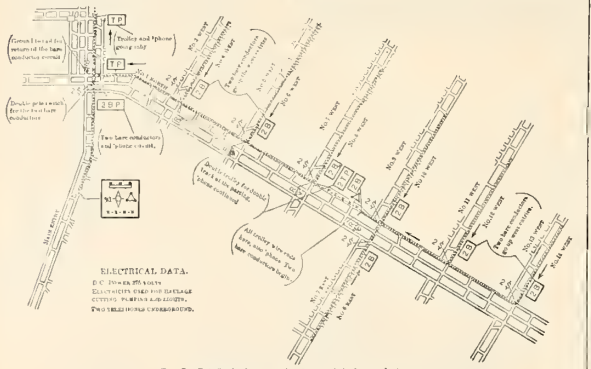
TP
Trolley and 'phone going inby
Ground listed for return of the bare conductor circuit
TP
Double pole switch for the two bare conductors
2BP
Two bare conductors and 'phone circuit
Main Entry
No. 1 North
No. 3 West
No. 4 West
Two bare conductors go up this entry
2B
No. 5 West
No. 6 West
No. 7 West
No. 8 West
No. 9 West
No. 10 West
No. 11 West
No. 12 West
No. 13 West
No. 14 West
2B
Double trolley for double track at the parting. 'Phone continued
All trolley wire ends here, also 'phone. Two bare conductors begin.
Two bare conductors go up this entry
ELECTRICAL DATA.
D.C. Power 275 volts
Electricity used for haulage cutting, pumping and lights.
Two telephones underground.

Fig. 7.—Detail of mine map showing symbols for conductors.

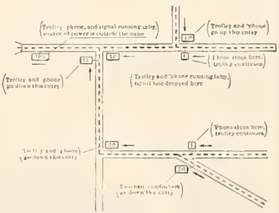
Trolley, phone, and signal running entry, source of power is outside the mine
Trolley and 'phone go up this entry
TPS
TP
TP
T
Trolley and phone go down this entry
'Phone stops here, trolley continues
Trolley and 'phone running entry, signal line dropped here
'Phone stops here, trolley continues
TP
T
Trolley and phone go down this entry
2B
Two bare conductors go down this entry

Fig. 8.—Electrical symbols as used on mine map.

The Bureau of Mines plans to revise and enlarge this list of symbols from time to time.

The Bureau is also preparing, and will soon issue, a series of symbols for other features of mine equipment for use on general mine maps, and on maps that relate especially to explosions and fires.

At the new Valleyfield Colliery, belonging to the Fife Coal Company, Fife, a Baum washer, capable of dealing with 1,000 tons per two shifts of eight hours, has been erected, and the picking and screening plant are of the most approved type. The Valleyfield coal area extends to fully 2,400 acres, and in addition to the coal under the foreshore, operations will be carried out for a mile seawards under the bed of the Forth. At Valleyfield everything is being done to obtain a large output. In the Navigation coalseams about 500 tons per day are being sent up. An output of about 2,500 tons a day is being arranged for. Two of the best seams in the Valleyfield pits are Navigation coal which, it is stated, compares favourably with the South Wales seams from which the Royal Navy draw their coal supplies. As the Valleyfield Colliery is only half-a-dozen miles from the new Naval Dockyard at Rosyth, it is anticipated that the Fife coal will find a navy market. A model village is being laid out by the Fife Coal Company at Valleyfield. The main road is 60 ft. in width, with pavements on each side. Crescents run east and west. The houses are all one storey in height, and each block of 24 cottages forms one side of a crescent. Each house has garden ground, and in the centre of the crescents there is a large plot of ground which will be planted with shrubs. Water is being introduced into the cottages, and the occupants of the three-roomed houses have a bathroom.

ELECTRIC SHOCK.

The *Lancet* for November 30, 1912, contains an interesting letter from Dr. Reginald Morton, president of the Section of Electro-therapeutics of the Royal Society of Medicine. Dr. Morton refers to an address on "The Dangers of Electricity" given by Dr. S. Jellinek, of Vienna, before the section of which Dr. Morton is president, on November 15, and observes that there were some important yet simple facts which are not as generally known as they should be.

There are, he says, only two fundamental facts that need be impressed upon the minds of everyone. The first is that death from electrical shock is only an apparent death at first; and secondly, whatever the conditions or severity of the accident, there is practically always a time, varying from a few minutes upwards, during which it is possible to resuscitate the victim by artificial respiration if resorted to at once. So important is it to commence artificial respiration quickly that it is the first duty of the bystander to see to this before everything else. He must not leave the victim to summon medical aid—it may be too late by the time the doctor arrives—but he should send for medical assistance if there is anyone else present. If the victim has fallen clear of electrical contact first-aid may be given at once, but if he remains in contact with the circuit the first step is to get him free. This is dangerous to the rescuer unless care is taken, but the necessary precautions are simple enough for any voltage likely to be encountered by the public. If, then, the victim remains in contact with the circuit, his body must not be touched by his rescuer, but the latter may pull him out of contact by hauling on the clothing, or he may take off his own coat, insert his hands in the sleeves, and then handle the victim with little or no risk to himself. Almost any article of clothing or material may be used, provided it is dry and of moderate thickness. Artificial respiration must be persevered with for at least two hours, or until the patient revives; in many cases it may be only a few minutes. After return to consciousness complete rest is essential for a day or two, and under no circumstances must the man be allowed to return to work at once, as he may wish to do if the shock has been a light one. With the prompt application of first aid practically every victim can be revived, and of these nearly all will make a complete and permanent recovery provided they were previously in a normal state of health.

In connection with the foregoing, we may draw the attention of our readers to the "Directions for the Restoration of Persons Suffering from Electric Shock," compiled for us some two years ago by Dr. T. Lister Llewellyn, the first Tyndall Research Mining Student of the Royal Society, whose experience at the Powell-Duffryn and Rhymney Collieries gave his opinion the greatest weight. In these directions, which are couched in terms admirably simple and clear, Dr. Llewellyn formulated methods of resuscitation which in their nature and sequence exactly agree with Dr. Morton's suggestions. The directions are supplied with graphical instructions for the application of the Schäfer or Sylvester systems as desired, each of these excellent systems having its adherents.

The Royal Insurance Company Limited have issued a further and revised edition of their rules of golf. They will be glad to send copies to any of our readers.

THE MINING INDUSTRY OF JAPAN.*

By Keijero Nishio.

At a time of great antiquity when our Yomato tribe had not yet found its way throughout the country, there lived in Japan barbarous tribes of the Stone Age. In a cove lately discovered at the village of Morita, 10 miles west from the port of Aomori, there were found pieces of micaceous iron ore and psilomelane, with oval holes pierced from both sides. Among the traditions given in the *Nihonshoki*, an ancient history of Japan, there is one relating to the mining industry. According to this tradition, in the mythological age Izanami-no-Mikoto gave birth to Kanayamahiko-no-Mikoto, god of mines, and Amaterasu-Okami (the sun-goddess) was armed with swords. It came to pass at one time that she concealed herself in Ama-no-Iwato ("Heavenly Cave"), and several gods made contrivances to entice her out. Among them, Ishikoridome, a smith, made a mirror with copper obtained from the Ama-no-Kagoyama, by means of a pair of bellows known as the Ama-no-habuki, which was made of a deer-skin. It is recorded also that Susanô-no-Mikoto, her younger brother, observed the abundance of gold and silver in Korea, where his descendants were to reign, and urged them to provide themselves with boats to convey them across the Sea of Japan. In the course of time he accomplished his object. proceeding to Korea with his son, Isotakeru-no-Mikoto,

Records for the space of 860 years from the first year of the Emperor Jimmu, B.C. 660, to the conquest of Korea by the Empress Jingu, A.D. 200, show that swords and mirrors were made early in those days, but nothing definite is given as to other metallic products. In 506 A.D., during the reign of the Emperor Ojin, communications with China supplied the Japanese with a splendid opportunity to bring themselves into closer contact with various forms of Indian civilisation, which soon spread far and wide through the country. The people directed their attention seriously to the mining industry, which was specially encouraged under the beneficent reign of Emperor Monmu, full of sagacity and wisdom, from A.D. 697 to 706. The zeal of the Emperor for the mining industry was so intense that he took the initiative in the mining law which is known to us in the famous code, *Daihōryō*, issued in June A.D. 701. The mining of copper and iron ore was freely granted to the people at large by the *Daihōryô* of A.D. 701, but the mines were gradually assumed by rich and powerful men, as were also the ironmines in Omi. Thereupon, such monopolisation was forbidden, so as to allow the poor to participate in the industry.

Iron was produced before the eighth century from the provinces of Chūgoku, which were blessed with an abundance of magnetic sand, derived from decomposed granite. In A.D. 796, as the production of iron from Bizen was reduced, the payment of taxes in the shape of iron ploughs was stopped. It was at the beginning of the ninth century that famous swords made their appearance in these regions.

From A.D. 1001 to A.D. 1582, the production of gold and silver made a gradual but steady increase, particularly in the provinces of Mutsu and Dewa.

The production of copper from the official mines declined in the middle of the tenth century. These facts, however, do not go to prove the decline of the copper-mining industry in those days. The production of the Yoshioka copper mine, in Bitchu, was gradually increasing in A.D. 1427; the Tada Mine, in Settsu, produced an immense amount of copper in A.D. 1570; the Ani Copper Mine, in Ugo, commenced to be mined in A.D. 1575, and the Motoyama Mine, in Mutsu, was also opened about that time. The method of matte-smelting, commonly called the "Mabuki" process or "Yamashitabuki," was invented in the sixteenth century at the smelter of the village of Yamashita, Tada, in the province of Settsu.

We have but scanty and meagre records of the iron industry during this period. At the Sugatani Mine, Iishi county, Idzumo, the smelting plant for magnetic sand commenced to work in A.D. 1266. The discovery of the Daira leadmine in Ugo took place about A.D. 1270, and was followed by that of the Obira Mine, Bungo, A.D. 1547. This was started as a tinmine, but later became a copper mine. In A.D. 1469, at Inariyama, in Chikugo, a farmer found a coalseam, which is worked at present as the Miike Colliery; while in A.D. 1532, at Kurobeyama, in the provice of Etchu, sulphur was discovered, and three years later it was worked.

From A.D. 1583 to A.D. 1866, gold- and silver-mining, which had been encouraged in earlier periods, made striking progress.

The mining of gold and silver ores in the early days was only the excavation of the enriched zone above the drainage level, but as in the course of operations it became necessary to sink below that level, the difficulty of drainage was felt. In those days, for the purpose of drainage in the Sasa silver mine, Tsushima, a treadmill was used. In the Sado Mine a well-bucket only was used, which was worked by prisoners convicted of capital offences. In A.D. 1634, the "Supondoi" was adopted—a primitive hand-pump consisting of a wooden pipe 4 in. square, and from 9 to 12 feet long, having a valve 3 ft. below the upper mouth, and a piston 3 ft. long, with a valve at its end. In A.D. 1637, Sōbo, the hydraulic engineer, who came from Osaka, designed the "Tatsudoi," which took the place of the "Supondoi." It was an Archimedean pump of Roman style, which consisted of a wooden cylinder and screw, 9 ft. long and 1 ft. in the upper and 1·2 ft. in the lower diameter. The ruins of such a pump were lately found at the old working place, and are now preserved in the Tokyo Imperial University.

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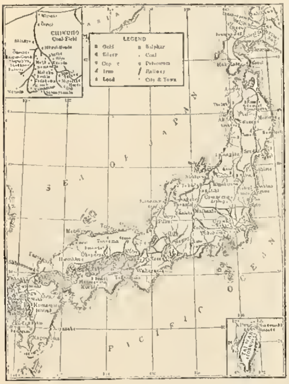
* From a paper read before the American Institute of Mining Engineers.

In A.D. 1872, a hand-pump, introduced from Holland, was successfully worked at Aoban and Jingo in the Sado Mine.

As the drainage grew to be a serious question for mining, the excavation of the adit was started, utilising the topographical conditions. In the Sado Mine, the adit of Midzukane ravine, whose length was 2,880 ft. through andesite tuff, was commenced in 1629 and completed in 1639. The adit of Ogiri, begun in 1647, was completed after the constant work of 13 years. Its length was 948 ft., and that of the accompanying airway 1,080 ft. Lastly, the adit of Minamizawa ravine was undertaken, which remains to this day. It was commenced July 25, 1691, to drain the water in the working places at the Waremabu bonanzas. May 14, 1696, success was attained after five years of effort. The length of the adit was 3,014 ft. It was driven from six points, making two intermediate shafts at the Kitazawa ravine. The sections of the adit were made in several forms besides the common rectangular form, in order to reduce the upper pressure and to enlarge the flowing area. The monthly progress at each working face was 8·6 ft. through andesite tuff. The excavation was done with chisel and hammer, making the surface of the wall and the roof very even, and leaving the traces of the chisel. A part where the trace resembles the spider's web is celebrated as the *Kumonosu-Kengiri*. During the excavation the working was ventilated by brattice. The surveyor of the work was Shidzuno Yoemon, who used the magnetic compass and clinometer, which are now preserved at the Tokyo Imperial University. The circumference of the compass is divided into 480 degs., and each of these into 10 minutes and east and west are placed as in the modern compass. The clinometer is 1 ft. square, its scale being divided into 10 *sun* and each *sun* into 10 *bu*.



Map of Japan showing Important Mines.

In the sixteenth century the European ships visited the western shore of Kyūshū, at Hirado, Gotō, Hizen and Satsuma, and entered into commerce with the natives. The amount of gold and silver then exported by the Portuguese was enormous.

In 1697 they began to use, in the Sado Mine, stamps driven by water-wheels to crush the poor ores formerly abandoned. It is very curious to observe that the methods of rugging and concentrating the ore at that mine were identical with those of Cornwall in ancient times.

After the sixteenth century the copper-mining industry made a slow but steady progress. In 1668 there were 23 copper mines in working order, which, after the lapse of 17 years, were increased to 34. The labourers in copper mines numbered 200,000, and those engaged in liquation at the copper refineries at Osaka, 10,000. In 1702 the Government summoned Sumitomo Kichizaemon to Yedo to undertake the increase of the production of the mines of Besshi and Yoshioka, which he was working. Acting under the suggestions of this experienced miner, the Government advanced 5,000 *ryō* as a mining capital for the Besshi Mine, and the same amount for the excavation of an adit for the Yoshioka Mine. It was in this wise that the so-called "Government copper mines" were brought into existence, of which the Government required a certain fixed amount to be produced for specific objects, leaving any surplus to the disposal of the miners.

The excavation of rocks and ores was formerly effected by means of chisels and hammers, but where they were hard fire-setting was sometimes used, as at the Nawachi silver mine, in Idzu, and in the Besshi copper mine, to facilitate the mining of the ore. In 1862, Raphael Pumpelly and W. P. Blake, both American engineers, and Oshima Takatō, introduced for the first time blasting with gunpowder at the Yūrapu lead mine, in Hokkaidō, which was considered as a forerunner of the new working of the mining industry during the present *régime*.

Iron was formerly smelted from the magnetic sand produced from decomposed granite which occupies the mountainous region of Idzumo, Iwami, Bitchū, Bingo, and Aki. Owing to the progress of society and the consequent increase of the demand, the iron industry has grown to be quite prosperous. In the valley of the Tōjō River, Bitchū, places worked for magnetic sand numbered 267 in 1671. The remarkable invention of balance bellows was made in Iwami at the beginning of the eighteenth century. The tread-bellows, "Fumidatara," was formerly used, which required eight men to operate. The new balance bellows, "Tenbindatara," which was invented in the eighteenth century, needed only two men for the pair to produce the same effect. This saving of smelting expense was conducive to the remarkable development of the industry. As a consequence of this growth, a conflict of interests with farmers began to arise. Through the arbitration of Lord Asano, the matter was brought to a successful issue on the ground that the washing was executed at the time when agriculture was inactive. Another industry was started in Tosa in 1782, and the magnetic sand on the coast of the Hokkaidō became the object of attention. In 1855 Takenouchi Yasunori and Takeda Hisaburō built shaft furnaces at Kobui, Oshima, Hokkaidō, to smelt magnetic sand from the coast. This was the first one built in Japan. The Kamaishi ironmine, Rikuchū, was discovered in 1823, where the smelting was commenced in 1849, and in 1860 shaft furnaces were built by Oshima Takatō to smelt the iron ores. In 1857 the Kamiteoka (or Kamichūka) ironmine (Iwaki) was discovered, where tread-bellows were used in smelting ores. In the counties of Ongu, Kurate and Kaho, in Chikuzen, which are the important coalfields in Japan at present, coal has been produced since 1702 in a somewhat limited degree. In 1721 the coal at Hiranoyama, in Miike coalfield, in Chikugo, began to be worked. This was followed by the discovery of the coalseam of the Yoshinotani Colliery; and in 1800 Goheida, a native of Hirado, discovered the Takashima Colliery in the province of Hizen—and in these districts coal was known as "Goheida," after the name of the discoverer. In those early days, coal was chiefly used for domestic purposes, but sometimes it was sold as a fuel in the saltfields in Setouchi coast or to foreign steamers visiting Nagasaki. In 1843, Matsumoto Heinai started a coal store at the port of Ashiya, in Chikuzen, where he monopolised the business of the coal, eggs and crude wax produced in that province. In 1855 a steamship was sent as a souvenir to the Shōgun by the King of Holland. This suspended the export of block coal from Chikuzen, since it had to be used as fuel for the steamer. The maximum output of coal from the province of Chikuzen was fixed by Lord Kuroda at 60,000 long tons annually. Coalmining in those days was simply cutting from the outcrop, and hence there was every need for improvement. In 1855, the Oura slope of the Miike Colliery (Chikugo) was started. It reached success in four years, when the coalseam was met at 230 ft. on the slope, or 40 ft. vertically. The Takashima Colliery introduced in 1867 the European method of mining.

At the end of the Tokugawa regency the country was in a troubled condition, whence the mining industry was also disturbed, and at last stopped during the civil war ending with the Restoration of 1867, which has given a happy chance for mining development.

From the earliest times on record several persons have devoted themselves to the development of the mining industry in Japan. At the end of the seventeenth century Japan was blessed by the birth of a hero at the north-eastern part of Honshū, whose name was Satō Nobukage. He is the author of *Sansōhiroku* (*The Principles of the Exploitation of Mines*), which contains epitomised accounts of his rich experience. In August 1731, at the invitation of one of his pupils, he paid a visit to the Ani copper mine in Ugo, where, in the course of his examination underground, an explosion of gas ended his glorious and promising career. There are even to these days many miners in the provinces of Mutsu, Dewa, Iyo, Tajima and Iwami who have full confidence in his principles of the exploration of mines.

Before the Restoration of 1867, the mining and metallurgical arts in Japan had reached the highest development which could be attained without the aid of mechanical contrivances—the only source of power available in that period having been manual labour. The condition was identical with that of Europe 300 years ago. The Restoration wrought, in every direction throughout Japan, the greatest change in accordance with the requirement of the times. It was no wonder that the new Government took every opportunity to encourage the mining industry. As the commencement of this policy, an Act was issued in February 1872 by which the Bureau of Mines was established in Osaka, which was formerly called the Osaka Copper Office, and which became the embryo of the present Bureau of Mines, Tokyo. A mining law, *Nippon Kōhō*, was issued in January 1873, according to which, whoever wanted to work a mine, had first to make application to the local office.

In order to lead the mining industry into a new trend, fresh sources of knowledge were sought in the Occident. At that time, the Government took some of the larger mines under its control, and also supplied to them the knowledge and capital which they required. For this purpose, the Ikunos silver and copper mine, in December 1868, and then the Sado goldmine, the Kosaka silver mine, the collieries of Takashima and Miike, the Okudzu goldmine, the ironmines of Kamaishi and Nakakosaka, the Innai silver mine and the Ani copper mine—10 in all—were selected as the Government mines successively. In 1870 the Bureau of Mines engaged Baron von Richtofen, a German geologist, to prospect mines and to promote the establishment of a mining school. Our Government utilised most wisely the services of mining engineers, civil engineers, geologists and other instructors, and even of miners from England, America, France and Germany, numbering in all 78 men, for the reformation of various industries in Japan. The foreign engineers were distributed to the Government mines to direct the working; and in order to prosecute their designs, the Government invested the required capital, and thus gave practical examples of mining, which aroused the people from their long sleep in this industry. Not only were the mines supplied with capital, but also the people learned the foreign arts, which were finally propagated in all the mines throughout Japan. Among the eminent mining engineers now engaged in the business, there are not a few who were directly educated by these Occidental engineers.

The Manda Shaft, Miike Colliery.

The Government mines having undergone much improvement in consequence of the policy above mentioned, the Government afterwards thought it high time to hand over the mines to private enterprise. Accordingly, in 1885, all the Government mines, except the Miike Colliery, the Ikuno and the Sado mines, were disposed of to the people. At the same time the engineers who had been educated by the foreign engineers took the place of the latter in working the mines. Afterwards the Miike Colliery was sold to a private operator in 1888

A.D., and the Sado and Ikuno mines were assigned to the Bureau of the Imperial Estate in the following year, leaving the Shinbaru and Gotoku collieries, worked for the Navy, as the only mines under Government control. In short, the unremitting efforts of the Government in the industrial sphere have been modified from time to time, as the conditions required.

The progress of society did not allow the continuation of such an arbitrary system as the mining law, *Nippon Kōhō*, already mentioned, which was calculated to impair seriously the advance of the mining industry. In 1890 the law was amended, and the new regulation, *Kōgyō Jōrei*, was issued two years later. The concession system, which distinctly established the right of permanent working, introduced a sound development of the mining industry in Japan.

The Government did not forget the necessity of technical education. In September 1870 it laid a base of mining education by the erection of the Mining School, *Kōgakuryō*, at the instance of Oshima Takatō. Afterwards it was changed to the Engineering School, to teach not only mining, but all other branches of engineering, by foreign instructors. In January 1887 the courses of the school were raised, and the name was changed to the Engineering College. In September of that year other courses of lectures on mining and metallurgy were commenced in the Science Department, Tokyo College. Both were included in 1886 in the Tokyo Imperial University

Producton of Principal Coal Mines in 1908.

Mines.	Prefectures.	Concessionaires.	Output.	No. of Laborers.
			Long Tons	
Yūbari 1st	Hokkaido	Hokkaido Colliery & S. S. Co.	458,186.9	5,003
Sorachi	Hokkaido	Hokkaido Colliery & S. S. Co.	315,579.5	1,957
Shin-Yūbari	Hokkaido	Ishikari Coal Co. & others	163,720.8	1,553
Horonai	Hokkaido	Hokkaido Colliery & S. S. Co.	161,709.0	1,236
Yūbari 2nd	Hokkaido	Hokkaido Colliery & S. S. Co.	116,736.2	913
Ikushumbetsu	Hokkaido	Hokkaido Colliery & S. S. Co.	76,541.4	718
Pompetsu	Hokkaido	Nippon Kōgyō Co.	83,013.3	395
Uchigō	Fukushima	Iwaki Coal Mine Co.	199,926.3	1,505
Onoda	Fukushima	Iwaki Coal Mine Co.	190,562.4	1,194
Iriyama	Fukushima	Iriyama Coal-Mining Co.	194,742.5	1,402
Yoshima	Fukushima	Yoshima Coal Mining Co.	126,826.9	1,545
Ojō	Fukushima	Ojō Coal-Mining Co.	69,094.2	441
Sansei	Fukushima	Sansei Coal Mining Co.	69,298.1	545
Ibaraki Saitan	Ibaraki	Ibaraki Coal Mining Co.	69,733.6	580
Ibaraki Mumtan	Ibaraki	Ibaraki Anthracite Mining Co.	59,042.2	822
Ōmine	Yamaguchi	Navy Department	96,995.7	971
Okinoyama	Yamaguchi	Watanabe Yūsaku	53,282.7	508
Kaia	Yamaguchi	Noda Kiichibei & others	58,526.5	119
Ōtsuji 1st	Fukuoka	Kaijima Tasuke	197,115.8	1,624
Ōtsuji	Fukuoka	Kaijima Tasuke	167,260.6	1,417
Miyoshi	Fukuoka	Miyoshi Tokumatsu	130,653.1	731
Iwasaki	Fukuoka	Iwasaki Kumekichi	65,113.7	455
Nakatsuru	Fukuoka	Itō Denyemon	57,656.4	371
Akaji	Fukuoka	Itō Denyemon	54,450.9	559
Ōnoura	Fukuoka	Kaijima Tasuke	771,530.8	6,195
Shinnyū	Fukuoka	Mitsubishi & Co.	126,621.0	4,945
Meiji	Fukuoka	Meiji Mining Co.	419,763.0	3,156
Shimogashira and Shakanoo	Fukuoka	Furukawa Mining Co.	373,198.0	2,705
Mitsui Honda	Fukuoka	Mitsui Mining Co.	198,914.6	3,064
[illegible] Kaigun	Fukuoka	Navy Department	213,353.4	1,532
Koyanose (1st)	Fukuoka	Kai Iwakichi	83,111.3	563
Koyanose (2nd)	Fukuoka	Kai Iwakichi	46,780.8	280
Namazuta	Fukuoka	Mitsubishi & Co.	271,836.0	2,207
Futase	Fukuoka	Government Steel Works	354,953.9	2,629
Yoshio	Fukuoka	Asō Takichi	243,390.0	1,792
Mitsui-yamano	Fukuoka	Mitsui Mining Co.	177,660.5	2,220
Tadakuma	Fukuoka	Sumitomo Kichizaemon	168,569.3	1,637
[illegible]	Fukuoka	Asō Takichi	159,153.0	1,076
Aida	Fukuoka	Nakano Tokujirō & others	97,210.6	652
Kamiyamada	Fukuoka	Mitsubishi & Co.	93,550.4	1,021
Muta	Fukuoka	Itō Denyemon	91,632.8	758
Shimoyamada	Fukuoka	Furukawa Mining Co.	103,336.9	1,103
Hirayama	Fukuoka	Tajima Shinobu	22,730.7	837
Honami	Fukuoka	Ishida Osamu	36,122.2	168
Mitsui-tagawa	Fukuoka	Mitsui Mining Co.	536,260.0	4,460
Kanada	Fukuoka	Kanada Mining Co.	290,978.6	2,442
Ōtō	Fukuoka	Buzen Coal Mining Co.	171,546.0	1,305
Akaike	Fukuoka	Meiji Mining Co.	172,962.2	1,444
Hōkoku	Fukuoka	Meiji Mining Co.	127,063.8	1,454
Hōjō	Fukuoka	Mitsubishi & Co.	96,645.4	1,155
Miyazaki-hōshu	Fukuoka	Miyazaki Giichi	105,002.3	929
Mineji	Fukuoka	Kashiwagi Kanpachirō	66,529.3	1,450
Hassoda	Fukuoka	Masaya Hikosuke	60,413.8	553
Miyao	Fukuoka	Kurachi Jiichi	56,735.8	882
Sōka	Fukuoka	Abe Yasujirō	53,064.4	643
Kigyo-Komatsu-hōji	Fukuoka	Korachi Shigehiko	64,763.3	556
Kaheru	Fukuoka	Kuwahara Masa	47,257.3	669
Tsubakuro	Fukuoka	Kaijima Tasuke	81,214.2	835
Shimbaru Kaigun	Fukuoka	Navy Department	61,221.1	1,318
Sasahara	Fukuoka	Yonezawa Tokichi	60,693.2	234
Ueki	Fukuoka	Okada Sango	63,394.0	324
Miike	Fukuoka	Mitsui Mining Co.	1,419,255.8	9,276
Yoshinotani	Saga	Yoshinotani Coal-Mining Co.	251,773.7	3,160
Ōchi	Saga	Mitsubishi & Co.	181,458.0	2,176
Kishidake	Saga	Koga Seijirō & others	83,017.3	1,184
Akasakaguchi	Saga	Takatori Koreyoshi	124,162.9	1,547
Yunokibaru	Saga	Kaijima Tasuke	87,350.7	1,119
Kishima, 2nd	Saga	Tajima Shinobu	61,926.9	1,171
Kishima	Saga	Hirade Ichiji & others	71,248.3	1,697
Takashima	Nagasaki	Mitsubishi & Co.	184,816.1	2,693
Matsushima	Nagasaki	Koga Shun-ichi	78,535.7	1,226
Matsura	Nagasaki	Matsura Coal-Mining Co.	10,719.2	456

Gunpowder was used for blasting in the Yūrrapu Mine, Hokkaidō, in 1862, as before mentioned. During the 18 years between 1868 and 1885 there was much activity in the introduction of new Occidental technical knowledge in several departments of mining. The laying of rails both underground and overground, the sinking of shafts and the driving of levels, the introduction of stoping systems (including the pillar and longwall systems for coal), methods of timbering, the deep boring for exploration, the application of horse, water and steam power, the use of winding engines, pumps and ventilators, ore breakers, dressing apparatus and reverberatory furnaces, the methods of amalgamation and lixiviation of gold, silver and copper ores, the methods of assaying and the method of underground surveying and mapping—are the principal items of improvements introduced from foreign countries.

From 1885 to 1890, rock drills, dynamite and high explosives came into extensive use, while effective up-to-date machines were adopted in rapid succession. The adoption of electricity generated by water power at the Ashio Copper Mine, in 1889, called the attention of mining operators to the great technical and economical advantages of this agency, and greatly accelerated the progress of the mining practice.

The iron metallurgy of Japan has very ancient records to show. In the districts of Chūgoku, pig and wrought iron and steel were prepared from magnetic sand to the satisfaction of all the domestic demands. In 1874 the Government started iron-smelting works after the most up-to-date method in the Kamaishi ironmine; but the enterprise proved, unfortunately, to be a failure. Ever since that time charcoal pig iron has been made in Kamaishi, Hitokabe, and the environs of Morioka city. The iron necessary to supply the deficiency of the domestic production has been imported from abroad.

In the coalfields of Kyūshū, which furnish at present 65 per cent. of the total output of coal in Japan, the Shakuno-o Colliery led others into the setting up of boilers in 1881. In Hokkaidō coal was first worked in 1883, under Benjamin Smith Lyman, an American geologist. During the period under consideration, the domestic consumption of coal was quite insignificant. Railways were laid in 1880 between the collieries in Hokkaidō and the harbour of Otaru, and in 1891 the mining railways of Chikuhō introduced a new feature in coalmining.

In 1894 arose the Japan-China war, which ended in the victory of Japan. Subsequently, with the sudden uprising of various branches of industry, a new foundation of mining activity was soundly laid. In 1897, the cyanide process was introduced into the goldmines in Satsuma, and this method has rapidly been propagated throughout all the goldmines of Japan. Mechanical roasting was introduced at the Ashio Copper Mine in 1900; and in the same year the Kosaka Mine, adapting pyritic smelting of its ores, took its place as a leading producer of copper, gold and silver, instead of being only the largest silver mine. These steps have practically revolutionised copper-ore smelting in Japan.

After the Japan-China war, popular opinion demanded the establishment of ironworks by the Government. To meet this necessity, the Imperial Steelworks in Kyūshū were opened in 1901. Their capacity was intended to be one-half of the annual demand, which was estimated to be 120,000 long tons. Since then the plant has been gradually enlarged to 150,000 long tons at present; one blastfurnace has been erected at the Sennin Ironmine for the manufacture of charcoal pig; and at the Kamaishi Mine the plant has been enlarged and Siemens-Martin furnaces have been built. In 1909, at the harbour of Mororan, an experimental blastfurnace was blown in. Another steel foundry is now being built in the same place, under the co-operative efforts of the Hokkaidō Colliery and Steamship Company and the two firms of Armstrong and Vickers and Sons.

In 1898 coal was first exported to a certain place on the Chinese coast. The collieries of Kyūshū were gradually deepened, and many of the slopes in the district attained the depth of several thousand feet. The extra cost of timbering, transportation and drainage rendered slopes uneconomical, and at the beginning of 1900 a shaft 700 ft. deep was completed in the Shin-nyu Colliery, and in 1902 the famous Manda First Shaft, 896 ft. deep, was finished in the Miike Colliery. New shafts 1,000 ft. deep are being sunk successively in the collieries of Ita and Futase. Those collieries have gradually adopted electric power, which took the place of steam boilers in use. Since "special" pumps were first introduced in the colliery of Kyūshū, they have been adopted in general except in the Miike. Though these pumps are uneconomical, yet they satisfied their demand, because water is found in but a small quantity in all collieries in this region. However, since 1900 other economical pumps have been adopted, such as the Evans and other electric pumps. As regards the improvement of the pumping apparatus, the Miike was always a leader, affording great benefits to other collieries, because it requires a supply of great pumping power (about 25,000-horse power) for regular operations and for experiments. Together with this technical progress, the amalgamation of mining concessions and the enlargement of working plants have also induced the rapid advancement and the success of the coal industry since 1900.

The progress of mining industry called for the reformation of the mining law, *Kōgyō Jōrei*. Hence, in 1905, the mining law, *Kōgyō-Ho*, now in force, was promulgated; but it was only a rearrangement, without essential alterations, of the *Kōgyō Jōrei*. As to technical education, though the Tōkyō University supplied a considerable number of graduates, the demand of the mines was far from being satisfied, and the want was most keenly felt. So the Government, as well as the people, have recently endeavoured to establish educational institutions. The result has been the opening of the Kyōto Imperial University and the three Government technical high schools in Osaka, Kumamoto and Sendai. Another mining high school is now being built in the city of Akita by the joint efforts of the mineowners and the Government, besides one erected near Wakamatsu in Kyūshū by the private enterprise of K. Yasukawa. Lately the courses of lectures on mining and metallurgy have been opened in the Waseda University, founded by Count Okuma, and the Kyūshū Imperial University at the city of Fukuoka. The Kōshu-Gakkō, or Foreman's School, in Tōkyō, the Technical School of Fukuoka Prefecture, and others are worthy of note. The first, being the oldest school of this class, has the largest number of graduates. Also, mines such as the Miike Colliery and others, where primary mining education is given, have recently increased. Thus, in the future, a sufficient number of engineers will be supplied, and it is expected that those who are advanced in technical knowledge will be obtainable at pleasure, according to the demand.

In 1908 the motive power utilised in all the Japanese mines and collieries amounted to 255,477-horse power, including both steam and water power; but it is a conspicuous fact that there was not a single boiler at the time of the Restoration (1867), and in 1890 the steam and water power did not exceed 5,300-horse power. In future, it is expected that electricity generated by water will be utilised extensively, so that the amount of the motive power will show correspondingly a great increase.

The mining industry before the Restoration was insignificant—the mineral products in 1874 were valued at £154,690. The output had increased in 1908 to £11,658,667. The principal causes of this great prosperity are found in the introduction of the modern civilisation of Europe and America, at the time of Restoration of the the present *régime*, with wise judgment and prudent solution, and in the revival, under the power of administration and education, of the industrial genius of the early Japanese, which has thus been directed in fruitful activity.

MINING ACCIDENTS IN 1911.*

In 1911, 1,349 separate fatal accidents occurred in and about the mines and quarries of the United Kingdom, causing the loss of 1,407 lives. Compared with the previous year there is a decrease of 11 in the number of fatal accidents and of 495 in the number of lives lost. Of the 1,349 separate fatal accidents, 1,253, causing the loss of 1,308 lives, happened at mines, and 96, causing the loss of 99 lives, happened at quarries.

At mines there is, as compared with the previous year, a decrease of 27 in the number of fatal accidents, and of 510 in the number of deaths. As mentioned in Part I. of the report, the returns under section 1 of the Notice of Accidents Act, 1906, show that the total number of non-fatal accidents which disabled the injured person for a period of more than seven days was 167,883 at all mines, by which 168,360 persons were injured, as against 160,143 non-fatal accidents and 160,638 persons injured in the previous year. The actual number of deaths by itself—viz., 1,308, does not afford a complete test of the comparative safety or danger of the mining industry in 1911. The number of workmen is now nearly five times as great as it was at the end of the first half of the nineteenth century. If the number of accidents remains the same with a quintupled working population, the dangers of the occupation have been reduced to one-fifth of what they were. The gain in safety can be followed more accurately by comparing the actual death-rates per 1,000 persons employed, expressed either numerically or graphically. The figures show that in the early fifties the underground death rate was more than 5 per 1,000, whilst, taking all the mines together, both those under the Coal Mines Acts and those under Metalliferous Mines Acts, the average death-rate of the *underground* workers in 1911 was 1·308.

The figures in Table A show the death-rates during the last 10 years.

In 1851 about 19 persons were killed per 1,000,000 tons of coal raised from mines; in 1911 the death-rate was 4·42 for a like quantity of mineral. The death-rate per million tons of mineral raised from coalmines alone was 4·47.

The number of persons reported as injured by non-fatal accidents by which they were disabled for more than seven days has increased from 143,258 in 1908 to 168,360 in 1911, or more than 17 per cent., but if the last two years only are compared the increase is less than 5 per cent.

In classifying the accidents according to place or cause, we find (Table B) that in 1911 more than 48 per cent. of the deaths were due to falls of ground, 28·4 per cent. to miscellaneous causes underground, 2·8 per cent. to explosions of firedamp and coaldust, and 8·3 per cent. to shaft accidents.

Explosions of Firedamp or Coaldust.

There were 23 fatal and 127 non-fatal accidents by explosions of firedamp or coaldust, resulting in 36

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* From Part II. of the General Report on Mines and Quarries for 1911, edited by Mr. R. A. S. Redmayne, H.M. Chief Inspector of Mines.

TABLE A.—DEATH RATE FROM ACCIDENTS IN AND ABOUT ALL MINES UNDER THE COAL AND METALLIFEROUS MINES REGULATION ACTS, PER 1,000 PERSONS EMPLOYED, FROM 1902 TO 1911.

Year	Death-rate from accidents per 1,000 persons.						
	Underground workers taken separately.					Surface workers taken separately	General death-rate of all persons employed both above and under ground.
	Explosions of firedamp or coaldust.	Falls of ground.	Shaft accidents.	Miscellaneous.	All causes underground.		
1902	·092	·686	·154	·438	1·370	·687	1·231
1903	·020	·832	·102	·398	1·351	·895	1·258
1904	·031	·753	·126	·438	1·348	·831	1·243
1905	·251	·758	·106	·404	1·519	·720	1·358
1906	·076	·773	·104	·472	1·424	·767	1·291
1907	·057	·755	·133	·511	1·455	·761	1·316
1908	·157	·741	·111	·458	1·467	·740	1·322
1909	·272	·736	·108	·505	1·621	·670	1·432
1910	·579	·760	·111	·467	1·917	·748	1·686
1911	·041	·721	·124	·422	1·308	·725	1·193
Average for 10 years	·165	·751	·118	·452	1·486	·752	1·339

TABLE B.—ACCIDENTS AND DEATHS AT ALL MINES UNDER THE COAL AND METALLIFEROUS MINES REGULATION ACTS.

Place or cause of the accident.	Fatal accidents.						Non-fatal accidents disabling for more than seven days.			
	Number of separate accidents.	Percentage of total number of accidents.	Deaths from accidents.	Percentage of total number of deaths.	Average for preceding five years.		1911.		1910.	
					Separate accidents.	Deaths.	Separate accidents	Persons injured.	Separate accidents	Persons injured.
I. Underground accidents:										
1. Explosions of firedamp or coaldust	23	1·8	36	2·8	19·2	191·0	116	187	114	173
2. Falls of ground	621	49·6	635	48·6	582·0	604·8	58,588	58,771	56,028	56,215
3. Shaft accidents	99	7·9	109	8·3	77·6	91·0	598	692	838	894
4. Miscellaneous	360	28·7	372	28·4	369·6	387·8	95,812	95,926	90,866	91,034
II. Surface accidents	150	12·0	156	11·9	145·0	148·0	12,769	12,784	12,297	12,322
Total	1,253	100·0	1,308	100·0	1,193·4	1,422·6	167,883	168,360	160,143	160,638

deaths and injuries to 220 persons; 116 of the non-fatal accidents caused a disablement of more than seven days to 187 of the persons injured. Compared with the preceding year these figures show an increase of five in the number of explosions, but a decrease of 465 in the number of deaths, an increase of 20 in the number of persons injured. The death-rate from explosions of firedamp or coaldust per 1,000 persons employed underground in 1911 was 0·041, whilst the average death-rate from this cause during the last 10 years was 0·165. In the following table the accidents are classified according to the number of deaths, and cause:—

Cause.	No. of fatal accidents.	No. of deaths.	No. of non-fatal accidents.	No. of persons injured.*
Lighting—				
Naked lights	17	21	121	186
Matches or smoking	—	—	1	1
Safety lamps—				
In defective condition	—	—	2	2
Injured during work	1	3	1	2
Shot-firing—				
Flame or sparks from fuse or igniter	—	—	1	2
Flame of explosive	2	4	1	9
Underground fires—				
Accidental or spontaneous ignition of mineral, timber, or other material	1	6	—	14
Miscellaneous or unknown	2	2	—	4
Total in 1911	23	36	127	220
Total in 1910	18	501	127	200

* Including persons injured by explosions which proved fatal to others.

In the Scotland district, out of a total of 80 explosions 79 were due to ignitions of firedamp by naked lights.

The most serious colliery explosions in 1911 were at the Jamage Pit, North Staffordshire, on the morning of November 25, by which six persons lost their lives and 14 others were more or less injured*; at the Maltby Main Colliery (in Yorkshire), owned by the Maltby Main Colliery Company Limited, on August 21, by which three persons lost their lives; on September 15, at the No. 7 Pit, Netherton Colliery, in Worcestershire; at Hanham Colliery, Gloucestershire, on April 27, killing two men and injuring two others; at Cwmaman Colliery, in Glamorganshire, on September 16, causing the death of two men; on October 16, at the Dalmeny shale mine, in Linlithgowshire, causing the death of two persons and seriously injuring five others; at Polquhairn Colliery, in Ayrshire, on December 13, causing the death of a roadsman and a drawer, and injury to two other workmen.

In 1911 the Scotch and the Welsh coalfields, including Monmouthshire, though employing only about 57 per cent. of the number of men employed in the remaining coalfields, and producing only 54 per cent. of the output, had three times as many explosions from the use of naked lights.

Falls of Ground.

During 1911, 635 persons were killed and 58,771 persons were injured* by falls of ground at all mines under the Coal and Metalliferous Mines Regulation Acts, a decrease of 23 in the number of deaths, but an increase of 2,556 in the number of persons injured on the figures for the previous year. Fourteen accidents caused two deaths each, and the remaining 637 one death each. The following table shows the accidents from falls of ground at all mines under the Coal and Metalliferous Mines Regulation Acts, classified according to place of occurrence:—

Place where the fall occurred.	Fatal accidents.		Deaths.	
	1910.	1911.	1910.	1911.
At the working face	415	424	425	433
On roads while repairing or enlarging	113	109	117	113
On roads while otherwise working or passing	94	85	102	86
In shafts	8	3	14	3
Total from falls underground	630	621	658	635

Comparing the number of fatal accidents and deaths from falls with the total number of fatal accidents and deaths at mines, it will be seen that falls are responsible for 49·6 per cent. of the total number of accidents, and 48·6 per cent. of the total number of deaths. If compared only with fatal accidents and deaths underground the percentages are 56·3 of the accidents and 55·1 of the deaths. There were no very serious individual accidents from falls of ground, but the death-rate from this cause continues exceedingly high. The death-rate in 1911 was lower than it has been since 1902, the actual death-rate being 0·721 as against 0·760 in 1910 and 0·736 in 1909.

In respect of mines under the Coal Mines Regulation Act, the numbers of non-fatal accidents and persons injured by falls of ground reported under the Notice of Accidents Act were respectively as follows:—

	Accidents.	Persons injured.
At the working face	46,688	46,737
On roads while repairing or enlarging	6,019	6,035
On roads while otherwise working or passing	5,664	5,680
In shafts	69	70

Shaft Accidents.

Ninety-nine fatal accidents causing 109 deaths, or 8·3 per cent. of the total number of deaths in and about all mines under the Coal and Metalliferous Mines Regulation Acts, were caused by shaft accidents. Two accidents each caused four deaths, one three deaths, two two deaths, and the remaining 94 caused one death each. Ninety-nine deaths occurred in coal mines, two in iron mines, and eight in other mines.

The following shows the shaft accidents in all mines under the Coal and Metalliferous Mines Regulation Acts, classified according to cause:—

Cause.	Fatal accidents.		All non-fatal accidents disabling for more than seven days.	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.
Overwinding	3	5	17	89
Ropes or chains breaking	1	1	6	6
Whilst ascending or descending by machinery*	27	29	66	80
Falling into shaft from surface	4	4	36	36
Falling from part way down	26	29		
Things falling into shaft from surface	5	5	231	237
Things falling from part way down	7	10		
Miscellaneous	26	26	242	244
Total	99	109	598	692

* Exclusive of accidents coming under the two previous headings.

The death-rate from shaft accidents per 1,000 persons employed underground was 0·124.

Compared with the average of the previous five years there was an increase of 18 deaths by shaft accidents.

Miscellaneous Underground Accidents

Under this division are included all underground accidents other than those from explosions of firedamp or coaldust, falls of ground and shaft accidents. It is an important division, which in 1911 caused 360 separate fatal accidents or 28·4 per cent. of all the deaths at mines. One of the accidents caused five deaths, two caused three deaths each, four caused two deaths each, and 353 caused one death each.

The following table, in which the accidents are classed under eight sub-heads, enables us to say at once that haulage was responsible for 73 per cent. of the miscellaneous fatal accidents:—

Cause.	Fatal accidents.		All non-fatal accidents disabling for more than seven days.	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.
Explosives	19	20	301	340
Suffocation by natural gases	7	10	9	11
Underground fires	1	6	4	4
Irruptions of water	5	6	3	17
Haulage:—				
(a) Ropes or chains breaking	21	21	141	141
(b) Run over by trams and tubs*	211	212	26,072	26,104
(c) Other haulage accidents	32	32	18,259	18,268
Electricity	9	9	20	20
Machinery	7	7	414	415
Sundries	48	60	50,589	50,606
Total	360	372	95,812	95,926

* Not including accidents coming under (a).

Explosives.—The tables, which include surface accidents, show a decrease over the preceding year of eight deaths and an increase of 77 persons injured by accidents from explosives.

Underground Fires.—There was only one fatal accident from this cause, which resulted in five deaths. Serious as it was, however, it might have been very much worse. It emphasises the extreme danger of storing or keeping inflammable materials near the bottom of a downcast shaft.

Underground Haulage.—By underground haulage in 1911, there were 264 fatal and 44,472 non-fatal accidents, resulting in 265 deaths and injuries to 44,513 persons; the accidents showing a decrease over the preceding year of 21 deaths and 2,765 persons injured.

The following table gives some indication as to the

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* Report on the Causes of and Circumstances attending the Explosion which occurred in the Jamage Pit of the Bignall Hill Colliery on Saturday, November 25, 1911, by R. A. S. Redmayne. [Cd. 6512.] Price 1s. 3d. London, 1912.

* As returned under the Notice of Accidents Act, 1906.

THE COAL AND IRON TRADES.

THURSDAY, DECEMBER 26.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 158,872 tons of coal and 223 tons of coke were despatched from Tyne Dock, an increase of 1,354 tons of coal and a decrease of 3,286 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston shipments totalled 62,653 tons of coal and 732 tons of coke, a decrease of 816 tons of coal and 2,457 tons of coke. The Blyth clearances aggregated 98,121 tons of coal and coke, an increase of 2,739 tons. The practical equilibrium of the shipments last week, as compared with those of the corresponding week of last year, affords an interesting illustration as to the quickly recuperative faculty of the local coal trade after a disastrous stoppage of work. Very little business for prompt shipment has been done this week, "coalmen" being mainly occupied in despatching delayed steamers and clearing up contract arrears of shipment for the present month. Spot bunkers have commanded high prices. The outlook for business next month appears to be good, although there is some disposition on the part of buyers to hold off wherever possible. The Russian State Railways are stated to be enquiring for a further supply of 300,000 tons of best steam coals for delivery during March and April. It will be remembered that these railways recently contracted for nearly 300,000 tons of similar fuel for January-February delivery, Yorkshire, Scottish and Northumbrian coals being taken at respectively about 14s. 1d., 12s. 9d. and 14s. per ton f.o.b. Tenders are due in early next month. The business is naturally causing a good deal of interest. The possibility of a strike of German miners is also interesting the local coal trade. The cessation of work is stated to be likely to commence with the new year. F.o.b. quotations for prompt shipment are as follow (steady as compared with last week when not otherwise mentioned):—Best steams, Blyths (D.C.B.), 15s. to 15s. 6d. per ton; Tynes (Bowers, &c.), 15s. 6d.; seconds, Blyths, 13s. 6d. to 14s., a decline of from 1s. to 1s. 6d.; Tynes (Hastings or West Hartleys), 14s., 1s. decreased; unscreened, 13s. to 13s. 6d., 1s. reduced; smalls, Blyths, 12s., 6d. dearer; Tynes, 11s.; specials, 12s., stronger; smithies, 16s., 1s. lower; gas bests (New Pelton or Holmside), 16s., 6d. cheaper; seconds (Pelaw Main or similar) 15s.; specials, 16s., 6d. decreased; unscreened bunkers, Durhams, 14s. 9d. to 15s. 6d.; Northumbrians, 13s. 6d. to 14s., 6d. cheaper; coking coal, 16s.; smalls, 15s., 6d. declined; households, 15s. 6d. to 16s.; coke, foundry, 30s.; blastfurnace, 27s.; and gas coke, 22s. Smart prices are reported to have been paid for occasional lots of coal in completion of cargoes. For some best Blyth steam smalls, 15s per ton f.o.b. is stated to have been given, and for Hastings-Hartley unscreened coal 14s. It is to be hoped that the conclusion of the holidays will synchronise with the conclusion of the railway wagon famine, from which many collieries have suffered since the strike. Much of the company's mineral rolling stock appears to have found its way to South Durham, where there was a rush of work during the idleness which prevailed elsewhere in the district, and the railway authorities do not appear to have been able to get all the trucks back yet. The consequence is that shifts have been lost at the collieries, there being heavy stocks of coal at bank and no transit facilities for them. At the shipping places the overplus of tonnage is gradually being got rid of, but the congestion of loading turns is not yet overcome.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 106,260 tons of coal and 970 tons of coke, as compared with 115,030 tons of coal and 1,130 tons of coke for the corresponding period of 1911, being a decrease of 8,770 tons of coal and 160 tons of coke. Practically no fresh business is now possible this side of the new year; owing to the congestion of turns there is every indication, however, of active trade, once the present bookings are cleared off. In cases where coal can be obtained high prices have to be paid for prompt shipment, but in a general way there is very little business passing. In the bunker coal trade there is a full demand, and the ordinary classes of unscreened are from 15s. 6d. to 16s. free on board, whilst for special kinds up to 17s. per ton is quoted free on board South Dock. The coking coal trade is very brisk, both for home use and export, unscreened being 16s. 6d. to 16s. 6d., and smalls 15s. 6d. to 16s. 6d., smithies 15s. 6d. to 16s. In gas coals the consumption is now at about its heaviest, and there are heavy exports. Bests are from 16s. to 16s. 3d., and second class are 15s. 6d. to 16s. per ton. Household coals are steady at 15s. 6d. to 16s. Coke is exceptionally strong; foundry is quoted at 30s. per ton free on board, furnace coke is 29s. 6d. to 30s. per ton at the Teesside blastfurnaces. The output of gas coke is now at its heaviest, and the price is from 20s. 6d. to 21s. 6d. free on board. As usual, the freight market is very quiet before the holidays, and rates easier. The London rate is 3s. 9d. and Hamburg 4s. There are now few Baltic fixtures. Halmstadt has paid 6s. 9d. and Norrkoping 7s. to the Bay, 5s. is the rate for St. Nazaire, and 7s. 3d. to Lisbon. Mediterranean is represented by Genoa 10s., Leghorn 10s. 3d., Palermo 10s. 6d., Marseilles 9s. 6d., Port Said 10s.

Middlesbrough-on-Tees.

COAL.

The fuel trade is steady, but holidays have stopped business. Just now there is nothing doing in the way of forward transactions, and prompt quotations are also nominal. Best gas coal is 16s. to 16s. 6d., and second qualities 15s. 6d. to 15s. 9d. Ordinary Durham bunkers range from 14s. 9d. to 16s. f.o.b., and best kinds are in the neighbourhood of 17s. Coking coal 15s. 6d. to 16s. 6d. Blastfurnace coke is 30s. delivered at Teesside works, but there is practically none available for sale. Foundry coke is put at 32s. 6d. f.o.b. Gashouse coke is 21s. 6d. to 22s.

IRON.

With holiday making general, few transactions are recorded in the iron trade. The general situation of the staple industry, however, is most healthy. Values all round are firm, and prospects for next year are regarded as very bright and encouraging. No. 3 g.m.b. Cleveland pig is fully 67s. 9d. f.o.b., and business has been done at that price. No. 1 is 70s. 3d.; No. 4 foundry and No. 4 forge are each 67s. 6d.; and mottled and white iron each 67s., all for early delivery, rather higher rates being asked on forward account. There is no east coast hematite pig available for anything like early delivery, and the forward quotation for Nos. 1, 2, and 3 is very firm at 83s. Foreign ore is still inactive, and market rates are nominally on the basis of 22s. 9d. ex-ship Tees for rubio of 50 per cent. quality. As usual, finished iron and steel works closed over the holidays so as to do necessary repairs, &c. Business in these industries is quiet for the time being, but producers have very heavy order books, and renewal of activity is looked for with the new year. Common iron bars, £8 10s.; iron ship plates, £8; iron ship angles, £8 10s.; steel ship plates, £8 5s.; steel ship angles, £7 17s. 6d.; basic steel bars, £8; Siemens steel bars, £8 5s.; steel strip, £8; steel joists, £7 7s. 6d.; heavy steel rails, £6 15s.—rails net, and all other descriptions less 2½ per cent.

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South-West Lancashire.

COAL.

Many of the pits in this district played on Christmas Day and Boxing Day. They will work on Friday and Saturday, and probably this will be repeated next week, January 1 and 2 being observed as holidays. The household trade has no acuteness in the demand, although quite sufficient orders are coming to clear the daily production, the mildness of the weather accounting for this lack of animation. Prices remain without change. With regard to shipping, bunkering requirements this week are naturally heavier even than recent weeks owing to the general endeavour on the part of the shipowners to get their supplies in before the holidays, and to a large extent this has been done, and there is probably not much actual shortage of coal. At the same time unusual difficulty has been experienced owing to traffic delays, and in some cases matters have been made worse by the late arrival of steamers. Under the circumstances prices have stiffened, and for what fuel there may be to spare range from 14s. f.o.b. for ordinary qualities of screened Lancashire steam coal to 15s. f.o.b. or thereabouts for the better grades. Coastwise and cross channel shipments continue without any notable change. In slacks it is quite as much as the producer can do to find an adequacy to cover the stoppage. Prices are strong all round at late rates.

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South Lancashire and Cheshire.

COAL.

Being Bank Holiday, business has naturally taken a back seat, but during the week up to Christmas Day it was fairly cheerful and prices are firm at late rates:—House coal 16s. 6d. to 17s. for the best grades, with good medium qualities at 15s. 3d. to 16s., and the commoner sorts from 12s. 6d. to 13s.—all into wagons at the pit. Furnace coal, about 12s. 6d. per ton at the pit. Shipping coal about 14s. f.o.b. Partington. Slack is very brisk, and prices are on the hardening side, being about 9s. 6d. to 10s. for best qualities, with the commoner grades 8s. 6d. to 9s.

IRON.

There was a good attendance on 'Change in Manchester but not much actual business passing in view of the holidays. Pig iron prices are well maintained. All makers report full order books, and prices are without alteration.

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Yorkshire and Derbyshire.

Leeds.

COAL.

There is nothing of special interest since our last report. There was no meeting on the Yorkshire Coal Exchange on Tuesday and very little new business has been put through this week. The pits have worked about five days, but the output has again been much below the maximum, owing to scarcity of empty trucks. The house coal trade has been dull and lifeless, the demand from the distant markets being especially poor. London merchants and factors have taken little beyond contract tonnage, and at all the pits doing a London business there are considerable siding stocks, consisting mainly of best coal. In the coastwise trade freights have again been easier but the demand has been exclusively for the cheaper grades. In the West Riding merchants have had none of the usual Christmas rush, and apart from a little extra turnover by the retailers of bags, there has been very little doing. Ground stocks at the depots are mostly untouched, and unless there should be a spell of very cold weather, prices in January are likely to be irregular. The greatest activity prevails in manufacturing fuel, coking slacks and washed nuts for electricity purposes. There are scarcely any stocks at the Bradford and Leeds drops, and higher prices have been the rule this week for spot lots. Almost famine prices are being paid for washed furnace coke, and considerable difficulty is being experienced to keep the furnaces in blast in the Frodingham district. It is reported that beehive coke has been sold during the last few days at 22s. per ton at the ovens. Forward contracts to the end of June have been placed at 21s. and all round the coke market shows remarkable firmness. Supplies of gas coal are quite inadequate to meet the demand and most collieries are in arrears with contract deliveries, especially with regard to gas nuts. There is nothing offering for prompt shipment, but there are a good many enquiries for cargoes to be shipped during January. The collieries closed down on Tuesday, and it is expected that there will be very little coal on the market until after New Year's Day. Prices, except as modified above, remain as in our last report.

Barnsley.

COAL.

With the collieries only working practically two days this week, there was not a great deal of business negotiated, nor was much possible in the steam branch of the trade. The supplies needed occupied the full efforts of the coalowners, and of course values were firmly maintained in every respect. The loss of several days' output in the present time of heavy demand is bound to be a serious factor in the situation, and there will be little chance to recover the loss until well on in the new year. It was hoped by many collieries to restart work on Friday, but this was doubtful, whilst work in many cases stopped on Tuesday noon. The demand for large steam coal for export was strong, and fortunately the weather enabled the railway companies to deal with the traffic somewhat expeditiously, or the position must have become very serious, as in other years when the tonnage required was only of an average character. Further arrangements on forward account are quite held up unless higher rates are paid, and hards of the best quality were again quoted at 12s. 6d. per ton, with secondary sorts 11s. 6d. to 11s. 9d. per ton. Washed nuts were again very scarce, and sold up to 12s. per ton, and best washed slacks as high as 9s. 6d. per ton, with rougher sorts up to about 7s. 6d. per ton. The demand for house coal, despite the very mild weather, was rather stronger, particularly for the best class of fuel, but medium-grade sorts were not so much sought after, yet collieries were able to maintain the advanced prices fairly well. Quotations are now:—Best Silkstone, 15s. to 15s. 6d. per ton; best Barnsley softs, 14s. to 14s. 6d. per ton; seconds, 11s. 6d. to 13s. 6d. per ton; best house nuts, 12s. 6d. to 13s. 6d. per ton; and secondary qualities, 10s. 6d. to 11s. 6d. per ton. The gas coal collieries were fully engaged in meeting the demands under contract, whilst the enquiry in the home market was of a stronger character, and prices showed a considerable advance over contract rates. Business still booms in regard to coke, and despite the high prices which are being paid (about 20s. per ton), the iron districts were pressing strongly for supplies.

Hull.

COAL.

The days immediately preceding the Christmas holidays have been busy ones. There has been a steady extra demand in anticipation of the pits closing down, and the stronger tone in prices has been maintained in all departments. Forward there has been a fair amount of business passing, contracts being renewed at 14s. 6d. to 14s. 9d. f.o.b. at Hull for best Yorkshire steam hards. A large quantity of coal has gone for export this month, last week being in no wise different from its predecessors in this respect. Both to foreign and coastwise destinations more than usually large quantities have been sent, last week's cargoes including nine sent under the Russian State Railways contract. London has again taken exceptionally large shipments. There is every appearance that the coal dealt with at the port of Hull will establish a record, and that for the first time the arrivals from collieries will exceed 7 million tons in the year. The exports are already greatly in excess of last year, and December shipments being heavy, a very substantial increase will be recorded. The freight market is stagnant and rates easy, Baltic ports being quoted at 6s. 6d. for Riga and Mediterranean ports on the basis of 9s. for Genoa. Prices are as quoted last week.

Chesterfield.

COAL.

There is a fair demand for house coal considering the mildness of the weather. The intervention of the Christmas holidays has substantially reduced the output, and stocks are much smaller than might have been expected; indeed, at some collieries there is practically no reserve stock of house coal. The position with regard to fuel for manufacturing use continues to be exceedingly strong. Prices are

AND IRON TRADES.

sday, December 26.

d, Durham and Cleveland.

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COAL.

58,872 tons of coal and 223 tons of
rom Tyne Dock, an increase of 1,354
ecrease of 3,286 tons of coke when
ipments for the corresponding week
nston shipments totalled 62,653 tons
coke, a decrease of 816 tons of coal
The Blyth clearances aggregated
coke, an increase of 2,739 tons. The
of the shipments last week, as com-
he corresponding week of last year,
g illustration as to the quickly
the local coal trade after a disastrous
ery little business for prompt ship-
this week, "coalmen" being mainly
g delayed steamers and clearing up
ipment for the present month. Spot
nded high prices. The outlook for
ppears to be good, although there is
e part of buyers to hold off wherever
n State Railways are stated to be
er supply of 300,000 tons of best
ery during March and April. It will
hese railways recently contracted for
f similar fuel for January-February
ottish and Northumbrian coals being
bout 14s. 1d., 12s. 9d. and 14s. per ton
e in early next month. The business
good deal of interest. The possibility
miners is also interesting the local
tion of work is stated to be likely to
w year. F.o.b. quotations for prompt
(steady as compared with last week
mentioned):—Best steams, Blyths
. 6d. per ton; Tynes (Bowers, &c.),
ths, 13s. 6d. to 14s, a decline of from
(Hastings or West Hartleys), 14s., 1s.
l, 13s. to 13s. 6d., 1s. reduced; smalls,
arer; Tynes, 11s.; specials, 12s.,
s., 1s. lower; gas bests (New Pelton or
eaper; seconds (Pelaw Main or similar)
.decreased; unscreened bunkers, Dur-
d.; Northumbrians, 13s. 6d. to 14s., 6d.
16s.; smalls, 15s., 6d. declined; house-
.; coke, foundry, 30s.; blastfurnace,
22s. Smart prices are reported to
casional lots of coal in completion of
est Blyth steam smalls, 15s per ton
ave been given, and for Hastings-
oal 14s. It is to be hoped that the
idays will synchronise with the con-
ay wagon famine, from which many
d since the strike. Much of the com-
g stock appears to have found its way
here there was a rush of work during
vailed elsewhere in the district, and
s do not appear to have been able to
k yet. The consequence is that shifts
collieries, there being heavy stocks of
nsit facilities for them. At the shipping
tonnage is gradually being got rid of,
loading turns is not yet overcome.

COAL.

Sunderland last week amounted to
nd 970 tons of coke, as compared with
and 1,130 tons of coke for the corre-
11, being a decrease of 8,770 tons of
oke. Practically no fresh business is
side of the new year; owing to the
there is every indication, however, of
e present bookings are cleared off. In
be obtained high prices have to be
pment, but in a general way there is
assing. In the bunker coal trade there
the ordinary classes of unscreened are
ree on board, whilst for special kinds
uoted free on board South Dock. The
ry brisk, both for home use and export,
s. 6d. to 16s. 6d., and smalls 15s. 6d. to
s. 6d. to 16s. In gas coals the con-
bout its heaviest, and there are heavy
from 16s. to 16s. 3d., and second class
r ton. Household coals are steady at
e is exceptionally strong; foundry is
free on board, furnace coke is 29s. 6d.
Teesside blastfurnaces. The output
at its heaviest, and the price is from
free on board. As usual, the freight
t before the holidays, and rates easier.
3s. 9d. and Hamburg 4s. There are
ures. Halmstadt has paid 6s. 9d. and
e Bay, 5s. is the rate for St. Nazaire,
n. Mediterranean is represented by
10s. 3d., Palermo 10s. 6d., Marseilles
.

Middlesbrough-on-Tees.

COAL.

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Chesterfield.

COAL.

There is a fair demand for house coal considering the mildness of the weather. The intervention of the Christmas holidays has substantially reduced the output, and stocks are much smaller than might have been expected; indeed, at some collieries there is practically no reserve stock of house coal. The position with regard to fuel for manufacturing use continues to be exceedingly strong. Prices are quoted at Methil and Burntisland 17s. to 18s., unscreened 15s. to 16s., first-class steam coal 13s. 9d. to 14s., third-class 12s., treble nuts 13s. 6d. to 14s., doubles 12s. 6d. to 13s., and singles 11s. to 11s. 6d., dross being up as far as 10s. to 10s. 6d. per ton. The demand for house coal for home use has been very active at firm prices.

THE WELSH COAL AND IRON TRADES.

THURSDAY, DECEMBER 26.

North Wales.

Ruabon.

COAL.

The state of the coal trade this week is much the same as last week. Apart from holidays, all the pits are working full time, and orders are plentiful for all grades of fuel at the time of writing these notes. There is a very brisk demand for household coal both for railborne and land sales trade. All the output of steam coal finds quick disposal. The railway companies are particularly anxious to get increased supplies on account of their locomotive contracts. The demand for gas fuel has also been great up to the holiday, but the demand for this coal, over and above the ordinary winter proportion of contract, will be easier after the holidays. All the works of the locality are still fairly busy and take fair quantities of fuel for manufacturing purposes. There is very little coal available for bunkers at the present time owing to a better market being obtained elsewhere. Slacks, nuts and gas coke are all finding a ready sale, as well as the larger sizes. The following are the prices quoted at the time of writing. Best large household coal f.o.r., 16s. to 17s. 6d.; large seconds ditto, 14s. to 16s.; best small ditto, 14s. to 16s.; steam coal, 12s. 6d. to 13s. 6d.; bunkers, 12s. 6d. to 13s.; nuts, 11s. to 12s.; slack, 6s. 6d. to 9s. 6d.; gas coke at works, 16s. to 18s. 4d.

Monmouthshire, South Wales, &c.

Newport.

COAL.

The coal trade during the short time preceding Christmas showed practically nothing new in fresh business, merchants evidently having concluded their arrangements last week. For supplies after the holidays buyers seem to be holding off, being well content to await developments. Sellers are offering no inducements to promote business, and, in fact, are quoting very firmly for all January deliveries. The information just disclosed that most of the Egyptian State Railways contracts have been given to United States firms has given rise to some surprise, as it was generally considered that after allowing for the higher freight across the Atlantic there would be an advantage of about 2s. in favour of Welsh prices. The only firm to obtain a portion of the order so far has been Messrs. Morgan, Wakley and Co., whose tender for 60,000 tons of Monmouthshire semi-bituminous coals has been accepted. It is understood that the Consolidated Coal Company (U.S.A.) has received a contract for 100,000 tons. Supplies of smalls continue very scarce indeed. There has been no change worth recording in house coal, patent fuel, coke or pitwood. In the freight market a fair number of fixtures have been effected, the easier rates prevailing being conducive to business. Approximately, values now prevailing may be taken as follow:—Coal: Very best Black Vein large, 16s. 9d. to 17s. 3d.; western-valleys, ordinary, 16s. 3d. to 16s. 9d.; eastern-valleys, best, 15s. 9d. to 16s. 3d.; other sorts, 15s. 6d. to 15s. 9d.; colliery smalls, best, 13s. to 13s. 6d.; seconds, 11s. 9d. to 12s. 6d.; inferiors, 11s. 3d. to 11s. 6d.; screenings, 13s. 3d. to 13s. 9d.; through coals, 14s. 6d. to 15s. 6d.; best washed nuts, 14s. 9d. to 15s. 3d.; house coal, best, 18s. 6d. to 19s.; seconds, 17s. 6d. to 18s. Patent fuel, 19s. 6d. to 20s. 6d. Coke: Furnace, 22s. to 23s.; foundry, 24s. to 28s.

Cardiff.

COAL.

Up to the eve of the holidays there was great pressure for coals, and the shipments last week amounted to over 412,000 tons, an increase on the corresponding week of last year of over 50,000 tons. The difficulty in reference to tipping is still very acute, and with anything like the present outputs it is perfectly evident that it is going to continue. What will happen in the future when the new undertakings which are now being rapidly developed come into operation, it is impossible to forecast. There is no question that the lack of tipping accommodation has and will have a detrimental effect upon prices, as people are loth to place orders unless they can be assured that the coal will be supplied when required. Not much business has been passing during the past week as the collieries are practically full for the remainder of the year. On account of the stoppage during the national strike, contracts then in course of execution got very much in arrear, and many collieries were obliged to ask for an extension of time for delivery. The result is that considerable quantities of coal will have to be shipped in January and February which under ordinary circumstances would have been loaded this month. There is consequently very little free coal on the market, and shippers in present need of supplies have had to pay very high prices. As much as 19s. 6d. has been given for prompt shipment of best colliery screened steam coals, and even at this figure collieries declined to give a guarantee that loading would be completed before the holidays. It is stated on good authority that already 19s. 6d. has been paid for cargoes for shipment in January and February, and with the prospect of trade continuing at its present high level any relaxation of these prices can hardly be looked for. The French admiralty have just placed an order for an additional 50,000 tons of best double-screened steam coals with Messrs. Lysberg Limited, who, it is said, intend supplying Nixon's navigation coal. As the contract is a c.i.f. one it is difficult to ascertain at what rate the price would be f.o.b., but assuming that the c.i.f. price is as reported—38¼ fr.—it would, on the basis of a 13 fr. freight, work out at about 19s., or about 2s. above the price paid for supplies in August last. Delivery is to be made in French steamers at the Toulon naval harbour over a period of four months. Messrs. Lysberg are in an exceptionally favourable position to meet c.i.f. business, as they have a fleet of steamers at their disposal. Current prices of superior Admiralty seconds are 18s., and for ordinary seconds 17s. 6d. per ton. There continues to be a good demand for small coal. Large quantities are being used for industrial purposes, especially for the manufacture of coke, whilst there is also an enormous consumption in Germany of small coal which previously was exported. Best bunkerings are 15s. to 15s. 6d., best ordinaries 14s. 6d., and cargo qualities 13s. 6d. to 14s. Best washed nuts are 15s. 6d. to 16s., and best washed peas 14s. 6d. per ton. The only large operation in Monmouthshire coals has been in connection with the Egyptian State Railways contract. The quantity for which tenders were asked was some 160,000 metrical tons, and up to the time of writing the only firm which had received news of any allotment was that of Messrs. Morgan, Wakley and Co. It is reported that they have received an order for from 60,000 to 100,000 tons for delivery from February to July at 1s. to 1s. 3d. per ton above the price at which similar contracts were placed in October last. At that time tenders were sent in for 300,000 metrical tons, but the Egyptian authorities kicked at the figures quoted, and only placed orders for half their usual quantity. By their action they will now have to pay an extra £8,000 or £9,000 as a result of the recent advance in values. A rumour was current on 'Change that they had decided to obtain a considerable portion of their supplies from America, but no confirmation of this had been received when this report was despatched. It is scarcely likely to be true as nothing is to be gained by purchasing American coals. The tenders sent in for Monmouthshire coals were round about 17s., less the usual discount. Current prices of Monmouthshires are:—Black Veins 17s. 3d., western valleys 17s., and eastern valleys (best) 16s. 6d., seconds 16s. to 16s. 3d.—in each case f.o.b. Cardiff. The total quantity of coal exported from the Bristol Channel ports to foreign countries for the 11 months ended November 30 was 23,639,507 tons, as against 22,813,750 tons in the corresponding period of last year, being an increase of 825,807 tons. The shipments coastwise for the month amounted to 286,613 tons, a decrease of 81,300 tons as compared with last year. From Cardiff the shipments were 123,347 tons, of which Southampton took 41,500, London 23,840, Liverpool 22,910 and Bristol 12,875 tons; from Newport the shipments were 63,294, Port Talbot 11,630, Briton Ferry 9,630, and Swansea 35,406 tons. Chartering transactions last week showed a great falling off, but this is usually the case on the eve of a prolonged holiday. The vessels taken up only represented a carrying capacity of 163,000 tons, being a decrease of 34,000 tons over the preceding six days. In bituminous coals there is no material change. Some sellers still ask 18s. for No. 3 Rhondda large, but 17s. 6d. is being freely taken up by more than one colliery. Through-and-through is 16s., and small 14s. 6d. to 15s. No. 2 large is 15s. 9d. to 16s., through-and-through 14s. 9d. to 15s., and small 13s. 9d. per ton. There is no change in patent fuel. Crown brands for prompt shipment are quoted at 23s., other qualities 19s. 6d. to 21s. 6d. It is reported that the Austrian naval authorities have placed an additional order with the Arrow Patent Fuel Company, Swansea, for upward of 70,000 tons of patent fuel, and although the price has not been disclosed it is stated that the figure is a record one. Special foundry coke is 33s., ordinary qualities 28s. to 30s. Furnace coke is 26s. to 27s. Pitwood remains steady at 22s. per ton.

IRON.

Owing to a shortage of tonnage the shipments of tin-plates for the week only amounted to 64,414 boxes. Receipts for works were 136,080 boxes, so that there were added to stocks 71,666 boxes, and they now stand at 305,683 boxes. Some of the tin-plate mills stopped the whole of this week, others four days out of the six, but the steelworks, owing to the great demand for bars, were only idle on Christmas day. This was the more remarkable, because during the week over 10,000 tons of bars, billets, blooms, &c., had been received from Germany and America. Tin-plate works which are in need of specifications have been accepting very low figures in order to keep machinery at work; 14 × 20 Bessemer cokes are about 15s., oil sizes 14 × 18¾ and 14 × 19¼ are 15s. 3d. to 15s. 4½d., and 10 × 20 plates 22s. to 22s. 3d. Siemens tin bars for forward delivery have sold at £6, but makers have been disinclined to accept less than £6 7s. 6d. for prompt delivery. There is no change in galvanised sheets, 24-gauge corrugated still selling at £12 5s. to £12 7s. 6d. Considerable quantities of rails have been turned out at the Dowlais Works, and prices of heavy sections are firmly quoted at £6 10s. to £6 15s. There is no change in Welsh pig iron or in scrap metals.

Swansea.

COAL.

The trade of the port last week showed a decrease as compared with the preceding period, chiefly due to the non-arrival of tonnage. The coal trade was fairly active, but the exports of patent fuel were considerably less than the average; the shipments together totalled 94,860 tons. There was a good attendance on 'Change on Tuesday, but owing to the near approach of Christmas there was very little business doing. Shippers confined their attention to getting their boats away before the holidays. Prices for all descriptions of anthracite, however, were firm, with very little free coal available. In the steam coal department, the conditions were also very firm. Prices are as quoted last week.

IRON.

Last week an average yield of pig iron was registered at the blast furnaces, and full time will be worked on the furnace and coke banks this week as usual, other arrangements of a mutual character being made for those employed on Christmas Day. The whole of the steel-smelting establishments were, as in the preceding period, actively operating, with every available furnace producing to its utmost capacity. Christmas Day only, was recognised as a holiday at all the steel-smelting departments of the various works. With a couple of exceptions, tin-plate works throughout the district were fully engaged. The shipments of tin-plates last week were 64,414 boxes, receipts from works 136,080 boxes, and stocks in the dock warehouses and vans 306,683 boxes.

Llanelly.

COAL.

The market this week is controlled by a holiday spirit and very little work has been done. Some of the collieries closed down for the week after Tuesday, whilst all the others had their outputs far below the average. There is no alteration noticeable in the market, and the demand for most coals is likely to continue for months to come. So many of the collieries have sold most of their outputs that there will be a difficulty in getting proper supplies for some time to come. A few of the manufacturing works are only contracting for their requirements for the time being, in the hope that prices will come down in the near future. The anthracite market continues to be busy, although the holidays have affected orders at the moment. Beans and peas leave room for improvement, but culm and duff are in big demand. Prices this week are:—Best malting large, 24s. 6d. to 25s. 6d.; seconds, ditto, 23s. to 24s.; Big Vein large, 19s. 6d. to 21s. 6d; Red Vein large, 15s. 6d. to 16s.; machine-made cobbles, 22s. to 23s.; German, French and Paris nuts, 25s. to 27s.; machine-made beans, 22s. to 22s. 6d.; machine-made peas, 12s. 6d. to 13s.; rubbly culm, 7s. to 7s. 6d.; duff, 5s. to 5s. 6d.; large steam, 17s. to 17s. 6d.; through-and-through, 15s. to 16s.; small steam, 11s. to 12s. bituminous small, 13s. 6d. to 14s. 6d.—all f.o.b.

THE IRISH COAL TRADE.

THURSDAY, DECEMBER 26.

Dublin.

Up to the time of writing the coal trade in most branches showed increased activity in view of the stoppage for the holidays, but there has been no extraordinary demand for household qualities owing to the absence of any prolonged period of cold weather. The year closes without the usual winter advance having been made in prices, and there is no change in any other class of fuel, although the new year may see higher prices ruling all round. Quotations in the city stand as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; steam coals from 20s. per ton upwards; house coal, retail, 1s. 5d. to 1s. 6d. per sack; best coke 23s. per ton, or 18s. per chaldron. Irish coals, at Gracefield collieries, Queen's County:—Best large malting coal, 20s. per ton; best hand-picked breakage, 20s. per ton and 17s. 6d. per ton; cobbles screened and beans screened, 17s. 6d. per ton; culm, 5s. per ton at the pit mouth. There has been a good demand for patent fuel and turf since the winter commenced. The import trade maintained its improvement in spite of the very wild weather at sea, coaling vessels arriving being chiefly from Garston, Liverpool, Newport, Glasgow, Point of Aire, Maryport, Manchester, Cardiff, Troon, Ayr, Neath Abbey, Workington and Swansea. The colliers entering the port amounted to 58 as compared with 63 the week previously, the total quantity of coal discharged upon the quays being 25,000 tons.

Belfast.

Although the household trade has not yet assumed its full winter proportions, there has nevertheless been more quienry about for the past week or so, making provision to cover the Christmas period, and the demand for steam and manufacturing coal has been active. There is no change in any of the quotations, and the hardening tendency at the Scottish ports has not yet affected the market here. City prices of house coal are from 22s. 6d. to 26s. 6d. per ton; best Orrell slack, 22s. 6d. Quotations ex-quay:—Scotch steam coal, 16s. 6d. to 17s. 6d.; navigation steam, 16s. 6d. to 17s. 6d; Welsh steam coal, 17s. to 18s. per ton; English house coal 22s. 8d. per ton. Cargoes arriving during the week were chiefly from Garston, Ayr, Partington, Girvan, Manchester, Troon, Ellesmere Port, Glasgow, Maryport, Ardrossan, and Irvine.

THE BY-PRODUCTS TRADE.

Tar products:—The market generally is firm, and prices are well maintained. The weakest features are carbolic crystals and 90's benzols, the latter having given way in price distinctly. Crude carbolic is firm, but crystals have fallen considerably. Naphthas are steady. Creosote is unchanged. Nearest prices are:—

Benzols, 90's, 9½d. to 10d.; ditto 50's, 10½d.; toluol, 10¾d.; carbolic acid, crude (60 per cent.), 2s. 3d. to 2s. 4d.; ditto crystals, 40 per cent., 6d.; solvent naphtha, 1s. 0½d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 3½d. for ordinary qualities; pitch, 43s. to 43s. 6d. f.o.b. east coast; ditto, 40s. 6d. to 42s. 6d. f.a.s. west coast; ditto, 46s. gas companies.

[*Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b.* net.]

Sulphate of ammonia:—There is a steady movement on the upward grade, and prices generally are favouring sellers. Naturally the forward market is very firm, and £14 15s. is wanted for short dates, while £14 11s. 3d. is reported for January-June delivery. The open weather is, of course, helping the position considerably. Closing prompt prices are:—

London (ordinary makes), £13 12s. 6d.; Beckton, £13 12s. 6d.; Liverpool, £14 7s. 6d.; Hull, £14 6s. 3d.; Scotch ports, £14 7s. 6d. to £14 10s.; nitrate of soda (ordinary), 11s. 7½d. per cwt.

[*Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.*]

A meeting of the Scottish local section of the Institution of Electrical Engineers was held recently in Edinburgh, when Mr. F. Creedy read a paper on "The Turbo-converter, A High-speed Direct-current Generating Unit," which he described as a new type of apparatus to be used as a substitute for and improvement on existing machines, with a view to overcoming certain well-known difficulties in connection with the direct-current turbo-generator. The turbo-converter, he said, consisted of an induction generator combined into one machine with a rotary converter, one member (preferably the primary) being mounted on the converter shaft and revolving with it, and the other, usually the squirrel-cage rotor, being mounted on the turbine shaft.

l Burntisland 17s. to 18s., unscreened
steam coal 13s. 9d. to 14s., third-class
d. to 14s., doubles 12s. 6d. to 13s., and
d., dross being up as far as 10s. to
demand for house coal for home use
at firm prices.

COAL AND IRON TRADES.

rsday, December 26.

North Wales.

COAL.

l trade this week is much the same
from holidays, all the pits are working
are plentiful for all grades of fuel at
these notes. There is a very brisk
l coal both for railborne and land sales
t of steam coal finds quick disposal.
ies are particularly anxious to get
account of their locomotive contracts.
fuel has also been great up to the
nd for this coal, over and above the
rtion of contract, will be easier after
works of the locality are still fairly
quantities of fuel for manufacturing
ery little coal available for bunkers at
g to a better market being obtained
ts and gas coke are all finding a ready
larger sizes. The following are the
ime of writing. Best large household
6d.; large seconds ditto, 14s. to 16s.;
to 16s.; steam coal, 12s. 6d. to 13s. 6d.;
3s.; nuts, 11s. to 12s.; slack, 6s. 6d. to
orks, 16s. to 18s. 4d.

shire, South Wales, &c.

COAL.

ng the short time preceding Christmas
thing new in fresh business, merchants
cluded their arrangements last week.
holidays buyers seem to be holding
t to await developments. Sellers are
nts to promote business, and, in fact,
mly for all January deliveries. The
losed that most of the Egyptian State
ave been given to United States firms
e surprise, as it was generally con-
llowing for the higher freight across
uld be an advantage of about 2s. in
s. The only firm to obtain a portion
s been Messrs. Morgan, Wakley and
60,000 tons of Monmouthshire semi-
been accepted. It is understood that
el Company (U.S.A.) has received a
ons. Supplies of smalls continue very
e has been no change worth recording
fuel, coke or pitwood. In the freight
r of fixtures have been effected, the
ling being conducive to business.
s now prevailing may be taken as
best Black Vein large, 16s. 9d. to
leys, ordinary, 16s. 3d. to 16s. 9d.;
15s. 9d. to 16s. 3d.; other sorts, 15s. 6d.
smalls, best, 13s. to 13s. 6d.; seconds,
feriors, 11s. 3d. to 11s. 6d.; screenings,
hrough coals, 14s. 6d. to 15s. 6d.; best
. to 15s. 3d.; house coal, best, 18s. 6d.
. 6d. to 18s. Patent fuel, 19s. 6d. to
ace, 22s. to 23s.; foundry, 24s. to 28s.

COAL.

he holidays there was great pressure
ipments last week amounted to over
ase on the corresponding week of last
tons. The difficulty in reference to
acute, and with anything like the
perfectly evident that it is going to
l happen in the future when the new
are now being rapidly developed come
impossible to forecast. There is no
k of tipping accommodation has and
atal effect upon prices, as people are
nless they can be assured that the coal
en required. Not much business has
the past week as the collieries are
e remainder of the year. On account
g the national strike, contracts then
a got very much in arrear, and many
d to ask for an extension of time for
is that considerable quantities of coal
pped in January and February which
mstances would have been loaded this
sequently very little free coal on the
in present need of supplies have had
rices. As much as 19s. 6d. has been
pment of best colliery screened steam
t this figure collieries declined to
that loading would be completed
. It is stated on good authority
6d. has been paid for cargoes for
ary and February, and with the
ontinuing at its present high level any
prices can hardly be looked for. The
e just placed an order for an additional
ouble-screened steam coals with Messrs.
o, it is said, intend supplying Nixon's
the contract is a c.i.f. one it is difficult
t rate the price would be f.o.b., but
c.i.f. price is as reported—38¼ fr.—it
of a 13 fr. freight, work out at about
ve the price paid for supplies in August
be made in French steamers at the
our over a period of four months.
in an exceptionally favourable position
, as they have a fleet of steamers at
rrent prices of superior Admiralty
for ordinary seconds 17s. 6d. per ton.

There continues to be a good demand for small coal. Large quantities are being used for industrial purposes, especially for the manufacture of coke, whilst there is also an enormous consumption in Germany of small coal which previously was exported. Best bunkerings are 15s. to 15s. 6d., best ordinaries 14s. 6d., and cargo qualities 13s. 6d. to 14s. Best washed nuts are 15s. 6d. to 16s., and best washed peas 14s. 6d. per ton. The only large operation in Monmouthshire coals has been in connection with the Egyptian State Railways contract. The quantity for which tenders were asked was some 160,000 metrical tons, and up to the time of writing the only firm which had received news of any allotment was that of Messrs. Morgan, Wakley and Co. It is reported that they have received an order for from 60,000 to 100,000 tons for delivery from February to July at 1s. to 1s. 3d. per ton above the price at which similar contracts were placed in October last. At that time tenders were sent in for 300,000 metrical tons, but the Egyptian authorities kicked at the figures quoted, and only placed orders for half their usual quantity. By their action they will now have to pay an extra £8,000 or £9,000 as a result of the recent advance in values. A rumour was current on 'Change that they had decided to obtain a considerable portion of their supplies from America, but no confirmation of this had been received when this report was despatched. It is scarcely likely to be true as nothing is to be gained by purchasing American coals. The tenders sent in for Monmouthshire coals were round about 17s., less the usual discount. Current prices of Monmouthshires are:—Black Veins 17s. 3d., western valleys 17s., and eastern valleys (best) 16s. 6d., seconds 16s. to 16s. 3d.—in each case f.o.b. Cardiff. The total quantity of coal exported from the Bristol Channel ports to foreign countries for the 11 months ended November 30 was 23,639,507 tons, as against 22,813,750 tons in the corresponding period of last year, being an increase of 825,807 tons. The shipments coastwise for the month amounted to 286,613 tons, a decrease of 81,300 tons as compared with last year. From Cardiff the shipments were 123,347 tons, of which Southampton took 41,500, London 23,840, Liverpool 22,910 and Bristol 12,875 tons; from Newport the shipments were 63,294, Port Talbot 11,630, Briton Ferry 9,630, and Swansea 35,406 tons. Chartering transactions last week showed a great falling off, but this is usually the case on the eve of a prolonged holiday. The vessels taken up only represented a carrying capacity of 163,000 tons, being a decrease of 34,000 tons over the preceding six days. In bituminous coals there is no material change. Some sellers still ask 18s. for No. 3 Rhondda large, but 17s. 6d. is being freely taken up by more than one colliery. Through-and-through is 16s., and small 14s. 6d. to 15s. No. 2 large is 15s. 9d. to 16s., through-and-through 14s. 9d. to 15s., and small 13s. 9d. per ton. There is no change in patent fuel. Crown brands for prompt shipment are quoted at 23s., other qualities 19s. 6d. to 21s. 6d. It is reported that the Austrian naval authorities have placed an additional order with the Arrow Patent Fuel Company, Swansea, for upward of 70,000 tons of patent fuel, and although the price has not been disclosed it is stated that the figure is a record one. Special foundry coke is 33s., ordinary qualities 28s. to 30s. Furnace coke is 26s. to 27s. Pitwood remains steady at 22s. per ton.

IRON.

Owing to a shortage of tonnage the shipments of tin-plates for the week only amounted to 64,414 boxes. Receipts for works were 136,080 boxes, so that there were added to stocks 71,666 boxes, and they now stand at 305,683 boxes. Some of the tin-plate mills stopped the whole of this week, others four days out of the six, but the steelworks, owing to the great demand for bars, were only idle on Christmas day. This was the more remarkable, because during the week over 10,000 tons of bars, billets, blooms, &c., had been received from Germany and America. Tin-plate works which are in need of specifications have been accepting very low figures in order to keep machinery at work; 14 × 20 Bessemer cokes are about 15s., oil sizes 14 × 18¾ and 14 × 19¼ are 15s. 3d. to 15s. 4½d., and 10 × 20 plates 22s. to 22s. 3d. Siemens tin bars for forward delivery have sold at £6, but makers have been disinclined to accept less than £6 7s. 6d for prompt delivery. There is no change in galvanised sheets, 24-gauge corrugated still selling at £12 5s. to £12 7s. 6d. Considerable quantities of rails have been turned out at the Dowlais Works, and prices of heavy sections are firmly quoted at £6 10s. to £6 15s. There is no change in Welsh pig iron or in scrap metals.

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The trade of the port last week showed a decrease as compared with the preceding period, chiefly due to the non-arrival of tonnage. The coal trade was fairly active, but the exports of patent fuel were considerably less than the average; the shipments together totalled 94,860 tons. There was a good attendance on 'Change on Tuesday, but owing to the near approach of Christmas there was very little business doing. Shippers confined their attention to getting their boats away before the holidays. Prices for all descriptions of anthracite, however, were firm, with very little free coal available. In the steam coal department, the conditions were also very firm. Prices are as quoted last week.

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THE IRISH COAL TRADE.

Thursday, December 26.

Dublin.

Up to the time of writing the coal trade in most branches showed increased activity in view of the stoppage for the holidays, but there has been no extraordinary demand for household qualities owing to the absence of any prolonged period of cold weather. The year closes without the usual winter advance having been made in prices, and there is no change in any other class of fuel, although the new year may see higher prices ruling all round. Quotations in the city stand as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 23s.; Scotch, 20s.; best Orrell slack, 21s.; steam coals from 20s. per ton upwards; house coal, retail, 1s. 5d. to 1s. 6d. per sack; best coke 23s. per ton, or 18s. per chaldron. Irish coals, at Gracefield collieries, Queen's County:—Best large malting coal, 20s. per ton; best hand-picked breakage, 20s. per ton and 17s. 6d. per ton; cobbles screened and beans screened, 17s. 6d. per ton; culm, 5s. per ton at the pit mouth. There has been a good demand for patent fuel and turf since the winter commenced. The import trade maintained its improvement in spite of the very wild weather at sea, coaling vessels arriving being chiefly from Garston, Liverpool, Newport, Glasgow, Point of Aire, Maryport, Manchester, Cardiff, Troon, Ayr, Neath Abbey, Workington and Swansea. The colliers entering the port amounted to 58 as compared with 63 the week previously, the total quantity of coal discharged upon the quays being 25,000 tons.

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THE BY-PRODUCTS TRADE.

Tar products:—The market generally is firm, and prices are well maintained. The weakest features are carbolic crystals and 90's benzols, the latter having given way in price distinctly. Crude carbolic is firm, but crystals have fallen considerably. Naphthas are steady. Creosote is unchanged. Nearest prices are:—

Benzols, 90's, 9½d. to 10d.; ditto 50's, 10½d.; toluol, 10¾d.; carbolic acid, crude (60 per cent.), 2s. 3d. to 2s. 4d.; ditto crystals, 40 per cent., 6d.; solvent naphtha, 1s. 0½d., as in quality and package; crude ditto, 5½d. in bulk; creosote, 3½d. for ordinary qualities; pitch, 43s. to 43s. 6d. f.o.b. east coast; ditto, 40s. 6d. to 42s. 6d. f.a.s. west coast; ditto, 46s. gas companies.

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Sulphate of ammonia:—There is a steady movement on the upward grade, and prices generally are favouring sellers. Naturally the forward market is very firm, and £14 15s. is wanted for short dates, while £14 11s. 3d. is reported for January-June delivery. The open weather is, of course, helping the position considerably. Closing prompt prices are:—

London (ordinary makes), £13 12s. 6d.; Beckton, £13 12s. 6d.; Liverpool, £14 7s. 6d.; Hull, £14 6s. 3d.; Scotch ports, £14 7s. 6d. to £14 10s.; nitrate of soda (ordinary), 11s. 7½d. per cwt.

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against the Truck Act, in having deducted certain sums from the wages of miners leaving their employment as security for the rent of houses occupied by them and owned by the companies.

A special national conference of miners has been called for January 2, to consider the Trades Unions Bill as amended in Committee.

The action of the North Wales Miners' Association a fortnight ago, in announcing its intention of tendering notices in support of the surfacemen's demands for better conditions, was followed by negotiations, which have ended amicably. A temporary arrangement embodying the coalowners' original offer has been accepted.

A terrible explosion occurred on the 23rd inst. at the Ubari Colliery at Sapporo, Hokkaido. About 200 men were working in the mine at the time, and of these only three have been got out alive.

Safety Lamp Glasses.

THE statement contained in the letter[*] written to the Home Office by Mr. W. H. JOHNSON, managing director of Messrs. Richard Johnson, Clapham and Morris Limited, Manchester, that only one firm of glass manufacturers (Messrs. Schott and Gen, of Jena) supply lamp glasses capable of passing the Home Office tests, followed by the request that the tests should therefore be modified, gives occasion for a consideration of this important component of the modern safety lamp.

The light afforded by the early lamps of the Davy type was very feeble, on account of the obstruction caused by the gauze mantle through which the light must pass, and about 1839 Dr. CLANNY invented a lamp in which the lower part of the gauze was replaced by glass.

Since that time the glass has formed an essential feature of safety lamps, but it has received very little attention, on its own account, in this country, notwithstanding the following significant statement made by the Royal Commission on Accidents in Mines (Final Report, March 15, 1886, p. 84):—

> "From our experiments it appears that the ultimate source of danger with all these lamps is the breaking of the glass."

This conclusion was arrived at after making 1,752 experiments with more than 250 lamps obtained partly from various sources in this country and partly from Belgium, France and Germany; in addition to having placed at their disposal the record of the experiments (183) carried out by the adjudicators in the Ellis Lever competition, at which they were also invited to be present.

On the Continent, however, the subject has received close attention, especially during the last few years. This is probably accounted for by the widely increasing use of benzine, which, while giving a better light than oil, gives also a much hotter flame, and, by causing a greater expansion of the glass, tends to more frequent ruptures.

As a consequence of the considerable increase in the number of broken glasses which took place following the introduction of the new regulations in Belgium in 1904, which permitted the use of benzine safety lamps, a series of highly interesting experiments was commenced by Messrs. WATTEYNE and STASSART at the Frameries Testing Station in 1905.

According to the requirements of the Regulation of April 28, 1884, the thickness of the walls of lamp glasses was fixed between the limits of 5 mm. (0·2 in.) as a minimum and 7½ mm. (0·3 in.) as a maximum. This thickness was adhered to for the most part in regard to the lamps authorised by the Order of August 19, 1904.

The security of the lamp glass against breakage can hardly be over-estimated. "The lamp glass possesses considerable importance; it is, in fact, the greater or less resistance of the glass which assures the safety of the lamp. The most perfect lamp, offering the highest degree of security, will only constitute an instrument of the greatest danger if the glass with which it is fittedis of bad quality and subject to be broken."[*]

The usual causes of breakage are:—

(1) The flame of the lamp, or of gas ignited within the lamp, playing directly on the glass;

(2) The impact of cold water on the glass while the latter is in a more or less heated condition;

(3) A blow.

While thin glass is more liable to damage from a blow, thick glass is more susceptible to local changes of temperature in its substance, producing unequal expansion and contraction.

The experiments of Messrs. WATTEYNE and STASSART referred to above were directed towards testing (1) the resistance of the glass when the lighted lamp is placed upright or inclined at various angles in a current of air containing 7 to 8 per cent. of methane; (2) resistance of the glass, when more or less heated, to the effect of water or ether cast upon it by the hand in the form of small drops, or in the form of spray by means of a syringe; (3) resistance of the glass to a blow, which is effected by means of a weight of 85 grammes falling from a varying height.

The general conclusions arrived at as the result of these experiments were:—

(1) That the reduction, within certain limits, of the thickness of the glass substantially increased its resistance to the effects of heat, which tends to break it.

(2.) On the other hand, very thin glasses are very fragile when exposed to blows, but that if a certain minimum is not passed, the resistance of a well manufactured glass is quite sufficient. This minimum was fixed at 4 mm. (0·157 in.). The reduction in the thickness of the glass involves the necessity of absolute accuracy in fitting.

The results of the experiments on the resistances of ordinary glasses of about 5 mm. thickness fitted to a Wolf lamp, with air feed from below and exposed to explosive currents, are given in the first column of Table II. A current flowing horizontally with a velocity of 3 metres per second caused the glass to crack.

The effect of projecting water in the form of drops, and by means of a syringe, on a lamp, fitted with a glass about 5 mm. thick, which had been lighted for 20 minutes and placed in a still atmosphere free from firedamp, was, in the former case, that all the glasses remained uninjured, and, in the latter case, that 40 per cent. were broken. When the lamp was placed vertically after being heated by an inflammable current, and exposed to the effects of drops and a jet, all the glasses remained uninjured in the former case, and all were broken in the latter. When drops of water were projected on the lighted lamp, inclined at an angle of 15 degs., having been previously heated by an inflammable current, 25 per cent. of the glasses were broken.

The results of the experiments regarding the resistance of the glasses to blows varied considerably with the manufacture. The average amount of fall of the weight of 85 grammes required to produce rupture was as follows:—

TABLE I.

mm.		mm.		
700	for glasses	3½	thick.	Factory A
760	,,	5½	,,	,, A
680	,,	7	,,	,, B
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440	,,	5½	,,	,, C
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A result of these experiments, which favoured a certain reduction in the thickness of the glasses, was the issue of a Ministerial Order, dated April 7, 1905, authorising 4 mm. as the minimum thickness, instead of 5 mm. as formerly.

In the introduction to an account of a further investigation of the subject of safety lamps, which included new researches on the resistance of the glasses, Messrs. WATTEYNE and STASSART say:—

"We believe that we may say that henceforth the serious objection which can be raised against the benzine lamp, on account of the increasing frequency of broken glasses, may be considered as limited by the employment of glasses of good quality. In foreign countries where the use of benzine lamps has been permitted for a long time, this objection, which affects in such a high degree the safety of the mine, does not appear to have been taken up, and in no case has it been met. In our country, the extreme distrust with which the employment of the benzine lamp has been, and is, in certain coalfields, still received, has had the good effect of bringing out, perhaps with some exaggeration, the inconveniences and dangers inherent in its employment, and of provoking new research and new efforts which have resulted in fresh progress."

After considering various proposals designed to prevent or limit the effect of the breaking of lamp glasses, such as the employment of double glasses suggested by M. H. JORIS, and arming the glass by means of a metallic trellis, with large meshes, embedded in its substance, Messrs. WATTEYNE and STASSART came to the conclusion that the true solution of the problem appeared to be in the quality of the glass itself. They carried out at Frameries a series of experiments upon a type of glass, supplied by the Cristalleries du Val-Saint-Lambert, known as $\frac{D\,S}{4}$, and also upon other glasses submitted to them by M. H. JORIS, and designated "verres indifferentes."

The results obtained by the experiments upon these types were most satisfactory.

The following comparative table gives a summary of the experiments on the resistance of lamp glasses in rapid explosive currents, using a Wolf lamp, fed with air from below:—

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Descending, vertical	5	15*	15*
Rising, vertical	20	15*	15*

* Not ruptured.

All the glasses had a thickness of 5 mm. approximately.

The experiments with water consisted, as in the case of the ordinary glass described above, of projecting drops by means of the hand, and a jet by means of a syringe against $\frac{D.S.}{4}$ glasses placed on a safety lamp and previously heated by the passage of a current of inflammable gas.

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[*] *Colliery Guardian*, December 6, 1912.

[*] *La Sécurité dans les Mines*, par H. Schmerber, 1910, p. 275.

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y Guardian, December 6, 1912.

* *La Sécurité dans les Mines*, par H. Schmerber, 1910, p. 275.

relative rope and drum diameter could be solved, and he hoped other mining engineers would give the institute the benefit of their experience. He (Mr. Eckmann) was of the opinion that the old definition of the safety factor, *i.e.* :—

$$\frac{\text{Breaking load of rope}}{\text{Dead load + weight proper of the rope}}$$

was the most suitable one. The dynamic stresses need not be included, as the safety factor had to be selected with regard to possible shocks during which the dynamic stresses were considerably in excess of what they were during starting in the ordinary winding service. The bending stresses on the drum need not be considered, as the dangerous sections apparently never reach the drum. As to the value of the safety factor, the greater or smaller possibility of shocks should be taken into account. It might perhaps be less with an electric winder where the starting torque was automatically controlled, than with a steam winder where the starting torques were much less controllable. It might be less for a winder with modern keps than for a winder with old keps. It might also be less for Koepe winders, where heavy shocks were impossible, as they would cause the rope to slide on the Koepe pulley and thus prevent heavy stresses. He hoped that one result of M. du Pasquier's interesting paper would be to clear the at present very debatable question of the safety factor of winding ropes.

Mr. Hugh Bramwell said he believed ropemakers would bear him out that provided proper steel was used, drawn to a proper tensile breaking strain to suit the conditions, it would be found when the rope was taken off, even if wires in it had broken, to have as high a breaking strain under test as when it was put on. The reason of this was that during the working life of the rope it was subject to stresses and releases of stress which tended to gradually raise the actual breaking strain of the wire itself, and a rope drawn, say, to 100 lb. per square inch would test to 110 lb., or even more. Of course, breaking strain under test was not everything, because, as a matter of fact, the wires had been all the time becoming "fatigued," and instead of breaking singly at particular points might suddenly collapse altogether. He had heard of cases where the mere taking off of the cap led to the rope wires splintering like glass, showing that the wire had become quite brittle from constant use, although it had been working the day before. Generally speaking, especially where an electric winder was adopted, which gave a perfectly regular acceleration and very much less sudden strain on the rope, a materially reduced factor as far as breaking strain was concerned was perfectly permissible. He believed in South Africa a safety factor of 6 was adopted where 10 was formerly talked about, and even in this country few people considered it necessary to put in a factor of 10 in their winding ropes. He agreed that there was practically no bending strain of ropes lapping on the drum to be added to the working strain in the shaft, and it could be left out of calculation altogether.

Mr. Leighton Stevens, referring to the author's phrase of "preventing excessive angling of the rope," asked what M. du Pasquier deemed excessive angling. The point had direct bearing upon the question of the width of the drum.

The Chairman said it was not his experience that the breaking strain of a rope increased by use. Even if the wire did show a better breaking strain at the end of its life it was certainly nearer its death than when it was first put in. He would not like to go as far as Mr. Bramwell and say there was no stress due to bending around the drum or pulley, but it had been very much exaggerated. On the average he would put it at about half what was calculated in the ordinary formula.

Mr. Frank Anslow wrote that it was very refreshing to see the electric winder problem boldly approached from the simplicity standpoint by an electrical engineer with a plea that the mechanical portions and other conditions should be made suitable. This was very necessary if the best results were to be obtained from electric winding, and if electrical design and gear were not to be debited with complications not justly attributable to the system. A feature of the author's propositions was the adoption of geared motors. Gearing, rightly or wrongly, would be regarded with suspicion until it was thoroughly established for winding work. This was naturally so, as it was in marked contrast to the plain, slow-running direct-coupled steam engine and direct-coupled slow-speed motor. Considerable advantage must therefore be shown for this system before it could compensate for the simplicity of the plain direct-coupled drive. The introduction of double helical gearing had done much to render gearing reliable and noiseless, but while there was gearing that was noiseless, there was some otherwise. Experience would show that much could be done to remove this latter objection in the way of enclosing the gearing, and also making provision to minimise the effect of the drum acting as a sounding board. He (Mr. Anslow) had satisfactory experience of gearing in connection with machinery requiring equal reliability to winding. It would appear that the adoption of quick-running motors with gearing was essential to the author's propositions, both as regarded first cost and operation, particularly in respect of the power factor. The author's summary of comparison between straight A.C. drive and equalising systems was fair, and showed that any system of equalising should only be adopted when absolutely necessary.

Mr. J. W. Davison said it became necessary at one of the pits with which he was connected to adopt round ropes in place of flat ropes. The space between the engine bearings being narrow, and the lead short, it was found that the round ropes would have to coil upon themselves. The drum was therefore designed for this, grooved for the rope, and provided with a special form of flange to raise the rope on to itself, similarly to the plan adopted in South Africa. The result had been most satisfactory, and no difficulty had occurred in the coiling of the rope. After the ropes had been in use for about two years some of the wires broke at the part of the rope where the second coils mounted the first; but by turning the ropes end for end, say after 12 or 15 months, a longer life had been got. Where there were facilities for altering the position of the rope on the drum from time to time, still better results were obtainable. In his opinion drums designed for ropes coiling on each other should have special means of letting out or varying the position of the ropes on the drum, and the rope should not be simply clamped in one position at the drum shaft, and kept in that position during the life of the rope. This was easily done by having rope reels mounted on the shaft inside the drum. Mention had been made of the overlaying of ropes on the drawn centre. It had been their practice to lag with oak the barrel part of every winding drum, slightly tapered to the centre. The ropes soon formed a groove in the wood and a cushion and bed for the rope. There was, of course, unequal wear on the lagging, but it was easier to change the wood lagging than to renew the steel plates. It was also better for the ropes. The wood laggings lasted from 8 to 10 years. With regard to the factor of safety of ropes, he agreed with the author that such a margin as 10 was unnecessary. His experience was that under many conditions a rope with a factor of safety of about 6 made from milder steel was quite as safe as, and gave better results than, one with a factor of 10 of harder wire. Then why have a high factor of safety for ropes when attachments to the cage were generally materially lower? Some nine years ago tests were made of rope caps from some leading collieries in South Wales, and in every instance the cap gave way at about six times the load. Could there be any reason, therefore, for adopting 10 for the rope? With regard to controllers and handling gear of electrical winders, electrical firms made the mechanical connections and attachments far too light and of a too flimsy nature, such, for instance, as persisting in making cranks and levers of cast iron. In most gears with which he had had to do, parts had broken and had to be substituted with wrought iron or steel of more substantial proportions.

Mr. T. E. Richards said he would like to see stated the cost of electric winding, leaving out standing losses, in a case where equalising would not be necessary, and where also a straight alternating current winder could be used, as could be done nowadays if within the radius of a power supply company, and whether under such conditions an over-all efficiency of 50 per cent. could be obtained if an improved drum was installed.

Mr. du Pasquier replied to a few points raised in the discussion, but decided to furnish a detailed reply in the *Proceedings* of the institute.

On the motion of the Chairman, seconded by Mr. Hugh Bramwell, a cordial vote of thanks was extended to the author, and the discussion was closed.

Meeting at Swansea.

A special general meeting of the South Wales Institute of Engineers was held at Swansea on December 17, Mr. Henry T. Wales, vice-president, in the chair. The chairman referred to the reported intention of some gentlemen in that neighbourhood to form an engineering society, and deprecated such a course. The South Wales Institute of Engineers, by its charter and title comprehended all branches of the profession, and among its founders were such eminent metallurgists as Mr. Menelaus, Mr. Edward Williams (of Middlesbrough), Mr. James Colquhoun, and Mr. E. P. Martin. The *Transactions* of the institute showed that many papers had been read on metallurgical subjects, and the council would always welcome them and give facilities for their fullest consideration. It would not be disputed that one large and well-established institute must be of much greater benefit to the engineers of the whole district than two or more bodies. (Hear, hear.)

Discussion was resumed on papers by Mr. David E. Roberts on "The Modern Blast Furnace and a Mechanical Puddling Furnace," and on a paper by Mr. A. O. Schenk, chief engineer to the Swansea Harbour Trust, describing the construction of the Severn Tunnel, with which he was associated.

Among those who contributed to the discussion on the two first-named papers were Mr. Roger Beck, Swansea; Mr. W. O'Connor, F.G.S.; Mr. W. Ogden Dayson, Swansea; Mr. Henry Parfitt, Merthyr; Mr. J. E. Torbock, Landore; Mr. John Hutchinson, Cardiff; and Mr. Guy Barrett, Ebbw Vale.

Resolutions of thanks to the authors were adopted with acclamation.

LABOUR AND WAGES.

North of England.

A meeting between the Cleveland ironstone mineowners and the Cleveland miners' representatives was held at Middlesbrough on Monday, Sir Hugh Bell, Bart., presiding, when further consideration was given to the application of the surfacemen for an advance in the base rates. The owners conceded an advance in the base rates to able-bodied datal workmen, and with regard to the boys a scale of rates applicable to different ages was agreed to. The advance takes effect from Tuesday, the 30th inst.

Federated Area.

The voting for the election of president of the Notts Miners' Association for the ensuing year was made known at the monthly meeting of the council on Saturday, the retiring president, Mr. G. A. Spencer, of Sutton-in-Ashfield, who had received 307 votes, being duly elected to the position for the second year in succession. The unsuccessful candidates were:—Mr. Wm. Fowkes, Linby, 23; Mr. A. Beswick, Hucknall, 90; Mr. John Whyatt, Gedling, 88; Mr. W. G. Hancock Bentinck, 20; and Mr. J. Allton, Eastwood, 54. Of the 17 candidates for the junior auditorship, Mr. Wm. Round, Silver Hill, with 147 votes, was successful. Messrs. J. H. Hankin (Underwood), G. Brown (Hucknall), S. Kirkwood (Pinxton), T. Martin (Moorgreen), S. Fisher (High Park), F. Rawson (Kirkby), W. Pollard (Langley Mill), J. Sponage (New Watnall), J. Granger (Bulwell), and W. Bott (Langton), were appointed on the executive committee. As representatives on the joint board of the Notts Miners', Derbyshire Miners', and Derbyshire and Notts Enginemen and Firemen's Associations, Mr. J. G. Hancock, M.P. (the agent), Mr. L. Spencer (treasurer), Mr. W. Carter (assistant-secretary), Mr. G. A. Spencer (president), Mr. F. Rawson, Mr. G. H. Godber, and Mr. A. Beswick, were elected.

The secretary, Mr. C. Bunfield, gave a report of the negotiations which had taken place between representatives of the association and the Midland Counties Coalowners' Association with reference to the surfacemen's grievances at the New Hucknall and Bentinck Collieries, and was pleased to state that a settlement had been arrived at. Mr. Bunfield was thanked for his services, and he was requested to have the terms of the settlement printed.—The agent placed before the council the correspondence which had passed between himself and the secretary of the Leen Valley Coalowners' Association with regard to the wages and hours of employment of enginemen and firemen in the district. It was reported that Sunday labour at certain collieries in the county was greatly on the increase, and a resolution was passed strongly deprecating unnecessary Sunday work, and urging its discontinuance in every case as far as possible.—A circular was read from the Nottingham Labour Party in reference to a Parliamentary candidate for East Nottingham, and it was decided that four officials should attend the next meeting of the party to further consider the matter.—On the proposition of the president, seconded by Mr. B. Smith (vice-president), it was agreed to place on record the council's hearty congratulations to Mr. L. Spencer, treasurer of the association, on his appointment as a justice of the peace for the city of Nottingham.

With reference to the recent demand for an increase in wages made by the surfacemen who manipulate the coal on the pit bank in North Wales, a joint conference of the Coalowners' Association and the representatives of the North Wales Miners' Federation was held in Wrexham, on Thursday of last week, presided over by Mr. Jas. Darlington, J.P., when a settlement was come to, and the following are the terms agreed to by both parties:—"At a joint meeting of the North Wales Coalowners' Association and representatives of the North Wales

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ion and very much less sudden strain
materially reduced factor as far as
was concerned was perfectly permis-
ed in South Africa a safety factor of 6
re 10 was formerly talked about, and
try few people considered it necessary
or of 10 in their winding ropes. He
e was practically no bending strain of
the drum to be added to the working
ft, and it could be left out of calculation

n Stevens, referring to the author's
enting excessive angling of the rope,"
du Paequier deemed excessive angling.
irect bearing upon the question of the
m.

n said it was not his experience that
ain of a rope increased hy use. Even if
w a better breaking strain at the end
certainly nearer its death than when it
He would not like to go as far as
nd say there was no stress due to bending
n or pulley, but it had been very much
On the average he would put it at about
alculated in the ordinary formula.

nslow wrote that it was very refreshing
ric winder problem boldly approached
city standpoint by an electrical engineer
the mechanical portions and other con-
e made suitable. This was very necessary
ults were to be obtained from electric
electrical design and gear were not to
h complications not justly attributable
A feature of the author's propositions
otion of geared motors. Gearing,
ngly, would be regarded with euspicion
thoroughly established for winding
as naturally so, as it was in marked
he plain, slow-running direct-coupled
and direct-coupled slow-speed motor.
dvantage must therefore be shown for
ore it could compensate for the simplicity
ect-coupled drive. The introduction of
gearing had done much to render gearing
eeless, but while there was gearing that
there was some otherwise. Experience would show that much could be done to remove thie latter objection in the way of enolosing the gearing, and also making provision to minimise the effect of the drum acting as a sounding hoard. He (Mr. Anslow) had satisfactory experience of gearing in connection with machinery requiring equal reliability to winding. It would appear that the adoption of quick-running motors with gearing was essential to the author's propositions, both as regarded first cost and operation, particularly in respect of the power factor. The author's summary of comparieon between straight A.C. drive and equalising eysteme was fair, and showed that any system of equalising should only be adopted when absolutely necessary.

Mr. J. W. Davison said it became necessary at one of the pits with which he was connected to adopt round ropes in place of flat ropes. The space between the engine bearings being narrow, and the lead short, it was found that the round ropes would have to coil upon themselves. The drum was therefore designed for this, grooved for the rope, and provided with a special form of flange to raise the rope on to itself, similarly to the plan adopted in South Africa. The result had been most satisfactory, and no difficulty had occurred in the coiling of the rope. After the ropes had been in use for about two years eome of the wires hroke at the part of the rope where the second coils mounted the first; but by turning the ropes end for end, say after 12 or 15 months, a longer life had been got. Where there were facilities for altering the position of the rope on the drum from time to time, still better results were obtainable. In hie opinion drums designed for ropes coiling on each other should have special means of letting out or varying the position of the ropes on the drum, and the rope should not he simply clamped in one position at the drum shaft, and kept in that position during the life of the rope. This was easily done by having rope reels mounted on the shaft inside the drum. Mention had been made of the overlaying of ropes on the drawn centre. It had heen their practice to lag with oak the harrel part of every winding drum, slightly tapered to the centre. The ropes soon formed a groove in the wood and a cushion and hed for the rope. There was, of course, unequal wear on the lagging, hut it was easier to change the wood lagging than to renew the steel plates. It was also better for the ropes. The wood laggings lasted from 8 to 10 years. With rogard to the factor of safety of ropes, he agreed with the author that such a margin as 10 was unnecesary. Hie experience was that under many conditions a rope with a factor of safety of about 6 made from milder steel wae quite as safe as, and gave better results than, one with a factor of 10 of harder wire. Then why have a high factor of safety for ropes when attachments to the cage were generally materially lower? Some nine years ago tests were mads of rope caps from eome leading collieries in South Wales, and in every instance the cap gave way at about six times the load. Could there be any reason, therefore, for adopting 10 for the rope? With regard to controllers and handling gear of electrical winders, electrical firms made the mechanical connectione and attachments far too light and of a too flimsy nature, such, for instance, as persisting in making cranks and levers of cast iron. In most gears with which he had had to do, parte had broken and had to be substituted with wrought iron or steel of more eubstantial proportions.

Mr. T. E. Richards said he would like to see stated the cost of electric winding, leaving out standing losses, in a case where equalising would not be necessary, and where also a straight alternating current winder could be used, as could he done nowadays if within the radine of a power supply company, and whether under such conditions an over-all efficiency of 50 per cent. could he obtained if an improved drum was installed.

Mr. du Pasquier replied to a few points raised in the discussion, but decided to furnish a detailed reply in the *Proceedings* of the institute.

On the motion of the Chairman, seconded by Mr. Hugh Bramwell, a cordial vote of thanks was extended to the author, and the discussion was closed.

Meeting at Swansea.

A special general meeting of the South Walee Institute of Engineers was held at Swansea on December 17, Mr. Henry T. Wales, vice-president, in the chair. The chairman referred to the reported intention of some gentlemen in that neighbourhood to form an engineering society, and deprecated such a course. The South Wales Institute of Engineers, by its charter and title comprehended all branches of the profession, and among its founders were such eminent metallurgists as Mr. Menelaus, Mr. Edward Williams (of Middlesbrough), Mr. James Colquhoun, and Mr. E. P. Martin. The *Transactions* of the institute showed that many papere had been read on metallurgical subjects, and the council would always welcome them and give facilities for their fullest consideration. It would not be disputed that one large and well-established institute must be of much greater benefit to the engineers of tho whole district than two or more bodies. (Hear, hear.)

Discussion was reeumed on papers by Mr. David E. Roberts on "The Modern Blast Furnace and a Mechanical Puddling Furnace," and on a paper by Mr. A. O. Schenk, chief engineer to the Swansea Harbour Trust, describing the construction of the Severn Tunnel, with which he was associated.

Among those who contributed to the discussion on the two first-named papers were Mr. Roger Beck, Swansea; Mr. W. O'Connor, F.G.S.; Mr. W. Ogden Dayson, Swansea; Mr. Henry Parfitt, Merthyr; Mr. J. E. Torbock, Landore; Mr. John Hutchineon, Cardiff; and Mr. Guy Barrett, Ebbw Vale.

Resolutions of thanke to the authors were adopted with acclamation.

LABOUR AND WAGES.

North of England.

A meeting between the Cleveland ironstone mineowners and the Cleveland miners' representatives was held at Middlesbrough on Monday, Sir Hugh Bell, Bart., presiding, when further consideration was given to the application of the eurfacemen for an advance in the base rates. The owners conceded an advance in the base rates to able-bodied datal workmen, and with regard to the boys a scale of rates applicable to different ages was agreed to. The advance takes effect from Tuesday, the 30th inst.

Federated Area.

The voting for the election of president of the Notts Miners' Association for the ensuing year was made known at the monthly meeting of the council on Saturday, the retiring president, Mr. G. A. Spencer, of Sutton-in-Ashfield, who had received 307 votes, being duly elected to the position for the second year in succession. The unsuccessful candidates were:—Mr. Wm. Fowkes, Linby, 23; Mr. A. Beswick, Hucknall, 90; Mr. John Whyatt, Gedling, 88; Mr. W. G. Hancock Bentinck, 20; and Mr. J. Allton, Eastwood, 54. Of the 17 candidates for the junior auditorship, Mr. Wm. Round, Silver Hill, with 147 votes, was successful. Messrs. J. H. Haukin (Underwood), G. Brown (Hucknall), S. Kirkwood (Pinxton), T. Martin (Moorgreen), S. Fisher (High Park), F. Rawson (Kirkby), W. Pollard (Langley Mill), J. Sponage (New Watnall), J. Granger (Bulwell), and W. Bott (Langton), were appointed on the executive committee. As representatives on the joint board of the Notts Minere', Derbyshire Miners', and Derbyshire and Notts Enginemen and Firemen's Associations, Mr. J. G. Hancock, M.P. (the agent), Mr. L. Spencer (treasurer), Mr. W. Carter (assistant-secretary), Mr. G. A. Spencer (president), Mr. F. Rawson, Mr. G. H. Godber, and Mr. A. Beswick, were elected.

The secretary, Mr. C. Bunfield, gave a report of the negotiations which had taken place between representatives of the aseociation and the Midland Countiee Coalowners' Association with reference to the surfacemen's grievances at the New Hucknall and Bentinck Collieries, and was pleased to state that a settlement had been arrived at. Mr. Bunfield was thanked for his services, and he was requested to have the terms of the settlement printed.—The agent placed before the council the correspondence which had paesed between himself and the secretary of the Leen Valley Coalowners' Association with regard to the wages and hours of employment of enginemen and firemen in the district. It was reported that Sunday labour at certain collieries in the county was greatly on the increase, and a resolution was passed strongly deprecating unnecessary Sunday work, and urging its discontinuance in every case as far as poesible.—A circular was read from the Nottingham Labour Party in reference to a Parliamentary candidate for East Nottingham, and it was decided that four officials should attend the next meeting of the party to further consider the matter.—On the proposition of the president, seconded by Mr. B. Smith (vice-president), it wae agreed to place on record the council's hearty congratulations to Mr. L. Spencer, treasurer of the association, on his appointment as a justice of the peace for the city of Nottingham.

With reference to the recent demand for an increase in wagee made hy the surfacemen who manipulate the coal on the pit bank in North Wales, a joint conference of the Coalowners' Association and the representatives of the North Walee Miners' Federation was held in Wrexham, on Thursday of last week, presided over by Mr. Jas. Darlington, J.P., when a settlement was come to, and the following are the terms agreed to by both parties: —"At a joint meeting of the North Wales Coalowners' Association and representatives of the North Wales

Miners' Federation, held at Wrexham on Thursday, December 19, 1912, Mr. James Darlington in the chair, it was agreed that the members of the association should give an advance of 2d. per day to men 21 years of age and over, and 1d. per day to boys under 21 years employed on the pit banks and screens and manipulating the coal—namely, those to whom the recent advance of 5 per cent. applied, such advance to be made as from the first making-up day in January next. There shall be no further alteration in wages until the Miners' Federation of Great Britain decide that general notice shall be tendered by each district with a view of arriving at a national settlement of surface wages, except such alterations as may from time to time be made by the Conciliation Board of the Federated area.—Signed for the North Wales Coalowners' Association, W. D. Haswell, secretary. For the representatives of the North Wales Miners' Association, Edward Hughes, secretary."

Scotland.

A meeting of the executive of the Scottish Miners' Federation was held in Glasgow on the 18th inst. It was decided that the Federation should be strongly represented at the conference of trade unions on the Trades Union Bill in London on January 2, and delegates were appointed. The executive discussed at considerable length the question of medical attendance for the wives and families of miners after the Insurance Act benefits come into force early next year, and it was resolved to hold a further meeting with the representatives of the medical profession with a view to coming to an arrangement under which medical attendance will be continued to miners' families. In the event of an amicable settlement between the doctors and the Federation, the employers will be requested to attend a joint meeting for the purpose of making final arrangements for the deduction of medical fees through the office.

At a meeting of the executive committee of the Lanarkshire Miners' Union on the 18th inst. in Hamilton, Mr. David Gilmour submitted the report of an interview with the Lord Advocate and the Secretary for Scotland on the question of evictions, and pointed out that the previous understanding anent restoring the defences against eviction was not now likely to be carried out by the passing of the House Letting Bill. A further difficulty had arisen, which was not met in the amending Bill at present being introduced by the Lord Advocate. The executive strongly protested against this, and agreed that everything possible should be done throughout the Miners' Federation of Great Britain to get the Labour party to take vigorous action.

MINING AND OTHER NOTES.

At the second meeting of the fifty-fifth session of the Geological Society of Glasgow, Mr. Peter Macnair and Mr. H. R. J. Conacher exhibited specimens of the Hurlet coal and associated limy breccia from Thorntonhall Quarries, Busby, and Mr. R. W. Dron read a paper on "The Old Channel of the Tillon Burn, Motherwell." Mr. G. W. Tyrrell read, on behalf of Mr. Russell F. Gwinnell, a paper on "An Occurrence of Dolomitic Limestone in Glen Fruin."

At the annual meeting in Edinburgh in connection with the Mauricewood Pit Disaster Fund, it was stated that the roll of beneficiaries now stood at 25. In 1890, shortly after the accident, there were 148 recipients. The funds are in a satisfactory position. The liabilities are estimated at £8,280, while the funds in hand amount to £9,830.

Messrs. Lancaster and Sons recently offered by auction, at Barnsley, the Dearne and Dove Steelworks, Worsbro' Dale, now dismantled, and 16 dwelling houses adjoining, but in no case of the four lots was the reserve price reached.

Mr. George Pate has been appointed manager for the Carron Company in succession to the late Mr. Thomas Bamforth, J.P. Mr. Pate has been assistant manager for the past 11 years, and prior to that he was in charge of the commercial section of the company's pig iron and coal departments for eight years. Before joining the Carron Company's service Mr. Pate was in the employment of Messrs. Merry and Cuninghame, iron and coal masters, Glasgow, for 18 years.

Another shocking case of cruelty to a pit pony was brought before the notice of the Notts magistrates on December 14, when Albert Clarson, aged 16, pony driver, appeared at the Shire Hall, Nottingham, to answer a summons for cruelty. This was the second case in a week from Gedling pit, and Mr. F. Berryman, who prosecuted, stated that the youth was caught hitting a pony with a heavy iron locker. The pony was cut on the head, underneath the leather cap it was wearing as a protection, and obviously to cause such an injury very considerable force must must have been used. A dataller and one of the ostlers described the nature of the pony's injuries. "The unfortunate part of these cases," said the chairman (Mr. H. Heath), after the Bench had retired to consider their decision, "is that the punishment usually falls on the parents of the offenders. We feel that some representation should go from the Bench to the Home Office asking that in cases of this sort, where dastardly cruelty has taken place, we shall have power to deal with the boy himself, and give him a real good thrashing." A fine of three guineas, or a month's imprisonment, was inflicted.

We have received from Messrs. Bruce Peebles and Co. Limited, of Edinburgh, a handsome "desk companion" or blotting pad. With it is a useful reference book containing abridged specifications and prices of the firm's manufactures.

The Glamorgan Coal Company Limited, Llwynypia, are putting down a modern byo-product plant. This consists of 50 new coke ovens and a modern bye-product plant. In these new ovens the coal is placed in an airtight retort, the gases are drawn off by means of exhausters, cooled, washed by passing them through sulphuric acid, and are then returned to heat the coking retorts. The ovens are now so designed that only half of the gas is required to create the heat for coking, while half of it is available for other purposes. In connection with this plant the company has built a large laboratory.

The Arniston Coal Company, near Edinburgh, are to proceed with the installation of electric plant for pumping, haulage, etc. This has been rendered essential, owing to the developments underground. The company had £9,770 to divide for last year's working, after paying debenture interest, the dividend on preference shares, and setting aside £5,500 for depreciation. The ordinary shareholders will receive a dividend at the rate of 24s. per share, making with the interim dividend paid, 32s. per share for the year. Prospects are excellent and the company are building additional houses for employees.

The Law and Parliamentary Committee of Hackney Borough Council report having had under consideration the question of applying for powers to establish a municipal coal supply, but in the light of the report upon an enquiry recently held at Bradford on the same question, and which was unfavourable to the proposal, the committee have decided to take no action in the matter.

At a recent meeting of the Bristol Association of Engineers a paper was read by Mr. F. R. B. Watson on "The Production of Gas in the Suction Gas-producer, from Bituminous and Non-bituminous Fuels."

THE FREIGHT MARKET.

The outward freight market has been light in volume this week, the influence of the Christmas holidays being manifested in business circles. On the north-east coast, rates show some disposition to make up some portion of the leeway lost through the railway strike and the consequent heavy congestion of tonnage. At South Wales rates show little alteration, but the tendency is towards firmness. For January loading the Plate is firm, and other directions are steady. At the Clyde, business is fairly active at firm figures. The Humber is quiet, business having been "cleared up" until after Christmas. Homewards, a moderate amount of chartering has been done. The Black Sea, Azof and Danube are dull and easy. The Mediterranean and ore trades are steady. The Baltic is firm. America is well maintained. River Plate rates are upheld without difficulty.

Tyne to Aalborg, 1,700, 6s.; 2,000, 6s. 3d.; Antwerp, 3,000, 4s. 9d.; Barcelona, 6,000, 10s. 3d.; Calais, 1,350, 5s. 6d.; Halmstad, 1,000, 6s. 9d.; Las Palmas, 2,000, 10s.; Lisbon, 3,000, 7s. 3d.; London, 900, 5s. 3d.; 2,000, 4s. 6d.; 1,500, 3s. 9d.; Leghorn, 3,500, 10s. 3d.; Marseilles, 3,800, 9s. 6d.; 3,000, 9s. 6d., from Dunston; Portovesme, 1,000, 18s. 6d., coke; Port Said, 4,000, 10s., ppt.; Palermo, 3,400, 10s. 6d., 400, ppt.; Seville, 1,500, 9s. 6d., from Dunston; St. Nazaire, 1,500, 5s. 6d.; 3,000, 5s., from Dunston; Venice, 11s. 6d., 500; Zeebrugge, 2,500, 3s. 10½d.

Cardiff to Algiers, 11 fr., ppt.; 2,600, 10½ fr., end December; Alicante, 2,800, 9s.; Bahia Blanca, 3,600, 17s. 6d., January 1; Buenos Ayres, 2,700-2,900, 18s., December 30, option part cargo Rosario 19s. 6d., Parana 21s; Buenos Ayres, 3,300-3,800, 18s., December 28, option Rosario 18s. 6d., option Santa Fe 19s. 6d.; Carthagena, 2,800, 9s.; Calais, 1,600, 5s., ppt.; Genoa, 5,500, 9s.; 2,200, 10s. 6d., ppt.; 2,700, 10s. 6d., January 1; 3,600, 10s. 6d., December 29; 5,500, 9s. 9d., December 30; Gibraltar, 1,600, 9s., January 7; 1,100, 9s., January 1; Granville, 680, 6s.; Islands, 5,400, 9s. 6d., ppt.; La Pallice, 2,000, 6¾ fr., December 30; Leghorn, 3,100, 11s., 500, January 1; 3,100, 10s. 6d.; Las Palmas, 1,200, 10s.; Marseilles, 4,200, 11 fr., ppt.; Malta, 4,000, 8s. 6d., Admiralty, end December; Naples, 3,100, 11s., 350, January 1; 3,100, 10s. 6d.; Port Said, 5,000, 11s., ppt.; Pernambuco, 3,600, 17s. 6d., January 1; Passages, 3,800, 6s. 6d., January 3; River Plate, 6,200, 18s. 6d., reported; 4,700, 18s., January 15; 6,000, 18s.; 5,600, 17s. 9d., f.d., January 8-28; Rio de Janeiro, 5,000, 18s. 6d., fuel; Seville, 1,700, 8s., end December; Savona, 5,500, 9s.; 2,200, 10s. 6d., ppt.; Spezzia, 2,200, 10s. 6d., ppt.; Skien, 1,200, 7s. 6d., January; St. Nazaire, 2,900, 7½ fr., ppt.; West Coast South America and home, p.t., January; Wei-hai-wei, 6,300, 17s. 6d., Admiralty.

Partington to Alexandria, 11s. 6d., ppt.

Tees to Genoa, 2,800, 10s. 6d., pig iron.

Leith to Alexandria, 2,500, 10s.

Antwerp to Buenos Ayres, sail, 25s.; 25s., January-February; Drontheim, 850, 11s., coke; Boca, 25s., January-February.

Christiania to Jersey, 62,000 c.f. straw, 30s.

Swansea to Algiers, 4,000, 10 fr., December 31; Nice, 1,300, 10s. 3d., ppt.; Trouville, 530, 6s. 6d., ppt.; Genoa, Savona, Spezzia or Leghorn, 1,800, 10s. 6d.; Caen, 680, 6s. 3d.; Rouen, 1,180, 6s. 6d.; Calais, 1,300, 5s.; Genoa, 1,200, 10s., ppt.; Barcelona, 3,000, 9s. 9d., ppt.

Seaham Harbour to Goteburg, 1,300, 5s.

Idefjorden to Buenos Ayres, 4,300, 22s., ppt.; 6,200, 20s., ppt.

Forth to Hamburg, 2,000, 5s.

Wales to West Coast South America and home to United Kingdom-Continent, sail, about 47s. 6d. on the round.

Hull to Rotterdam, 2,500, 3s. 7½d.; Genoa, 4,000, 9s.; London, 1,000, 4s. 3d.; Cronstadt, seven steamers, 15,000, 5s. 10½d., May-September.

Newport to Buenos Ayres or La Plata, 18s., with 1s. 3d., December 27; Gibraltar, 1,600, 9s.; Algiers, 1,000, 11 fr., 500, spot.

Antwerp and Bremen to Buenos Ayres, 24s., December.

Barry to Callao, sail, 25s. 6d.

Wear to Norrkoping, 1,500, 7s.

Rotterdam to La Rochelle, 1,500, 5s. 3d., December 30-January 12; Malta, 4,000, 8s. 6d., January 3; Honfleur, 1,500, 6s. 9d., spot; Bordeaux, 3,400, 5s. 6d. coal, 6s. 3d. fuel, ppt.; Dieppe, 2,900, December 20; Rochefort, 1,500, 4s. 5d., December 30-January 20.

Garston to Alicante, 1,900, 8s., ppt.

Port Talbot to Dieppe, 820, 5s. 6d.

Immingham to Hamburg, 1,550, 4s.

East Coast coal port to Stockholm, 4,200, 6s.

King's Lynn to Caen, 670, 8s. 6d.

Burntisland to Tromsoe, 2,700, 6s. 6d.

Blyth to Plymouth, 700, 6s.; Libau, 2,500, 7s.

Homeward charters:—Novorossisk, 4,200, Denmark, about 18s. 3d., oilcake, ppt.; Nicolaieff, 1,953 net, berthed Hamburg, 9s. 9d., end December; 6,200, 10s., ppt.; West Australia, 2,559 net, United Kingdom-Continent, 40s., with options, February; Burmah, 8,800 max., 32s. 6d. c.c., less 6d. Holland, January-February; 3,174 net, Hamburg 31s. 3d., Holland 30s. 9d., clean rice, January-February; 1,981 net, Alexandria, 30s., January-February; 2,690 net, 31s. 3d. c.c., United Kingdom-Continent, January-February; 6,000, United Kingdom-Cont., 31s. 3d. c.c., with Adriatic options, January-February; 2,845 net, U.K.-Cont. 32s. 6d. c.c., 32s. Holland, January-February; Rangoon, 2,472 net, Alexandria and Liverpool, 31s., February; Calcutta, Rs. 5·8, Burmah, Rangoon, January; Northern Range, 30,000 qrs., 10 per cent., United Kingdom-Continent, p.p., 3s. 1½d., Hamburg 3s. 3d., Copenhagen 3s. 4½d., Havre 3s. 7½d., January; San Lorenzo, 4,500, 10 per cent., United Kingdom-Continent, 22s. 6d. c.c., less 6d., days, January 25; 4,850, 10 per cent., 22s. 6d. c.c., less 6d., option full cargo below bar 1s. less, February; 4,500, 10 per cent., 22s. 6d., c.c., less 6d., seed limited to 1,500 tons at 1s. extra, January-February 20; 4,700, 10 per cent., 23s. c.c., less 6d. January 20-February 20; 4,400, 10 per cent., 23s. c.c., less 6d., January-February; 6,400, 10 per cent., 23s. c.c., less 6d., option Bahia Blanca same rate, option Buenos Ayres or La Plata 1s. 6d. less, February 1-28; 4,400, 10 per cent., 23s. c.c., less 6d., January 25-February 25; Talanta Channel, 3,800, Emden, 7s. 3d., ppt.; Porman, 4,600, West Hartlepool, 6s. 9d., ppt.; Carthagena, 5,000, Herrenwieck, 11s., f.t., ppt.; Santander, 2,000, Oslebshausen, 6s. 6d., ppt.; Bilbao, 2,000, Middlesbrough, 6s. 3d., ppt.; 3,000, Cardiff, 5s., end December; 1,800, Rotterdam, 6s. 3d., with 600-600, ppt.; 3,100, 5s. 6d., early January; Taltal, sail, 25s., United Kingdom-Continent, January; Portland, Or., sail, 38s. 9d., United Kingdom-Continent, December; 37s. 9d., March, time charter, about 6s., one round trip, delivery Liverpool, redelivery United Kingdom-Continent; 10s., one trip, Northern States to Manchester; Huelva, 10s., Charleston, Tinto terms; 4,600, New York, Philadelphia or Baltimore, 10s. 1½d., Tinto terms, end December; 5,000, Northern States, 11s., f.d., end December; 4,600, Middlesbrough, 6s. 1½d., December; Halifax, 800 stds., West Britain or East Ireland, 7s. 6d., March; Poti, 3,400, Maryport, 14s. 6d., December-January; Nicolaieff or Odessa, 6,800, London or Rotterdam 10s., Weser 10s. 3d., Hamburg 10s. 6d., with 3d. less barley up to half cargo, January; Danube, 5,100, Rotterdam, 10s. 9d. on d.w., grain and or wood, in case of ice to load or complete at Sulina for Antwerp, or at 6d. less spot; Kustendje, 5,700, Antwerp or Rotterdam, about 9s. 3d., December-January; Buenos Ayres or La Plata, 6,300; 10 per cent., U.K.-Continent, 20s. c.c., less 6d., January; Greece, 3,300, Middlesbrough, 7s., spot; Villaricos, 3,800, Emden, 6s. 3d., December-January; Portland, Or., 25s., Japan, January; Madras Coast, 1,737 net, Trieste 34s., Fiume or Trieste and Fiume 34s. 6d., Marseilles 35s., with 500 tons unshelled 25s. extra, January-February; 2,695 net, Trieste, Marseilles and Havre, three ports, 36s., January-February; Buenos Ayres, 17s. 4½d., Rotterdam, spot; 5,300, 10 per cent., Antwerp, 18s. 6d., days, December 28; Bahia Blanca, 6,100, 10 per cent., United Kingdom-Continent, 21s. 6d., c.c., less 6d., option Genoa or Marseilles 2s. extra, days, January 1; Bona, 4,000, Servola, 7s. 6d., ppt.; Porman, 7s. 6d., Maryport, December-January; Gulf timber port, sail, 15¾ dols., Rio de Janeiro, February-March; New Caledonia, sail, 35s., United Kingdom-Continent, nickel ore; Otaru to United Kingdom-Continent, ex France, basis 37s. one port, timber, with options, free loading and free commission; Odessa or Novorossisk, 3,000, Denmark, 16s. 9d. one port, 17s. two ports, 17s. 3d. three ports, 3d. extra both loading, oil cake, early January; Kurrachee, 2,613 net, United Kingdom-Continent, ex France, 19s. one p.p., January-February; Buenos Ayres or La Plata, 4,500, 10 per cent., United Kingdom-Continent, 20s. 6d. c.c., less 6d., option part oats 1s. 6d. more, days, end December; Rosario, 3,800, 10 per cent., United Kingdom-Continent, 22s. 6d. c.c., less 6d., December-January; Seriphos, 5,400, Rotterdam, 7s., ppt.; Hornillo Bay, 3,800, Glasgow, 6s. 3d., early January; Baltimore, sail, 8 dols., San Francisco, coal; Pensacola, sail, 21 dols., Colastine or Santa Fé; time charter, European trade, 2,000, £775, five months; 2,200, £685, nine months; 3,600, £1,085.

THE TIN-PLATE TRADE

Liverpool.

There is no improvement to report on the week. Possibly the new year will see a turn for the better. There must be a good deal of business being held back, and if makers' statements, that quotations cannot be lowered if a profit is to be made at all, are correct, there will probably be a good many mills closing down for Christmas who will not trouble to restart until matters improve. Quotations are nominally:—Cokes: I C 14 × 20 (112 sh. 108 lb.), 15s. to 15s. 1½d. per box; I C 28 × 20 (112 sh. 216 lb.), 30s. to 30s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 15s. 4½d. to 15s. 6d. per box; I C 14 × 18¾ (124 sh. 110 lb.), 15s. 3d. to 15s. 6d. per box; I C 14 × 19½ (120 sh. 110 lb.), 15s. 3d. to 15s. 6d. per box; I C 20 × 10 (225 sh. 156 lb.), 22s. to 22s. 6d. per box; I C squares and odd sizes, 15s. 3d. to 15s. 6d. basis. Ternes are quiet at 26s. for I C 28 × 20, and charcoal tins are quoted 17s. 6d. basis and upwards according to tinning. Coke wasters are in quiet request. Quotations:—C W 14 × 20, 14s. to 14s. 1½d. per box; C W 28 × 20, 28s. to 28s. 1½d. per box; C W 14 × 18¾, 14s. per box; C W 14 × 19½, 14s. 4½d. per box; C W 20 × 10, 19s. 9d. to 20s. per box—all f.o.b. Wales, less 4 per cent.

LABOUR IN 1911.*

persons employed at mines and the Quarries Act in the United of Man during the year 1911 was 96,238 were employed in or about about quarries. Of the 1,096,238 ines 881,002 worked underground, ound; of the latter, 6,460 were ith the preceding year there is an s working underground, and an and of 56 females working above l increase of 18,155 persons. The vas 17,195, at iron mines 582, and 378 in the number of persons

eral summary of the number of ach of the three classes of mines.

Coal Mines.

g to coalmines have been arranged pal coalfields (*see* Table B).

at there has been an increase of oalmines at work, and an increase ons employed. The increase has ss of the Northern, South Wales, ds. There is an increase of 58 in employed on the surface at coal- jority of whom are employed in re. The Yorkshire, &c., coalfield, ding of York and the counties of m, employs nearly one-quarter of opulation of the United Kingdom. he persons employed at coalmines d one-fifth on the surface.

Employed at all Mines under the Coal and Metalliferous Mines Regulation Acts, classified according to Sex.

	No. of mines at work.	Under-ground.	Above ground.		Total under and above ground.	Per-centage of total number.	Comparison of total number employed with that of preceding year.
		Males.	Males.	Females.			
. .	3,192	849,421	194,242	6,234	1,049,897	95·8	+ 17,195
.	138	14,847	4,224	3	19,074	1·7	+ 582
.	647	16,734	10,310	223	27,267	2·5	+ 378
...	3,977	881,002	208,776	6,460	1,096,238	100·0	+ 18,155
.	3,960	865,485	206,194	6,404	1,078,083	100·0	+ 35,648

—Persons Employed at Coalmines, Classified According to the Coalfields.

Coalfield.	No. of mines at work.	Under ground.	Above ground.		Total under and above ground.	Comparison with preceding year.
		Males.	Males.	Females.		
	468	106,248	22,239	2,827	131,314	— 1
l	420	174,506	42,147	80	216,733	+ 4,390
alfield	687	195,221	49,890	—	245,111	+ 3,344
heshire coalfield	372	81,961	19,378	2,620	103,959	— 700
s	404	68,977	20,055	128	89,160	+ 1,621
alfields	125	20,944	5,225	422	26,591	+ 569
field	51	12,688	2,734	2	15,424	+ 253
field	647	188,287	32,373	155	220,815	+ 7,654
	18	589	201	—	790	+ 65
	3,192	849,421	194,242	6,234	1,049,897	+ 17,195
	3,163	834,751	191,775	6,176	1,032,702	+ 34,994

Ironmines.

e shows the number of persons (exclusive of open workings for ording to country:—

dsr und.	Above ground.	Total under & above ground.	Comparison with preceding year.
164	3,839	17,003	+ 349
127	48	175	— 8
,384	304	1,688	+ 253
172	35	207	— 13
—	1	1	+ 1
,847	4,227	19,074	+ 582
,346	4,146	18,492	+ 131

Other Mines.

the number of persons employed ified according to country:—

Under ground.	Above ground.	Total under & above ground.	Comparison with preceding year.
8,322	6,243	14,565	+ 163
2,711	2,735	5,446	— 67
5,153	1,164	6,317	+ 218
345	262	607	+ 148
203	129	332	— 84
6,734	10,533	27,267	+ 378
6,388	10,501	26,889	+ 523

he underground workers to the d, which at coalmines is 80·9 per cent. and at ironmines 77·8, drops at "other mines" to 61·4. This, as pointed out in previous years, is due to the number of persons employed in "dressing" the metallic ores and slate. The proportion of young persons (*i.e.*, under 16) employed underground, which at coalmines is 5·2, falls at ironmines to 1·7, and at "other mines" to 1·4.

Quarries.

According to the returns received by the inspectors, 82,863 persons were employed during 1911 in and about the quarries of the United Kingdom which fall under the Quarries Act, 1894. Of this total, 52,053 persons worked inside the actual pits, holes, or excavations; whilst 30,810, including 36 females, were employed at factories and workshops outside. Compared with 1910 the figures show decreases of 2,355 and 619 persons employed inside and outside quarries respectively.

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he General Report on Mines and by Mr R. A. S. Redmayne, H.M

MINE FIRES.*

By George S. Rice.

This paper summarises many important topics that concern the lessening of risks to life and property from mine fires, and reviews construction, equipment, and methods relating to fire protection. Various matters that are briefly mentioned will be discussed in detail in succeeding reports of the Bureau.

Fires in Surface Buildings.

In the Pennsylvania anthracite region it used to be customary to place the immense breaker building immediately over the shaft. Before separate distant exits were provided, such an arrangement was a fearful menace, for if this structure caught fire all chance for escape of men underground might have been shut off. Of late years it has been the rule, in designing new plants, to erect the breaker at a distance from the shaft and some of the more recent structures are either steel or concrete. In the bituminous mining districts, although large wooden head-frames with adjacent tipples and screen buildings are still widely employed, in many of the newer structures steel has been substituted for wood. However, it is probable that over 90 per cent. of the present structures are built of wood. Where wood must be used, it is very much better that only a skeleton or open-framed structure be erected, and where wood is largely used safety is increased if emergency steel trapdoors are placed at the top of the shaft and arranged in such a way that they can be closed down from a safe distance if a fire breaks out. In recent years it has become the custom to build the fan casings and engine houses of non-combustible material. All blowing fans should be built of such material. If fan structures are built of wood, it is best to have steel trapdoors ready quickly to cover the air shaft when a fire starts in the fan. At a coalmine in northern Illinois, the shaft and probably the mine were saved by such doors.

All pipe fittings, including hose connections, for fighting mine fires should have standard iron-pipe threads. This was brought to the attention of the engineers of the Bureau at one large mine fire, where there was a serious delay because the fire-hose connections could not be attached to the mine pipe lines. Duplicates of all parts should be on hand.

A valuable device for fighting fire is that in use in the fire-fighting and training station at Beuthen, Upper Silesia, Germany. This is a special swing connection with gate valve attached, which can be clamped anywhere on a pipe. By using a ratchet drill through the open valve, a hole can be drilled in a main that contains water under pressure. When the hole is finished the drill is withdrawn and the valve closed until the hose connection has been made. All this can be done in a few minutes.

The hose and the nozzles supplied in the past have often been too large for quick use. For mines, particularly, it seems best to select hose that is small enough to be handled under pressure by one man. Informal tests made by the Illinois Mining Commission, at the Chicago laboratory of the National Fire Underwriters' Association (January 29, 1910), and at the Bureau of Mines testing station at Pittsburg, indicate that the best size for one man to handle easily is 1½ in., with a ½ in. to ¾ in. cone nozzle. It was also indicated in these tests that one man cannot readily handle such a hose and nozzle in a narrow place, such as a mine entry or heading, when the water pressure reaches above 40 lb. per square inch, and only with difficulty when the pressure is 50 lb. or over. In the Chicago tests the trajectories of jets from a smooth cone nozzle ½ in. in diameter were measured for pressures of less than 40 lb. at the hydrant. The length of the cotton hose tested was 50 ft., its diameter 1½ in. The nozzle was held so that the orifice was 12 in. above the floor, and the top of the water-jet trajectory in each case was made tangential to a plane 6 ft. above the floor. The measurements given below represent the horizontal distances from the nozzle to the farthest point at which the stream struck the floor.

Lengths of Trajectories of Streams under Different Pressures.

Pressure per square inch. Lb.	Distances to point of tangency. Ft.	Horizontal length of trajectory.* Ft.
10	16	32
15	20	40
20	23½	47
25	27	53
30	29	58
35	32½	63
40	34	68

* Average of distances to points where the stream struck the floor.

A series of tests in the experimental mine near Bruceton, Pa., was made on May 2 and 3, 1912, with 1½ in. rubber hose, 50 ft. long, nozzles of different sizes and varying water pressure. The five nozzles used in the tests were ordinary cone nozzles having the following diameters of orifice:—$\frac{7}{16}$, ½, $\frac{9}{16}$, ⅝, and ¾ inch. The $\frac{7}{16}$, ½, and ⅝ inch nozzles were of the ordinary long-cone type; the others, the $\frac{9}{16}$ and ¾ inch nozzles, were short-cone nozzles, the end piece having been unscrewed. The ½ in. nozzle threw the water farthest; the $\frac{9}{16}$ in. was next, and then the $\frac{7}{16}$ in. The larger nozzles allowed a greater quantity of water to pass, but owing to the frictional resistance in the hose, caused by increased velocity in the hose, the distance which the water was projected was not so great. It would appear from these tests that the ½ or $\frac{9}{16}$ inch nozzle is best adapted for use in connection with 1½ in. hose. The distance from the nozzle to the point of tangency at the roof is the effective fire-fighting distance when the fire is in the roof or roof timbers.

Fires Underground.

If possible, brick or concrete linings, or "steel timbers," with as little wood as possible, should be used at shaft bottoms or landings. There should always be a water main large enough to supply several streams of water near the shaft; this main should not be less than 3 in. in diameter. The water pressure is of great importance. The informal experiments made at the Chicago laboratory of the National Fire Underwriters' Association proved that one man unaided cannot control easily a 1½ in. hose with a smooth cone nozzle of ½ in. diameter when the pressure is from 40 to 50 pounds; on the other hand, to throw the stream far enough to be of value, the pressure must be not less than 20 lb. per square inch (46 ft. head). A pressure of 20 lb. is easy to obtain; the usual difficulty in shaft mines is to control or keep the pressure down to 50 lb. This control can be had by an automatic reducing valve at the foot of the shaft-column pipe, but such a device is open to the objection that it is liable to get out of order. Another method of controlling high pressures is to open very slowly the valve at the hose attachment. Unfortunately, in the haste of the moment, the valve is liable to be opened too far, and the hose becomes uncontrollable. A third plan, more expensive than the others but more certain in deep shafts, is to place a tank or sump 90 to 100 feet from the bottom of the shaft, thus obtaining the desired pressure of about 40 lb. The water-supply pipe from the surface should discharge into the tank, in which a float should automatically close or open a valve in the column pipe. Obviously, for winter use such a tank must be placed in an upcast or in a neutral shaft to avoid freezing.

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* From Technical Paper 24, United States Bureau of Mines.

Water taps not more than 100 ft. apart should be provided along the landings or main bottoms. The water pipe and taps, if not extended throughout the mine, should be in all the passageways in the vicinity of the shaft or shafts, and along the main roadways for several hundred yards. As previously stated, the water main should be not less than 3 in and the branch lines not less than 2 in. in diameter. In a coalmine the taps can be used in wetting down coaldust. Reels of 50-ft. lengths of 1½-in. hose with nozzles attached should be placed in recesses or in portable boxes at intervals of about 200 yards, and there should be at least three such reels at easily accessible points in the immediate vicinity of the shaft.

Where shafts or shaft bottoms are lined with wood and are connected by a cross passage, it is important that this passage have at least three doors, preferably steel, hung in brick or concrete frames. Such doors prevent fire in or near one shaft short-circuiting to the other shaft.

All motor, generator, or transformer rooms should be arched and lined with a non-combustible material, such as brick or concrete, and should be floored with cement. The entrances should have fire doors, so that serious fires can be shut in if necessary. A supply of sand should be kept in buckets for use in putting out such fires.

Wherever feasible, car oiling should be done on the surface. If oiling on the surface is not practical, the oil should be kept in a fireproof room with cemented floor and an emergency fire door of steel plate. If the oil requires heating, this should be done by hot-water coils; if steam is used the pipes should not be in direct contact with the oil. A drip pan should be used and frequently emptied.

Fires in stables are especially dangerous. Stables should not be lined with wood; they should be arched, and the partitions and stalls should be made of iron or concrete. Supplies of baled hay and straw should be brought into the mine in small quantities, and then only when wet or covered with wet tarpaulin. The hay or straw should be stored in a separate enclosure behind locked doors or grating. Straw, hay, and other material that will burn should be taken into the mine on that shift which has the smallest number of men. Each stable exit should have an emergency fire door, or doors, of steel plate hung in a concrete or masonry doorway.

Fires in the interior of coalmines may be grouped, for discussion, by locality, as follows: (1) In gangways or entries; (2) at the face or "in the solid"; (3) in pillar workings; (4) in abandoned workings.

Where the customary room-and-pillar system is employed in mines liable to gob fires, if the pillars cannot be quickly drawn, it is generally best to seal off promptly before the gob heats. A concrete or brick wall, coated with cement, should be used, a pipe with a gate valve being put through it near the top, so that temperature readings and samples of the gases may be taken. There is serious objection to sealing off rooms when the mine produces methane in any quantity, because a large body of standing gas, even behind a strong stopping, is a constant menace. In such a mine the pillar-and-stall method of mining, or some form of longwall, should be employed.

Fires resulting from explosions and general methods of recovery of burning mines will be discussed in detail in subsequent publications of the Bureau of Mines.

Fighting Mine Fires.

To fight mine fires the possession of proper appliances is necessary, of course, but even more necessary is the organisation of a fire-fighting force and the systematic arrangement of the appliances.

Two things are of great importance in fighting mine fires:—First: A system of patrol should be established. The foreman and assistants should so divide or district the mine that every district is readily patrolled or examined. Second: Fire-fighting brigades should be formed. Important help would be given to fire-protection organisation by providing each fire division with special fire-fighting maps, a general map of the mine, and separate maps of each fire division. These maps should not be too large for easy inspection, each one being not over 2 by 3 feet. The general fire-fighting map should be only a skeleton map of the mine showing the shafts and entries, and levels or headings, with the pipe lines and taps or hydrants, pumps, sumps, fire signals, and the ventilating system, including overcasts and doors, as in fighting some fires a change in the direction of the ventilating current might be essential. The division maps should show the details of the mine workings within each division, and, in addition, all details of fire-fighting apparatus. These division maps may be sun prints on cloth—black lines on a white background—printed from the regular mine-map tracing. After the prints of each division have been made, the position of the fire apparatus should be shown on the maps with waterproof red ink. Each foreman in charge of a squad should be supplied with a set of maps which should be kept at the division headquarters of his district.

As has been pointed out already, for efficient organisation the mine should be divided into fire districts, which, so far as possible, should be the natural divisions of the mine for ventilation and inspection. Each division should have headquarters, where the fire-fighting appliances may be kept. These headquarters should be provided with a telephone, and the author proposes that this place should be made into a refuge chamber, to be used whenever the exits of the mine or district are shut off by falls, by fires, or by gases.

Telephone communication to the outside would be of great value. A refuge chamber can be made out of an ordinary mine room or chamber by timbering it securely, walling up the crosscuts, and putting in double or triple doors at the mouth. Except when the emergency arises, these doors must be left open and a line brattice led into the room from the gangway or entry for ventilation; otherwise, a crosscut must be made for this purpose and must be provided with double or triple doors. To increase the capacity of the chamber, there are two methods: To keep compressed oxygen on hand in tanks; or, better, to have a direct drill-hole to the surface. Air could be forced down such a drill-hole by fan or compressor; or there could be an air pump at the foot of the drill-hole to be operated by the entombed men. Food and water could be sent down if necessary; but such a chamber can be easily stocked with water and canned provisions, as well as medical supplies. The location of the station or refuge chamber would vary with each district, but generally, when first started, would be near the head of the workings on the intake air-current; as the headings of the district advanced and new rooms turned, it would be necessary in time to shift the station.

(To be continued).

NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Heavy Increase in Coal Charges Proposed at Cardiff: Determined Opposition Foreshadowed—Where the Difficulty Lies as to Improved Facilities—The Old Idea of a Harbour Trust—Liability to Pay Damages for Subsidences—Merthyr Corporation and Colliery Owners—Likelihood of Colliery Decline—Curious Case under the Compensation Act.

Information was forthcoming on Saturday as to the increase of tonnage rates, which the Cardiff Railway Company (owners of the docks) wish to legalise by means of the Bill they will promote next session. The new maximum, under each heading, marks a considerable advance. Vessels above 400 tons trading to ports between Cape Finisterre and the North Cape would have the rate increased from 5d. to 8d. per ton; to the Mediterranean and ports south of Finisterre, from 7d. to 10d.; for other ports, from 9d. to 1s. 3d. For the use of tips and appliances the company seek power to charge what they please, up to 4d. per ton. Other serious changes are also proposed.

During the session of this year, the company promoted a similar Bill, but it was rejected, and the noteworthy feature of the new proposals is that while the heavy increases on coal traffic are again sought, the company have refrained from their previous endeavour to impose heavier charges on grain and flour, as to which they had to encounter very determined opposition last May. Their argument is that rates now prevalent were fixed nearly 40 years ago; that more costly appliances are now in use; that they give service by night as well as by day; that the labour charges (with other allied conditions) are much heavier; and that the return upon capital invested is altogether inadequate.

By far the most serious feature of the Bill is that it cannot be regarded as applying solely to the Cardiff Company's property. Inevitably, if that authority secures and exercises power to impose heavier charges, other local undertakings will follow suit. It is not a though any better facilities are offered in exchange fo higher rates. These new maximum amounts, s enormously raised, are without *quid pro quo*, and ver strong opposition is to be expected, for the trader insistently demand better facilities, whilst the dock authorities propose only heavier costs.

With regard to the lack of shipping facilities for coal, it is significant that Cardiff does not stand apart from Barry and Swansea. These are involved, and there is a determined effort being made to secure improvements. It is not alone in the docks that difficulty is experienced. The matter is one also for the railway companies, owing to the lack of sufficient siding accommodation. Both the railway and the dock owners retort upon the traders in two points—(1) that it is no part of their business to afford siding storage, which is practically warehouse room; and further, and more important, that it is the practice of mixing coals which is responsible for delays. But at the back of the whole trouble is the need for heavier outlay of capital, and the experiences of the dock companies have not been such as to encourage further investment.

From an outside quarter, the call is now made that the traders shall agree to a fractional increase in rates in order to justify the companies in making further outlay on the railways in sidings, and at the docks in tips, &c. But the whole matter widens out, and it would seem to be not so simple a matter as it at first sight appeared. There is the lack of effective control which is certain to exist at Cardiff and Barry because of the preference to large shipping firms in allocation of tips, and there is the "nursing" of tips by those fortunate enough to be in possession, and desiring to to retain them for the service of craft due to arrive.

Whether the committee which the Cardiff Chamber of Commerce appointed last week will be able, from its conference with railway and dock authorities, to bring about any reform, is very doubtful—the capital commitments are already so heavy and the cost of new tips is great.

The old suggestion of a harbour trust for Cardiff is being revived—a suggestion that has been made from time to time for half a century past—and the case of London is referred to as justifying the pooling of interests and the establishment of a representative body in which the traders, as such, would exercise due influence. But the great difficulty is that Cardiff, Penarth and Barry, apart from the timber trade, depend almost entirely upon coal, and therefore local authorities hesitate to take up the capital responsibilities now resting upon private investors. Certainly, such responsibilities would not be assumed unless (with transference of the docks) there were made also a very large transfer of land, so that the new authority might be able to offer favourable terms and bring some of the large industrial establishments to the coast, thereby ensuring greater prosperity, with a higher degree of permanence to their localities.

Risca Council (Monmouthshire) have passed a resolution which raises the question of liability for subsidences. At its meeting last week, a resolution was carried instructing the clerk to prepare a case showing damage to property of the Council (gas and water mains, &c.), as well as to schools, houses, &c., through working of minerals; and to get facts as to any local authority or ratepayers having recovered damages from a colliery company or landowner on account of subsidence. Further action was suggested with the object of "united action being taken by local authorities to promote legislation which will give compensation for such damage.

The Coalowners' Association in this district (of which Mr. Stuart is now chairman) controls four-fifths of the output of the coalfield—approximately forty millions of tons out of the fifty millions.

During an enquiry into a scheme of housing promoted by the Merthyr Corporation the Local Government Board inspector has had submitted to him some interesting evidence as to the position of the great coal and iron industry of Guest, Keen and Co., Dowlais and Cyfarthfa. Mr. Howell R. Jones, colliery agent to the firm, distinguished between the older Guest-Keen and the Crawshay properties, both of which are now under the one company. As to the former, he said that they employed 11,000 to 12,000 persons, and had property in the borough of £63,939 gross, and £29,478 ratable value whilst in the latter there were about 4,000 persons employed, with £55,827 gross value and £16,463 ratable

In reply to the inspector, who asked whether ensive machinery had not been installed recently, he that two furnaces were built about three years ago, of which was working. A very heavy outlay had n entailed, and the increase in rates had been a serious ter. Although the company had never previously osed a housing scheme, they felt the position had ome serious. Indeed, if the rates continued to rease as they had done during the past couple of rs it would induce the company to consider the isability of removing to the seaboard, for the ghbourhood was declining. Everybody knew that lower coalseams were becoming exhausted, and lieries were being stopped, whilst rates were going They would have to consider increasing their works the seaboard (the company own the Cardiff Dowlais uworks, adjoining the Cardiff docks). These might abandonment of collieries which would have a much e a much longer life if it were not for the rate dens. "What I mean is, that a colliery perhaps ald be stopped three or four years earlier than it erwise would. . . . . I have no hesitation in saying t certain important collieries in the borough will not at work seven or eight years hence."

The borough, it was stated, had reached its zenith. Cwm pit, which had employed about 800 men, was pped two years ago owing to the coal having been ked out.

Mr. N. F. Hankey, managing director at the Hill's mouth Colliery, employing 2,800 men and boys. having a ratable value of over £9,000, said he did think there was likely to be an increase in the lation of the borough; and since he had been in district they had abandoned the Abercanaid Pit. the Saron level had become exhausted. Mr. Joseph agent to the Ocean Coal Company, whose ratable is £11,187, said that he considered the scheme lvised.

A. curious case under the Compensation Act has before the Tredegar Court, the question being her ulceration of the nose had been caused by ust. Plaintiff met with an accident when employed imbering; and he was put to light work at the n. Here, as he alleged, the coaldust affected his h, the mucous membrane being affected. One al witness said the man suffered from nasal rh, the coaldust producing ulceration of the brane. Another doctor, called by defendants nney Iron and Coal Company) deposed that there no ulceration when he examined the man; and whatever the man suffered from, it was not due aldust. Witness had made a careful study of es due to occupations, but had never known of tion of the nose being set up by coaldust. The was specially adapted for dealing with dust. The held that the man was incapacitated from work. h able to work in a place where there was no ust; and made an award of 10s. 6d. a week to uber 1, and 2s. 6d. a week afterwards till he ed work.

urther discussion with reference to the cost of g school children during the strike, has taken at Pontypool at a meeting of the Eastern Valleys' of school managers. The Council had served s upon parents for repayment; and it was stated n one district 890 claims were served, but only d. in money had been collected.

ckmen's Inspectors in Metelliferous Mines.—Before oyal Commission on Metalliferous Mines and Quarries 16th inst., evidence was given by Mr. H. P. Marriott, lting engineer to the Central Mining Corporation in n. Mr. Marriott said he could not speak too strongly st the proposal to extend to metalliferous mines the of the workmen to choose inspectors from their er in special cases. It opened up a loophole whereby orkmen could interfere far too much with the manage- and he did not think the workmen inspectors would be npetent judges as the manager. Mr. A. G. Charleton, president of the Institution of Mining and Metallurgy, that he considered it a very bad principle to allow ppointment of working-men inspectors. In Australia und this gave too much scope to agitators, who formed es among the men in opposition to the managers. At ame time he would allow all reasonable facilities to the for bringing any point of danger to the notice of the gement and the Government inspectors, and he would the penalties more severe when an accident occurred a warning to the management from the men. Mine gers should not be bound by too hard and fast iron- d rules, but should be permitted a certain amount of ude for personal judgment.

CONTINENTAL MINING NOTES.

Belgium.

The following shows the exports and imports of fue during the first eleven months of the present year:—

	Imports.		Exports.	
	1911. Tons.	1912. Tons.	1911. Tons.	1912. Tons.
Coal	6,640,899	7,409,763	4,782,930	4,652,783
Coke	608,439	860,784	937,742	923,206
Briquettes	348,815	396,780	476,703	578,752

Exports in November included 424,693 tons of coal, 86,671 tons of coke, and 46,670 tons of briquettes. Imports in the same month were as follow:—Coal, 722,798 tons; coke, 87,234 tons; briquettes, 26,176 tons.

France.

In his report on the Naval Budget, M. Painlevé draws attention to the shortage of the supply of coal for naval purposes in the arsenals, this being due, he alleges, to the absence of any systematic provision of funds for the purpose. The consumption has increased considerably in recent years. In 1911 the annual consumption of briquettes in the five ports and Bizerta was estimated at about 213,000 tons, whereas in 1912 the total estimate had risen to 553,000 tons, whilst 300,000 tons were allocated for the use of the fleet. It is proposed to provide next year 404,000 tons of ordinary briquettes, and to obtain sanction for the additional expenditure necessitated. The following stocks will be laid down.—120,000 tons at Toulon and Brest, 75,000 tons at Cherbourg, 59,000 tons at Bizerta, 15,000 tons at Rochefort, and 12,000 tons at Lorient. Owing to the high price of briquettes (34 fr. 70 c. at Toulon in 1912, as against 30 fr. 50 c. in 1911), it is intended to use increased quantities of coal. In 1911, 25,000 tons were purchased, and in the present year contracts were placed, for delivery at Toulon, for 65,000 tons, of which 60,000 tons were Cardiff steam coals and 5,000 tons American. It is stated in the Budget report that the former have given very satisfactory results. Owing to the liability to deterioration in storage, it is impossible, however, to replace the use of briquettes entirely by coal.

Germany.

Coal Market in Upper Silesia.—The demand continues strong, but cannot be fully satisfied, owing to the shortage of railway wagons; and, as there is also the usual scarcity of labour at this time of year, it is not surprising that the pits are greatly in arrear with deliveries. In fact, the deliveries during November were 42,000 tons behind those of last year, instead of showing a considerable advance, as they would have done in the ordinary course of things. Consumers are suffering great inconvenience, as the supplies laid in by them and by the dealers do not last very long; and even in the home market, industrial users in particular are complaining of insufficient supplies. In these circumstances it is not surprising that consumers in the locality are urging that so long as these conditions prevail, the pits should stop delivering to outside districts and abroad—a measure which, of course, cannot be adopted, the retention of those markets being of importance. As it is, there is already a danger that the capital, which is a large consumer of Upper Silesian coals, will increase its purchases of English coals; and, in addition, consumers in Austria-Hungary have to be studied. In detail the distribution shows no change, all kinds of fuel being in good request—industrial and coking coals most of all. The same conditions prevail in the coke market, the demand being active, but difficult to satisfy on account of traffic conditions.

State Purchase of Coalfields in Saxony.—The State authorities in Saxony are reported to intend buying up all the meadowland in Pleissenau on account of the extensive underlying deposits of lignite. At present the State owns sufficient lignite properties to supply its railways with fuel for 500 years.

Fuel Movements in Ruhr Harbours, November.—The total consignments of fuel by rail amounted to: Ruhrort 675,367 tons, Duisburg 173,278 tons, Hochfeld 45,329 tons, or 893,974 tons in all. Shipments outward. To Coblenz and ports higher up the river 534,636 tons, to places below Coblenz 20,634 tons, to Holland 355,108 tons, to Belgium 247,195 tons, to France 27,375 tons, to other destinations 19,542 tons. Total shipments outward from: Ruhrort 741,226 tons, Duisburg 156,016 tons, Hochfeld 44,854 tons, Rheinpreussen 100,136 tons, Schwelgern 89,820 tons, Walsum 72,436 tons; aggregate, 1,204,490 tons.

Ruhr Coal Market.—There is no essential change in the market situation, the characteristic note being the scarcity of railway wagons which still continues in almost undiminished intensity and naturally forms a great impediment to business. The state of business is in itself satisfactory, specifications for delivery being extensive; and, if traffic conditions were normal, the volume of trade would beat all records. As it is, large quantities of fuel which could be disposed of at once, have to be stocked. The iron industry is still the largest customer, and is complaining of the insufficiency of supplies. Coking coals cannot be delivered to the desired extent—a highly disagreeable circumstance for such of the ironworks as have not their own sources of fuel. In South Germany the demand has increased, especially for house coal; but, here again, the shortage of wagons is delaying delivery. This is the more serious, because both dealers' and consumers' stocks are low. All the arrivals of water-borne coals pass into consumption at once. The export trade maintains a satisfactory level, so far as traffic conditions permit. English coal has latterly been making fresh headway in Holland, and also in Northern Germany; and unless there is an early change in traffic conditions, Ruhr coals are liable to be shut out of the market in many instances. The coke market remains the same, blastfurnace and foundry coke being naturally in greatest demand, though other kinds are also attracting interest.

Coal Market in South Germany.—The tension in this market is increasing, for though there is some improvement in the supply of railway wagons in the Ruhr district, the shipments coming forward are entirely insufficient. The result is that the increasingly pressing demand has to be largely met from stock, so that the reserves are shrinking, and in some kinds are practically exhausted, consumers being compelled to take substitutes. Except anthracite, the stocks of house coal are almost *nil*; and the available supplies of broken coke no longer suffice to meet all requirements, which in many cases are far in excess of contract specifications. This state of affairs is causing great uneasiness, and the more so because the possibility of the river being obstructed by ice has to be taken into consideration at this time of year. These circumstances, taken in conjunction with the probability of a strike among the Saar miners, has caused great excitement among consumers, and enquiries for available parcels, in order to keep works going in the event of a strike, are becoming urgent. The tone of the market is therefore firm, and prices are advancing considerably, especially since freights have been going up of late.

Russia.

The Commission appointed by the Kharkoff Conference to settle the prospective output arrangements for 1913 estimate that the production of the Donets coalfield will amount to 1,336 million poods of coal and 276 million poods of anthracite. The total home consumption in the same year is estimated at 1,632 million poods. Whatever deficit there may be will be made up out of stocks, whilst 10 million poods of coal were bought abroad in 1912 and 40 millions have been contracted for delivery during 1913.

THE VENTILATION OF THE BENTLEY COLLIERY.

Home Office Prosecution.

The Doncaster West Riding magistrates were on Friday last again occupied for five hours in hearing the summonses issued by Mr. T. H. Mottram, his Majesty's chief inspector of mines for the Yorkshire and North Midland district, at the instance of the Home Office, against Mr. J. W. Fryar and Mr. R. Clive, agent and manager respectively of the Bentley Colliery (Messrs. Barber Walker and Co., of Nottingham), at the time of the alleged offences. The summonses related to three dates in July upon which it was alleged the ventilation of the pit was not adequate, and were taken out under the Coal Mines Act of 1911.* The Home Office were again represented by Mr. W. M. Gichard, of Rotherham, and the colliery company by Mr. Norman Craig, K.C., M.P., and Mr. H. T. Waddy, instructed by Mr. Robert Barber, solicitor, of Nottingham. The evidence given on Friday was principally of a technical character. In his speech for the defence, Mr. Craig made a spirited attack upon the Home Office, and strongly criticised the conduct of the case. In the end the Bench reserved their decision, which they will give in a fortnight's time.

Upon the resumption of the case, Mr. Thos. Hy. Bailey, mining expert, of Birmingham, re-entered the box, and his cross-examination was continued by Mr. Gichard. He said he did not consider accumulations of gas in the waste a danger but rather a safeguard in pits subject to gob fires; 5 per cent. of gas would not explode, and was harmless.

Mr. Gichard: Do you consider it fit for men to work in?—No; because it is too near the explosive point.

Witness added: Mr. Hudspeth, the inspector, he thought, must have been wholly mistaken about there being 6 per cent. of gas in that sheet he spoke of. No such percentage could exist in the current of air passing along that face. On July 25 he would have gone through Bentley pit with a naked light remembering that there were accumulations of gas.

Mr. J. W. Fryar, one of the defendants, stated it was not true the late Mr. Pickering made a complaint to him about the ventilation. He never heard of a promise to put in an air crossing; he thought if anything was said about that, it would be a promise to take one out. Mr. Pickering was a very experienced mines inspector. The workings were so near the shaft pillar there was no necessity for an air crossing. Throughout the whole time they had discussed every condition at Bentley with the late Mr. Pickering, and when they engaged Mr. Bailey to make a report Mr.

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* See *Colliery Guardian*, November 22, 1912, page 1042, December 6, 1912, page 1145, and December 20, 1912, page 1246.

Pickering was at the meetings they had at the time the investigations were first set on foot. Witness said he sent Mr. Pickering Mr. Bailey's report on the whole ventilation of the colliery, and the last letter he received from Mr. Pickering was one thanking him for the report and returning it.

Witness, asked as to Mr. Hudspeth's evidence, said he considered it showed distinct exaggeration. The occurrence of 2½ per cent. of gas close up to the airway was not at all exceptional in a gassy mine. The difference made in the ventilation since Mr. Hudspeth's visit was exceedingly small, and the new split did not affect the area in question. There had been nothing in the evidence of the prosecution to suggest to him as a practical mining man that there was the slightest danger on July 25. He did not think an accumulation of 6 per cent. of gas against a sheet near the roof, as described by Mr. Hudspeth, was possible in the absence of any feeder or blower. The system of ventilation was always being considered and continually altered as the mine developed.

Mr. Craig: The Home Office correspondence has been conducted by Mr. Redmayne, the Chief Inspector?—Yes.

Has Mr. Redmayne, so far as you know, ever been at the working face of a mine in the Barnsley seam?—So far as I know he has not—certainly not at Bentley, and I do not know that he has seen the workings of the Barnsley bed in this new district. Witness said that when Mr. Poole, the inspector, was there in January of 1911 there was a certain system of ventilation in force. A fortnight later they had a very serious fire at an air crossing in the same district, and had to take all the men out of the pit until the fire was out. Mr. Wilson visited the colliery, and immediately after they set to work and took the air crossing out.

Mr. Gichard: Would you care to go about Bentley pit with a naked light with the conditions as they were on July 25?—I certainly would not go about the pit with a naked light. There are many things one would not do in ordinary life which may be perfectly safe. He knew a man named England who worked at the colliery, but was unaware he was discharged because he took men out of the pit and would not allow them to work in gas. His impression was that the man in question left of his own accord to take up a better position at another colliery. It was possible men might have been affected by gas in the colliery, but this was only in dealing with gob fires, and he had never heard of men being affected by methane in the working places.

Quoting from the correspondence with the Home Office, Mr. Gichard read a letter from Mr. Redmayne alluding to the danger of leaving the top soft coal unworked and of building coal into the gob packs.

"The whole of that," replied Mr. Fryar, "shows perfectly that the writer does not know what he is talking about." If there was a percentage of gas in the air and the goaves were full of gas, there would be no danger at all in Bentley—not the slightest danger, for it was the safest condition they could be in.

Mr. Gichard: Do you agree that leaving the soft coal in adds to the liability of danger from gas?—It is a fruitful source of trouble, both with regard to gas and gob fires.

Mr. Albert Longden, the under-manager, gave evidence of accompanying Mr. Hudspeth round the mine when he made his inspection in July. They did not always agree as to the percentages of gas which they found. When Mr. Hudspeth tested near the cloth, witness did not see his lamp explode. His own examination there only revealed the presence of 2½ per cent. of gas, or slightly over. Witness said he would not be afraid to go through the Bentley Colliery with a naked light.

Would it be safe?—Yes, probably with a practical man it would. Anywhere, in fact, where we went that day would be safe, except the portion fenced off. During their tour he told Mr. Hudspeth that his estimates were extravagant, and with regard to one sample and the analysis, he had a conversation with Mr. Hudspeth. The latter used bad language. Mr. Hudspeth, said the witness, stated that the amount stated in the sample was a —— lie, he could —— well tell nearer than 1 per cent., and he should take no —— notice of that.

Mr. Hudspeth was recalled, and denied using the bad language imputed to him. What he said when the chemist told him the sample was something over 3 per cent. was "I think you must be wrong." "I certainly would not use language like that," he added.

Mr. Craig said this was his case. His speech for the defence occupied just one hour, and in the course of it he very severely criticised the conduct of the case by the prosecution. Had the case been conducted upon normal lines, he should have called more witnesses, but it had ceased to be a prosecution, and amounted to a persecution. Whatever the result of it was, it must mean a very heavy pecuniary loss to the company. The summonses lacked definition—they did not define any part of the 20 miles of working face where the ventilation was said to be inadequate. It was because he felt so strongly that the course taken by the Home Office was calculated to produce mischief and wrong to the company that he took the responsibility of not calling any further evidence. It was hardly credible to him that Mr. Gichard in his cross-examination had not exceeded his instructions from the Home Office when he insulted a gentleman of the utmost distinction and attributed bad faith to the management of the colliery.

Mr. Craig protested strongly against some of Mr. Gichard's suggestions to Dr. Haldane. The doctor's position ought to have protected him from insult and outrage at the hands of anyone, and he protested, with the utmost strength in his power, against the conduct of a prosecution in this manner. He had felt it his duty to deal severely with the conduct of this case, and he did not do it upon a personal but upon public grounds. Mr. Hudspeth had not shown himself the calm unprejudiced enquirer one would expect, and there were distinct evidences of exaggeration in his statements. With regard to the coaldust danger, it was amazing that charges should be made when there was no evidence in support. Probably the greatest authority upon the question, Prof. Galloway, who was called, was unable to assist or express an opinion, because no one had taken a sample. Was there ever such a Gilbertian situation? The Home Office knew absolutely nothing of the dust in the Bentley Pit, because they had not taken the elementary precaution of taking samples. If this sort of prosecution was the sort contemplated, the colliery owners had better make ready to shut down the whole of the Yorkshire seam and go. It was monstrous the Home Office should come here and that these inspectors should say this dust was dangerous when they had never taken a sample of dust, and did not know the quality, quantity or relative proportions of the different kinds of dust. To suggest that the condition in 1911 was the condition in 1912 was a suggestion which made him aghast. Had the late lamented Mr. Pickering, who was an inspector of experience and position in the district, been fortunate enough to have had his life spared, he would certainly have been very slow to make himself responsible for a prosecution such as this. They had a letter from him in which he was co-operating with the company in their enquiry as regards these matters, the solution of which was so interesting to mineowners of this gassy seam. If this prosecution was the sort of prosecution contemplated, then all the people engaged in these mines had better make ready to shut down and go, because wherever they got a percentage of gas, if they were to imagine added circumstances which did not exist, they were at once to get a conclusion of danger, and if they got that conclusion they shut their mine. If the Bench were against him, then he contended Mr. Fryar could not be convicted, as he was the agent and not the manager. An agent could not be prosecuted for a question which affected the management. This had been decided in Stokes *v.* Mitcheson.

The chairman announced the Bench would take the opportunity of going through the whole of the evidence and would give their decision on January 4, when, if necessary, a date could be fixed for the hearing of the remaining two summonses.

COAL, IRON AND ENGINEERING COMPANIES.

Avery (W. and T.) Limited.—The directors have declared an interim dividend for the six months ended September 30 last at the rate of 5 per cent. per annum on the ordinary shares, free of income-tax.

Canterbury Coal Company Limited.—This company has been registered, with a capital of £167,500 (150,000 A shares of £1 each and 350,000 B shares of 1s. each), to carry on the business of colliery proprietors, &c.

Carr (James W.) and Co. Limited.—This private company has been registered, with a capital of £10,000 in £10 shares, to carry on the business of machinery, tool and metal merchants, &c. Permanent governing director, J. W. Carr (subject to holding 100 ordinary shares). Registered office, 35, Queen Victoria-street, E.C.

Cassel Coal Company Limited.—Dividend (No. 9) at the rate of 7½ per cent. (1s. 6d. per share). Warrants will be issued on or about February 8. Dividend (No. 7) was 1s., and dividend (No. 8) 1s. 3d. per share.

Cleveland Bridge and Engineering Company Limited.—The report for the 12 months ended September 30 last states that the net profit, including £8,074 brought forward, amounted to £16,151. The directors recommend a dividend of 2½ per cent., free of tax, on the ordinary shares, making, with interim, 5 per cent. for the year, carrying to next year's account £8,081.

Cooke (Wm.) and Co. Limited.—The directors have decided not to pay any interim dividend for the past half-year.

Dickson Corthesy Steam Turbine Developments Limited.—This company has been registered, with a capital of £5,000 in £1 shares, to exploit an invention by J. H. Corthesy for improvements in steam turbines, and to adopt an agreement with W. Kennedy-Laurie Dickson and W. G. S. Tyacke, trading in partnership as W. K.-L. Dickson. Registered office, 4, Denman-street, W.

East Indian Coal Company Limited.—The directors recommend a dividend of 2½ per cent. for the half-year ended October 31 last.

East Rand Gold, Coal and Estate Company Limited.—A dividend of 5 per cent. has been declared, payable to shareholders registered January 16, 1913.

Fisher (Stephen) and Co. Limited.—This private company has been registered, with a capital of £5,000 in £1 shares, to take over the businesses of a malleable iron founder, brassfounder, and fork manufacturer, carried on by T. A. Jervis, as Stephen Fisher and Co., and Francis Jervis, at Sylvester-gardens, Sheffield. First directors, T. A. Jervis, C. E. Spafford and R. G. Spafford. Registered office, Pelham Works, Sylvester-gardens, Sheffield.

Glencoe (Natal) Collieries Company Limited.—The directors have declared a dividend of 3¾ per cent. (9d. per share) for the year ending December 31.

Kent Collieries Limited.—The report to October 31 last states that to obviate the necessity of convening the general meeting in future years in the last week of December, the directors propose to make up the company's accounts to June 30 in each year. Progress at the colliery during the year has not been so great as was anticipated.

Lochgelly Iron and Coal Company Limited.—Interim dividend on the ordinary shares at the rate of 10s. per share, less tax, or 5 per cent.

Moirns Colliery Syndicate Limited.—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business indicated by the title, and to adopt an agreement with the Gas Coal Collieries Limited. Signatories: L. H. Hiscock, 15, Lonsdale-square, Barnsbury, N., and A. G. Dobrantz, 54, Mayeuod-avenue, West Hampstead, N.W.

Nantyglo and Blaina Ironworks Company Limited.—The directors, in presenting the balance-sheet and profit and loss account for the year ending September 30, 1912, regret to announce the death of Admiral E. Field, C.B., the late chairman of the company, in March last. Mr. Sydney Mason has succeeded him as chairman of the company, and Mr. F. Wootton Isaacson has been elected a director to fill the vacancy on the board. The net amount received for royalties and wayleaves is £26,571 17s. 11d., and for rent from land and houses and other sources of income £5,079 9s. 8d., making a total of £31,651 7s. 7d. The directors have paid, since their last report, two instalments of dividends on account of arrears of dividends upon the preference shares, amounting to £22,500, namely:—On April 16 £2, and on November 14 £2 10s. per share, making together £4 10s. per share. The output of coal and other minerals for the year has been 1,488,923 tons. The amount allowed for depreciation of properties for the year is £4,000, which, with the income from investments, £574 8s. 4d., has been added to reserve for depreciation account. The directors are pleased to report that the lease from the Marquis of Abergavenny has now been completed.

National Explosives Company Limited.—The report for the year ended October 31, 1912, shows a profit of £4,967, which, after paying interest on the prior lien debenture stock, leaves a balance of £2,930.

Patent Luffing Crane Company Limited.—This private company has been registered, with a capital of £300 in £1 shares, to acquire the benefit of certain existing inventions relating to cranes.

Screw Cutters Limited.—This company has been registered, with a capital of £39,500 (38,000 preference shares of £1 each, and 30,000 ordinary shares of 1s. each) (26,600 preference offered). Proposed directors: S. F. Edge, 7, Hertford-street, Mayfair; A. W. Towse, 29, Westminster Palace-gardens, S.W.; R. H. Goldie, South Lawn, College-road, Bath. Secretary, M. Smith. Registered office: Sardinia House, Kingsway, W.C.

Sheepbridge Coal and Iron Company Limited.—The directors have decided to pay an interim dividend of 1s. per share on the fully-paid, and 4·8d. each on the partly-paid shares, less income-tax.

Tarry (E. W.) and Co. Limited.—The report states that the result of the year's trading is not quite so favourable as last year's. The profit for the year amounts to £22,911, which with the balance brought forward, £6,614, makes £29,525. The directors recommend a further dividend on the ordinary shares of 5 per cent. (making 7½ per cent. for the year), and place to reserve £3,000, carrying forward £6,275.

Thistle Syndicate Limited.—This private company has been registered in Edinburgh, with a capital of £1,000 in £1 shares (250 preferred ordinary and 750 deferred), to carry on the business of makers of electrical appliances, machinery, &c. Registered office: 37, Bank-street, Kilmarnock, N.B.

United National Collieries Limited.—Warrants for interim dividends at the rate of 5s. per share, free of income tax, have been posted.

Mortgages and Charges.—The following have been registered in pursuance of the Companies Acts, 1907:—Meldrums Limited (particulars of £4,000 debentures created October 29, 1912, whole amount now issued); North Central Wagon Company Limited (issue on November 13, 1912, of £3,000 debentures, part of a series); Snowdown Colliery Limited (particulars of £50,000 debentures created August 3, 1912, whole amount now issued); South Derwent Coal Company Limited (memorandum of deposit on November 1, 1912, to secure £3,500, satisfaction in full on October 31, of memorandum of deposit dated September 26, 1912, securing £4,000, also notified); Torycoed Colliery Company Limited (particulars of £5,000 debentures created November 13, 1912, whole amount now issued); Carlton Main Colliery Company Limited (satisfaction in full of debentures dated October 14, 1904, and March 31, 1911, securing £2,800); Lincoln Wagon and Engine Company Limited (issue on November 27, 1912, of £4,715 debentures, part of a series); Mond Nickel Company Limited (issue on October 31, 1912, of £125,000 first mortgage debenture stock, part of a series); Pontelec Welding Patents Limited (issue on November 22, 1912, of £300 debentures, part of a series); Ponthenry Colliery Company Limited (issue on November 6, 1912, of £9,000 debentures, part of a series); Standard Steel Company Limited (issue on November 15, 1911, of £700, and on August 1, 1912, of £200, parts of a series); Bristol Wagon and Carriage Works Company Limited (issue on December 2, 1912, of £250 debentures, part of a series); Canal Coal and Building Materials Company Limited (mortgage dated November 28, 1912, to secure all moneys due or to become due from the company to W. J. Noble, T. R. Cairns and W. B. Noble, 44, Leadenhall-street, E.C.; Diamond Anthracite Mine Limited (issue on November 27, 1912, of £3,400 debentures, part of a series); Framwellgate Coal and Coke Company Limited (particulars of £15,000 second debentures created October 9, 1912, whole amount now issued); James Keith and Blackman Limited (particulars of £10,000 second debentures created November 18, 1912, and secured by trust deed of even date—there is no issue at present of this series); Kilburn and Co. Limited (particulars of £2,500 debentures created November 19, 1912, whole amount now issued); North Central Wagon Company Limited (issue on November 27, 1912, of £1,200 debentures, part of a series).

HE COLLIERY GUARDIAN

NTHLY LIST OF RECENT COAL LITERATURE

list of abbreviations used below :—
Zeitung.
gin. = American Institute of Mining

uarterly Publications of the American
n.
ales des Mines.
Canadian Mining Journal.
assier's Magazine.
hemiker Zeitung.
Chemical Trade Journal.
Colliery Guardian.
. = Deutsche Arbeitgeber Zeitung.
Deutsche Kohlen-Zeitung.
technischer Anzeiger.
= Elektrische Kraftbetriebe und

hnische Zeitschrift.
Engineering Contractor.
Engineering and Mining Journal.
ineering Review.
= Foundry Trade Journal.

Indian Agricult. = Indian Agriculturist.

Inst. Civ. Engin. = Institution of Civil Engineers.

Jl. Soc. Arch. = Journal of the Society of Architects.

Kohle Erz = Kohle und Erz.

Manchester Geol. Min. Soc. = Manchester Geological and Mining Society.

Metallurg. Chem. Engin. = Metallurgical and Chemical Engineering.

Midland Inst. Min. Eng. = Midland Institute of Mining Engineers.

Mines Minerals = Mines and Minerals.

Min. Ind. = Mining Industry.

Min. Mag. = Mining Magazine.

Montan. Rdsch. = Montanistiche Rundschau.

N. Staff. Inst. Min. Eng. = North Staffordshire Institute of Mining Engineers.

N. Zeit. = Neue Zeit.

Organ d. Bohrtechniker = Organ des Vereins der Bohrtechniker.

Proc. 8th Int. Congr. Appl. Chem. = Proceedings of the 8th International Congress of Applied Chemistry.

Railw. News = Railway News.

S. Afric. Inst. Engin. = South African Institute of Engineers.

S. Afric. Min. Jl. = South African Mining Journal.

S. Staffs. Inst. Min. Eng. = South Staffordshire and Warwickshire Institute of Mining Engineers.

Stahl Eisen = Stahl und Eisen.

Stein-Braunkohle = Stein und Braunkohle.

Techn. Zbl. Borgbau = Technisches Zentralblatt für Bergbau.

Tiefbohrwes. = Tiefbohrwesen.

Trans. Min. Inst. Scot. = Transactions Mining Institute of Scotland.

U.S. Bur. Mines = United States Bureau of Mines.

Z. Angew. Chem. = Zeitschrift für Angewandte Chemie.

Z. Bergw. Preuss. = Zeitschrift für das Berg. Hütten- und Salinenwesen im Preussischen Staate.

Zts. Zentr. Berg. Betrbsl. Oest. = Zeitschrift des Zentral-Verbandes der Bergbau-Betriebsleiter Oesterreichs.

Z. Ver. D. Ing. = Zeitschrift des Vereins Deutscher Ingenieure.

⁂ We shall be glad to obtain for readers, where possible, copies of the papers referred to at the prices named, which are inclusive of postage.

I.—General.

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II.—Education.

Technical Education in Mining. F. W. Hardwick. "Colliery Guard.," vol. 104, 2711, p. 1190. (Pres. address Midland Inst. Min. Eng.) 6d.

History of the Development of Mining and its Influence on the Mining Education in Upper Silesia. (Geschichte der Entwicklung des Bergbaubetriebes und ihr Einfluss auf die Begruendung und Erhaltung des bergmaennischen Unterrichte in Oberschlesien.) J. Kania. "Kohle Erz," 1912, 41, p. 1017-26. 2s.

III.—Geology.

Contribution to the Knowledge of Coal. (Zur Kenntnis der fossilen Kohlen.) E. Donath. "Chemiker Ztg.," vol. 36, 126, p. 1234. 1s. 3d.

On the Frequent Occurrence of Ankerite in Coal. T. Crook. "Mineralog. Mag.," vol. 16, 75, p. 219-23.

Causes of Surface Subsidences in the Ostrau-Karwin Mining District. (Ueber die Ursachen von Oberflaechenbewegungen im Ostrau-Karwiner Bergrevier.) Franz Bartoner. "Montan. Rdsch.," 1912, 4, p. 149-56, 7 fig.; 5, p. 211-5, 4 fig.; 6, p. 247-9. 4s.

A New Stratum in the Gas-flaming Coal Section of the Ruhr Coal District (Eine neue Schicht in der Gasflammkohlen - Partie des Ruhrkohlen - Bezirkes.) "Tiefbohrwes.," 1912, 12, p. 47. 2s.

The Brown Coals of Otago. A. G. Macdonald. "Colliery Guard.," vol. 104, 2708, p. 1036; 2709, p. 1089; 2710, p. 1140; 2711, p. 1190; 4 fig. 2s.

Carboniferous Deposits in Western Spitzbergen. (Zur Kenntnis der Karbonablagerungen des westlichen Spitzbergens.) Olaf Holtedahl. Kristiania: Dybwab. 1911.

Developments in the Forest of Dean. "Colliery Guard.," vol. 104, 2712, p. 1258. 6d.

Some Lignite Deposits along the Bahia Coast, Brazil, and the Possibilities of Working. (Einige Braunkohlenvorkommen an der Kueste des brasilianischen Staates Bahia.) Freise. "Braunkohle," 1912, p. 210-13.

The Coalseams of the East Cracow Coalfield and the Central Galicia District. (Die östliche Grenze des Krakauer Kohlenbeckens und das mittelgalizische Becken.) Dr. Grzyhowski. "Montan. Rdsch.," 1912 p. 918-25.

Teubner's Monographs of Commercial Geography of Germany, Vol. II. (Steinkohle, Braunkohle, Eisenerz und Eisenindustrie.) Von der Aa. Leipzig and Berlin, 1912. Map and explanatory test. (The hard coal, lignite, iron ore and siderurgic industries.)

The Sub-bituminous or "Arsa" Coal of Carpano, Istria. (Ueber die Arsakohle von Carpano, Istrien.) Ed. Donath and A. Indra. "Chemiker-Ztg.," 1912, p. 1118.

V.—Mining Technology.

Efficiency Engineering applied to Mining. G. A. Collins. "Am. Inst. Min. Eng.," Bull. 69, p. 995-1008; 2 fig. 3s. 6d.

VI.—Working of Minerals.

Jasper Park Colliery at Pocahontas, Alberta. "Canad. Min. Jl.," vol. 33, 21, p. 750-2; 3 fig. (Development operation with plant lay-out and construction.) 1s. 6d.

Breyten Collieries, Transvaal, S.A. "S. Afric. Min. Jl.," vol. 22, 1101, p. 263-5; 3 fig. (A description of mines and equipment, with output of 55,000 tons per month.) 2s.

Planning out Workings in a Mine, and Various Methods of Making Levels. (Einteilung des Grubenfeldes im Baufelder und die verschiedene Art der Sohlenbildung.) E. Graf. "Stein. Braunkohle," 1912, 17, p. 200-1. 1s. 6d.

On the Working of Vertical Seams. (Beitrag zum Abbau stehender Floeze.) G. Scholtze. "Kohle Erz," 1912. 32, p. 801-4. 2s.

Facts about Anthracite Mining. E. W. Parker. "Mines Minerals," vol. 33, 4, p. 202-3. (The history of the industry and development of economy in production.) 2s. 2d.

VII.—Boring, Shaft Sinking, and Tunnelling.

New Patterns in Deep-boring Machines and Tools. (Neukonstruktionen in Tiefbohrmaschinen und Geraeten.) "Tiefbohrwes.," 1912, 18, p. 73-80; 19, p. 85-7; 23 fig. 4s.

Water Flush Percussion Method of Shaft Boring. (Spuelschalgverfahren zum Abbohren von Schaechten.) Krecke. "Glückauf," 1912, 36, p. 1471-3; 2 fig. (Supplement to previous paper by the same author on the Stockfisch method.) 2s. 9d.

Method of Thawing-out a Shaft sunk by the Congelation Process. (Verfahren zum Auftauen eines unter Anwendung des Gefrierverfahrens ausgefuehrten Schachtes.) "Tiefbohrwes.," 1912, 14. p. 95-6; 1 fig. 2s.

Shaft Sinking in Presence of Large Influxes of Salt Water. (Ein Beitrag zum Schachtabteufen bei grossem Salzwasserzufluss.) Heinr. Groetiug. "Bergbau.," 1912, 42, p. 585-6; 3 fig. 2s.

Sinking Shafts, &c., in Solid or Yielding Water-bearing Strata, by Impregnation with Solidifying Materials. (Verfahren zum Abtaufen von Schaechten und Ausgrabungen in wasserhaltigen festen oder nachgiebigen Bodenschichten durch Traenkung mit Dichtungsstoffen.) "Vulkan," 1912, 18, p. 74. 2s. 6d.

Calculating Ferro-Concrete Shaft Linings. (Berechnung von Eisenbeton schachtwandungen.) F. Baumstark. "Armierter Beton," vol. 5, 1912, 6, p. 226-31; 3 fig.

Lining Shafts and Galleries with Ferro-Concrete. (Auskleidung von Schaechten und Stollen durch Eisenbetonwerkstuecke. "Tiefbohrwes.," 1912, 18, p. 82-3; 6 fig. 2s.

Method of Lining Shafts with Ferro-concrete. (Verfahren zur Herstellung von Schachtauskleidungen aus Eisenbeton ohne Schalung.) "Tiefbohrwes.," 1912, p. 69; 3 fig. 2s.

Fireproof Shaft, Vermillion Mine, Westville, Ill. A. F. Allard. "Mines Minerals," vol. 33, 3, p. 130-2; 10 fig. (Steel sinking shoe and construction of shaft lining and bottom in concrete described.)

Advantages of Inclined over Vertical Shafts; and the Gmeyner System of Chain Winding. (Ueber tonnlaegige Foerderschaechte und eine neuartige Schleppschachtfoerderung.) E. Gmeyner. "Montan. Rdsch.," 1912, p. 964. (Paper read to Bergmannstag, Vienna, 1912. Abstract.)

VIII.—Explosives, Blasting.

Progress in Mine Blasting. (Fortschritte auf dem Gebiete der Minenzuendung.) "Kohle Erz," 1912, 42, p. 1089-92; 4 fig. 2s.

Chemical Testing of Mining Explosives. J. Moir. "Chem. Trade Jl.," vol. 51, 1328, p. 457-8. 6d.

The Use of Cordeaux Fuse. W. Cleaver. "Colliery Guard.," vol. 104, 2710, p. 1142; 1 fig. 6d.

IX.—Timbering, Packing, &c.

Transporting Material in Hydraulic Goaf Packing Installations. (Der Massentransport in Spuelversatzanlagen.) "Kohle Erz," 1912, 42, p. 1069-78; 6 fig. 2s.

The Hydraulic System of Goaf Packing. (Das Spuelversatzverfahren im In- und Ausland.) Putz. "Glückauf," 1912, 34, p. 1357-68; 35, p. 1398-1406; 36, p. 1441-7, 48 fig.; 37, p. 1486-92. (Historical development of the system. Application in Upper Silesia, materials, apparatus, action and cost. Lower Silesia, Aachen, Westphalia, Saxony, Holland. Belgium, Spain, Austria-Hungary, and Russia. Economic advantages.) 11s.

The Preservation of Mine Timber. (Konservierung von Grubenhoelzern.) Max Landau. "Bergbau," 1912, 40, p. 563-4. 2s.

The Use of Old Wire Ropes in Timbering Roadways. J. McLuckie. "Trans. Min. Inst. Scot.," vol. 35, 1, p. 37-40. 5s.

The Relation Between Subsidence and Packing, with Special Reference to the Hydraulic Stowing of Goaves. G. Knox. "Colliery Guard.," vol. 104, 2711, p. 1195, and 2712, p. 1240. (Abst. paper read before Manchester Geol. Min. Soc.) 1s.

Mine Timber and the Trade in Mine Timber. (Das Grubenholz u. d. Grubenholzhandel.) Eulefeld. "Mitt. D. Forstver.," 1912, 2, 3, p. 26-75.

Prolonging the Life of Mine Timbers by Impregnation. (Die Impraegnierung der Grubenhoelzer zum Zwecke der Verlaengerung ihrer Standdauer.) A. Rzehulka. "Kohleninteressent," 1912, p. 215.

X.—Surface Arrangements

Portable Tippler for Coal Tubs. (Fahrbare Kippvorrichtung fuer Foerderwagen.) Rath. "Glückauf," 1912, 37, p. 1513-4; 2 fig. (Hasenjuergen tippler used at the heapstead of the Konstantin der Grosse Colliery.) 2s. 9d.

Automatic Weighing and Recording Machines for Coal in Bulk. "Railw. News," vol. 98, 2546, p. 900-2; 5 fig.

Advanced Practice in Illinois Coalfields." W. Roberts and O. Cartlidge. "Mines Minerals," vol. 33, 3, p. 121-5; 9 fig. (Buckner, No. 2 Mine, Franklin, Co. Ill., surface and underground arrangements.)

Experimental Construction of Schools in Colliery Districts. "Jl. Soc. Arch.," vol. 5, 59, p. 413-6. (Methods of counteracting the danger of subsidences.)

XI.—Winding and Haulage.

Starting Control Gear for Steam Haulage Engines. (Anfahrregler fuer Dampf - Foerdermaschinen.) Wintermeyer. "Bergbau," 1912, 41, p. 573-5! 7 fig. 2s.

Air-balanced Hoisting Engine. R. R. Carbett. "Mines Minerals," vol. 33, 4, p. 221-2; 2 fig. (The power developed by the descending skip compresses air to be used in hoisting.) 2s. 2d.

The Braking of High-speed Winding Engines. G. K. Chambers. "S. Afric. Min. Jl.," vol. 22, 1099, p. 216. 2s.

Electric Hoists at the Hecla Mine. E. M. Murphy. "Am. Inst. Min. Eng.," Bull. 69, p. 977-94; 14 fig. 3s. 6d.

Experiments with Electrical and Steam Winding Engines. (Untersuchungen an elektrisch und mit Dampf betriebenen Foerdermaschinen.) Robbert. "Z. Ver. D. Ing.," 1912, 36, p. 1456-60; 5 fig. (Comparative trials of four steam and four electrical engines. 2s. 6d.

First Cost and Efficiency of Electric Main Haulage Machines. (Anlagekosten und Wirkungsgrad bei elektrisch betriebenen Hauptschachtfoerdermaschinen). Karl Meller. "Glückauf," 1912, 42, p. 1719-21; 2 fig. 2s. 9d.

Contribution to the Economy of Electric Main Haulage Plant. (Zur Frage der Wirtschaftlichkeit elektrischer Hauptschachtfoerdermaschinen.) "Glückauf," 41, p. 1679-85. (Kleinschmidt, Handorff and Philippi discuss further the article which appeared in "Glückauf," No. 28, p. 1109.) 2s. 9d.

New Cage Chains. O. Putz. (Ein neues Foerderkorb-Zwischengeschirr.) "Glückauf," 1912, 38, p. 1554-5; 2 fig. 2s. 9d.

Automatic Tub-changing Device for Pit Cages. (Elektrisch angetriebene Aufschiebevorrichtung fuer Foerderkoerbe.) Haller. "Glückauf," 1912, 34, p. 1379. (Device in use at the Victoria Mathias Colliery, Essen.) 2s. 9d.

Grunewald Safety Appliance with Governing, Cushioning and Graduated Braking Action. (Sicherheitsvorrichtung Grunewald mit Regel-, Stau- und abgestufter Bremswirkung.) Förster. "Mitt. Oberschl. Bez. Ver. D. Ing.," 1912, 10, p. 140-2; 3 fig.

Winding in Shafts: Ropes, Rope Pulleys, Cages, Safety Catches. Keps, Automatic Tub Changers. Chapter: Cages and Safety Catches. (Foerdermit tel bei der Schachtfoerderung: Foerderseil, Seilscheiben, Foerderkoerbe, Fangvorrichtungen, Aufsarzvorrichtungen, automatische Beschickvorrichtungen. Kapitel: Foerderkoerbe u. Fangvorrichtungen, bearb. vom Dip.-Ing. Wohlstadt.) Lex 8vo, 7, 163, p. 181; ill. Kattowitz Phoenix-Verlag, 1912. 20s.

Compressed Air Mine Locomotives. (Druckluft-Grubenlocomotiven. "Z. Ver D. Ing.," 1912, 34, p. 1374-6; 1 ill., 6 tab. (Comparative experiments carried out in Germany.) 2s. 6d.

Cage Fence Gates. W. G. Peasegood. "Colliery Guard.," vol. 104, 2712, p. 1245. 6d.

The Cleaning and Greasing of Winding Ropes. "Colliery Guard.," vol. 104, 2712, p. 1241. 6d.

Haulage Clips in Use in North Staffordshire. W. G. Salt and A. L. Lovatt. "Colliery Guard.," vol. 104, 2700, p. 1141. [Paper read before N. Staff. Inst. Min. Eng.] 6d.

New Chain, Cableway, and Shunt Rail Haulage Systems of the Skoda Works, Pilsen, Bohemia. (Neuere Ketten-, Seil-, und Rangierfoerderungen.) E. Blau. "Zts. Zentr. Bergb. Betrbsl. Oest.," 1912, p. 591-603.

Equipping a Ventilating Shaft for Hoisting Men and Coals, Bois Communal à Fleurus Colliery, Belgium. (Amenagement d'une Tour d'Extraction sur le Puits d'Aerage.) Gillet. "Ann. Mines," 1912, vol. 17, 3, p. 671-7.

Electric Hoists in Headgears. S. E. Boult. "S. Afric. Inst. Engin.," vol. 11, 2, p. 45-8; 2 fig.

Cost of Operating an Electric Hoist for Mine Shaft. "Engin. Contract," vol. 38, 14, p. 375-6; 2 tab.

The Electric Motor *v.* Compressed Air Drive for Winding. (Der Elektro-motor im Vergleich zur Pressluftmaschine zum Antrieb von Schacht-Foerdermaschinen.) H. Herberts. "Foerdertechnik," 1912, p. 192. (Critical review of Pauly's paper read before Am. Inst. Min. Engin.)

Newer Types of Compressed Air Locomotives for Mines. (Neuere Drukluftlokomotiven fuer Grubenbahnen.) Th. Giller. "Montan. Rdsch.," 1912, p. 962.

XII.—Signalling.

Wireless Telephony in Mines. E. P. Buffet. "Coal Age," vol. 2, 19, p. 646-8; 3 fig. 1s. 3d.

The Adair Face Conveyor. "Colliery Guard.," vol. 104, 2708, p. 1035; 10 fig. 6d.

Wireless Telephony in Mines. (Drahtlose Grubentelephonie.) O. Dobbelstein. "Glückauf," 1912, 40, p. 1623-8; 12 fig. (Description of installation made at the Pit Karolinenglueck, Bochum, for the purpose of determining the possibility of using wireless telephony in mines.) 2s. 9d.

Signalling Switch Installation for Mine Electric Railways with the Conductor below ground. (Signal und Schaltanlage fuer elektrische Grubenbahren mit Fahrdraet unter Tage.) M. Henke. "El. Z.," 1912, 34, p. 870-1; 1 fig. (Adjacent to the conductor an insulated signalling wire is laid, carrying a maintaining current which, by means of an electro-magnet at the power station, closes a switch in the conductor circuit. In case of immediate danger, current can be cut off from the conductor by breaking the signalling wire.)

XIII.—Lighting.

Prize Competition for Safety Lamps. (Preisausschreiben fuer Sicherheitslampen.) "Stahl Eisen," 1912, 43, p. 1791-2. 2s. 9d.

Safety Lamps in Coalmines. "Colliery Guard.," vol. 104, 2710, p. 1138. (Protests of manufacturers.) 6d.

XIV.—Ventilation.

Significance of the Counter Current. J. Verner. "Coal Age," vol. 2, 20, p. 677-9; 2 fig. (The flame of an explosion feeds on the rear of the dust column, so there must be fresh air behind the dust. The air is supplied by the return draft. The cokedust on the leeward side of projections is deposited also by the counter current.) 1s. 3d.

Facts and Theories relating to Mine Fans. D. M. Mowat. "Trans. Min. Inst. Scot.," vol. 35, 1, p. 26-36; 1 double plate. 5s.

Experiments in Ventilation by Means of Pipes. (Untersuchungen ueber Wetterfuehrung mittels Lutten.) W. Arlt. "Kohle Erz," 1912, 43, p. 111-4. 2s.

Fan Drive with Induction-Cascade Motors at the Werne Pit. (Ventilatorantrieb mit Induktionskaskade auf der Zeche Werne.) Scherbius and Zederbohm. "El. Kraftbetriebe," 1912, 25, p. 538-40; 1 fig.

Driving of Mine Fans by Three-phase Motors for Variable Speed. (Antrieb von Gruebenventilatoren durch Drehstrommotoren mit regelbarer Umlaufzahl.) Sauvage. "Glückauf," 1912, 41, p. 1668-72; 4 fig. 2s. 9d.

Moistening Mine Ventilating Currents. A. A. Steel. "Mines Minerals," vol. 33, 3, p. 141-3; 1 fig., 3 tab. (Method of avoiding fog and undue dampness in the use of steam jets and water sprays.)

Notes on Electrically-driven Fans for Mining Ventilation. J. W. Rogers. "Eng. Rev.," vol. 26, 4, p. 137-8.

XVI.—Coaldust.

A Contribution to the History of the Coaldust Question. (Einiges aus der Geschichte der Kohlenstaubfrage.) v. Rosen. "Bergbau," 1912, 29, p. 405-7. 2s.

Plant and Equipment for Underground Experimental Stations for the Examination of Coaldust. (Anlage und Einrichtung von Kohlenstaub-Versuchsstationen. Hugo Spiel. "Montan. Rdsch.," 1912, 8, p. 349-54; 5 fig. 1s. 4d.

The Danger of Coaldust Formation in Mines and Means of Preventing it. (Die Gefahren der Kohlenstaubbildung unter Tage und ihre Bekaempfung.) A. Rzehulka. "Techn. ZBl. Bergbau," 1912, 40, p. 450-1; 41, p. 463-4; 42, p. 474-5; 6s.

A Stonedust Distributing Machine. "Colliery Guard.," vol. 104, 2710, p. 1139; 1 fig. 6d.

XVII.—Explosions.

Prevention of Mine Gas Explosions. (Verhuetung von Schlagwetter-Explosionen.) J. Schnitzler. "Kohle-Erz.," 1912, 36, p. 897-900. 2s.

Causes and Prevention of Firedamp Disasters. (Die Ursachen der Schlagwetterkatastrophen und deren Verhuetung.) Paul Grabein. "Stein-Braunkohle," 1912, 16, p. 187-8. 1s. 6d.

The Mining Disaster at the Lothringen Pit. (Das Grubenunglueck auf Zeche Lothringen.) "Bergbau," 1912, 41, p. 575-7. 2s.

Firedamp and Coaldust Explosions. (Die Schlagwetter und Kohlenstaubexplosionen.) G. Werner. "N. Zeit.," 1912, 47, p. 753-8.

The Firedamp Explosion in the Aller-Nordstern Potash Mine near Grosshaeuslingen, Prussia, November 27, 1911. (Die Schlagwetterexplosion im Kalisalzbergwerk Aller-Nordstern bei Grosshaeuslingen am Nov. 27, 1911.) Wigand. "Z. Bergw.-, Preuss.," 1912, vol. 60, 2, p. 214-25.

XVIII.—Mine Fires.

Notes on Gob Fires near Ashby-de-la-Zouch, Leicestershire. T. Stubbs. "Colliery Guard.," vol. 104, 2711, p. 1192. [Abst. paper read before Midland Inst. Min. Eng.] 6d.

Rescue and Ambulance.

line Life-saving. (Neuerungen auf
s Grubenrettungswesens.) August
" Montan. Rdsch.," 1912, 3, p. 105-9;
.; 9, p. 397-403. 4s.

lia" Diving Apparatus. (Die neuen
Westfalia.") Grahn. "Glückauf,"
1; 5 fig. (Suitable for use in flooded
or diving.) 2s. 9d.

hing During the Use of Rescue
mungsarten bei Verwendung von
en.) "Kohle Erz," 1912, 35, p. 873-8.

Mines. J. Piggford. "Colliery
2712, p. 1246. (Experiments at the
.) 6d.

iances: A Danger Occurring in the
tus in which an Injector is Employed.
Colliery Guard.," vol. 104, 2712,
(Abst. paper read before S. Staffs.
) 6d.

Drainage, Pumping, &c.

Drainer. "Colliery Guard.," vol. 104,
ig. 6d.

XXI.—Preparation.

Screens. B. Shubart. "Coal Age,"
10; 5 fig. 1s. 3d.

thracite Coal. S. V. Tench. "Coal
381-2; 1 tab. 1s. 3d.

d Briquetting. "Mines Minerals,"
; 12 fig. (The plant of the Alstaden
d to handle anthracite coal.) 2s. 2d.

he Old Silkstone Collieries. "Coal
634, p. 513-4; 2 fig. 10d.

in the Upper Silesian District.
und Kohlensorten beim Ober-
inkohlenbergbau.) Kurt Schroth.
12, 14, p. 313-22. 2s.

ressing and Coal Washing in 1911.
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Ores and Coal. (Aufbereitung von
en.) Leipzig, 1912.

XXII.—Briquettes.

n Coal Briquette and its Application
Industrial Purposes. (Das rheinische
ett und seine Verwendung in haeus-
chen und industriellen Feuerungen.)
tt. Niederrhein. Bez. der D. Ing.,"
.; 55 fig.; 6 ill.

at the United States Fuel Testing
Virginia, 1907-8. C. L. Wright.
Iines.) 8vo, 42 p.; 9 pl. London:
1s. 6d.

XXIII.—Coke Ovens.

of Coke. F. E. Lucas. "Am. Inst
l. 71, p. 1315-26. 3s. 6d.

Present State of the Coke Industry
(Entwicklung und gegenwaertiger
ereiindustrie Niederschlesiens.) F.
55 p. Berlin: Springer. 1912.

l Apparatus in Tar Cokeries, with
ce to the Removal of the Gas.
Betriebsueberwachung auf Teerko-
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9d.

The Manufacture of Coke. W. H. Blauvelt. "Am. Inst. Min. Eng.," Bull. 71, p. 1299-1314; 1 fig. 3s. 6d.

Coking Practice in the South Wales District. R. H. G. Greaves. "Foundry Trade Jl.," vol. 14, 130, p. 618-23; 3 fig., 3 tab. 2s.

The Separation of Tar from Coke Oven Gases. (Abscheidung des Teers aus Koksofengasen.) H. Krueger. "Glückauf," 1912, 33, p. 1317-21. 2s. 9d.

Lignite, Sub-bituminous Coals, Coal Preparation and Cokes. J. R. Campbell and others. "Metallurg. Chem. Engin.," vol. 10, 10, p. 690-2.

Waste Heat Coke Ovens. S. Reynolds. "Mines Minerals," vol. 33, 3, p. 135-6; 2 fig.

Use of Graphite Air-mixing Feed Pipes in Underfed Coke Ovens. (Mischrohraufsaetze aus Graphit fuer Unterbrenner Koksoefen.) Rath. "Glückauf," 1912, p. 1338.

XXIV.—Fuels, Testing, &c.

Commercial Sampling of Coal. C. E. Scott. "Mines Minerals," vol. 33, 4, p. 199-201; 1 fig., 1 tab. 2s. 2d.

Coal Consumption, the Heating Plant Industry and the Coal Trade. (Kohlenkonsum, Heizanlagenindustrie u. der berufsmaessige Kohlenhandel.) "D. Kohlen-Ztg.," 1912, 5, p. 47-8.

Calorific Tests of Silesian Coals. (Heizversuche mit schlesischen Kohlen.) P. W. Uhlmann. "Chemiker-Ztg.," 1912, p. 1058.

Investigation Relative to the Better Utilisation of Non-coking Low-grade Lignitic Coals. E. J. Babcock. "Proc. 8th Int. Congr. Appl. Chem.," vol. 10, p. 41-52.

The Application of the Zeiss Interferometer for Smoke Gas Analysis. (Die Verwendung des Zeisschen Interferometers zur technischen Rauchgasanalyse.) O. Mohr. "Z. angew. Chem.," vol. 25, 26, p. 1313-7.

The Classification of Coal. L. V. Newton. "Mines Minerals," vol. 33, 3, p. 139-40; 2 fig., 7 tab. (A study of the different classifications proposed by different investigators.)

XXV.—Steam Engines and Boilers.

Boiler Practice and Fuel Economy. J. H. Dales. "Eng. Rev.," vol. 26, 5, p. 166-8. 1s. 6d.

Coal Stacking and Coal Firing. H. Kenrick. "Gas World," vol. 57, 1481, p. 762-7. (Special consideration is given to gasworks storage of coal in anticipation of strikes.) 10d.

Report of the Steam Boiler Inspecting Commission, Dortmund District, for the year 1911-12. (Bericht des Dampfkessel-Ueberwachungs-Vereins der Zechen im Oberbergamtsbezirk Dortmund ueber das Geschaeftsjahr 1911-12. "Glückauf," 1912, 33, p. 1329-33. 2s. 9d.

XXVI.—Compressed Air

A Recent Swedish Compressed Air Plant. (Eine neuzeitliche schwedische Druckluftanlage.) Hjalmar Erikson. "Glückauf," 1912, 34, p. 1368-72; 8 fig. (Description of plant for the production of compressed air recently built by the Striber Company for their mines.) 2s. 9d.

Compressed Air und Electricity in Coalmining. Pressluft und Elektrizitaet im Grubenbetrieb.) Eugen Liwehr. "Montan. Rdsch.," 1912, 10, p. 449-52; 2 fig. 1s. 4d.

XXVII.—Electricity.

On Coal Central Stations. (Ueber Kohlenzentralen.) O. Buehring. "Ber. Verb. Suedwestd.," 1912, p. 244-55.

Underground Mine Switches. D. W. Jessup. "Engin. Min. Jl.," vol. 94, 22, p. 1031-4; 17 fig. 1s. 6d.

Electrical Equipment of the Shelton Iron, Steel and Coal Company's Works. "Colliery Guard.," vol. 104, 2711, p. 1187; 6 fig. 6d.

Electric Power Plants at Mining and Metallurgical Works in Westphalia, Belgium, Northern France and England. (Elektrische Kraftanlagen auf Berg- und Huettenwerken in Rheinland-Westfalen Belgien Nordfrankreich und England.) K. Hoefer. "Z. Ver D. Ing.," 1912, 32, p. 1281-91; 16 fig., 8 ill, 1 tab-2s. 6d.

The Electric Plants of the Mine El Guindo, La Carolina, Spain. "AEG-Ztg.," vol. 14, 12, p. 8-11, 4 ill.; 15, 1, p. 9-11, 3 ill. (Three-phase current transmitted through long-distance line; hauling engine worked by Ilgner-Leonard system; centrifugal pumps driven by three-phase motors.)

Portable Electric Motors, Applications and Costs of Several Types. (Transportable Elektromotoren.) Koenig. "El. Anz.," 1912, pp. 791-3 and 317-8.

XXVIII.—Surface Transport.

The World's First Coal Port. M. Meredith. "Cassier's Mag.," vol. 42, 5, p. 379-88; 9 fig. (The Bute Docks, Cardiff, of the Cardiff Railway Company). 1s. 6d.

The Coal Transport Plant of the Municipal Electricity Work at Frankfort a. M. (Die Kohlentransportanlage des Staedtischen Elektrizitaetswerkes in Frankfurt a. M.) "Vulkan," 1912, 20, p. 81-3; 3 fig. 2s. 6d.

Mechanical Handling of Coal for British Locomotives. C. J. B. Cooke. "Colliery Guard.," vol. 104, 2712, p. 1239; 1 fig. (Abst. paper read before Inst. Civ. Engin.) 6d.

The Coal Culm Cableway at the Providence Mine, Marchienne-au-Pont, Belgium. (Die Haldenseilbahn des Werkes Providence bei Marchienne du Pont.) Al. Parma. "Kohleninteressent.," 1912, p. 217.

Telfer Coal Transporter Plant. "Eng. Rev.," vol. 26, 4, p. 142-3; 4 fig. (The Frankfurt Municipal Electrical Works coal transporter from the quay over railway tracks.)

Fuelling Ocean-going Vessels. "Black Diamond," 1912, p. 25. (Combined lighter and crane hoist of Rapid Coaling and Transfer Company of Baltimore.)

The B. & O.R.R. America's First Coal Carrier. "Black Diamond," 1912, p. 32. (Describes past and present railroad and bay terminal facilities.)

XXIX.—Sanitation, Diseases, &c.

The State of Health of Miners according to the Latest Report of the Mining Authorities. (Der Gesundheitszustand der Bergarbeiter nach dem neuesten Bericht der Bergbehoerden.) "Bergbau," 1912, 30, p. 422-3. 2s.

Workmen's Insurance and Hygienics. (Arbeiterversicherung und Gewerbehygiene.) Hanauer. "Bergbau," 1912, 15, p. 211. 2s.

XXX.—Mining Laws, Royalties.

Mining Law Development. H. C. and L. H. Hoover. "Engin. Min. Jl.," vol. 94, 18, p. 823-5. 1s. 6d.

Mine Ventilation and Mine Finance. H. C. Hoover. "Min. Mag.," vol. 7, 4, p. 275-7. (Assured value and prospective value with the redemption of capital, considered.)

The Reserve Fund and its Status in State-owned Mines. (Ueber Wesen und Bedeutung von Reservefonds mit besonderer Beruecksichtigung der Beduerfnisse des Staatsbergbaus.) Gutdeutsch. "Z. Bergw.-, Preuss.," 1912, vol. 60, 2, p. 147-85.

ORK IN THE MIDLANDS.

s of three lectures in higher mining
alville, Leicestershire, on Saturday,
Mr. P. Ormand, chief inspector in rescue
d coalowners (Birmingham University
upon the Fleuss apparatus, the training
university, and mine rescue work. The
d by a committee comprised of members
e Education Committee, the National
ery Managers (South Midland branch),
ining Officials' Association. Despite the
yshire County Council have withdrawn
audience was exceedingly numerous.

r. W. A. Brockington, M.A., director of
estershire, while regretting that the
Council had not seen its way to continue
tulated the committee on the large
that Leicestershire's support would be
uld be glad to welcome Derbyshire men.
ose lecture was profusely illustrated,
ope of saving the lives of any persons
live in a mine after an explosion or fire
hief object of mine rescue work. The
hed the Fleuss or Proto apparatus in its
entioned that in the 1912 pattern there were two cylinders with a common valve to obviate the risks of becoming mistaken between the two valves. The mouthpiece was an airtight joint, so that the wearer could not get gas from the outside atmosphere into the apparatus. Without the aid of the by-pass or emergency valve the task at Hulton Colliery could not have been carried through. Once the bag was filled the gas could be shut off for half-an-hour quite comfortably without troubling over a single thing connected with the apparatus. By use of the relief valve they could get rid of the over supplies of gas in the bag, empty the bag at will, and also use the valve for "washing out the bag," as it was termed, when necessary. Mr. Ormand next referred to the report of the Midland Committee of Coalowners, emphasising the fact that in the Fleuss apparatus it was absolutely impossible to get anything from the outside atmosphere into the apparatus. The lecturer reminded his hearers that perfect coolness was necessary, no matter how trying the circumstances, and proceeded to show how a member of the rescue brigade at Hulton escaped with his life by the display of this quality while his companions carried him out.

Early this year the coalowners decided to appoint an instructor and to grant to the mining department of the Birmingham University a sum of money. With this the instructor's salary was paid, and they now had a laboratory equipped with apparatus and material necessary for the training of men in the use of breathing apparatus. He (Mr. Ormand) was appointed as the instructor, and the work of training began early last April. The men attending the course of instruction were managers, assistant managers, overmen, deputies, and even colliers. The men were trained to use the Fleuss apparatus, and to work in the experimental mine in irrespirable air. The application of various types of oxygen-reviving apparatus was taught in conjunction with the well-known systems of artificial respiration, and, of course, ambulance stretcher drill.

Mr. T. Y. Hay, in submitting a vote of thanks to the lecturer, said that Mr. Ormand had given them many valuable hints as to the building of the station at Ashby-de-la-Zouche. He thought they would have there one of the best stations in the Midlands, and one of the best apparatus. He was certain they would soon have one of the best rescue brigades in the country. Only the other day a manager told him that, but for the apparatus described, half his mine would have been lost, but with it the rescue brigade stopped the fire.

The lecture was illustrated by a fine series of lantern slides, and Mr. Ormand was assisted in practical demonstrations by Mr. B. L. Wilson, the proposed instructor at the Ashby Rescue Station, who wore the Fleuss apparatus.

In the next lecture, to be delivered on January 11, 1913, Mr. Ormand will deal with "The training of brigades and the organisation necessary to cope with fires and explosions at collieries."

COLLIERY ACCIDENTS.

Mansfield.

An enquiry was held recently into an accident which occurred at the Sherwood Colliery, when two Mansfield men—William H. Whatham, of Albion-street, and Walter Allsop—were buried beneath a fall of roof, weighing 100 tons. The deceased had been at work for over a fortnight in widening the roadway. They had to cut away the sides of the road and then put up cross-bars supported by props. A bump was heard at 6 o'clock, but was not regarded as unusual, and the accident occurred at 8 30.

William Sterland, under-manager, said there had been no special settlement about the place, and no special anxiety had been felt concerning the work. For a short distance along the roadway the iron girder hitherto in use had been removed, and wooden supports and cross-bars substituted. Witness explained that this particular place was where tubs were knocked off, and in order to facilitate this work, and to make the place safer for the lads, as well as to comply with the rules of the new Coal Mines Act, the management were opening out the road for about 20 yards. Witness expressed the opinion that the danger from the roof is greater than the danger to the lads from coupling and uncoupling. The law compelled them to decrease one danger, whilst it increased another very much more. This work was talked over amongst the head officials months ago when the Act came into operation. It was acknowledged that the work would be dangerous, and it was being carried out in the best possible way.

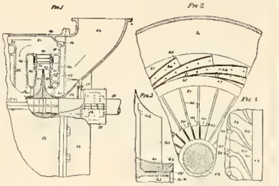
In summing up, the coroner said it was suggested that the regulation in the new Act providing for the widening of the roadways had within it an element of danger which did not seem to have been foreseen, and he thought that in any particular case in which it was considered by managers and mine inspectors that such operations could not take place without incurring special dangers, there should be a provision by which this could be avoided.

The jury returned a verdict of "Accidental death."

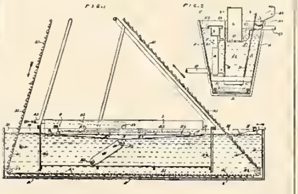
Disputed Contracts.—Two actions were heard by Mr. Mr. Justice Rowlatt and a special jury at the Manchester Assizes recently. The first was brought by Messrs Adam Bromley and Co, coal merchants, Bolton, against Messrs. James Hardcastle and Co., Limited, bleachers, dyers and printers, Bradshaw Works, Bolton, to recover a sum of £182, the balance of a coal account. Defendants counterclaimed on the ground of short deliveries and the cancelling of the contract. In September 1911 the plaintiffs, it was stated, entered into a contract with the defendants to supply 15,000 tons of coal. Deliveries were to be made at the rate of 50 tons per day, or 300 tons per week, extending over 12 months. About that time the coal strike was looming, and in January and February 1912 deliveries were short to the extent, counsel for the defendants stated, of 565 tons in January and 725 tons in February. During the strike period the defendants could not claim to receive any coal by reason of the strike clause in the contract. Owing to the short deliveries the defendants went into the market and bought against the plaintiffs. They deducted £182 from the plaintiffs' account as the increased cost to which they had been put, and a cheque was sent for the balance. When the defendants wanted further deliveries after the strike, the plaintiffs stated that they had cancelled the contract, and that the defendants had made default in payment. The defendants contended that under the facts which existed the plaintiffs were not entitled to cancel the contract. The plaintiffs claimed that they had that right because facts arose which brought them within the conditions that enabled them to do so. The defendants counterclaimed for non-delivery, which the plaintiffs repudiated on the ground of justification. The amount the defendants stated they were out of pocket was £1,496, for which they counterclaimed. A number of witnesses were called who stated that shortage of delivery was caused, among other things, by heavy falls of snow, during which the men could not work at the collieries from which the plaintiffs obtained their coal, the flooding of one of the mines, and accidents to machinery. His lordship, dealing with the conditions of the contract, said cancelling obviously involved communication of the decision to cancel. With regard to what was said to have happened at the collieries, the evidence forthcoming from the collieries on that head was of a vague and flimsy description, so that he could not act with great certainty upon it He should say that the sum of £182 ought to be reduced by £65. As to the counterclaim, which was much larger in amount, he was unable to hold, under the circumstances, that the buyers—the defendants—had made default, if his construction of the contract was right. Substantially, he thought he was doing justice if he made a reduction of the counter-claim by £50, and the result would be that the plaintiff would take judgment on the claim, and the defendant on the counter-claim for £1,446. In the second case, the Spinners' Coal Company Limited, who are coal merchants carrying on business at Stalybridge, sought to recover from Mr John Hargreaves, paper maker, Tame Side Mills, Stalybridge, a sum of £148, the price of coal delivered to the defendant. The defendant admitted the delivery of the coal, but pleaded that it was delivered under a contract at a price below the market price, that the contract had been broken, and that he had sustained a loss of £350, for which he counter-claimed. The plaintiffs denied that a contract existed. Eventually defendant, feeling that there would be serious difficulty in satisfying the jury that any contract had been made, consented to judgment against him —Judgment was therefore entered for the plaintiffs for £148, the amount claimed.

ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

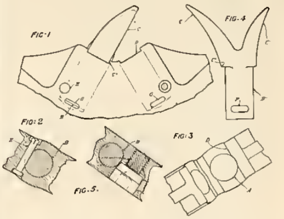
922 (1912). *Improvements in and relating to Centrifugal Air Compressors.*—The British Thomson-Houston Company Limited, of 83, Cannon-street, London, E.C. (A communication from the General Electric Company, of Schenectady, New York, U S.A.).—This invention relates to centrifugal air pumps or compressors, and has for its object to provide an improved construction of impeller for such pumps or compressors. The invention consists in so constructing the impeller that the various parts may be quickly, efficiently and cheaply assembled and secured to the driving shaft in such a manner that there is little probability of the parts being relatively displaced owing to strains set up by centrifugal force or by expansion or contraction due to changes in temperature. Fig. 1 is a partial axial section of a multi-stage centrifugal air compressor; fig. 2 is a partial tranverse section on a larger scale, showing the relation of the impeller vanes to the stationary discharge vanes; fig. 3 is a detail view, showing the rotary guide vanes in side elevation; fig. 4 is a plan view of these vanes. (Four claims.)



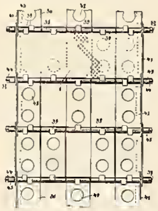
5183 (1912). *A Water Clarifying Apparatus for use in Coal Washing and like Operations.* W. Reid, of Greenfield Foundry, Burnbank, Hamilton, Lanarkshire.—The invention has for its object to provide, in combination with a dredger tank, means for causing more rapid settling of the coal and more complete clarification of the outflowing water so that the water may be repeatedly used for washing and spraying purposes. Fig. 1 is a longitudinal vertical section, and fig. 2 a transverse vertical section of a settling tank as made according to one example of the invention. During operation, spraying water enters along with that which is in constant circulation—the washing water. When work is over, the inner buoyant tank G floating on the surface is so adjusted as to its buoyancy by the manipulation of balance weights that it commences slowly to sink; or the valves G¹ controlling the apertures in its bottom may be so controlled that on their being then opened it commences slowly to sink. Its sinking is so timed that it is submerged and full of completely clarified water when operations are next started. That clarified water from this tank G is then used for spraying. Again, it mixes with the less clarified water, until at the end of the run the main tank A is again full and the buoyant tank G floating on its surface. A ballcock H is preferably fitted on the tank so that water retained by the coal or lost by evaporation may be made up. According to a modification, the discharge connection from the floating launder D is in the form of a flexible pipe, and the floating tank G, instead of being filled from the valve-controlled apertures in its bottom, is filled from a second floating launder device, similar to the floating launder D, and connected by pipes with a flexible connection opening into the interior of the floating tank G, thus the possibility of scum and dust entering the floating tank with the water is prevented. (Four claims.)



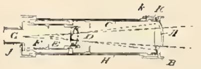
9348 (1912). *Improvements in or connected with Cutters for Cutter Discs and Cutter Discs of Machines for use in Mining Coal.* Mavor and Coulson Limited and S. M. Mavor, both of 47, Broad-street, Mile-end, Glasgow.—This invention refers to cutters for cutter discs and cutter discs of machines of the type in which the cutter disc is furnished with cutters which project from the periphery of the disc, and, if required, are adapted to be set for cutting in either direction of rotation of the disc. According to the invention the sockets in the periphery of the disc and the shanks of the cutters are made circular in cross section, and axial rotation of the cutters is prevented by each cutter and a portion of the periphery of the disc adjacent to the mouth of each socket being so formed as to enter into transverse engagement with one another when the cutter is placed in position. Fig. 1 is a plan showing a portion of a cutter disc with a cutter in position; fig. 2 is a cross section taken in a plane at right-angles to the axis of the cutter; fig. 3 is an elevation of a portion of the periphery of the cutter disc; and fig. 4 is a side elevation of the cutter. Fig. 5 is a view corresponding to fig. 4, illustrating a modification. (Five claims.)



15569 (1912). *Improvements in Conveyor Bands.* H. Seck, of 15, Leubnitzerstrasse 15, Dresden, Germany.—This invention relates to a hinged conveyor band, the invention residing essentially in the fact that the conveyor band consists of a series of supporting plates arranged close together or at intervals and hinged together to form an endless band, upon which supporting plates the conveyor plates receiving the material to be conveyed are removably fixed. If the supporting plates are formed with lateral flanged or channelled guides it is possible to render the plates readily interchangeable without the necessity of fixing means such as screws, rivets or the like. The novel hinged conveyor band is illustrated by way of example in the accompanying drawing. (Four claims.)



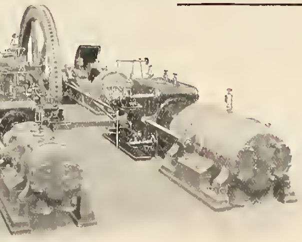
25742 (1911). *Improvements in Surveying Telescopes and like Instruments* G. Eagle, 37, Brown-street, Manchester, Lancashire.—This invention relates to that type of surveying telescope or tacheometer or like instrument in which an objective lens of any usual or suitable type is combined with a dispersive negative lens. It consists in so mounting the dispersive lens in conjunction with the objective lens that relative adjustment between the two can be easily effected by the maker of the instrument to correct any error in the focal length of the objective. This adjustability of one lens relatively to the other enables the length of their combined focus to be adjusted to any multiple of the distance between extra stadia webs when such are used, obviates the necessity of adjusting such webs relatively to one another, and offers a particular advantage with a glass diaphragm formed with engraved lines thereon the distance apart of which cannot be varied. When properly adjusted and set the combined lenses are fixed and secured relatively to each other. Should the objective glass be the one which is moved for focussing for varying distances the dispersive lens which is combined with it will move with it in the same direction. The accompanying drawing illustrates in vertical section one mode of combining the lenses in a tacheometer according to the invention. (Two claims.)



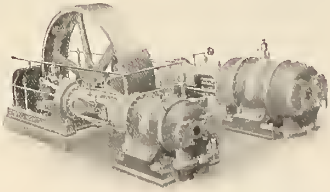
26451 (1911). *Improvements in and Relating to Apparatus for Deep Boring.* A. C. Potter, of Lant-street, Borough, London, S.E.—This invention relates to apparatus for deep boring, and particularly relates to that class of apparatus in which cores of the strata bored through are produced and brought to the ground level by the action of air under pressure. According to the invention compressed air and water are employed for the purpose of removing the *débris* as well as the core, the operation of boring being continued uninterruptedly. Two boring tubes are provided.

ALKER BROS. (WIGAN) LTD

efield Ironworks, WIGAN. New Broad Street House, LONDON.



Pair Compound Corliss Steam Two Stage Air Compressing Engines.

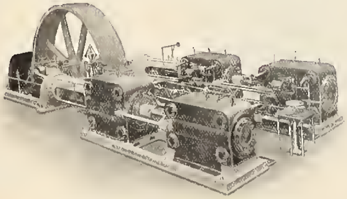


Pair Two Stage Air Compressing Engines for Belt Drive.

PATENT DISC VALVES FOR AIR COMPRESSING & BLOWING ENGINES.

H EFFICIENCY AND LARGE OUTPUT.

Applicable to existing Installations.

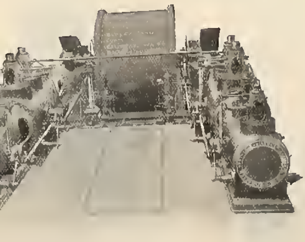


Triple Expansion Driving Engine with Corliss Valve Gear.

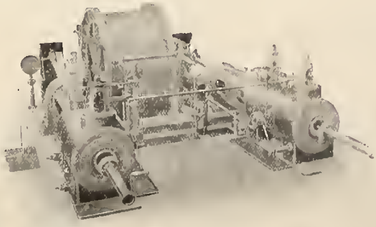
IDESTRUCTIBLE" TYPE VENTILATING FANS

FOR STEAM OR MOTOR DRIVING.

EASY MEANS FOR REVERSING AIR CURRENT.



Twin Tandem Compound Winding Engines.

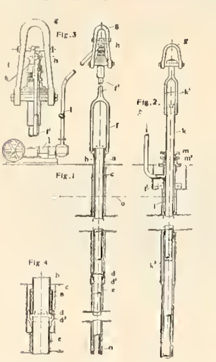


Horizontal Winding Engines with Two Non-Compound Cylinders

WINDING, HAULING AND GENERAL MINING MACHINERY.

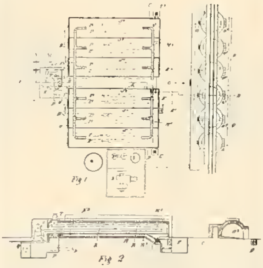
& Petries' Patent Overwind and Overspeed Device.

one within the other, leaving an annular space between them through which the compressed air passes down into a convenient position above the core barrel or within the core barrel or any other convenient position so as to induce rapid upward flow of water through the central tube and through the core barrel communicating therewith, the water thus carrying with it the *débris* as it is formed in the rotation of the boring tool as well as the core as it is detached in the operation of boring. Fig. 1 represents a sectional elevation



of one construction or arrangement of the apparatus, in use; fig. 2 represents a sectional elevation of a modification of the apparatus, in use; and figs. 3 and 4 are detail sectional views of the supporting gear and air inlet fitting for the inner tube respectively, to an enlarged scale of the apparatus shown in fig. 1. (Four claims.)

28145 (1911). *An Improved Process for Producing Peat Fuel or Coke, and Apparatus therefor.* W. L. St. Julien Prioleau, Pen-y-Lan, Boncath, South Wales, and J. R. H. Prioleau, 1, Trafalgar-square, Chelsea, London. — This invention relates to a method of treating peat for use as fuel, or for forming peat coke, and to the apparatus by which the process is carried out. The invention comprises the drying of the peat in two distinct stages—the one being really a heating process and the other a cooling process—the utilisation in the second stage of the damp heat evolved in the first stage, and an intermediate step of forming the partially dried peat into soft shapes, or blocks, by moderate pressure, which are afterwards condensed by cooling and drying in the second stage and without pressure. An essential feature of the complete process is that the crude peat is thoroughly disintegrated and the fibrous matter broken up before the preliminary heating is attempted. The preliminary drying stage then effects the drying of the peat in such a manner that not more than about half of its moisture is extracted from it at the same time that the peat is raised to a temperature of about 100 degs. Cent. The drying and heating are effected by causing a thin layer of the disintegrated peat to traverse a hot chamber subject to surface heating only, so that it is not harmfully affected by products of combustion or the like. Preferably the disintegrated peat will pass slowly through the hot chamber on travelling bands which deliver it to a briquetting machine. The moisture remaining in the peat, together with its own constituents, in view of the heat to which it is raised provide sufficient binding effect when subjected to moderate pressure to make a soft briquette which will retain its shape. The briquettes thus made are taken to a drying shed, the special feature of which is that by utilising warm air containing some moisture the cooling and drying is effected slowly in a current of moist air, and at a temperature of about 35 degs. Cent. The drying is continued for several days until ordinarily only about 2 per cent. to 10 per cent. of moisture remains in the blocks. If, however, a higher percentage of moisture may be allowed in the blocks, the drying period is correspondingly less. The heat required for this purpose is conveniently obtained by carrying the air from the preliminary heating chamber into the drying sheds and exhausting it after receiving its additional moisture by means of fans, a high chimney shaft, or otherwise. A convenient arrangement is to place the heating chamber in proximity to a line of coke ovens so that the gases therefrom or some of them may pass directly to the heating chamber flue, or flues, and to further arrange the drying sheds on each side of the central heating chamber—say, for instance, three on each side thereof, with connecting flues so that any one or more of the drying shed flues may receive the heat from the central chamber flue. Fig. 1 is a plan showing a combined plant for both briquetting and coking peat blocks, and fig. 2 is a sectional elevation on the line A B of fig. 1. (Four claims.)



The Markham Colliery, which is being sunk near Holly Bush, in the Sirhowy Valley, was the scene of an alarming occurrence on the 14th inst., which, fortunately, was not attended with any loss of life. It appears that while shot-firing was in progress by means of an electric battery from the top of the shaft, a gas blower in the shaft became ignited and flames shot up the shaft. The fire was got under about three o'clock in the afternoon. The shots were fired under water with a permitted explosive.

GOVERNMENT PUBLICATIONS.

⁂ Any of the following publications may be obtained on application to this office at the price named **post free.**

National Insurance: Welsh Regulations as to Powers and Duties of District Committees (H L. 181), 1d.; Draft Regulations under Section 67, December 2, 1912, 1½d.; Special Order, Inquiry Rules (Ireland), 1½d.

Friendly Societies: Report for 1911, 1s. 10d.; Forms A. R. 3 and A. R. 9, for 1912, 3½d. each.

Royal Scottish Museum Extension Act, 1912, 1½d.

Foreign Trade: Returns for November [H.C. 61, ix.], 6d.

Statistical Abstract for the Colonies, 1897-1911 [Cd. 6533] 2s. 3d.

Bahamas Report for 1911-12, 4½d.

Education Bill No. 2 (340), 1d.

Trade Unions Bill, Report (395), 6d.

MINES AND QUARRIES: STATISTICS, PART 2, for 1911, 1s. 7d.

Boiler Explosion Reports: Boiler Explosion at Staines (2165), 2½d.; Oven at Lye, near Stourbridge, 2½d.

Metalliferous Mines Evidence, January 17, 1912, 1s. 0½d.

MINE FORMS, Nos. 25 and 24, 1d. each.

MINES AND QUARRIES: Form 15D, Metalliferous Mines, Special Rules, &c., 2s. 6d.

Scottish Housing Commission.—The recently-appointed Royal Commission on Housing in Scotland held their first meeting in the offices of the Local Government Board for Scotland in Edinburgh, on the 20th inst. Sir Henry Ballantyne, the chairman, presided. The general lines to be followed in conducting the enquiry were discussed. It was decided that at the first meeting of the Commission for taking evidence the character of the evidence should be of a more general or official nature from Local Government Board officials and representatives of local authorities so as to open out the enquiry. It was decided to invite all parties interested desiring to give evidence to communicate with the secretaries at 45, Queen street, Edinburgh. The Commission are taking offices in Edinburgh, the address of which will be intimated later.

Prize Competition for Testing Autogenous Welds.—In view of the dangers liable to arise from defective joints made by the autogenous welding process, the Zentralbüro für Acetylen und Autogene Metallbearbeitung, Nuremberg, has decided to offer prizes amounting to 1,500 marks (1,000 marks first prize, 500 marks second prize) for a method of testing which will reveal inclusions, defective jointing, and overheating in autogenous-welded joints without injury to the joint itself. Special consideration will be given to simplicity and portability of the apparatus, and the prizes may be awarded to methods which, though they do not completely solve the entire problem, enable the quality of the weld to be accurately judged in the majority of cases. Descriptions of the process must be in writing and signed with a cognomen (which must also be forwarded, with the competitor's name, in a sealed envelope), and lodged before July 1, 1913. The awards will be made by a jury consisting of Prof. F. Wüst, Prof. Schlesinger, Prof. H. Baumann, Messrs. H. Richter, K. Schröder, and a representative of the Zentralbüro. The successful processes will be made public, with acknowledgment of authorship, but without any further remuneration.

First-class Medals—Paris, 1885, London, 1862.
"SHELTON" IRON.
"SHELTON" STEEL (Siemens Open Hearth.)
"GRANVILLE" PIG IRON (Forge and Foundry.)
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THE SOUTH WALES COALFIELD. PART II.
By Henry K. Jordan, F.G.S. (Past President and first Gold Medallist of the South Wales Institute of Engineers).
This Paper, which deals with the western part of the Coalfield, has just been published by the South Wales Institute of Engineers. It consists of 81 pages of printed matter with Sections and Diagrams. The large drawings are issued separately and comprise:—
1. A Horizontal Section across the anthracite region of Llandybie and Pant-y-ffynnon, and via the Dulais Valley to the sea at Swansea. It is drawn to a scale of six inches to one mile, is 8 ft. in length, mounted on linen, and geologically coloured.
2. Comparative Sections of the Lower Measures in the following areas—
(A) Neath Valley. (E) Ammanford.
(B) Swansea Valley. (F) Loughor Valley.
(C) Brynamman District. (G) Gwendraeth District.
(D) Amman Valley. (H) Gwendraeth District.
These are drawn on one sheet, about 35 by 30 in., mounted on linen, to a scale of 200 ft. to 1 in.
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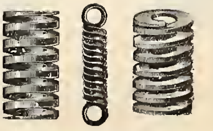

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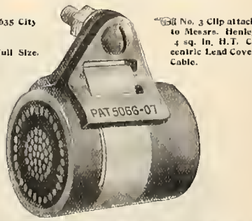

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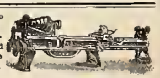

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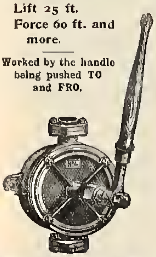

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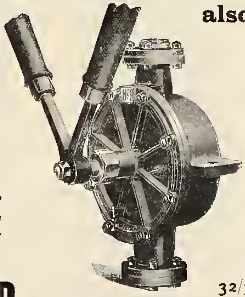

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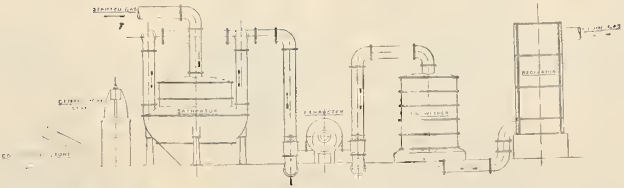

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- Wood, John, & Sons Ld., Brook Foundry, Wigan

Castings (Malleable)

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- Thomas and Bishop, 119-125, Finsbury Pav., E.C.

Cement-Making Machinery

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- Earle, G. & T., (1912) Ld., Wilmington, Hull

Centrifugal Fans
- Bumsted and Chandler Ld., Hednesford, Staffs.
- Davidson & Co. Ld., Belfast
- Heenan and Froude Ld., Worcester
- Waddle Patent Fan and Engineering Co., Llanelly
- Walker Bros. (Wigan) Ld., Wigan

Centrifugal Pumps
- Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
- British Westinghouse Electric and Manufacturing Co. Ld., Manchester
- Bumsted and Chandler Ld., Hednesford, Staffs.
- Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
- Hathorn, Davey & Co. Ld., Sun Foundry, Leeds
- Pulsometer Engineering Co. Ld., Reading
- Robey and Co. Ld., Lincoln
- Simon-Carves Ld., 20, Mount-street, Manchester
- Tickle Brothers, Vulcan Ironworks, Wigan
- Tangyes Ld., Cornwall Works, Birmingham

Channels (Steel)
- Scott, Walter, Ld., Leeds Steel Works, Leeds

Chains
- Firth, William, Ld., Leeds
- Haggie Brothers Ld., Gateshead-on-Tyne
- Benton, B. M., and Co., Sheffield
- Theedam, E. C., Ld., Dudley
- Wright, Joseph, and Co., Tipton
- Youngs, Byland-street Works, Birmingham

Chains for Driving and Power Transmission

Checks and Labels (Brass)
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- Frost, Albert, and Co., Sheffield
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- Humble, Stephen, 9, Victoria-st., London, S.W.
- Smallman, J. W., Nuneaton
- Theedam, E. C., Ld., Dudley
- Tickle Bros., Vulcan Ironworks, Wigan

Clutches (Facings for)
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- Bennis, Ed., and Co. Ld., Little Hulton, Bolton
- Coke Oven Construction Co. Ld., Sheffield
- Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
- Hardy Patent Pick Co. Ld., Sheffield
- Head, Wrightson and Co. Ld., Stockton-on-Tees
- Heenan & Froude Ld., Worcester and Manchester
- Koppers Coke Oven & Bye-Product Co., Sheffield
- Leech, Goodall & Co., Hunslet, Leeds
- Norton's (Tividale) Ld., Tipton
- Simon-Carves Ld., 20, Mount-street, Manchester
- Spencer and Co. Ld., Melksham, Wilts
- Tickle Brothers, Vulcan Ironworks, Wigan
- Wood, John, and Sons Ld., Wigan
- Wright, Joseph, and Co., Tipton
- Yorkshire Hennebique Contracting Co. Ld., Leeds

Coal Carrying Belts
- Bennis, Ed., and Co. Ld., Little Hulton, Bolton
- Cantrell, W. E., and Co. Ld., Beeston, Notts
- Cort, Arthur, & Co., 303½, Camberwell Rd., London
- Hardy Patent Pick Co. Ld., Sheffield
- Head, Wrightson and Co. Ld., Stockton-on-Tees
- Heenan & Froude Ld., Worcester and Manchester
- Leech, Goodall & Co., Hunslet, Leeds
- Norton's (Tividale) Ld., Tipton
- Reddaway, F., & Co. Ld., Pendleton, Manchester
- "Scandinavia" Belting Co. Ld., 59, Southwark street, S.E.
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- Davis, John, and Son (Derby) Ld., Derby
- Diamond Coal-Cutter Co., Wakefield
- Gillott, John, & Son, Lancaster Works, Barnsley
- Hardy Patent Pick Co. Ld., Sheffield
- Heenan and Froude Ld., Worcester
- Hurd Coal-Cutter and Engineering Co. Ld., 188, St. Vincent-street, Glasgow
- International Channelling Machines Ld., 327 Penistone-road, Sheffield
- Mavor and Coulson Ld., 47, Broad-street, Glasgow
- Mining Engineering Co. Ld. (The), Sheffield
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- Waterfall, H. & B., & Barber, Bridge-st., Sheffield

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- Davis, John, and Son (Derby) Ld., Derby
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- Head, Wrightson and Co. Ld., Stockton-on-Tees
- Heenan & Froude Ld., Worcester and Manchester
- Koppers (The) Coke Oven and Bye-Product Co., 301, Glossop-road, Sheffield
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- Norton's (Tividale) Ld., Tipton
- Reddaway, F., & Co. Ld., Pendleton, Manchester
- Simon-Carves Ld., 20, Mount-st., Manchester
- Spencer and Co. Ld., Melksham, Wilts
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- Wood, John, & Sons Ld., Brook Foundry, Wigan
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- Hardy Patent Pick Co. Ld., Sheffield
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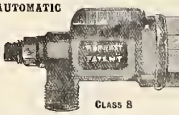

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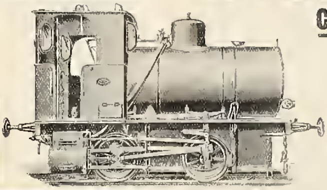

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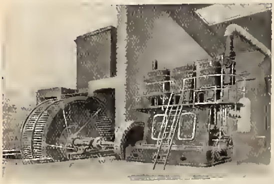

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Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Hyland-street Works, Birmingham

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Tangyes Ld., Cornwall Works, Birmingham
Youngs, Hyland-street Works, Birmingham

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Tangyes Ld., Cornwall Works, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Hyland-street Works, Birmingham

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Cut-off Gear

Brown, David, & Sons (Hudd.) Ld., Huddersfield
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Thornewill and Warham Ld., Burton-on-Trent
Wood, John, and Sons Ld., Wigan

Detonators

British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Dies, Embossing Presses, and Seals

Pryor, Edward, and Son, 68, West-st., Sheffield

Disintegrators

Davis, John, and Son (Derby) Ld., Derby
Hardy Patent Pick Co. Ld., Sheffield
Middleton, Robert, Sheepscar Foundry, Leeds
Simon-Carves Ld., 20, Mount-street, Manchester
Yeadon, Son and Co., Albion-place, Leeds

Diving Apparatus

Pulsometer Engineering Co. Ld., Reading
Siebe, Gorman and Co. Ld., Westminster S.W.

Dog Spikes

Frost, Albert, and Co., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Benton, B. M., & Co., Midland Works, Sheffield

Double Helical Gear (Machine Cut)

Brown, David, and Sons (H'f'd) Ld., Huddersfield
Citroen, Andre, and Co., 27, Queen Victoria-street, London

Drain Cocks

Appleton and Howard, St. Helens, Lancs.
Hopkinson, J., and Co. Ld., Huddersfield

Drawing Instruments

Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drawing Office Stationery

Davis, John, and Son (Derby) Ld., Derby
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

Drills (Electric)

United States Metallic Packing Co. Ld., Soho Works, Bradford

Driving Pulleys

Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Duplex Pumping Engines

Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Evans, Joseph, and Sons Ld., Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Pearn, F., and Co. Ld., West Gorton, Manchester
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Dustbins (Sanitary)

Baker, John, and Son, Bilston, Staffs
Harvey, G. A., & Co., Woolwich-rd., London, S.E.
Lewis, Wm., and Son, Bilston
Theedam, E. C., Ld., Dudley

Dynamite, &c.

British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Nobel's Explosives Co. Ld., Glasgow

Dynamos

British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Sutcliffe, Richard, Horbury, near Wakefield

Ebonite and Vulcanite

Cort, Arthur, & Co., 303½, Camberwell-rd., London

Electric Detonators and Fuses

British Explosives Syndicate Ld., Glasgow
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Electrical Earthing Clips

Ingle, Albert E., 13, Albert-place, Bridge street, Manchester

Electrical Engineers

British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Hurd Coal-Cutter and Engineering Co. Ld., 188, St. Vincent-street, Glasgow
Jardine, John, Deering-street, Nottingham
Mather and Platt Ld., Manchester
Theedam, E. C., Ld., Dudley

Electrical Fault Indicators

Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield

Electric Haulages

Avonside Engine Co. Ld., Bristol
Bridge, David, & Co. Ld., Castleton, Manchester
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davis John, and Son (Derby) Ld., Derby
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Longbotham, H. H., and Co. Ld., Wakefield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Electric Meters

British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby

Electrical Plant

British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Ward, Thos. W., Limited, Albion Works, Sheffield

Electrical Pumps

Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Davis, John, and Son (Derby) Ld., Derby
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Pulsometer Engineering Co. Ld., Reading
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Electrical Stores

Cort, Arthur, & Co., 303½, Camberwell-rd., London
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Theedam, E. C., Ld., Dudley

Emery Wheels

Enamelled Plates for Notices for Mines

Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff
Theedam, E.C., Ld., Dudley

Enamel Manufacturers (for all Metals)

Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Kalbitum Paint Co. Ld., Belvedere
Wailes, Dove and Co. Ld., Newcastle-on-Tyne

Engineers (Consulting)

Entreprise Générale de Fonçage de Puits, 5, Rue de Surêne, Paris
Fell, C. A., Dronfield, near Sheffield
Rodford, R. H., Son, and Squire, Sheffield
Sutcliffe, Richard, Horbury, near Wakefield
Thomas, Wm., Cambrian Mining School, Porth

Engines (Blowing)

British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Robey and Co. Ld., Lincoln
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Gas-Compressing)

British Oxygen Co. Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Reavell and Co. Ld., Ipswich
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Sons Ld., Wigan

Engines (Hauling and Winding)

Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford, Yorks.
Bradley & Craven Ld., Wakefield
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam
Longbotham, H. H., and Co. Ld., Wakefield
Phillips, Chas. D., Emlyn Works, Newport, Mon.
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Globe Works, Lincoln
Sheppard and Sons Ld., Bridgend, South Wales
Stringer, John, and Son, Dept. 11, Blackburn
Sutcliffe, H., Horbury, near Wakefield
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Walker Brothers (Wigan) Ld., Wigan
Wood John, & Sons Ld., Brook Foundry, Wigan

Engines (Locomotive)

Avonside Engine Co. Ld., Bristol
Bagnall, W. G., Ld., Castle Engine Works, Stafford
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Davis, John, & Son (Derby) Ld., Derby
Hawthorn, Leslie and Co. Ld., Newcastle-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Peckett & Sons, Atlas Locomotive Works, Bristol
Ward, Thos. W., Limited, Albion Works, Sheffield
Yorkshire Engine Co. Ld., Sheffield

Engines (Marine Type)

Mather and Platt Ld., Manchester

Engine Merchants

Phillips, C. B., Newport, Mon.
Stringer, John, and Son, Blackburn

Engines (Oil)

Avonside Engine Co. Ld., Bristol
Belliss and Morcom Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Engines Pumping) (See Pumps)

Engines (Rolling Mill)

Daglish, Robt., and Co. Ld., St. Helens, Lancs.

Engines (Steam)

Belliss and Morcom Ld., Birmingham
Bever, Dorling and Co. Ld., Bradford
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Pulsometer Engineering Co. Ld., Reading
Reavell and Co. Ld., Ipswich
Robey and Co. Ld., Globe Works, Lincoln
Stewarts and Lloyds Ld., Nile-st., Birmingham
Stewarts and Lloyds Ld., 41, Oswald-st., Glasgow
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Wood, John, and Sons Ld., Wigan
Wootton Bros. Ld., Coalville, Leicester

Exhaust Turbine Reducing Valves

Auld, D., and Sons, Whitevale Foundry, Glasgow
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Royles Ld., Irlam, Manchester

Exhaust Turbine Safety Valves

Auld, D., and Sons, Whitevale Foundry, Glasgow

Exhibitions

Expansion Gear

Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Teague and Chew Ld., Cinderford, Glos.
Wood, John, and Sons Ld., Wigan

Explosives

British Explosives Syndicate Ld., Glasgow
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow
Roburite Explosives Co. Ld., Gathurst, nr. Wigan and 163, Cannon-street, E.C.
Thompson and Co., Wigan

Explosives (Permitted)

Curtis's and Harvey Ld., Cannon-st. House, E.C.

Fans (Air Propeller)

Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester

Fans (Exhaust)

Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., & Co., Woolwich-rd., London, S.E.
Heenan and Froude Ld., Worcester
Waddle Patent Fan & Engineering Co. Ld., Llanmore Works, Llanelly
Walker Brothers (Wigan) Ld. Wigan

Fans (Ventilating

Alldays & Onions Pneumatic Engineering Co. Ld. Birmingham
Allen, W. G., and Sons (Tipton) Ld., Tipton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Capell Fan Co., 13, Mosley-st., Newcastle-on-Tyne
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Davidson and Co. Ld., Belfast
Harvey, G. A., & Co., Woolwich-rd., London, S.E
Heenan and Froude Ld., Worcester
Humble, Stephen, 9, Victoria-st., London, S.W
Lewis, Wm., and Son, Bilston, Staffs.
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Theedam, E. C., Ld., Dudley
Waddle Patent Fan & Engineering Co. Ld., Llanelly
Walker Brothers (Wigan) Ld., Wigan

Feed-Water Filters

Mather and Platt Ld., Manchester
Wright, Joseph, and Co., Tipton

Feed-Water Heaters

Bailey, W. H., and Co. Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Lancaster and Tonge Ld., Pendleton, Manchester
Royles Ld., Irlam, Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Tangyes Ld., Cornwall Works, Birmingham
Wright, Joseph, and Co., Tipton, Staffs.

Ferro-Concrete Constructions

Yorkshire Hennebique Contracting Co. Ld., Leeds

Files

Hardy Patent Pick Co. Ld., Sheffield
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

Filters (Oil)

Pulsometer Engineering Co. Ld., Reading
Royles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham
Wakefield, C. C., and Co., 27, Cannon-street, E.C
Willcox, W. H., and Co. Ld., London, S.E.
Wright, Joseph, and Co., Tipton

Filters (Water and Grease)

Mather and Platt Ld., Manchester
Pulsometer Engineering Co., Ld., Reading
Royles Ld., Irlam, Manchester
Wright, Joseph, and Co., Tipton

Fire Appliances

Fell, C. A., Dronfield, near Sheffield
Reddaway, F., & Co. Ld., Pendleton, Manchester
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

Fireclay Goods

Witton Firebrick Co. Ld., Darlington

Firewood Machinery

Glover, M., and Co., Holbeck-lane, Leeds

Firelighter Machinery

Glover, M., and Co., Holbeck-lane, Leeds

Fishplates

Bute Works Supply Co. Ld., 1, Pearson-pl., Cardiff
Firth, William, Ld., Leeds
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Railway and General Engineering Co. Ld., Notts
Benton, B. M., and Co., Midland Works, Sheffield
Shelton Iron, Steel, & Coal Co. Ld., Stoke-on-Trent
Ward, Thos. W., Ld., Albion Works, Sheffield

Fittings (Iron and Steel)

Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Stewarts & Lloyds Ld., Nile-street, Birmingham
Wellington Tube Works Ld., Great Bridge, Tipton

Forced Draught

Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Davidson and Co. Ld., Belfast
Heenan and Froude Ld., Worcester
Pillatt and Co. Ld., Stapleford, Nottingham

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Sheffield, England.

Purchasers' Guide to Advertisers' Specialities—(continued).

Forges
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Hardy Patent Pick Co. Ld., Sheffield

Forgings
Bagnall, W. G., Ld., Stafford
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Renton, B. M., and Co., Midland Works, Sheffield
Uskside Engineering Co. Ld., Newport
Walker Bros. (Wigan) Ld., Wigan
Wright, Joseph, and Co., Tipton
Yorkshire Engine Co. Ld. Sheffield

Friction Clutches
Bever, Dorling, and Co. Ld., Bradford, Yorks.
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Longbotham, B. H., and Co. Ld., Wakefield
Norton's (Tividale) Ld., Tipton
Reavell and Co. Ld., Ipswich
Reddaway, F., & Co. Ld., Pendleton, Manchester
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Brothers (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton

Friction Surfaces
Frood, Herbert, Co. Ld., Chapel-en-le-Frith

Fuel Economisers
Fell, C. A., Dronfield, near Sheffield
Pillatt and Co., Stapleford, Nottingham
Stringer, John, and Son, Dept. 11, Blackburn
Yorkshire Boiler Co. Ld. Bradford

Fuel Machinery
Middleton, Robert, Sheepscar Foundry, Leeds
Uskside Engineering Co. Ld., Newport
Yeadon, Son and Co., Albion-place, Leeds

Furnaces
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Bennis, Ed., and Co. Ld., Little Hulton, Bolton
Leech, Goodall & Co., Hunslet, Leeds
Pillatt and Co. Ld., Stapleford, Nottingham
Tickle Brothers, Vulcan Ironworks, Wigan

Furnace Ironwork
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Heenan & Froude Ld., Worcester and Manchester
Leech, Goodall & Co., Hunslet, Leeds
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Fuse Igniters

Fuses (Safety)
Cotton Powder Co. Ld., 32, Queen Victoria-st., E.C.
Curtis's and Harvey Ld., Cannon-st. House, E.C.
Davis, John, and Son (Derby) Ld., Derby
Electric Blasting Apparatus Co. Ld., Cinderford
Nobel's Explosives Co. Ld., Glasgow

Ganister Bricks

Gas Compressors
Belliss and Morcom Ld., Birmingham

Gas Engines
British Oxygen Co Ld., Elverton-st., Westminster
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Glover, M., and Co., Holbeck-lane, Leeds
Railway and General Engineering Co. Ld., Notts
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham

Gas Exhausters
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

Gas Plant
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Mather and Platt Ld., Manchester

Gas Producers
Appleby, E. G., and Co., 10, Victoria-street, Westminster

Gas-Testing Lamps
Ackroyd and Best Ld., Morley, Leeds
Davis, John, and Son (Derby) Ld., Derby

Gas Tubes and Fittings
Lewis, Edwin, and Sons, Wolverhampton
Stewarts & Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Tipton

Gas Valves
Haslam and Schontheil Ld., Bristol

Gauge Glasses
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Royles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley
Treasure, J. B., & Co., 8 & 12, Vauxhall-rd., L'pool

Gauge Glass Protectors
Davis, E., 2, Aire-street, Leeds
Hopkinson, J., and Co. Ld., Huddersfield
Royles Ld., Irlam, Manchester
Theedam, E. C., Ld., Dudley

Gauges
Davis, E., 2, Aire-street, Leeds
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Yorkshire Boiler Co. Ld., Bradford

Gear (Special for Motor Lorries Cars &c.)
Brown, David, & Sons (Hudd.) Ld., Huddersfield

Gearing
British Insulated and Helsby Cables Ld., Prescot
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Bumsted and Chandler Ld., Hednesford, Staffs.
Citroën, Andre, and Co., 27, Queen Victoria Street
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
Leech, Goodall & Co., Hunslet, Leeds
Thornewill and Warham Ld., Burton-on-Trent
Walker Brothers (Wigan) Ld., Wigan
Wood, John, and Son Ld., Brook Foundry, Wigan

Girders (Iron and Steel)
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Firth, Wm., Ld., Water-lane, Leeds
Heenan and Froude Ld., Manchester
Henderson and Glass, Liverpool
Isca Foundry Co., Newport, Mon.
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Ward, Thos. W., Limited, Albion Works, Sheffield

Glass Manufacturers (Tube Rods Enamels)
Guilbert-Martin, 9, Edmund-pl., Aldersgate, E.C.

Governors (Engine)
Evans, Joseph, and Sons (Wolverhampton) Ld., Wolverhampton
Mather and Platt Ld., Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Tangyes Ld., Cornwall Works, Birmingham

Governors (Hydraulic)

Grease
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Gaunt and Hickman, Wolverhampton
Trier Bros., Caxton House, Westminster
Theedam, E. C., Ld., Dudley
Thomas and Bishop, 119-125, Finsbury Pav., E.C.
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Grinding Machinery
Bridge, David, & Co. Ld., Castleton, Manchester
Hardy Patent Pick Co. Ld., Sheffield

Grindstones

Gunpowder
Curtis's and Harvey Ld., Cannon st. House, E.C.

Gutta Percha
Cort, Arthur, & Co. 503½, Camberwell-rd., London

Harness

Hauling Drums
Bever, Dorling and Co. Ld., Bradford
Bridge, David, & Co. Ld., Castleton, Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Heenan & Froude Ld., Worcester and Manchester
Norton's (Tividale) Ld., Tipton
Leech, Goodall & Co., Hunslet, Leeds
Phillips, C. D., Newport, Mon.
Robey and Co. Ld., Lincoln
Spencer and Co. Ld., Melksham, Wilts
Sutcliffe, B., Horbury, near Wakefield
Thornewill and Warham Ld., Burton-on-Trent
Tickle Brothers, Vulcan Ironworks, Wigan
Walker Bros. (Wigan) Ld., Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan
Wootton Bros. Ld., Coalville, Leicester
Wright, Joseph, and Co., Tipton
Youngs, Ryland-street Works, Birmingham

Headgears
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Heenan & Froude Ld., Worcester and Manchester
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Robey and Co. Ld., Lincoln
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Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Mather and Platt Ld., Manchester
Mavor and Coulson Ld., 47, Broad-street, Glasgow
Reavell and Co. Ld., Ipswich
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John & Sons Ld., Brook Foundry, Wigan
Wright, Joseph, and Co., Tipton
Youngs, Hyland-street Works, Birmingham

Hooks or Links (Safety)
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Walker, Thos., and Son Ld., Birmingham
Wood, John, & Sons Ld., Brook Foundry, Wigan
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Hoppers
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Harvey, G. A., & Co., Woolwich-rd., London, S.E
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Heenan and Froude Ld., Worcester
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Theedam, E. C., Ld., Dudley
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Cort, Arthur, & Co., 303½, Camberwell-rd., London
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Mining Engineering Co. Ld., Sheffield
Northern Rubber Co., The Wicker, Sheffield
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Reddaway, F., & Co. Ld., Pendleton, Manchester
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

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Davis, John, and Son (Derby) Ld., Derby

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Bagnall, W. G., Ld., Stafford
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Southern, T. A., Universal Mining School, Cardiff

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Jardine, John, Deering-street, Nottingham
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Railway & General Engineering Co. Ld., Notts
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Ward, Thos. W., Limited, Albion Works, Sheffield

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Bridge, David, & Co. Ld., Castleton, Manchester
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Tangyes Ld., Cornwall Works, Birmingham
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Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Hardy Patent Pick Co. Ld., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
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Youngs, Ryland-street Works, Birmingham

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Scott, Walter, Ld., Leeds Steel Works, Leeds

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Wood, John, and Sons Ld., Wigan

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Jardine, John, Deering-street, Nottingham
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Thomas, E., and Williams Ld., Aberdare

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Thomas, E., and Williams Ld., Aberdare

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Tangyes Ld., Cornwall Works, Birmingham

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Thomas, Wm., Cambrian Mining School, Glanfrwd, Porth, Glam.

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Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan
Youngs, Ryland-street Works, Birmingham

Lightning Conductors
British Insulated and Helsby Cables Ld., Prescot
Brown, W. B., and Co. (Bankhall) Ld., Liverpool
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Shaw, John, Ld., Sheffield
Theedam, E. C., Ld., Dudley

Locknut Washers
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Bridge, David, & Co. Ld., Castleton, Manchester
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Lancaster and Tonge Ld., Pendleton, Manchester
Ormerod, Edward, Atherton, nr. Manchester
Royles Ld., Irlam, Manchester
Tangyes Ld., Cornwall Works, Birmingham
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Benton, B. M., and Co., Midland Works, Sheffield
Stringer, John, and Son, Dept. 11, Blackburn
Ward, Thos. W., Ld., Albion Works, Sheffield

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United States Metallic Packing Co. Ld., Soho Works, Bradford

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Hardy Patent Pick Co. Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield

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Hardy Patent Pick Co. Ld., Sheffield
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Spencer and Co. Ld., Melksham, Wilts
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Wood, John, & Sons Ld., Brook Foundry, Wigan

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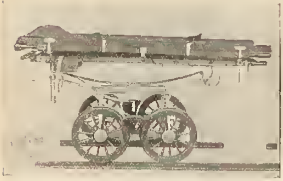
Head, Wrightson and Co. Ld., Stockton-on-Tees
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Spencer and Co. Ld., Melksham, Wilts
Thompson and Co., Wigan
Thompson and Southwick Ld., Tamworth
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, & Sons Ld., Brook Foundry, Wigan

Pump Buckets and Strips
Cort, Arthur, and Co., Camberwell, London
Daglish, Robert, and Co. Ld., St. Helens, Lancs

Pump (Packing)
Greene, Tweed and Co., Westminster
Northern Rubber Co., The Wicker, Sheffield
United States Metallic Packing Co. Ld., Soho Works, Bradford
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

Pumps and Pumping Machinery
Bailey, W. H., and Co. Ld., Salford, Manchester
Bever, Dorling and Co. Ld., Bradford, Yorks.
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Bumsted and Chandler Ld., Hednesford, Staffs.
Cameron, John, Ld., Salford, Manchester
Clarke, Chapman and Co. Ld., Gateshead-on-Tyne
Daglish, Robert, and Co. Ld., St. Helens, Lancs.
Davis, John, and Son (Derby) Ld., Derby
Evans, Joseph, & Sons (Wol. Ld.) Wolverhampton
Fraser & Chalmers Ld., 3, London Wall Bldgs., E.C.
Hathorn, Davey and Co. Ld., Leeds
Isca Foundry & Engineering Co., Newport, Mon.
Lancaster and Tonge Ld., Pendleton, Manchester
Llewellyn & Cubitt Ld., Pentre, R.S.O., Glam.
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Mavor and Coulson Ld., 47, Broad-st., Glasgow
Mather and Platt Ld., Manchester
Middleton, Robert, Sheepscar Foundry, Leeds
Pearn, Frank, & Co. Ld., West Gorton, Manchester
Phillips, C. D., Newport, Mon.
Pulsometer Engineering Co. Ld., Reading
Robey and Co. Ld., Lincoln
Tangyes Ld., Cornwall Works, Birmingham
Tickle Brothers, Vulcan Ironworks, Wigan
Uskside Engineering Co. Ld., Newport
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.
Wood, John, & Sons Ld., Brook Foundry, Wigan



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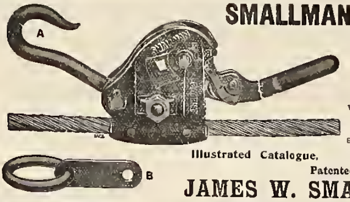

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The 1911 lever has large lateral stops and a wedge-shaped head.
Drop-forged shells (two sizes), levers (four sizes), catches and couplings.
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Patentee and Sole Manufacturer:—
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ENGINES FOR ELECTRIC LIGHT AND POWER.
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HEDNESFORD, STAFFS.

Purchasers' Guide to Advertisers' Specialities—(continued).

Pumps (Turbine)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Pulsometer Engineering Co. Ld., Reading
Tickle Brothers, Vulcan Ironworks, Wigan

Punching Bears
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street, Birmingham

Rail Benders
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Renton, B. M., and Co., Midland Works, Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Theedam, E. C., Ld., Dudley

Rail Sawing Machines
Orenstein and Koppel—Arthur Koppel, (Amalgamated), 27, Clements-lane, London, E.C.
Youngs, Ryland-street Works, Birmingham

Rails (Iron and Steel)
Bagnall, W. G., Ld., Stafford
Bute Works Supply Co. Ld., Cardiff
Firth, William, Ld., Leeds
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Railway and General Engineering Co. Ld., Notts
Renton, B. M., and Co., Midland Works, Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

Railway Carriages and Wagons
Allen, W. G., and Sons (Tipton) Ld., Tipton
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
Bristol and South Wales Railway Wagon Co. Ld., Bristol
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Cardiff
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester
Lancashire and Yorks, Wagon Co. Ld., Heywood
Lincoln Wagon and Engine Co. Ld., Lincoln
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld. Midland Works Birmingham
Moy, Thomas, Ld., Railway Works, Peterboro'
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Rigley, Wm., Bulwell, Nottingham
Rolling Stock Co., Darlington
Wigan Wagon Co. Ld., Springs Branch, Wigan

Railway Plant
Avonside Engine Co. Ld., Bristol
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, Birmingham
British Wagon Co. Ld., Rotherham
Bute Works Supply Co. Ld., Bute Docks, Cardiff
Firth, William, Ld., Leeds
Hardy Patent Pick Co. Ld., Sheffield
Head, Wrightson and Co. Ld., Stockton-on-Tees
Heenan & Froude Ld., Worcester
Isca Foundry and Engineering Co., Newport, Mon.
Marple & Gillott Ld., Coronation Bldgs., Sheffield
Midland Railway Carriage and Wagon Co. Ld. Midland Works Birmingham
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Renton, B. M., and Co., Midland Works, Sheffield

Railway Plant—continued.
Shelton Iron, Steel and Coal Co. Ld., Stoke-on-Trent, Staffs.
Summerson, Thomas, and Sons Ld., Darlington
Thompson and Co., Wigan
Ward, Thos. W., Limited, Albion Works, Sheffield
Youngs, Ryland-street Works, Birmingham

Railway Plant (Electrical)
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Mather and Platt Ld., Manchester
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.

Railway Wagon Association
Association of Private Owners of Railway Rolling Stock, Clarence Chambers, Gloucester
Chorley Railway Wagon Co. Ld., Chorley, Lancs.

Railway Wagon Financiers
Bristol and South Wales Railway Wagon Co. Ld., Bristol
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Lincoln Wagon and Engine Co. Ld., Lincoln

Railway Wagon Repairers
Birmingham Railway Carriage and Wagon Co. Ld., Smethwick, near Birmingham
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley
Heenan & Froude Ld., Worcester
Lancashire and Yorkshire Wagon Co. Ld., Heywood, near Manchester
Lincoln Wagon and Engine Co. Ld., Lincoln
Moy, Thomas, Ld., Railway Works, Peterboro'
Rigley, Wm., Bulwell, Nottingham

Railway Wagons (Tipping)
Allen, W. G., and Sons (Tipton) Ld., Tipton
Bagnall, W. G., Ld., Stafford.
British Wagon Co. Ld., Rotherham
Chorley Railway Wagon Co. Ld., Chorley, Lancs.
Heenan & Froude Ld., Worcester
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.

Rakes (Pit)
Baker, John, and Son, Bilston, Staffs
Hardy Patent Pick Co. Ld., Sheffield

Reducing Gear
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, and Sons (Huddersfield) Ld., Park Gear Works, Lockwood, Huddersfield

Reducing Valves (Full Bore and Standard)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield
Royles Ld., Irlam, Manchester

Refrigerators
Pulsometer Engineering Co. Ld., Reading

Refuse Destructors
Heenan & Froude Ld., Manchester

Regulating Valves (Full Bore)
Auld, D., and Sons, Whitevale Foundry, Glasgow
Royles Ld., Irlam, Manchester

Rescue Apparatus
British Oxygen Co. Ld., Elverton-st., Westminster
Davis, E., 2, Aire-street, Leeds
Knowles Oxygen Co. Ld., Wolverhampton
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., 187, Westminster-bridge-road, S.E.

Respirators
British Oxygen Co. Ld., Elverton-st., Westminster
Mining Engineering Co. Ld. (The), Sheffield
Siebe, Gorman and Co. Ld., Westminster

Rivets
Baker, John, and Son, Bilston, Staffs
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Renton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley
Ward, Thos. W., Limited, Albion Works, Sheffield

Rock Drills
Aqueous Works and Diamond Rock Boring Co. Ld., Guildford-st., York-road, Lambeth, S.E.
Davis, John, and Son (Derby) Ld., Derby
Diamond Coal-Cutter Co., Wakefield
Hardy Patent Pick Co. Ld., Sheffield
International Channelling Machines Ld., Sheffield
Mining Engineering Co. Ld. (The), Sheffield
Stephens, R., and Son, Carn Brea, Cornwall

Rollers and Pulleys (Haulage)
Bagnall, W. G., Ld., Stafford
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Renton, B. M., and Co., Sheffield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

Roofs and Outdoor Buildings
Heenan & Froude Ld., Newton Heath, Manchester
Isca Foundry & Engineering Co., Newport, Mon.
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Wootton Bros. Ld., Coalville, near Leicester
Wright, Joseph, and Co., Tipton

Ropes (Cotton Driving)
Kenyon, Wm., & Sons Ld., Dukinfield
Mudford, J. H., & Sons, 55, Exchange-st., Sheffield

Ropes (Driving)
Kenyon, W., & Sons Ld., Dukinfield Manchester

Ropes (Hemp and Manilla
Mudford, J. H., & Sons, 55, Exchange-st., Sheffield

Rope Preservative
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

Ropes (Wire)
Brown, W. B., and Co, (Bankhall) Ld., Liverpool
Cooke, William and Co. Ld., Tinsley, Sheffield
Elliot, George, and Co. Ld., Westminster, S.W.
Glover, Wm. Jas., and Co., St. Helens, Lancs.
Haggie Brothers Ld., Gateshead-on-Tyne
Latch and Batchelor Ld., Hay Mills, Birmingham
Shaw, John, Ld., Sheffield
Thompson and Co., Wigan

Ropeways
Bleichert, Adolf, and Co., 99-100, Palmerston House, Bishopsgate-st. Within, 60, E.C.
Tickle Brothers, Vulcan Ironworks, Wigan

Rubber-Covered Rollers
Northern Rubber Co., The Wicker, Sheffield
Beddaway, F., & Co. Ld., Pendleton, Manchester

Safety Valves
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster and Tonge Ld., Pendleton, Manchester
Royles Ld. Irlam, Manchester

Saws and Sawing Appliances
Appleby, E. G., and Co., 10, Victoria-street, Westminster
Glover, M., and Co., Holbeck-lane Leeds

Scoving for Coal and Coke
Baker, John, and Son, Bilston
Hardy Patent Pick Co. Ld., Sheffield
Theedam, E. C., Ld., Dudley

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Barns, W., and Son, Globe Works, Holloway, N.
Hardy Patent Pick Co. Ld., Sheffield
Harvey, G. A., & Co., Woolwich-rd., London, S.E.
Heenan and Froude Ld., Worcester
Norton's (Tividale) Ld., Tipton
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

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Hardy Patent Pick Co. Ld., Sheffield
Heenan & Froude Ld., Worcester and Manchester
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Simon-Carves Ld., 20, Mount-street, Manchester
Spencer and Co. Ld., Melksham, Wilts
Tickle Brothers, Vulcan Ironworks, Wigan
Wright, Joseph, and Co., Tipton

Screwing Machines
Frost, Albert, and Co., Sheffield
Tangyes Ld., Cornwall Works, Birmingham
Youngs, Ryland-street Works, Birmingham

Screws (Stretching)
Youngs, Ryland-street Works, Birmingham

Sewage Treatment Plant
Mather and Platt Ld., Manchester

Shafting
Bridge, David, & Co. Ld., Castleton, Manchester
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Fonçage de Puits, 5, Rue de Suréne, Paris
Hardy Patent Pick Co. Ld., Sheffield
Jardine, John, Deering-street, Nottingham
Lancaster and Tonge Ld., Pendleton, Manchester
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Spencer and Co. Ld., Melksham, Wilts
Tickle Bros., Vulcan Ironworks, Wigan
Uskside Eng. Co. Ld., Newport Mon.
Wright, Joseph, and Co., Tipton

Shaft Sinkers
Trefor Boring and Mining Co. Ld., Brussels

Sheet Iron
Firth, Wm., Ld., Water-lane, Leeds
Harvey, G. A., & Co., Leampit Vale, Lewisham, S.E.
Lewis, Wm., and Son, Bilston, Staffs.
Theedam, E. C., Ld., Dudley

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Baker, John, and Son, Bilston
Kenyon, Wm., & Sons, Ld., Dukinfield
Valor Co. Ld., Rocky-lane, Aston Cross, B'ngham

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British Explosives Syndicate Ld., Glasgow
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Baslam and Schonthell Ld., Cardiff
Nobel's Explosives Co. Ld., Glasgow

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Hardy Patent Pick Co. Ld., Sheffield
Renton, B. M., and Co., Sheffield
Theedam, E. C., Ld., Dudley

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Fell, C. A., Dronfield, near Sheffield

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Railway and General Engineering Co. Ld., Notts
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Summerson, Thomas, & Sons Ld., Darlington
Ward, Thos. W., Limited, Albion Works, Sheffield

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Allen, W. G., & Sons (Tipton) Ld., Tipton
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Bute Works Supply Co. Ld., Cardiff
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Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Renton, B. M., and Co., Midland Works, Sheffield

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Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Hardy Patent Pick Co. Ld., Sheffield

Purchasers' Guide to Advertisers' Specialities—(continued).

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Baker, John, and Son, Bilston, Staffs
British Wagon Co. Ld., Rotherham
Heenan and Froude Ld., Worcester
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford
Wright, Joseph, and Co., Tipton

SMOKE HELMETS
Siebe, Gorman and Co. Ld., Westminster, S.E.

SPEED-REDUCING GEARS
Bridge, David, & Co. Ld., Castleton, Manchester
Brown, David, & Sons (Hudd.) Ld., Huddersfield
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

SPRINKLER CLIP ARMOURED HOSE
Beddaway, F., & Co. Ld., Pendleton, Manchester

SPRINGS
British Wagon Co. Ld., Rotherham
Lancaster and Tonge Ld., Pendleton, Manchester
Skinner, J. P. and Co. Ld., Sheffield
Wigan Wagon Co. Ld., Springs Branch, Wigan

STAMPINGS
Baker, John, and Son, Bilston, Staffs
Chorley Railway Wagon Co. Ld., Chorley
Hardy Patent Pick Co. Ld., Sheffield
Lowmoor Co. Ld., Lowmoor Ironworks, Bradford

STEAM EXPERTS
Fell, C. A., Dronfield, near Sheffield
Boyles Ld., Irlam, Manchester
Tickle Brothers, Vulcan Ironworks, Wigan

STEAM FITTINGS
British Mannesmann Tube Co. Ld., London Wall
Green and Boulding Ld., 28, New Bridge-st., E.C.
Hopkinson, J., and Co. Ld., Huddersfield
Boyles Ld., Irlam, Manchester
Russell, John, and Co. Ld., Alma Works, Walsall
Spencer, John, Ld., Tube Works, Wednesbury
Stewarts and Lloyds Ld., Birmingham & Glasgow
Wellington Tube Works Ld., Great Bridge, Staffs.

STEAM MAINS AND PIPE INSTALLATIONS
Stewarts and Lloyds Ld., Birmingham & Glasgow
Tickle Brothers, Vulcan Ironworks, Wigan
Wellington Tube Works Ld., Great Bridge, Tipton

STEAM-SAVING APPLIANCES
Pillatt and Co. Ld., Stapleford, Nottingham
Boyles Ld., Irlam, Manchester
Yorkshire Boiler Co. Ld., Bradford

STEAM TRAPS
Alley and MacLellan Ld., Polmadie, Glasgow
Auld, D., and Sons, Whitevale Foundry, Glasgow
Bailey, W. H., and Co. Ld., Salford, Manchester
Hopkinson, J., and Co. Ld., Huddersfield
Lancaster & Tonge Ld., Pendleton, Manchester
Boyles Ld., Irlam, Manchester
Stewarts & Lloyds Ld., Birmingham and Glasgow
United States Metallic Packing Co. Ld., Bradford
Wright, Joseph, and Co., Tipton

STEAM WINCHES
Bridge, David, & Co. Ld., Castleton, Manchester
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Phillips, C. D., Newport, Mon.
Tickle Brothers, Vulcan Ironworks, Wigan
Wood, John, and Sons Ld., Wigan

STEEL
Cooke, William, and Co. Ld., Tinsley, Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Latch and Batchelor Ld., Hay Mills, nr. B'ham
Mining Engineering Co. Ld. (The), Sheffield
Shelton Iron, Steel & Coal Co. Ld., Stoke-on-Trent
Stewarts & Lloyds Ld., Birmingham and Glasgow
Thompson and Co., Wigan
Waterfall, H. & B., & Barber, Bridge-st., Sheffield

STEEL BLOOMS BILLETS
Renton, B. M., and Co., Sheffield
Scott, Walter, Ld., Leeds Steel Works, Leeds

STEEL FLATS AND ROUNDS
Scott, Walter, Ld., Leeds Steel Works, Leeds

STEEL TINBARS
Scott, Walter, Ld., Leeds Steel Works, Leeds

STENCIL PLATES, STEEL STAMPS, &C.
Pryor, Edward, & Son, 68, West-street, Sheffield

STONE BREAKERS
Hardy Patent Pick Co. Ld., Sheffield
Robey and Co. Ld., Lincoln

STRUCTURAL STEEL WORK
Hardy Patent Pick Co. Ld., Sheffield
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Norton's (Tividale) Ld., Tipton
Railway and General Engineering Co. Ld., Notts
Scott, Walter, Ld., Leeds Steel Works, Leeds
Wright, Joseph, and Co., Tipton

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Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

SULPHUR RECOVERY PLANT
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield

SUPERHEATERS
Clarke, Chapman & Co. Ld., Gateshead-on-Tyne
Heenan & Froude Ld., Worcester and Manchester
Pulsometer Engineering Co. Ld., Reading
Stringer, John, and Son, Dept. 11, Blackburn

SURGICAL APPLIANCES

SURPLUS STEAM VALVES (FULL BORE)
Alley and MacLellan Ld., Polmadie Glasgow
Auld, D., and Sons, Whitevale Foundry, Glasgow
Hopkinson, J., and Co. Ld., Huddersfield
Boyles Ld., Irlam, Manchester

SURVEYING (BOOKS ON)
Thomas, Wm., Cambrian Mining School, Porth

SURVEYING (INSTRUCTION)
Thomas, Wm., Cambrian Mining School, Porth

SURVEYING INSTRUMENT MAKERS
Davis, E., 2, Aire-street, Leeds
Davis, John, and Son (Derby) Ld., Derby
Harling, W. H., 47, Finsbury Pavement, London
Stanley, W. F., & Co. Ld., 286, High Holborn, W.C.
Thornton, A. G., Ld., King-st. West, Manchester

SWITCH BOARDS
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

SWITCH GEAR
British Insulated and Helsby Cables Ld., Prescot
British Westinghouse Electric and Manufacturing Co. Ld., Manchester
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

SWIVELS (BALL-BEARING)
Bridge, David & Co., Ld., Castleton, Manchester
Youngs, Ryland-street Works, Birmingham

TAMPING PLUGS

TANKS
Bagnall, W. G., Ld., Stafford
Daglish, Robert, and Co. Ld., St. Helens, Lancs
Harvey, G. A., & Co., Woolwich-rd., London, S.E.
Isca Foundry & Engineering Co., Newport, Mon.
Leech, Goodall & Co., Hunslet, Leeds
Mather and Platt Ld., Manchester
Stringer, John, and Son, Dept. 11, Blackburn
Theedam, E. C., Ld., Dudley
Tickle Brothers, Vulcan Ironworks, Wigan
Valor Co. Ld., Aston Cross, Birmingham
Ward, Thos. W., Limited, Albion Works, Sheffield
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan
Yorkshire Hennebique Contracting Co. Ld., Leeds

TANKS (FERRO CONCRETE)

TAR DISTILLING PLANT
Coke Oven Construction Co. Ld., Sheffield
Daglish, Robt., and Co. Ld., St. Helens, Lancs.
Koppers' (The) Coke Oven and Bye-Product Co., Sheffield
Simon-Carves Ld., 20, Mount-street, Manchester

TECHNICAL EDUCATION
Thomas, Wm., Cambrian Mining School, Porth
Southern, T. A., Universal Mining School, Cardiff

TELEPHONES
British Insulated and Helsby Cables Ld., Prescot
Davis, John, and Son (Derby) Ld., Derby
Haslam and Schontheil Ld., Cardiff

TIMBER (COLLIERY)
Baird, J. W., and Co., West Hartlepool
Osbeck and Co., Newcastle-on-Tyne

TIPPLERS.
Bagnall, W. G., Ld., Stafford
Cantrell, W. E., and Co. Ld., Beeston, Notts
Heenan and Froude Ld., Worcester
Leech, Goodall & Co., Hunslet, Leeds
Orenstein and Koppel—Arthur Koppel (Amalgamated), 27, Clements-lane, London, E.C.
Spencer and Co. Ld., Melksham, Wilts
Wright, Joseph, and Co., Tipton
Wood, John, and Sons Ld., Wigan

TOOLS
Alldays & Onions Pneumatic Engineering Co. Ld., Birmingham
Fell, C. A., Dronfield, near Sheffield
Hardy Patent Pick Co. Ld., Sheffield
Holland Drilling Co., 56, Moorgate-street, E.C.
Tangyes Ld., Cornwall Works, Birmingham
Willcox, W. H., & Co. Ld., 23, Southwark-st., S.E.

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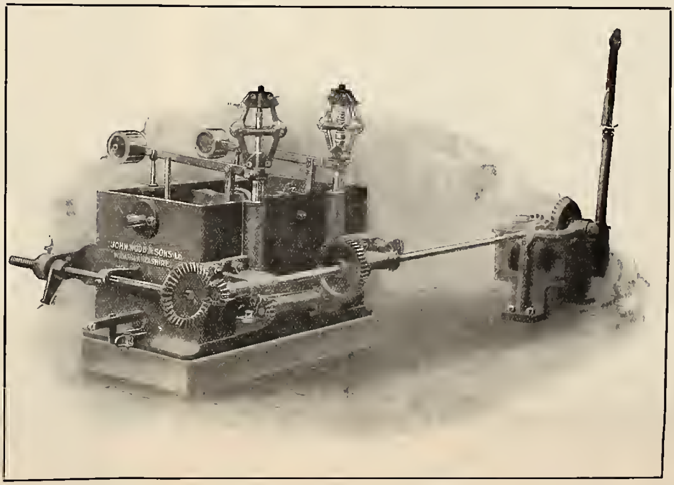

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The Teddington Urban District Council are desirous of receiving TENDERS for the supply of ROUGH SLACK, about 1,500 tons, for the period ending 31st December, 1913, delivered in quantities as required at the Sewage Works, situated in Broom-road, Teddington.

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The Council do not bind themselves to accept the lowest or any tender.

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G. H. SALMONS,
Clerk.

Council Offices,
Teddington,
14th December, 1912.

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For the Year 1913.

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⁂ *For* later Advertisements *and* Scale of Charges, *see* Page 1300 (Leader Page).

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January.

February.

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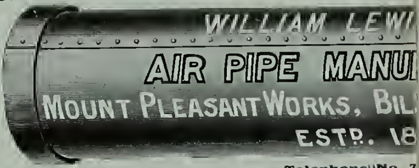

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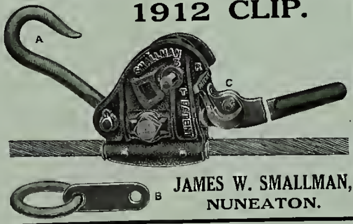

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JOHN THOMPSON, Wolverhampton, Eng.

Presented to the Subscribers] Supplement to the Colliery Guardian and Journal of the Coal and Iron Trades. [of the "Colliery Guardian."

THE COLLIERY GUARDIAN

ALMANAC 1913

COAL WASHING and SIZING PLANT, ANTHRACITE PLANT.

— *Write for Catalogue.* —

SHEPPARD & SONS LIMITED,
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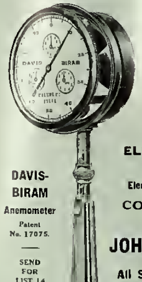

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Potts' Mining Register
AND DIRECTORY FOR THE
Coal and Ironstone Trades of Great Britain & Ireland.
W. J. POTTS, Atlas Works, NORTH SHIELDS, Northumberland

THE COLLIERY

January.

MOON'S CHANGES
New 7th 10h 28m morn. | Full 22nd 3h 40m after.
First 15th 4h 2m after. | Last 29th 7h 34m morn.

		ANNIVERSARIES, FESTIVALS, OCCURRENCES, HISTORICAL NOTES, ETC.
1	W	Stock Exchange closed
2	Th	
3	F	
4	S	
5	**S**	*2nd Sunday after Christmas*
6	M	*Epiphany.* Dividends due at
7	Tu	[Bank
8	W	
9	Th	Renishaw explosion, 1871
10	F	
11	S	Hilary Law Sittings begin
12	**S**	*1st Sunday after Epiphany*
13	M	Plough Monday
14	Tu	
15	W	Hartley accident, 1862
16	Th	
17	F	
18	S	Hyde explosion, 1889
19	**S**	*Septuagesima*
20	M	
21	Tu	Leycett Colliery explsn., 1880
22	W	
23	Th	
24	F	
25	S	
26	**S**	*Sexagesima*
27	M	[Tylorstown explosion, 1890
28	Tu	Roachburn accident, 1908
29	W	
30	Th	
31	F	

February.

MOON'S CHANGES
New 6th 5h 22m morn | Full 21st 8h 23m morn.
First 14th 0h 31m morn | Last 27th 9h 15m after.

		ANNIVERSARIES, FESTIVALS, OCCURRENCES, HISTORICAL NOTES, ETC.
1	S	
2	**S**	*Quinquagesima. Candlemas.*
3	M	
4	Tu	*Shrove Tuesday*
5	W	*Ash Wednesday.*
6	Th	Llanerch explosion, 1890
7	F	Whitfield explosion, 1881
8	S	Half-quarter Day
9	**S**	*1st Sunday in Lent.*
10	M	
11	Tu	
12	W	*Ember Day*
13	Th	
14	F	Morfa explosion, 1870
15	S	
16	**S**	*2nd Sunday in Lent*
17	M	West Stanley explosion, 1909
18	Tu	Ynyshir Colliery explosion, 1887
19	W	
20	Th	
21	F	
22	S	
23	**S**	*3rd Sunday in Lent*
24	M	*St. Matthias.* Pentre explo., 1871
25	Tu	
26	W	
27	Th	
28	F	

March.

MOON'S CHANGES
New 7th 0h 21m morn. | Full 22nd 11h 56m morn.
First 15th 0h 58m after. | Last 29th 0h 58m after.

		ANNIVERSARIES, FESTIVALS, OCCURRENCES, HISTORICAL NOTES, ETC.
1	S	*St. David.*
2	**S**	*4th Sunday in Lent*
3	M	
4	Tu	Genwen explosion, 1907
5	W	
6	Th	Dover sinking accident, 1897
7	F	
8	S	Harwood explosion, 1878
9	**S**	*Passion Sunday*
10	M	
11	Tu	Courrières explosion, 1906
12	W	
13	Th	Brynmally accident, 1889
14	F	
15	S	Victoria Pit explosion, 1851
16	**S**	*Palm Sunday*
17	M	*St. Patrick*
18	Tu	[Hilary Law Sittings end
19	W	Henwell explosion, 1907
20	Th	*Maundy Thursday*
21	F	*Good Friday.* Vernal Equinox
22	S	Easter Eve
23	**S**	*Easter Day*
24	M	Easter Monday, Bank Holiday
25	Tu	*Annunciation; Lady Day*
26	W	
27	Th	
28	F	[1912, passed
29	S	Coal Mines (Min. Wage) Act,
30	**S**	*Low Sunday*
31	M	

April.

MOON'S CHANGES.
New 6th 6h 46m after. | Full 20th 9h 33m after.
First 14th 5h 39m morn. | Last 28th 6h 9m after.

		ANNIVERSARIES, FESTIVALS, OCCURRENCES, HISTORICAL NOTES, ETC.
1	Tu	Highbrook explosion, 1869
2	W	[Easter Law Sittings begin
3	Th	
4	F	
5	S	Dividends due at Bank
6	**S**	*2nd Sunday after Easter*
7	M	
8	Tu	
9	W	Fire Insurances Expire
10	Th	
11	F	Pemberton accident, 1901
12	S	
13	**S**	*3rd Sunday after Easter*
14	M	Dukinfield explosion, 1874
15	Tu	
16	W	
17	Th	St. Helens explosion, 1889
18	F	Tudhoe explosion, 1882
19	S	Primrose Day
20	**S**	*4th Sunday after Easter*
21	M	
22	Tu	
23	W	*St. George*
24	Th	
25	F	*St. Mark*
26	S	
27	**S**	*Rogation Sunday*
28	M	*Rogation Day*
29	Tu	
30	W	Micklefield explosion, 1896

May.

MOON'S CHANGES.
New 6th 0h 24m morn. | Full 20th 7h 18m morn.
First 13th 11h 45m morn. | Last 28th 0h 4m morn.

		ANNIVERSARIES, FESTIVALS, OCCURRENCES, HISTORICAL NOTES, ETC.
1	Th	*Ascension Day*
2	F	Baddesley explosion, 1882
3	S	
4	**S**	*1st Sunday after Ascension*
5	M	
6	Tu	King's accession, 1910
7	W	
8	Th	[Sittings end
9	F	Half-quarter Day. Easter Law
10	S	Middle Duffryn explosion, 1852
11	**S**	*Whit Sunday*
12	M	Whit Monday. Bank Holiday
13	Tu	Whit Tuesday
14	W	*Ember Day*
15	Th	Scotch Quarter Day
16	F	
17	S	
18	**S**	*Trinity Sunday*
19	M	
20	Tu	Trinity Law Sittings begin
21	W	
22	Th	Universal explosion, 1901
23	F	[*Corpus Christi*
24	S	Empire Day.
25	**S**	*1st Sunday after Trinity*
26	M	Queen Mary b., 1867
27	Tu	Udston Colliery explosion, 1887
28	W	
29	Th	
30	F	
31	S	

June.

MOON'S CHANGES.
New 4th 7h 57m after. | Full 18th 5h 54m after.
First 11th 4h 37m after. | Last 26th 5h 41m after.

		ANNIVERSARIES, FESTIVALS, OCCURRENCES, HISTORICAL NOTES, ETC.
1	**S**	*2nd Sunday after Trinity*
2	M	
3	Tu	King George b., 1865
4	W	
5	Th	
6	F	
7	S	Haydock explosion, 1878
8	**S**	*3rd Sunday after Trinity*
9	M	
10	Tu	Ferndale explosion, 1840
11	W	*St. Barnabas*
12	Th	Dukinfield accident, 1866
13	F	
14	S	Victoria Pit explosion, 1866
15	**S**	*4th Sunday after Trinity*
16	M	Bedwellty explosion, 1865
17	Tu	
18	W	Clifton Hall explosion, 1885
19	Th	
20	F	
21	S	
22	**S**	*5th Sunday after Trinity*
23	M	Prince of Wales b., 1894
24	Tu	Midsummer Day. *John Baptist*
25	W	
26	Th	
27	F	
28	S	
29	**S**	*6th Sunday after Trinity*
30	M	[*St. Peter*

July.

MOON'S CHANGES.
New 4th 5h 6m morn. | Full 18th 6h 6m morn.
First 10th 9h 37m after. | Last 26th 9h 59m morn.

		ANNIVERSARIES, FESTIVALS, OCCURRENCES, HISTORICAL NOTES, ETC.
1	Tu	
2	W	Blantyre explosion, 1879
3	Th	
4	F	
5	S	Dividends due at Bank
6	**S**	*7th Sunday after Trinity*
7	M	Silverdale explosion, 1870
8	Tu	
9	W	Fire Insurance due
10	Th	[Cadeby Main explosion, 1912
11	F	National Colliery explosion, 1905
12	S	
13	**S**	*8th Sunday after Trinity*
14	M	
15	Tu	Risca explosion, 1880. *St. Swithin*
16	W	
17	Th	
18	F	[due
19	S	City and Boro' voters' Poor Rate
20	**S**	*9th Sunday after Trinity*
21	M	Haydock explosion, 1869
22	Tu	
23	W	Charles Colliery explosion, 1870
24	Th	
25	F	*St. James*
26	S	
27	**S**	*10th Sunday after Trinity*
28	M	
29	Tu	
30	W	[Game and Gun certs. expire
31	Th	Trinity Law Sittings end

August.

MOON'S CHANGES.
New 2nd 0h 58m after. | Full 16th 8h 27m after.
First 9th 4h 5m morn | Last 25th 0h 18m morn.
New 31st 8h 38m after.

		ANNIVERSARIES, FESTIVALS, OCCURRENCES, HISTORICAL NOTES, ETC.
1	F	Lammas Day
2	S	
3	**S**	*11th Sunday after Trinity*
4	M	Bank Holiday
5	Tu	
6	W	
7	Th	
8	F	
9	S	
10	**S**	*12th Sunday after Trinity*
11	M	Half-quarter Day
12	Tu	Grouse shooting begins
13	W	Woodend Pits explosion, 1866
14	Th	
15	F	
16	S	
17	**S**	*13th Sunday after Trinity*
18	M	Maypole explosion, 1908
19	Tu	
20	W	Garswood explosion, 1867
21	Th	
22	F	
23	S	
24	**S**	*14th Sunday after Trinity*
25	M	[*St. Bartholomew*
26	Tu	Park Slip explosion, 1892
27	W	
28	Th	
29	F	
30	S	
31	**S**	*15th Sunday after Trinity*

September.

MOON'S CHANGES
First 7th 0h 6m after. | Last 23rd 0h 30m after.
Full 15th 0h 46m after. | New 30th 4h 57m morn.

		ANNIVERSARIES, FESTIVALS, OCCURRENCES, HISTORICAL NOTES, ETC.
1	M	Partridge shooting begins
2	Tu	
3	W	Abertysswg explosion, 1902
4	Th	
5	F	
6	S	Moss Pit explosion, 1871
7	**S**	*16th Sunday after Trinity*
8	M	Seaham explosion, 1880
9	Tu	
10	W	
11	Th	Ebbw Vale explosion, 1878
12	F	
13	S	
14	**S**	*17th Sunday after Trinity*
15	M	
16	Tu	
17	W	*Ember Day*
18	Th	
19	F	
20	S	
21	**S**	*18th Sunday after Trinity*
22	M	[*St. Matthew*
23	Tu	Autumnal Equinox
24	W	
25	Th	
26	F	
27	S	
28	**S**	*19th Sunday after Trinity*
29	M	Michaelmas Day
30	Tu	

October.

MOON'S CHANGES.
First 7th 1h 46m morn. | Last 22nd 10h 53m after.
Full 15th 6h 7m morn. | New 29th 2h 29m after.

		ANNIVERSARIES, FESTIVALS, OCCURRENCES, HISTORICAL NOTES, ETC.
1	W	Pheasant Shooting begins
2	Th	Jewish Year begins
3	F	
4	S	Foggs accident, 1907
5	**S**	*20th Sunday after Trinity*
6	M	Dividends due at bank
7	Tu	Marley explosion, 1872
8	W	
9	Th	
10	F	
11	S	Pemberton explosion, 1877
12	**S**	*21st Sunday after Trinity*
13	M	Michaelmas Law Sittings begin
14	Tu	Fire Insurance due
15	W	
16	Th	
17	F	Morfa explosion, 1863
18	S	Wharncliffe explosion, 1883
19	**S**	*22nd Sunday after Trinity*
20	M	
21	Tu	Trafalgar Day, 1805
22	W	Blantyre explosion, 1877
23	Th	
24	F	
25	S	Seaham explosion, 1871
26	**S**	*23rd Sunday after Trinity*
27	M	
28	Tu	*SS. Simon and Jude*
29	W	
30	Th	
31	F	Pelton explosion, 1866

November.

MOON'S CHANGES.
First 5th 6h 34m after. | Last 21st 7h 57m morn.
Full 13th 11h 11m after. | New 28th 1h 41m morn.

		ANNIVERSARIES, FESTIVALS, OCCURRENCES, HISTORICAL NOTES, ETC.
1	S	*All Saints*
2	**S**	*24th Sunday after Trinity*
3	M	
4	Tu	
5	W	
6	Th	
7	F	Altham explosion, 1883
8	S	Ferndale accident, 1867
9	**S**	*25th Sunday after Trinity*
10	M	
11	Tu	*Martinmas.* Half-quarter Day
12	W	
13	Th	Radbod explosion, 1908
14	F	
15	S	Barrow accident, 1907
16	**S**	*26th Sunday after Trinity*
17	M	
18	Tu	Bardon accident, 1907
19	W	
20	Th	
21	F	
22	S	Walker accident, 1862
23	**S**	*27th Sunday after Trinity*
24	M	
25	Tu	Whitehaven explosion, 1897
26	W	
27	Th	
28	F	Marianna explosion, 1908
29	S	
30	**S**	*Advent Sunday*

December.

MOON'S CHANGES
First 5th 2h 59m after | Last 20th 4h 16m after.
Full 13th 3h 0m after | New 27th 2h 59m after.

		ANNIVERSARIES, FESTIVALS, OCCURRENCES, HISTORICAL NOTES, ETC.
1	M	
2	Tu	Elemore Colliery accident, 1886
3	W	
4	Th	Powell Duffryn accident, 1875
5	F	[Monongah explosion, 1907
6	S	Swaithe Main explosion, 1875
7	**S**	*2nd Sunday in Advent*
8	M	Edmunds Main accident, 1862
9	Tu	
10	W	Black Game and Grouse
11	Th	[shooting ends
12	F	Oaks Colliery explosion, 1866
13	S	Talk-o'-th'-Hill accident, 1866
14	**S**	*3rd Sunday in Advent*
15	M	
16	Tu	Coal Mines Act 1911, passed
17	W	Urpeth explosion, 1906
18	Th	
19	F	Abram explo., 1881; Darr, 1907
20	S	Cethin Cyfarthfa accident, 1865
21	**S**	*4th Sunday in Advent*
22	M	Shortest Day
23	Tu	Mardy explosion, 1885
24	W	
25	Th	*Christmas Day*
26	F	*St. Stephen.* Bank Holiday
27	S	*St. John*
28	**S**	*1st Sunday after Christmas*
29	M	*Holy Innocents*
30	Tu	
31	W	

GUARDIAN

COAL STATISTICS.

PRODUCTION OF COAL, 1911.

County.	Total Quantity 1911. Tons.	Total Quantity 1910. Tons.
England:—		
Cheshire	300,180	348,464
Cumberland	2,256,254	2,174,755
Derby	17,174,490	17,276,947
Durham	41,719,916	39,131,598
Gloucester	1,138,700	1,417,150
Kent	150	—
Lancaster	23,674,631	23,417,813
Leicester	2,800,107	2,793,120
Monmouth	13,708,747	13,006,275
Northumberland	14,082,427	13,121,691
Nottingham	11,673,250	11,180,353
Salop	813,191	837,341
Somerset	1,161,023	1,208,016
Stafford	14,017,758	14,060,785
Warwick	4,603,483	4,651,336
Westmorland	1,185	1,120
Worcester	615,353	655,297
York	39,135,418	38,306,600
Total	190,231,139	183,898,071
Wales:—		
Brecon	776,486	738,725
Carmarthen	2,115,311	2,085,501
Denbigh	2,670,686	2,608,370
Flint	763,392	814,500
Glamorgan	33,469,974	32,878,627
Pembroke	46,209	40,851
Total	39,845,058	39,104,581
Scotland:—		
Argyll, Dumfries, Kinross, Peebles, and Sutherland	403,634	414,638
Ayr	4,201,813	4,018,119
Clackmannan	111,746	105,912
Dumbarton	559,121	558,351
Edinburgh	3,038,868	2,991,811
Fife	9,437,590	9,674,144
Haddington	1,021,169	1,068,364
Lanark	17,501,906	17,880,137
Linlithgow	2,178,827	2,159,433
Renfrew	131,250	131,756
Stirling	3,112,939	3,075,782
Total	41,718,163	41,335,132
Ireland	81,564	79,602
Total United Kingdom	271,878,124	264,117,588

TECHNICAL INSTITUTIONS.

SECRETARIES, ANNUAL MEETINGS, &c.

Institution of Mining Engineers (Prof. O'Shea, hon. secretary; P. Strzelecki, secretary, Albany-buildings, 39, Victoria-street, S.W.)—
London Meeting ... June 5 & 6, 1913
Provincial Meeting (Manchester) ... September 24, 25 & 26, 1913

North of England Institute of Mining and Mechanical Engineers (L. Austin, Neville Hall, Newcastle-on-Tyne) ... August 2, 1913

Midland Institute of Mining, Civil and Mechanical Engineers (G. H. Walker, St. James's-chambers, Church-street, Sheffield) ... July 20, 1913

Midland Counties Institution of Engineers (G. A. Lewis, Albert-street, Derby) ... September 1913

Manchester Geological and Mining Society (S. A. Smith, 5, John Dalton-st., Manchester) Oct. 14, 1913

North Staffordshire Institute of Mining and Mechanical Engineers (F. R. Atkinson, Duffield, nr. Derby) ... October 13, 1913

H.M. INSPECTORS OF MINES, &c.

Chief Inspector of Mines: R. A. S. Redmayne, Esq., C.B., Home Office, Whitehall, London.

Electrical Inspector of Mines: Robert Nelson, Esq., Home Office, Whitehall, London.

Private Secretary to Chief Inspector: Granville Poole, Esq., Home Office, Whitehall, London.

Secretary to the Board for Mining Examinations: W. W. Ward, Esq., Home Office, Whitehall, London.

(a) Inspector; (b) Senior Inspector; (c) Junior Inspector; (d) Sub-inspectors.

1.—*Scotland District.*
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COAL STATISTICS.

PERSONS EMPLOYED, ACCIDENTS, &c., UNDER COAL MINES ACT.

Year.	Persons employed. Under ground.	Above ground.	Total.	Separate fatal accidents.	Deaths caused by the accidents.
1902	662,902	161,889	824,791	910	1,021
1903	676,716	165,350	842,066	1,036	1,072
1904	684,683	162,870	847,553	1,017	1,055
1905	691,112	167,261	858,373	963	1,159
1906	709,515	172,800	882,315	1,065	1,142
1907	757,687	182,731	940,618	1,162	1,245
1908	796,320	191,481	987,813	1,138	1,308
1909	818,381	195,617	1,013,998	1,182	1,453
1910	848,381	201,026	1,049,407	1,242	1,775
1911	863,512	203,701	1,067,213	1,212	1,265

(Number of mines at work in 1911, 3,323).

ACCIDENT DEATH RATES IN COALMINES (Per 1,000 employed.)

	Explosions.	Falls.	Shafts.	All causes. Below ground.	All causes. Above and below ground.
1873-82	0·63	1·12	0·32	2·37	2·24
1883-92	0·32	1·00	0·19	2·01	1·81
1893-1902	0·18	0·74	0·15	1·52	1·39
1903	0·02	0·81	0·10	1·35	1·27
1904	0·10	0·75	0·12	1·31	1·24
1905	0·26	0·75	0·09	1·49	1·35
1906	0·08	0·78	0·10	1·42	1·29
1907	0·16	0·78	0·13	1·46	1·32
1908	0·16	0·71	0·10	1·46	1·32
1909	0·25	0·71	0·10	1·61	1·43
1910	0·59	0·75	0·10	1·91	1·69
1911	0·01	0·71	0·11	1·29	1·19

OUTPUT OF BRITISH COAL, 1891-1911. [Including coal raised from quarries.]

	Tons.		Tons.		Tons.
1891	185,479,126	1898	202,054,516	1905	236,128,936
1892	181,786,871	1899	220,094,781	1906	251,067,628
1893	164,325,795	1900	225,181,300	1907	267,830,962
1894	188,277,525	1901	219,046,945	1908	261,528,795
1895	189,661,362	1902	227,095,042	1909	263,774,312
1896	195,361,260	1903	230,334,469	1910	264,433,028
1897	202,129,931	1904	232,428,272	1911	271,891,899

EXPORTS OF BRITISH COAL IN 1911

	1911. Quantity. Tons.	1911. Average value per ton. s. d.	1910. Quantity. Tons.	1910. Average value per ton. s. d.
Coal—				
Anthracite	2,654,523	15 2·1	2,425,932	15 10·6
Steam	47,119,017	11 7·0	45,190,340	11 10·0
Gas	10,504,172	8 9·0	10,142,708	10 2·1
Household	1,540,710	10 6·5	1,549,735	10 7·6
Other sorts	2,980,544	9 6·7	2,176,711	10 1·0
Large	36,952,418	12 10·6	36,593,094	13 1·7
Thro'-and-thro'	13,035,231	9 7·7	11,256,105	10 1·2
Small	14,611,565	8 9·7	14,206,277	8 11·2
Total & average	64,599,266	11 3·7	62,085,476	11 7·5
Coal shipped to bunkers	19,264,189	—	19,525,735	—

From	1911. Tons.	1910. Tons.	1909 Tons
Bristol Channel ports	25,199,795	23,222,257	25,368,509
North western ports	711,703	687,707	530,080
North-eastern ports	21,716,027	19,981,423	20,199,579
Humber ports	6,264,063	6,598,145	6,603,244
Other ports on east coast	125,179	336,010	378,716
Other English ports	197	1,388	1,946
East Scotland ports	8,743,321	8,180,772	7,993,557
West Scotland ports	2,158,950	2,075,852	2,047,326

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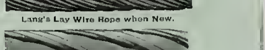

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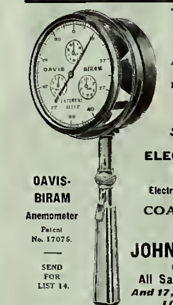

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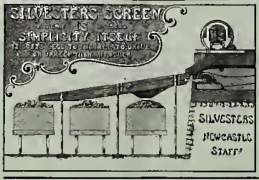
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E
R
Y

1 Tu
2 W Blantyre explosion, 1879
3 Th
4 F
5 S Dividends due at Bank
6 **S** *7th Sunday after Trinity*
7 M Silverdale explosion, 1870
8 Tu
9 W Fire Insurance due
10 Th [Cadeby Main explosion, 1912
11 F National Colliery explosion, 1905
12 S
13 **S** *8th Sunday after Trinity*
14 M
15 Tu Risca explosion, 1880. *St. Swithin*
16 W
17 Th
18 F [div-
19 S City and Boro' voters' Poor Rate
20 **S** *9th Sunday after Trinity*
21 M Haydock explosion, 1869
22 Tu
23 W Charles Colliery explosion, 1870
24 Th
25 F *St. James*
26 S
27 **S** *10th Sunday after Trinity*
28 M
29 Tu
30 W [Game and Gun certs. expire
31 Th Trinity Law Sittings end

1 F Lammas Day
2 S
3 **S** *11th Sunday after Trinity*
4 M Bank Holiday
5 Tu
6 W
7 Th
8 F
9 S
10 **S** *12th Sunday after Trinity*
11 M Half-quarter Day
12 Tu Grouse shooting begins
13 W Woodend Pits explosion, 1866
14 Th
15 F
16 S
17 **S** *13th Sunday after Trinity*
18 M Maypole explosion, 1908
19 Tu
20 W Garswood explosion, 1867
21 Th
22 F
23 S
24 **S** *14th Sunday after Trinity*
25 M [*St. Bartholomew*
26 Tu Park Slip explosion, 1892
27 W
28 Th
29 F
30 S
31 **S** *15th Sunday after Trinity*

1 M Partridge shooting begins
2 Tu
3 W Abertysswg explosion, 1902
4 Th
5 F
6 S Moss Pit explosion, 1871
7 **S** *16th Sunday after Trinity*
8 M Seaham explosion, 1880
9 Tu
10 W
11 Th Ebbw Vale explosion, 1878
12 F
13 S
14 **S** *17th Sunday after Trinity*
15 M
16 Tu
17 W *Ember Day*
18 Th
19 F
20 S
21 **S** *18th Sunday after Trinity*
22 M [*St. Matthew*
23 Tu Autumnal Equinox
24 W
25 Th
26 F
27 S
28 **S** *19th Sunday after Trinity*
29 M Michaelmas Day
30 Tu

1 W Pheasant Shooting begins
2 Th Jewish Year begins
3 F
4 S Foggs accident, 1907
5 **S** *20th Sunday after Trinity*
6 M Dividends due at bank
7 Tu Marley explosion, 1872
8 W
9 Th
10 F
11 S Pemberton explosion, 1877
12 **S** *21st Sunday after Trinity*
13 M Michaelmas Law Sittings begin
14 Tu Fire Insurance due
15 W
16 Th
17 F Morfa explosion, 1863
18 S Wharncliffe explosion, 1883
19 **S** *22nd Sunday after Trinity*
20 M
21 Tu Trafalgar Day, 1805
22 W Blantyre explosion, 1877
23 Th
24 F
25 S Seaham explosion, 1871
26 **S** *23rd Sunday after Trinity*
27 M
28 Tu *SS. Simon and Jude*
29 W
30 Th
31 F Pelton explosion, 1866

1 S *All Saints*
2 **S** *24th Sunday after Trinity*
3 M
4 Tu
5 W
6 Th
7 F Altham explosion, 1883
8 S Ferndale accident, 1867
9 **S** *25th Sunday after Trinity*
10 M
11 Tu *Martinmas.* Half-quarter Day
12 W
13 Th Radbod explosion, 1908
14 F
15 S Barrow accident, 1907
16 **S** *26th Sunday after Trinity*
17 M
18 Tu Rawdon accident, 1907
19 W
20 Th
21 F
22 S Walker accident, 1862
23 **S** *27th Sunday after Trinity*
24 M
25 Tu Whitehaven explosion, 1897
26 W
27 Th
28 F Marianna explosion, 1908
29 S
30 **S** *Advent Sunday*

1 M
2 Tu Elemore Colliery accident, 1886
3 W
4 Th Powell Duffryn accident, 1875
5 F [Monongah explosion, 1907
6 S Swaithe Main explosion, 1875
7 **S** *2nd Sunday in Advent*
8 M Edmunds Main accident, 1862
9 Tu
10 W Black Game and Grouse
11 Th [shooting ends
12 F Oaks Colliery explosion, 1866
13 S Talk-o'-th'-Hill accident, 1866
14 **S** *3rd Sunday in Advent*
15 M
16 Tu Coal Mines Act 1911, passed
17 W Urpeth explosion, 1906
18 Th
19 F Abram explo., 1881; Darr, 1907
20 S Cethin Cyfarthfa accident, 1865
21 **S** *4th Sunday in Advent*
22 M Shortest Day
23 Tu Mardy explosion, 1885
24 W
25 Th *Christmas Day*
26 F *St. Stephen.* Bank Holiday
27 S *St. John*
28 **S** *1st Sunday after Christmas*
29 M *Holy Innocents*
30 Tu
31 W

COAL STATISTICS.

PRODUCTION OF COAL, 1911.

County.	Total Quantity 1911. Tons.	Total Quantity 1910. Tons.
England:—		
Chester	300,180	348,464
Cumberland	2,256,254	2,174,755
Derby	17,174,490	17,476,941
Durham	41,718,016	39,431,598
Gloucester	1,436,200	1,417,150
Kent	150	—
Lancaster	23,674,631	23,417,913
Leicester	2,860,497	2,703,130
Monmouth	13,780,717	13,006,275
Northumberland	14,082,427	13,121,601
Nottingham	11,623,250	11,180,353
Salop	915,194	837,541
Somerset	1,161,023	1,208,046
Stafford	14,017,758	14,009,765
Warwick	4,681,483	4,651,336
Westmoreland	1,184	1,120
Worcester	615,353	638,297
York	39,135,418	38,300,600
Total	190,231,139	183,898,071
Wales:—		
Brecon	178,486	178,725
Carmarthen	2,115,911	2,035,301
Denbigh	2,679,083	2,598,370
Flint	703,392	812,506
Glamorgan	33,163,074	32,878,827
Pembroke	46,209	40,651
Total	39,643,058	39,114,581
Scotland:—		
Argyll, Dumfries, Kinross, Peebles, and Sutherland	493,634	444,634
Ayr	4,201,813	4,018,119
Clackmannan	414,741	405,912
Dumbarton	559,121	558,351
Edinburgh	3,053,978	2,991,611
Fife	9,037,110	8,671,444
Haddington	1,021,160	1,068,364
Lanark	17,341,906	17,886,137
Linlithgow	2,178,827	2,150,633
Renfrew	151,350	182,756
Stirling	3,112,939	3,075,782
Total	41,718,163	41,335,132
Ireland	84,564	79,602
Total United Kingdom	271,878,124	264,417,558

TECHNICAL INSTITUTIONS.

SECRETARIES, ANNUAL MEETINGS, &c.

Institution of Mining Engineers (Prof. O'Shea, hon. secretary; P. Strzelecki, secretary, Albany-buildings, 39, Victoria-street, S.W.)—
London Meeting . . . June 5 & 6, 1913
Provincial Meeting (Manchester) September 24, 25 & 26, 1913

North of England Institute of Mining and Mechanical Engineers (L. Austin, Neville Hall, Newcastle-on-Tyne) August 2, 1913

Midland Institute of Mining, Civil and Mechanical Engineers (G. B. Walker, St. James's Chambers, Church-street, Sheffield) July 20, 1913

Midland Counties Institution of Engineers (G. A. Lewis, Albert-street, Derby) September 1913

Manchester Geological and Mining Society (S. A. Smith, 5, John Dalton-st., Manchester) Oct. 14, 1913

North Staffordshire Institute of Mining and Mechanical Engineers (F. H. Allinson, Duffield, nr. Derby) October 13, 1913

South Staffordshire and Warwickshire Institute of Mining Engineers (G. D. Smith, 3, Newhall-street, Birmingham) . . . October 20, 1913

Mining Institute of Scotland (J. Barrowman, Staneacre, Hamilton, N.B.) April 12, 1913

South Wales Institute of Engineers (Martin Price, Park-place, Cardiff) March 18, 1913
Annual Dinner . . . January 23, 1913

Institution of Mining and Metallurgy (C. McDermid, 722-725a, Salisbury House, London-wall, E.C.) March 13, 1913

National Association of Colliery Managers (G. A. Lewis, Albert-st., Derby) London (date not fixed).

Association of Mining Electrical Engineers (C. St. C. Saunders, Bank-chambers, London road, Derby) . . . October, 1913 (Provis.)

Indian Mining and Geological Club (London) (Allan Greenwell, 30-31, Furnival-street, Holborn, E.C.)

H.M. INSPECTORS OF MINES, &c.

Chief Inspector of Mines: R. A. S. Redmayne, Esq., C.B., Home Office, Whitehall, London.

Electrical Inspector of Mines: Robert Nelson, Esq., Home Office, Whitehall, London.

Private Secretary to Chief Inspector: Granville Poole, Esq., Home Office, Whitehall, London.

Secretary to the Board for Mining Examinations: W. W. Wynne, Esq., Home Office, Whitehall, London.

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(d) P. [illegible], Esq., Wortley, Reid Street, Burnbank, Hamilton; W. Loudon, Esq., 11, Elliot Street, Dunfermline.

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(c) W. Leck, Esq., Cleator Moor, Cumberland; T. Ashley, Esq., 67, Holly Avenue, Jesmond, Newcastle-on-Tyne; H. T. Foster, Esq., 25, Queen's Terrace, Newcastle-on-Tyne; G. Cook, Esq., temporary address, Hill Crest, Newfield, Willington, Co. Durham.

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(c) W. J. Charlton, Esq., 37, Western Hill, Durham; L. Clive, Esq., 2, Pimlico, Durham; Douglas Hay, Esq., Abbey View, South Street, Durham.

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(c) G. B. Harrison, Esq., Shamrock, Worsley Road, Swinton, Manchester; J. C. Boscamp, Esq., 4, Arthur Street, Prestwich, near Manchester; F. N. Siddall, Esq., Bolton.

(d) J. Dunn, Esq., Accrington.

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(b) D. H. F. Matthews, Esq., Hoole, Chester; G. J. Williams, Esq., Coed Mawr, Bangor.

(c) O. H. Jones, Esq., Glan Seiont, Carnarvon; W. H. Mundie, Esq., Cairndhu, Queen's Drive, Mossley Hill, Liverpool.

(d) R. W. Coombes, Esq., 191, Downhall Green Road, Bryn, near Wigan; Eric Williams, Esq., 2, Garfield Terrace, Garth Road, Bangor.

7.—*South Wales District.*

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(c) J. M. Carey, Esq., Yewberry Cottage, Malpas, Newport, Mon.; T. Greenland Davies, Esq., 12a, Westbourne Road, Penarth, Cardiff; J. S. Foot, Esq., Bridgend, Glamorgan; E. S. Bess, Esq., Cardiff; P. T. Jenkins, Esq., Newport, Mon.

(d) W. J. Owen, Esq., 66, College Hill, Llanelly; T. D. Daniel, Esq., 37, Station Road, Llandaff, North, Cardiff.

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(b) W. Saint, Esq., Glenworth, Stafford; H. Walker, Esq., Walden, Widcombe Hill, Bath.

(c) W. H. Hepplewhite, Esq., Chestnut House, Kettlebrook Road, Tamworth; F. H. Wynne, Esq., 17, Brunswick Street, Newcastle, Staffs; J. R. Felton, Esq., 228, Pershore Road, Birmingham; T. Boydell, Esq., 7, Treyew Road, Truro; P. S. Lea, Esq., 228, Pershore Road, Edgbaston, Birmingham.

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COAL STATISTICS.

PERSONS EMPLOYED, ACCIDENTS, &c., UNDER COAL MINES ACT.

Year.	Persons employed. Under ground.	Persons employed. Above ground.	Persons employed. Total.	Separate fatal accidents.	Deaths caused by the accidents.
1902	661,901	161,890	824,791	919	1,021
1903	676,746	165,320	842,066	1,038	1,072
1904	681,983	165,570	847,553	1,017	1,055
1905	691,112	167,261	858,373	961	1,159
1906	709,515	172,800	882,345	1,005	1,142
1907	757,667	182,711	940,018	1,162	1,245
1908	790,329	191,491	987,813	1,138	1,308
1909	818,331	195,017	1,013,898	1,182	1,453
1910	848,181	201,026	1,049,407	1,242	1,775
1911	863,512	203,701	1,067,213	1,213	1,265

(Number of mines at work in 1911, 3,325).

ACCIDENT DEATH RATES IN COALMINES (Per 1,000 employed.)

	Explosions.	Falls.	Shafts.	All causes. Below ground.	All causes. Above and below ground.
1873-82	[illegible]	1·12	0·32	2·57	2·24
1883-92	[illegible]	1·00	0·19	2·01	1·81
1893-1902	0·15	0·76	0·13	1·52	1·30
1903	0·07	0·81	0·10	1·55	1·27
1904	[illegible]	0·75	0·12	1·51	1·24
1905	0·25	0·75	0·09	1·40	1·35
1906	[illegible]	0·78	0·10	1·42	1·29
1907	[illegible]	0·76	0·13	1·46	1·32
1908	[illegible]	0·71	0·10	1·40	1·32
1909	[illegible]	0·74	0·10	1·61	1·43
1910	[illegible]	0·75	0·10	1·91	1·60
1911	[illegible]	0·71	0·11	1·29	1·19

OUTPUT OF BRITISH COAL, 1891-1911.

(Including coal raised from quarries.)

	Tons.		Tons.		Tons.
1891	185,479,126	1898	202,054,516	1905	236,128,936
1892	181,786,871	1899	220,094,781	1906	251,067,628
1893	164,325,795	1900	225,181,300	1907	267,830,962
1894	188,277,525	1901	219,046,945	1908	261,525,795
1895	189,661,362	1902	227,095,042	1909	263,774,312
1896	195,361,260	1903	230,334,169	1910	264,433,028
1897	202,129,931	1904	232,428,272	1911	271,891,199

EXPORTS OF BRITISH COAL IN 1911

	1911. Quantity.	1911. Average value per ton.	1910. Quantity.	1910. Average value per ton.
Coal:—	Tons.	s. d.	Tons.	s. d.
Anthracite	2,454,523	15 2·1	2,403,932	15 10·6
Steam	47,119,917	11 7·0	45,190,350	11 10·0
Gas	10,504,172	9 9·0	10,112,709	10 2·1
Household	1,540,710	10 6·5	1,549,736	10 7·6
Other sorts	2,980,944	9 6·7	2,776,711	10 1·0
Large	36,152,418	12 10·6	36,593,094	13 1·7
Through-and-through	13,035,201	9 7·7	11,264,106	10 1·2
Small	14,411,565	8 9·7	14,226,277	8 11·2
Total & average	64,599,266	11 3·7	62,085,476	11 7·5
Coal shipped to bunkers	19,264,109	—	19,525,735	—

From	1911. Tons.	1910. Tons.	1909 Tons.
Bristol Channel ports	25,199,786	25,222,257	25,368,609
North western ports	711,705	661,707	530,020
North-eastern ports	21,716,017	18,961,421	20,749,379
Humber ports	6,264,083	6,598,145	6,003,944
Other ports on east coast	325,179	356,010	378,716
Other English ports	197	1,300	1,948
East Scotland ports	8,243,321	8,160,772	7,993,557
West Scotland ports	2,138,990	2,075,852	2,047,116
Irish ports	—	1,922	3,420
Total	64,599,266	62,085,476	63,076,799

PRICES OF FUEL EXPORTED 1900 TO 1911.

	s. d.		s. d.		s. d.
1900	16 9	1904	11 1·8	1908	12 0·2
1901	13 10·5	1905	10 6·7	1909	11 3·6
1902	12 3·4	1906	10 10·8	1910	11 8·6
1903	11 7·9	1907	12 9·0	1911	11 5·1

During 1911, 67,278,816 tons of fuel were exported from the U.K., as compared with 64,820,320 in 1910, at respective values of £38,417,355 and £37,813,360.

MAGNETIC DECLINATION, 1913.

The variation at Kew on January 1, 1913, is about 15° 10·3′ W.

POSTAL INFORMATION.

INLAND LETTERS.—Letters not exceeding 4 oz., 1d.; and ½d. for every additional 2 oz. Not to exceed 2 ft. in length, 1 ft. in width, and 1 ft. in depth.

POST CARDS.—Inland.—Stout (4¼ in. by 3¼ in.) 6d. for 11; thin (5½ in. by 3½ in.) ½d., 6d. for 12; 5s. per packet (120) stout; 10s. per packet (240) thin. Double or reply, double above rates. Private cards of same dimensions as post cards, with a halfpenny stamp, may be used as post cards. Foreign.—Single, 1d. Reply, 2d.

NEWSPAPERS.—Inland.—Registered newspapers may be sent to any part of the United Kingdom at a uniform rate of ½d. each. Foreign, ½d. for 2 oz.

HALFPENNY PACKETS.—Inland.—Not exceeding 2 oz., ½d.; exceeding 2 oz., unconditionally at letter rate. Dimensions as for letters.

PARCEL POST.—Parcels not exceeding 1 lb. 3d., 2 lb. 4d., 3 lb. 5d., 4 lb. 6d., 5 lb. 6d., 6 lb. 7d., 7 lb. 7d., 8 lb. 8d., 9 lb. 9d., 10 lb. 10d., 11 lb. 11d. No parcel to exceed 11 lb. in weight, and 3 ft. 6 in. in length, or 6 ft. in length and girth combined.

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MONEY ORDERS.—Not exceeding £1, 2d.; £3, 3d.; £10, 4d.; £20, 6d.; £30, 8d.; £40, 10d.

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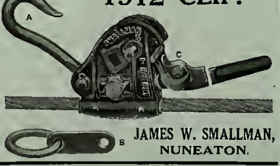

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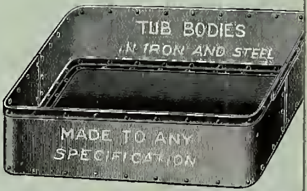

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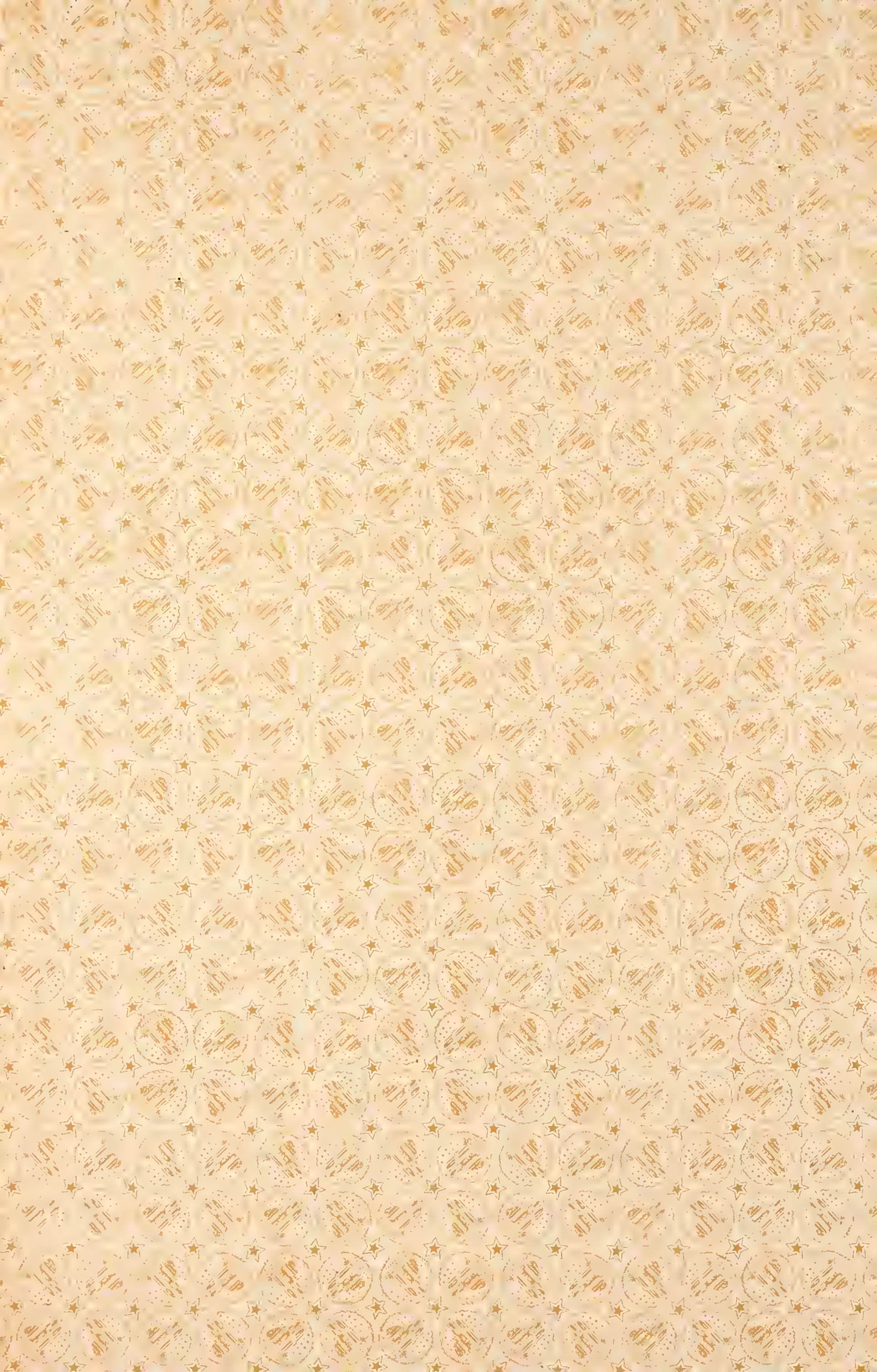

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